

# BANKING IN EMERGING MARKETS

by

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# ABSTRACT OF THE DISSERTATION

Banking in Emerging Markets

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In this dissertation, I examined three research questions related to banking in emerging markets. First, I explore barriers that affect access and ownership of a formal financial account in emerging markets. Second, I study the impacts of ownership structure on banking performance. And third, I study the associated impact of board diversity on bank performance.

The first research question addresses a key development issue with systemic impacts to economic growth. Using a novel rich dataset from the Bill and Melinda Gates Foundation (The BMGF), which cover nine emerging markets (Bangladesh, Indonesia, India, Pakistan, Ghana, Rwanda, Kenya, Tanzania, and Nigeria), I examine the social barriers to access to financial services. Analysis found that women are associated with reduced likelihood of being financially included—in terms of both accessing and owning a formal financial account—under the presence of only conventional banking system in all countries on the sample. Both rural residency and poor household also associated with lower likelihood of being financially included. Compared to the subset of population whom already accessing or owning a conventional bank account, digital branchless bank reach more women, more rural residents, and poorer household. However, if we compare the subset of population whom becomes financially included through digital branchless banking to the population that are still unbanked, we see repeated pattern of exclusion.

Analysis also show that while digital branchless bank does reach more rural and poorer household, there are still women, rural residents, and poorer household that are left behind and remain unbanked.

In essay 2, I study the impacts of ownership structure on bank performance. Utilizing a novel dataset of Indonesian banks mined and parsed from the Indonesian Financial Authority's banking quarterly financial report, I unmask the oft-unaddressed heterogeneity of owners. I add to the agency theory literature by differentiating the ownership effects of financial corporation, non-financial corporation, conglomerates, and government ownership. Past research argued that foreign owners are better endowed and better experienced, and that foreign ownership leads to better performance. Yet, data analysis reveal that in Indonesia, domestic private ownership is associated with better economic performance. So, being a foreign owner can be a form of disadvantage especially in an emerging market.

In essay 3, I look at the relationship between board gender diversity and banks' performance. Data on board of director were obtained from the Indonesian Financial Services Authority. Next, I parsed and restructured the data while assigning gender based on the name of the board of director. The resulting analysis provides an empirical evidence that increase in gender diversity of the board of director is positively associated with firm performance. This finding also corroborates Konrad (2006) critical mass argument which stated that having just one or a few women directors may not be meaningful and may just lead to tokenism—a situation in which women directors are treated as token instead of being given authority that can lead to impact on performance.

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## CHAPTER 1. INTRODUCTION

Banking is a global business. In every part of the world, in advanced economies and in emerging markets, banking enables firms to access capital and people to borrow, save, and invest. However, compared to advanced economies, the size of banks in emerging economies tends to be smaller, and a higher percentage of the population tends to have less opportunity for having access and ownership of formal financial services. In this dissertation, I examine three research questions related to banking in emerging markets. First, I explore barriers that affect access and ownership of a formal financial account in emerging markets. Second, I study the impact of ownership structure on banking performance in the context of emerging markets. And third, I study the associated impact of board diversity on bank performance.

The first research question addresses a key development issue with systemic impacts to economic growth. The ability to access banking products and services are key determinants of the ability of both individuals and households to manage their income and expenses, insure against economic shocks, start and expand businesses, and also to undertake investments (Beck & Brown, 2011; Renteria, 2015). An inclusive financial system which allows broad access to financial services by people with various income levels can benefit the poor or marginalized and other disadvantaged groups (Demirguc-Kunt & Klapper, 2012). For example, in many developing countries, a household's ability to keep and save money facilitates improvement in education (Gitter, Manley, & Barham, 2013), health status (Lloyd-Sherlock, Minicuci, Beard, & Chatterji, 2012), and many other welfare-enhancing benefits. Without access to financial services, individuals and

households have to rely on informal ways of saving and keeping their money—such as keeping them under their mattresses, in bags, or inside of piggy banks (Abdalla, 2013; Newton, Ryan & Banthia, Anjali, 2014). In addition to limited income, this lack of access to financial services further limits their ability to take advantage of economic opportunities. On the aggregate country-level, lack of access to financial services can further hamper economic growth and worsen the inequality of income (Heltman, 2015; Mookerjee & Kalipioni, 2010).

Using a novel rich dataset from the Bill and Melinda Gates Foundation (The BMGF), which covers nine emerging markets (Bangladesh, Indonesia, India, Pakistan, Ghana, Rwanda, Kenya, Tanzania, and Nigeria), I examined the social barriers to accessing financial services. Analysis found that, in all countries of the sample, women are associated with a reduced likelihood of being financially included in terms of both accessing and owning a formal financial account when only conventional banking systems are present. Both rural residency and poor households are also associated with a lower likelihood of being financially included.

Digital financial services are a new technology driven market. They offer digital branchless banking services—i.e. a banking service delivered through mobile phones and agents/kiosks without the presence of a traditional branch office. This strength enables it to reach geographical areas and society segments where it is too expensive for a conventional bank to operate a branch. In countries where digital branchless banking (hereafter referred to simply as “digital banks”) were developed, we expect expansion of financial inclusion. While this is true, analysis also reveals some potential pattern of exclusion. In other words, digital banking is a substitute for conventional branch office

banking, but not equally for everyone. Roughly, compared to the subset of population who already access or own a conventional bank account, digital banks reach more women, more rural residents, and poorer households. For some, digital mobile money accounts complement conventional bank services. They are a subset of population who already own a conventional bank account so that their mobile money digital bank account complements it. However, if we compare the subset of population who become financially included through digital banking to the population that still have no bank access, there is a repeated pattern of exclusion. Analysis shows that in some countries, women are still associated with less likelihood to be financially included through digital banking. In countries with developed digital banking - such as Kenya, Ghana, and Nigeria - it is not yet clear and not statistically significant if women are associated with an increased or decreased likelihood of being financially included through digital banking. Analysis also shows that while digital banks do reach more rural and poorer households, there are still rural and poor households that are left behind and remain without bank access. Nonetheless, we can conclude that digital banking does reach out to those who previously had no bank access.

Serving the bottom of the pyramid consumers are not without challenges. Past research argues that in the context of financial inclusion, bank-led initiatives may have a greater chance for success (Shaikh, Shazib E. & Syed Zahoor Hassan, Shaikh, 2014) because banks may have expertise and greater experience in providing financial services. For banks to be able to serve consumers at the bottom of the pyramid, banks first need to perform well. If banks are expected to serve the bottom of the pyramid profitably, it is also necessary for banks to run efficiently and with good performance (Prahalad & Hammond, 2002).

While banking is a global business, the factors which determine the performance of banks operating in advanced economies and in emerging market are likely to be different. Tarun Khanna and Krisna Palepu argued that advanced economies and emerging markets markedly differ in their institutions (Palepu & Khanna, 2005). Unlike advanced economies, emerging markets have plenty of *institutional voids*, which alter how determining factors impact the performance of businesses.

In terms of institutional differences, compared to advanced economies, emerging markets tend to have a thinner market for corporate control and a less developed capital market. This means that patterns of bank ownership in emerging markets differ from those in advanced economies (La Porta, Lopez-de-Silanes, & Shleifer, 1999), and that these differences impact bank performance differently. In essay 2, I study the impacts of ownership structure on bank performance. Utilizing a novel dataset of Indonesian banks parsed from the Indonesian Financial Authority's banking quarterly financial report, I unmask the oft-unaddressed heterogeneity of owners. Instead of a simple dichotomy of foreign vs. domestic, I add to the agency theory literature by differentiating the ownership effects of financial corporations, non-financial corporations, powerful conglomerates, and state government ownership. Much past literature argued that because foreign owners are better endowed and better experienced, foreign ownership leads to better performance. Yet, data analysis reveals that in Indonesia, relative to non-financial owners, foreign financial owners do not lead to better economic performance. Additionally, blockholding seems to confer better performance when compared to widely held shares. This finding provides support to the idea that, in emerging markets, there is an idiosyncratic principal-principal

problem. The presence of one dominant share holder minimizes the principal-principal problem, thereby adding firm value by reducing agency cost.

In essay 3, I look at the relationship between gender diversity on the board and bank performance. Data about boards of directors was obtained from the Indonesian Financial Authority. Next, I parsed and restructured the data while assigning gender based on the name of the board of director. I used resource dependence theory and agency theory to form my hypotheses, and then used fixed effect estimation method. The resulting analysis provides empirical evidence that an increase in gender diversity on the board of directors is positively associated with business performance. This finding further corroborates Konrad's (2006) critical mass argument, which stated that having just one or a few of women directors may not be meaningful and may instead lead to tokenism - a situation in which women directors are treated as tokens instead of being given sufficient authority to impact on performance.

## CHAPTER 2. ESSAY 1. WHO WERE THE UNBANKED? WHO ARE STILL UNBANKED? AN EMPIRICAL EVIDENCE ON PATTERNS OF FINANCIAL INCLUSION AND EXCLUSION FROM EMERGING MARKETS

### 2.1. ABSTRACT

Development of an inclusive financial system is an important component of a national development agenda, so much so that many policymakers embrace it as a development priority. This essay provides empirical evidence to understand the socio-economic barriers of financial inclusion through digital branchless banking at various developmental stages. This essay took advantage of the Financial Inclusion Insights Program survey data from the Bill and Melinda Gates Foundation. In general, women, rural residents, poor education, and impoverished households are factors that reduce the likelihood to be financially included in the absence of digital branchless banks. However, digital branchless banking can reach the previously unbanked. Although statistics show that, in the presence of digital branchless banks, not everyone benefits equally: data shows that women, rural residents, and impoverished households are still at risk to be financially excluded. One explanation for this is that digital branchless banking is a relatively new phenomenon that only began about nine years ago. It could be that it is still too early to see a decisive pattern of inclusion and exclusion; but, early awareness of this pattern of exclusion is important so that it can be addressed early.

Data also shows that while many countries started digital financial services around the same time, the extent of financial inclusion can end up at different developmental stages.

The stages of digital branchless banking development can be seen from an industrial organization perspective. Digital branchless banking is a new market which emerges as historically unrelated industries converge. The initial success and speed of its emergence depends not only on the historical dominance of players from at least two industries--banking and the mobile network operator—but also on a set of enabling regulation. The number of new competing entrants can also determine the overall success. Based upon the theory of market emergence, if left to the market, digital financial service tends to emerge slower in countries with both historical dominance of banking and mobile network operator.

## 2.2. INTRODUCTION

Access to banking services and products is a key determinant of an individual and a household's ability to prosper and manage their finances (Beck & Brown, 2011; Renteria, 2015). Financial services—such as savings, credit, and insurance—help individuals and households to manage income and expenditure, insure against economic uncertainties, start and expand businesses, and manage investments. An inclusive financial system which allows broad access to financial services needed by people with various income levels can benefit the poor, the marginalized, and other disadvantaged groups (Demirguc-Kunt & Klapper, 2012). For example, in many developing countries, a household's ability to keep and save money, facilitate improvement in education, (Gitter et al., 2013) manage pension, and increase access to health insurance improves overall elderly health status (Lloyd-Sherlock et al., 2012). Without such facilitation and ability to manage, individuals and households have to rely on informal ways of saving and keeping their money—such as keeping them under their mattresses, bags, or inside piggy banks (Abdalla, 2013; Newton,

Ryan & Banthia, Anjali, 2014). This made them vulnerable to theft, loss, and involuntary lending due to peer pressure (Klapper, 2012). In addition to limited income, this lack of accessibility to appropriate financial services further limits their ability to take advantage of economic opportunities. At the aggregate country-level, lack of access to financial services can further slow economic growth and worsen income inequality (Heltman, 2015; Mookerjee & Kalipioni, 2010).

A wide array of past literature has found that the usage of formal bank accounts in advanced economies differ systematically from emerging economies (Demirguc-Kunt & Klapper, 2012). In this essay, I explore the barriers of financial inclusion in emerging markets and the factors that explain the variation on how people in emerging markets use formal financial products to manage their finances. Using a novel, rich dataset from the Bill and Melinda Gates Foundation (The BMGF), which covers eight emerging markets (Bangladesh, Indonesia, India, Pakistan, Ghana, Rwanda, Tanzania, and Nigeria) with more than 3,000 questions and 137,000 individuals interviewed, I examine the socio-economic barriers to financial inclusion. In doing so, I consider firstly, to what extent does digital branchless banking reach new users that would not otherwise have access to formal financial service? Secondly, what are the socio-economic characteristics of the new users that are reached through digital banking? And finally, who remains to be the unbanked?

The resulting analysis of this essay provides statistically precise empirical evidence on financial inclusion. In the case of the US, surveys done by Federal Deposit Insurance Corporation (FDIC) and The Federal Reserve System indicate that usually improvement in economic condition is associated with reduction of the unbanked population (FDIC, 2009, 2014; Hannan, Timothy & Hanweck, Gerald, 2008). With the increase of wealth level,



individuals may be able to put more money into their savings accounts and pay banks for their services. In turn, bank branches yield profit (Hannan, Timothy & Hanweck, Gerarld, 2008). In the context of emerging economies, this study further adds to the picture of financial inclusion challenges: a central and common feature shared by emerging economies studied indicates that financial exclusion is strongly associated with social factors—such as gender, age, and education—in addition to economic wealth.

## 2.3. LITERATURE REVIEW AND HYPOTHESES

### DEVELOPMENT

#### 2.3.1. Financial inclusion

In the literature of economic development, financial depth(which is a lever of economic growth) includes financial inclusion—or the widening of access to financial services by all segments of society (Sahay, Ratna et al., 2011). Financial inclusion is defined as absence of price and non-price barriers in the use of broad formal financial services (Allen, Demirgüç-Kunt, Klapper, Peria, & Soledad, 2012; The World Bank, 2007). The scope of *use* can refer to using someone else's account to access financial services and using one's own account to access financial services.

The significance of financial inclusion has increasingly attracted a growing interest from policymakers and financial sector professionals(Cull, Demirgüç-Kunt, & Morduch, 2013). Financial inclusion is particularly problematic when the barriers to use are natural and structural. For example, long physical distance to bank offices, lack of transportation and lack of adequate infrastructure that help customers reach banks are examples of barriers that are difficult to obviate. Additionally, it can also be too expensive for a

conventional bank to open a branch and maintain profitability in loosely-populated, geographically remote areas. The other type of barriers are less natural and more socially and economically-constructed. For example, a person may not have enough funds to pay banks' administration fees or to meet banks' minimum deposit requirement. An entrenched gender inequality in one society may also inconspicuously preclude women from handling the household finances. Or the rural subculture of managing finances may not include the habit of possessing a formal bank account. A growing body of case studies documented all of these barriers in the context of developing countries. However, efforts to systematically test and quantify with statistical precision which barriers are the most detrimental to financial inclusion has been rare. In this dissertation, I attempt to measure the impact of some economic and social barriers on financial inclusion. By measuring this, I attempt to fill in that gap and inform evidence-based policy actions that may help pave the way for the development of a financial system that is inclusive all over the world.

Due to data availability, past studies on financial inclusion normally rely on country-level indicators such as: the number of account holders per capita, number of ATM per 100,000 adults, or number of bank branches per 100,000 adults. (Honohan, 2008; Kendall, Ponce, & Mylenko, 2010). However, a country-level proxy may be significantly different from an individual financial situation (Allen et al., 2012). For example, country-level data on the number of account holders per 100,000 adults may over-estimate the degree of financial inclusion. For example, there could be some individuals with multiple accounts within a 100,000 adult-sample and some individuals without any access at all, which can lead to overestimation of financial inclusion. More importantly, country-level

aggregation does not allow individual countries to tailor to which societal segment financial inclusion policy action should be directed.

### 2.3.2. Socio-economic factors

In the previous section financial inclusion is defined as both the absence of price and non-price barriers in the use of formal financial services. Ubiquity of price barriers—such as prohibitively high cost to use formal financial services that exclude large parts of the population—can be a reflection of market imperfections, such as an uncompetitive market, underdeveloped physical and institutional infrastructure, etc. (The World Bank, n.d.). Financial inclusion through the use of digital branchless banking can overcome parts of these market imperfections. In this section, we are reviewing some of the non-price barriers of using formal financial services that can be obviated through policy interventions.

#### **Gender**

##### *Discrimination within family*

Wealth accumulation can come from a transfer within family directly through inheritance or less directly through resources that a family allocated to a child (Ruel & Hauser, 2013). In many developing countries, there is evidence of discrimination against women. Angus Deaton argued that gender discrimination is a huge determinant in consumption pattern and wealth (Deaton & Paxson, 1998). When a girl is born, families tend to allocate less wealth to a girl compared to a boy (Deaton & Case, 2003). The severity of the discrimination against women can sometime be severe, the phenomenon of missing

women is the starkest example (Subramanian & Deaton, 1991). Missing women are women whom would otherwise have had resources had been equally allocated to them.

### *Discrimination in the workforce*

Past research suggests that women may be disadvantaged outside the family unit as well. Society tends to expect men to join the workforce and manage household finances (Akudugu, Egyir, & Mensah-Bonsu, 2009; Mahajan & Ramola, 1996; Shrivastava & Satam, 2015). When women work, they either tend to have lower pay for the same job or position as men or they are placed in industries and positions that pay less than men (Ruel & Hauser, 2013). Phenomena, such as the gender pay gap, suggests that women are also disadvantaged in the workforce.

Country's laws and regulations can also manifest disadvantages to women. Dissenting voices toward the established laws and regulations tend to come from the minority, which is further exacerbated when there is a lack of women who are not well-positioned and represented in local level power structures to act on the minority's behalf (Whitehead & Tsikata, 2003). Moreover Anecdotal evidence points out, for example, that development of women-owned enterprises is significantly more difficult as lack of ownership rights and social pressures discourage women to operate a business and deters women to work to accumulate wealth (Stevenson & St-Onge, 2005).

Effective wealth management requires access to financial services (Pande, Rohini, 2010). Nevertheless a large segment of the female population faces disproportionate barriers to participate in economic activities. These current social constructions do not

create demand for women to access formal financial services (Isaac, 2014). From the perspective of the financial services provider, in order to be profitable a bank account needs to maintain a certain amount of money and a certain level of activities. The cost of serving an account below those levels may exceed the revenue that a bank can generate from it. Therefore, traditionally, the difficulties facing women to access and use formal financial services come from both the supply (banks providing financial services) and demand sides (women population with lacking demand to financial services).

*H1: Women are less likely to be financially included*

### **Rural residency**

Past research suggests that living in a rural area precludes people from accessing and using formal financial services (Fang, Russell, & Singh, 2014; Stephen & Tom, 2015). From the perspective of banking operations, serving rural areas can be challenging since it tends to lack telecommunication services and the presence of a developed financial system (Renteria, 2015). From rural users' perspectives, banking habits may be previously non-existent, hence banks also need to educate users about the cost and benefits of using bank services. Finally the cost of conventional banks to open and maintain a branch to serve a relatively less-populated and rural area may outweigh the revenue from serving clients in that region (Shukla, Tewari, & Dubey, 2013).

On top of the bank profitability perspective, rural residences may be more familiar with informal financial services compared to formal financial services (Peters, Schoofs, & Sievert, 2016). While informal financial services can be costlier, economically and

socially, rural residents may be more familiar with their traditional informal service and thus, more inclined to perpetuate usage of informal financial services. Additionally, rural residents may resist the presence of formal financial services since, compared to the incumbent informal financial services, these formal financial services do not have a local origin (Dadzie, Dadzie, Winston, & Blankson, 2013). These facts suggest that:

*H2: Rural residents are less likely to be financially included*

### **Poverty level**

In general, people use bank accounts for multiple purposes. They use it to keep money, receive wages, and to send and receive payments and remittances (Allen et al., 2012). In terms of keeping money, evidence linking income levels and savings have been mixed. On one hand, higher income levels are associated with a drive to save for retirement (Fernández-López, Otero, Vivel, & Rodeiro, 2010). On the other hand, for lower-income social segments of society, research also shows that the ratio of saving to spending is higher in lower-income households (Murphy, 1965). This indicates that a strong desire to save exists in lower-income households and their desires have been underserved. Hence, the desire to save money seems to universally exist in different segments of society. Additionally, on average and on a global level, adults are equally as likely to use the accounts they possess to save (Allen et al., 2012).

The use of formal accounts to save is conditional on ability and willingness to save. Conjecturally, we can infer that low-income levels may only be sufficient to address basic

necessities. Consequently, there may be insufficient residual income left to be saved or that the size of the saving was too small to be saved in conventional banks. These suggest that:

*H3: Lower income is associated with lower likelihood to be financially included*

## **Literacy**

Evidence suggests a relationship between education levels and ability to manage finances exist (Sages & Grable, 2010). Past research using Indonesia and India as the emerging markets in an institutional context found a strong correlation between literacy and financial behavior (Cole, Sampson, & Zia, 2011). A recent study in rural Uganda also indicates that literacy is positively associated with financial inclusion (Okello Candiya Bongomin, Ntayi, Munene, & Nabeta, 2016). Based on these past research findings, we can expect to see that higher levels of education positively impact the likelihood of a person to use formal financial services. Formally stated:

*H4: Literacy is associated with higher likelihood to be financially included*

## **2.4 DATA AND METHODOLOGY**

### **2.4.1. Data**

For this essay I used and constructed my sample from The BMGF DFS survey, formally named as The Financial Inclusion Insights Program, InterMedia. The BMGF DFS is maintained by Intermedia, which is a global research consultancy organization. The BMGF DFS is an in-depth survey initially conducted in nine emerging markets: Bangladesh, Ghana, India, Indonesia, Pakistan, Kenya, Nigeria, Rwanda, and Tanzania.

Given that the in-depth DFS data gathering is a new initiative, there is only a year of data for some countries—such as Indonesia, Ghana, and Rwanda. Due to lack of time dimension, a country-wise multi-year fixed-effect estimation method is not possible. Furthermore, the variables--socio-demographics factors—are actually variables that tend to be stable over time. Therefore, a lot of the variation comes from cross-sectional variation instead of variations over time. Hence, specific to this case, the benefit of greater control over endogeneity that can be derived from panel data construction and estimation may be small anyway. Given these data characteristics, cross-sectional estimation is likely to provide valid estimates.

In the survey for each country, there are approximately 160 questions--with 10-25 sub-questions for each question. In total, there are approximately 2,000 variables for each individual. For every individual, instead of answering the survey by him/herself, an Intermedia interviewer asks the respondent the survey questions. Each interviewer is held responsible to a supervisor whom then checked the quality of the resulting filled-in survey. For each country, only individuals of age 15 or older are selected to participate as respondents.

#### 2.4.2. Measurements and models

Dependent Variable: Financial Inclusion

The primary dependent variable is financial inclusion. Since financial inclusion can roughly be defined as the use of a formal account (Allen et al., 2012), in this research, I operationalize the use of a formal account as follows:

1. Access to at least one conventional bank account
2. Ownership of at least one conventional bank account



3. Access to at least one digital branchless banking account
4. Ownership of at least one digital branchless banking account

In this research, access to a bank account does not always imply ownership of a bank account. For example, a wife without ownership of a formal account who can access a husband's account will be classified as having access to a bank account.

Financial inclusion through digital branchless banking is operationalized as access and also ownership to a digital branchless banking account by individuals whom do not have access and ownership to conventional bank. In other words, they are the individuals whom were underbanked but now have access and account ownership of a formal financial service through digital financial service. In figure 1, the digital financially included is shown as the shaded area. For each country there are six models, each model has different a dependent variable and use a different subset of the data sample. The dependent variable and subsample for model 1 is graphically represented on figure 42; model 2 on figure 43, model 3 on figure 44, model 4 on figure 45, model 5 on figure 46, and model 6 on figure 47.

#### Choice of estimation method

In general, given the data structure, there are two possible ways to quantify the effects of socio-economic background on financial inclusion.

#### *Linear versus non-linear estimation*

To find out the effects of individuals' demographics and income level on their likelihood to have access to at least one formal bank account, the following model is used:

$$Access_i = \alpha + \beta_1 Rural + \beta_2 Female + \beta_3 PovertyLikelihood + \beta_4 Literacy + \beta_5 Age + \beta_6 DocStat + \beta_7 LnHHsize + u_i \text{ (Equation 1)}$$

$i = \text{conventional banking (CB), digital banking (DB)}$

To find out the effects of an individual's demographics and income level on his or her propensity to own at least one formal bank account, the following model is used:

$$Own_i = \alpha_o + \beta_1 Rural + \beta_2 Female + \beta_3 PovertyLikelihood + \beta_4 Literacy + \beta_5 DocStat + \beta_6 Age + \beta_7 LnHHsize + u_i \text{ (Equation 2)}$$

$i = \text{conventional banking (CB), digital banking (DB)}$

There are several considerations that make non-linear estimation an attractive way to answer my research question. First, one of the weaknesses of the linear estimation method above is that, although I want to estimate the likelihood of an individual to own and to access a formal account, linear least square may yield estimation below zero (negative) and above one. Stated formally:

$$Access_{i,t} \in \{-\infty, \infty\}$$

$$Ownership_{i,t} \in \{-\infty, \infty\}$$

Additionally, many past studies on financial inclusion have utilized probit and logit to test their hypotheses using survey data with much smaller sample sizes compared to the BMGF data size. It can also be wise to follow past methods. While OLS yields the most unbiased

and efficient estimations, the assumption about dependent variables is not ideal. Alternatively, in non-linear scheme, access and ownership can be treated as binary outcomes. Utilizing a link function, we can transform our dependent variables to dichotomous dependent variables. Stated formally, access and ownership are bounded as:

$$Access \in \{0,1\}$$

$$Ownership \in \{0,1\}$$

And redefined as:

$$Access = \begin{cases} 0 & \text{if } Access^* \leq 0 \\ 1 & \text{if } Access^* > 0 \end{cases}$$

$$Ownership = \begin{cases} 0 & \text{if } Ownership^* \leq 0 \\ 1 & \text{if } Ownership^* > 0 \end{cases}$$

With base models as presented in equation 1 and equation 2.

Since probit and logit link functions are used in the transformation of the dependent variable, ideally probit and logit regressions are used to estimate coefficients of each independent variable. For probit and logit, estimations are carried out using maximum likelihood estimation (MLE). Theoretically, the resulting estimates are consistent.

However, the maximum likelihood estimator in nonlinear models with fixed effects is biased and inconsistent when  $T$  is small (Greene, 2004). This is a problem usually known as the incidental parameter problem. An incidental parameter problem is a non-issue when both  $N \rightarrow \infty$  and  $T \rightarrow \infty$  (Abrevaya, 1997). In an incidental parameter problem, instead of estimating structural parameters, as we increase the number of fixed effects, the higher the

likelihood that all of the estimates are smeared (Heckman, 1981). While probit and logit yield appropriate restrictions on the dependent variable, there remain two issues. First, there is a probability that the maximization algorithm may not converge and second, if the resulting maximum likelihood maximization algorithm does converge, it may not be accurate. In other words, there is a chance that simply the maximum likelihood estimates do not exist, and there can be false converges which lead to misleading validity of the resulting estimations (Allison, Paul D., 2008).

While I am aware of the flaw associated with the dependent variable lack of restriction in linear estimation, weighing the associated concerns and potential consequences of incidental parameter problems associated with non-linear estimation, in this research I chose to utilize ordinary least square as the most conservative approach. The resulting estimates will be unbiased. However, by construction, we will have heteroskedastic variance-covariance matrix. Therefore, I will use White's variance-covariance estimator to adjust my standard errors to take into account heteroskedasticity.

Additionally, I also will double-check the variance inflation factor (VIF) to see if there is a multicollinearity. Variance inflation factor presents by how much my standard errors are larger than they should have been in the absence of collinearity.

#### 2.4.3. Measurement

##### Dependent variables

Conventionally Banked	A dummy variable. It takes a value of one if a person has access to a conventional bank account
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Digital financially included (DFS1)	A dummy variable. It takes a value of one if a person has access to a digital bank account only relative to the entire banked population
Digital financially included (DFS2)	A dummy variable. It takes a value of one if a person has access to both a digital bank account only relative to the still unbanked population

#### Independent variables

Female	A dummy variable that takes a value of one if a person is female
Poverty-Likelihood	The likelihood that the respondent is poor. This variable takes value from 0 to 100%. The higher the score reflects a higher likelihood to be poor
Rural	A dummy variable. It takes a value of one if a person is a rural area resident
Age	Age of the participant
DocDepthStat	Natural logarithm of size of household
Literacy	A dummy variable that takes a value of one if a person is literate

#### Control variables

##### Age

Age strongly correlates with the likelihood of an individual to enter the workforce. As an individual enters the workforce, he or she will start producing income. As a person begins to produce income, there is a portion of the income to be spent, and there can be a portion of the income to be saved. As a person stays in the workforce longer, his or her income may also increase. This can create demand for financial services and with this

demand a higher likelihood that he or she will use or access a bank account (Dadzie et al., 2013; Idolor & Imhanlahimi, 2014).

Yet, disadvantages are also cumulative. Aggregate disadvantage effects increase with age and is reflected in income (Barnum, Liden, & Ditomaso, 1995). Also when a person ages due to regulation or physical condition, they may sometimes stop working, thereby no longer producing as much income as when he or she was in the workforce. Overall, we see that there are two opposing effects; one is a positive association between age and income, while the other competing force is a cumulative negative association between age and income.

#### Depth of documentation status

Proper identification for every citizen is an enabling infrastructure of financial inclusion (Chen, Greg, 2014; Ehrbeck, Tilman, 2014; Panikkal, Thacker, & Balani, 2011). Traditionally, whenever a person decides to open an account at a formal financial service institution, some forms of identification are required. However, in many developing countries, not everyone has the access to obtain any form of national documentation. For example, many national documentation requires a birth certificate and/or birth registration. This has precluded many people from obtaining national documentations (WHO, 2012). Laws, regulations, and other types of institutional requirements may also exclude individuals from obtaining documentation. For example, in some countries, a person born out of wedlock may not be entitled to have a birth certificate (Gerber, Gargett, & Castan, 2011). Parents may also choose not to obtain a birth certificate for their child for various reasons: society stigma and the possibly even a country's own regulations (Gerber et al., 2011).

This requirement of documentation is an issue that necessitates a delicate balance between knowing your customers and enabling inclusive growth through financial inclusion (Viritha, Mariappan, & Venkatachalapathy, 2015). Financial institutions are expected to have proper knowledge and information about whom their customers are (Pathania, Ali, & Rasool, 2015). This type of knowledge is important to guard against identity theft, money laundering, terrorism, and many more issues (Koker, 2014). Yet, many of the unbanked segment are also those that lack access to proper identifications and thus a strict documentation requirement may hamper financial inclusion (Koker, 2014). Possession of state-issued identification improves the likelihood of a person to access and own a formal bank account.

#### Household size

Theory and evidence from advanced economies suggest that access to financial services can smooth household consumptions (Bhattacharya & Patnaik, 2015), which is good for economically-vulnerable households. Household finance theory generally postulates that a higher household size will increase consumption (Jacobson, Mavrikiou, & Minas, 2010). However, empirical work on household finance points out that expenditure per capita decreases as the household size increases (Deaton & Paxson, 1998). While a higher size of budget must be allocated to rival goods—such as food and clothes—there are also goods that can be shared—such as access to water. This allows the family to economize more as the household size grows larger. Other evidence points out that the opposite is true: larger household size is associated with larger per capita expenditure (Gan & Vernon, 2003). Gan and Vernon (2003) argued that there are many goods within a

household that are more rivalrous (more private and less public) than previously thought. From these seemingly opposing results from past literature, the question of whether household size increases consumption seems to be more context-dependent; it depends on whether a culture tends to share more—which influences whether basic necessities are conceptualized more as public or more as private—and on the income segment.

In emerging economies, it is often inferred that younger and larger households are typically poorer (Lanjouw & Ravallion, 1995), thus available funds that need financial servicing also tends to be smaller. Efforts for financial inclusion must find a solution that is idiosyncratic to emerging economies in context. Typically, in an emerging economy, family is characterized with much more limited per capita income, and the country's financial services infrastructure is also less developed. A great deal of past research has not provided theories and empirical evidence sufficient to predict the effect of household size on household budgeting and financial inclusion. Yet anecdotal cases suggest that there is a direct relationship between household size and the likelihood of being financially included (Siddik, Sun, & Kabiraj, 2015). Larger household size can imply smaller disposable income due to a larger amount of the income allocated to fulfill household members' consumptions.

#### 2.4.4. Selection of country studied

In this essay, not all countries are included in the sample. Country-level data on percentage of account at a formal institution indicated that on average, about 53% of the entire world population is banked (Global Findex, 2015). Since the focus of this study is financial inclusion, we need data from countries with a high number of unbanked within a



country's population. Based on the Global Findex data, most of this population is concentrated in Asia and Africa. Therefore samples from Asia and Africa are the ideal countries of choice for this study. I use survey data from Bangladesh, Ghana, India, Indonesia, Kenya, Nigeria, Pakistan, Tanzania, and Rwanda for primarily three reasons. Firstly, in these countries, traditional (conventional) banking has left a large portion of the population unbanked. Secondly, these countries are densely populated countries, so the majority of the world's unbanked population reside within these countries. Finally, these countries reflect varying developmental stages of financial inclusion through digital financial services; thus, it will inform us of the progression and the extent of financial inclusion through digital financial services.

#### 2.4.5. Profiles of Countries in the Data

##### Bangladesh

Bangladesh is a lower middle income country in Asia, with about 30 % of its population living below the national poverty line. About 70% of its population lives below \$2.5 per day (Intermedia, 2016a). The majority of its population live in rural areas (Figure 2). Access to electricity covers only about 50% of the rural population and 80% of the urban population. In figure 3, we can see that Bangladesh is far from the  $y = x$  line. If a country is positioned near  $y = x$  line it indicates that rural electricity coverage is almost equal to urban electricity coverage. In the case of Bangladesh, this indicates very uneven electricity coverage between the urban and rural population. About 57% of Bangladesh's female population are literate, while 64% of Bangladesh's male population are literate. As we can see from figure 4, the difference between male and female literacy level is not

striking. Compared to other nations on the sample, however, Bangladesh's female participation in the labor force is quite low (Figure 5), although it has the lowest fertility rate (Figure 7). Bangladesh also has unequal wages between male and female workers for the same job (Figure 6). Based on these macro-level indicators, Bangladesh's female population will be less likely to be financially included since there is wage inequality and a lower labor force participation rate. Rural residences will also remain less likely to be financially included since infrastructure in the urban areas are superiorly developed. Lastly, low literacy rates for both the male and the female population may further decrease the overall likelihood to be financially included.

#### Banking, Telecom, and Digital Financial Services

Mobile subscription has grown exponentially, starting with a modest 0.8 subscribers per 100 people in 2002 to 83 subscribers per 100 people in 2015 (World Development Indicators, The World Bank, 2016). From these statistics, we can infer that in Bangladesh, the challenges to provide formal financial service to the population come from the cost of serving people with relatively low amount of income available for saving and accessing a population which live in remote areas. However, monetary transactions happen in all wealth segments and in rural locations too. Given that the size of the rural and the low income population are large, the ability to provide formal financial access can be a source of an early competitive advantage in the form of economy of scale.

In Bangladesh, the conventional bank branches have a limited reach to rural and low income population. There are about 8.2 commercial bank branches and 9 ATMs per 100,000 people. About 30% of the population is estimated to own a formal financial

account (World Development Indicators, The World Bank, 2016). Assets of the largest banks in Bangladesh are relatively concentrated. Data estimates that above 90% belong to five largest commercial banks (World Bank, 2016b) and that the industry competition is nearly monopolistic in character (Repon & Islam, 2016). The five largest SIM card providers in Bangladesh are Grameenphone, RobiMobile, Airtel, Banglalink, and Citycell—with Grameenphone as the leader.

In Bangladesh, digital financial service was first started in March 2011 (Evans & Pirchio, 2015). Currently, digital financial service is mainly served by bKash, which is a purpose-built company specifically made to provide mobile financial service to the previously underbanked population. bKash began its operation on 2011, and it operates as a subsidiary of BRAC bank. Its shareholders include Money in Motion LLC, a US based company which also includes Nick Hughes (who launched M-Pesa in Kenya), the International Finance Corporation and the Bill and Melinda Gates foundation (“bKash Bangladesh,” 2016, “2016,” n.d.; International Finance Corporation, 2012). In delivering its digital financial service BRAC partners with Grameenphone, Banglalink, and RobiMobile—the three largest telecom operators in the country (“bKash Bangladesh,” 2016). The parents of BRAC bank are BRAC (An international developmental non-governmental organization) and the IFC. Figure 15-17 describe the breakdown of Bangladesh’s population by their access and ownership to conventional banks and digital branchless banking.

Ghana

Ghana is a lower middle income country in Sub-Saharan Africa. 24.2% of its population lives below the national poverty line. Most of its population are urban (Figure 2), as only 46 % of people are estimated to live in rural areas (“Ghana | Data,” 2016). About 45% of its rural population has access to electricity; while in comparison, 85% of its urban population has access to electricity. In figure 3 we see this sharp divide in access to electricity between rural and urban areas. About 70% of Ghana’s female population are literate, while the literacy rate for males is 81%, which is slightly far away from the  $y=x$  line in figure 4. Compared to other countries in the sample, Ghana’s female labor participation is almost as high as their male labor participation (Figure 5). Although the country has not yet reached equal pay between male and female workers (Figure 6), the relatively high female labor participation ratio suggests that there can be a higher demand of financial services for women in Ghana. Ghana has a somewhat high fertility rate (Figure 7), which may reduce the amount of money that can be saved in a bank account. Based on these macro-level indicators, Ghana’s female population may be less likely be financially included. Although the country has a high female labor participation rate, there is the issue of wage inequality and a relatively high fertility rate, which may reduce the amount of money to be saved by a working woman. Disparity between urban and rural infrastructure further compounds financial inclusion.

### Banking, Telecom, and Digital Financial Services

Mobile subscription grew exponentially fast, from 1.9 subscriptions per 100 people in 2002 to 129 subscriptions per 100 people in 2015 (Figure 14). Based on this figure, delivery of financial service through mobile phones is a promising way to promote

financial inclusion. In Ghana, there are 6.1 bank branches and 8.1 ATMs per 100,000 adults. In 2014, about 34% of adults were estimated to own a formal financial account (“Ghana | Data,” 2016). Assets of the largest banks are concentrated, about 87% belong to the five largest commercial banks (World Bank, 2016a). There are six SIM mobile network operators: MTN, Vodafone, Tigo, Airtel, Glo, and Express Telecom (National Communications Authority of Ghana, 2015). Of these, MTN, Tigo, Airtel and Vodafone are mobile operators offering digital financial services. There are two other digital financial services providers: Fidelity Bank and e-Zwich. The latter is an electronic payment program introduced by the Bank of Ghana in collaboration with all banks in Ghana (e-Zwich, 2007).

The first digital financial service was started in June 2009 (Evans & Pirchio, 2015). Currently, the digital financial service in Ghana is led by MTN mobile money service. MTN launched their service in 2009, after the Bank of Ghana issued branchless banking regulations in 2008 (Intermedia, 2016b). MTN is a South-African based multinational mobile operator. The other industry leaders are Airtel and Tigo. Airtel delivers Airtel Money in partnership with Standard Chartered, Ecobank, and UBA (Evans & Pirchio, 2015). Compared to other sub-saharan African countries in the sample, Ghana has the highest mobile subscription proportion; however, financial inclusion through digital financial service has not yet gained take off momentum as fast as Kenya and Tanzania (Zeterli, 2015). Figures 18-20 describe the breakdown of Ghana population’s by their access and ownership to conventional banks and digital branchless banking.

Indonesia

Indonesia is a lower middle income country in Southeast Asia (“Indonesia | Data,” 2016a) with about 11.3 % of its population living below the national poverty line. 60% of its population overall lives below \$2.5/day (“Indonesia · Financial Inclusion Insights by Intermedia,” 2016). About 46% of Indonesia’s population lives in rural areas, which makes the majority of Indonesia’s population urban (figure 2). About 92.9% of rural residents have access to electricity and nearly 99% of its urban population has access to electricity. This indicates that both its urban and rural population have almost equal access to electricity (figure 3). Indonesia is also a highly literate country, about 96 % of its female population is literate, while 98% of male population is literate. Thus, both genders have nearly an equal rate of literacy (figure 4). From this data, we can see that financial inclusion should be relatively easy since most of Indonesia’s population live in urban areas and its rural population also has good electricity coverage. Finally, both genders are equally highly literate, which should enable them equally to access formal financial service.

Unfortunately, Indonesia has not yet reached equal pay and equal labor participation rates between male and female worker (Figure 5 and 6). Since there are less women workers, women whom do not work may have less money that can be saved in a bank account. Moreover, compared to other countries, Indonesia has a lower fertility rate. Based on these macro-level indicators, Indonesia’s female population may be less likely to be financially included.

#### Banking, Telecom, and Digital Financial Services

In Indonesia there are about 11 bank branches and 49.6 ATMs per 100,000 adults—the highest rate in my sample. The five largest commercial banks hold 63% of the country's total bank's assets. About 35% of Indonesian adults are estimated to have a formal bank account ("Indonesia | Data," 2016b). Mobile subscriptions are high, 132 subscriptions per 100 people ("Indonesia | Data," 2016b). Compared to other countries in my sample, it is the highest rate per 100 people (Figure 14). There are four mobile network operators: Telkomsel, Indosat Ooredoo, Hutchison 3G's 3, XL Axiata. There are eight primary brands and twenty one licenses that were approved by the Indonesian central banks ("Electronic Money License - Bank Sentral Republik Indonesia," 2016).

The first digital financial service was started in November 2007 (Evans & Pirchio, 2015). Some of the early entrants are Indosat's Dompetku, Telkomsel's T-Cash, and XL Axiata's XL Tunai, Mandiri Bank's eCash, BTPN's Wow! and Jenius. Yet, at the time of writing, Indonesia's development of digital financial inclusion is still at its early stage. Data shows that the society began to become aware of its presence and that, in terms of brand awareness, XL tunai was the leader ("Indonesia · Financial Inclusion Insights by Intermedia," 2016). XL Tunai is a product by XL Axiata. Mobile subscription is relatively high in Indonesia, as about 69% of the population can send and receive SMS. Nonetheless, financial inclusion through digital financial service has yet to take off. Figures 24-26 describe the breakdown of Indonesia's population by their access and ownership to conventional banks and digital branchless banking.

## India

India is a lower middle income country in South Asia ("India | Data," 2016). 21.9% of its population lives below the national poverty line. About 78% of India's population

lives below \$2.5/day (“India · Financial Inclusion Insights by Intermedia,” 2016). About 67% of India’s population are rural (figure 2), and only 69% of the rural population have access to electricity. If we look at the ratio of electricity coverage in rural and urban area, we see that in India they are still far from equal (figure 3). As much as 98% of India’s urban population has access to electricity. Furthermore, there is a noticeable gap in literacy as about 63% of the female population are literate, compared to 81% of male population. Thus, we see that India is far from the  $y=x$  line (figure 4). Compared to other nations on the sample, India also has a lower female to male labor force participation rate (figure 5). India also has the lowest female to male earned income ratio for the same job (figure 6). Based on these macro-level indicators, there seems to be significant barriers to help females become better financially included. Disparity of rural-urban infrastructure and male-female literacy rate may also increase the difficulty of helping rural residences to be financially included.

### Banking, Telecom, and Digital Financial Services

In India, conventional bank branches are estimated to be about 13 branches per 100,000 adults. The 5-largest banks in India hold about 40% of the country’s assets, so the banking industry competition is less likely to be monopolistic in character. While there are ten mobile network operators: Airtel India, Vodafone India, Idea Cellular, RCom, BSNL, Tata, Telenor, Jio, MTS, and MTNL, the current largest mobile money providers in India are Airtel and Aircel (Intermedia, 2015). In India, per 100 people, about 78 are estimated to have mobile phone subscriptions. This is a bit lower than Indonesia and Bangladesh;



yet, slightly higher than Pakistan. Figures 21-23 describe the breakdown of Indian population by their access and ownership to conventional banks and digital branchless banking.

The first digital financial service in India was started in November 2007 (Evans & Pirchio, 2015), but it did not take off. Major digital financial service industry players are MobileOnMoney, BeamMoney, and Airtel Money. Unlike Airtel Money, which is a program by mobile network operator Airtel, both MobileOnMoney and BeamMoney were working independently without partnership with a mobile network operator or banks. In 2014, the Indian Prime Minister Narendra Modi announced the “Pradhan Mantri Jan-Dhan Yojana” (Prime Minister’s People’s Wealth Scheme). This government-led financial inclusion initiative provide unbanked Indians with zero-balance bank accounts, which then lead to about two-third of the population becoming financially included (“India · Financial Inclusion Insights by Intermedia,” 2016). Under this scheme, India also tackles the issue of interoperability among mobile network operators. Currently there are 1.26 lac (1.26 x 10E5) bank partners participating in the Pradhan Mantri Jan-Dhan Yojana scheme (“Pradhan Mantri Jan-Dhan Yojana | Department of Financial Services | Ministry of Finance,” 2016).

## Kenya

Kenya is a lower middle income country in Sub-Saharan Africa (“Kenya | Data,” 2016). 45.9% of its population lives below the national poverty line. The majority, which is about 75% of Kenya’s population, are rural. Compared to other countries in the sample,

Kenya has the highest proportion of rural residency (Figure 2). There is a stark difference in terms of electricity coverage for urban and rural area (Figure 3). Electricity covers about 60% of urban areas, yet only about 10% of rural areas. Both the male and the female population are equally literate: about 78% of Kenya's female population is literate, compared with 81% of the male population (Figure 4). From these macro-level indicators, financial inclusion in Kenya is challenging, especially in rural areas where most of Kenya's citizens live. But the ability to serve hard-to-reach rural population will confer some degree of competitive advantage.

Compared to other nations on the sample, Kenya's ratio of female to male participation within the labor force is quite high (Figure 5). The female to male earned income ratio shows that there is significant wage inequality (Figure 6). Relative to other countries in the sample, Kenyan females also have a somewhat high fertility rate (Figure 7). Labor and wage data suggests that the female population may have less money available to be kept in banks, but higher fertility rates may increase the need to have formal access to financial services to better manage their household finances.

### Banking, Telecom, and Digital Financial Services

In Kenya there are about 5.7 bank branches and 10.1 ATMs per 100,000 adults. The five largest banks control 62% of the country's assets. About 2/3s of adult Kenyans are estimated to have access to formal financial accounts. This number is relatively high given that there are only 5.7 bank branches per 100,000 adults. Per 100 people, about 83

are estimated to have mobile phone subscriptions (Figure 14). There are three mobile network operators in Kenya: Safaricom, Airtel, and Telkom Kenya.

The first digital financial service was started in March 2007 (Evans & Pirchio, 2015). At the present time of writing, Kenya's financial inclusion is primarily driven by mobile banking ("Kenya · Financial Inclusion Insights by Intermedia," 2016). The leader of the digital financial service is Safaricom's m-pesa. Safaricom partnered with Bank of Africa and Equity bank in delivering m-pesa. The other digital branchless banking service providers are Airtel, which partnered with Citigroup, Standard Chartered. Orange partnered with Equity Bank (Evans & Pirchio, 2015). Figures 27-29 describe the breakdown of the Kenyan population by their access and ownership to conventional banks and digital branchless banking.

## Nigeria

Nigeria is a lower middle income country in Sub-Saharan Africa ("Nigeria | Data," 2016). 46% of its population lives below the national poverty line, while 88% of Nigerian live below \$ 2.5/ day ("Nigeria · Financial Inclusion Insights by Intermedia," 2016). About 50% of the population is rural and the rest is urban (Figure 2). In the rural areas, access to electricity is somewhat low with only 30% of the population having access to electricity. This is a stark contrast with the urban population; 83% of the urban population has access to electricity (Figure 3). There is a noticeable gap in literacy between male and females in Nigeria. Only 50% of the female population is estimated to be literate, while 70% of the male population is literate (Figure 4). These stark differences between urban/rural, and

male/female literacy can be a challenging barrier in equalizing access to formal financial services for everyone.

Compared to other nations on the sample, Nigeria's ratio of female to male labor participation rate is somewhat high (Figure 5). With more women in the labor force, in aggregate women may have more income. However, female to male ratio of earned income is a bit low. For the same job, a female worker receives 0.6 of male worker wage (Figure 6). Data also shows that Nigerian women have the highest fertility rate compared to women from other countries in the data set (Figure 7). This suggests that there may be a higher demand for access to formal financial services to help women manage household finances, but the inequality in labor force participation and wage gap pinch the share of income for female population. This, in turn, may reduce the amount of available money to be saved overall.

#### Banking, Telecom, and Digital Financial Services

In Nigeria, there are estimated to be 16 ATMs and 5.6 bank branches per 100,000 adults. Assets of the largest banks are concentrated, 88% belong to the five largest banks. In 2011 only 20% of adults were estimated to have access to formal financial services ("Nigeria | Data," 2016). This number increased tremendously since then and in 2014, nearly 44% of the adult population has access to formal financial services. There are six mobile network operators, MTN, airtel, GloMobile, Etisalat, Visafone, and multilinks Telkom.

The first digital financial service was started in February 2011 (Evans & Pirchio, 2015). Through the Maya Declaration, the Nigerian government announced their plan to increase the populations financial inclusion to 80% overall in 2020 (“Maya Declaration | Alliance for Financial Inclusion | Bringing smart policies to life,” 2016, “Nigeria · Financial Inclusion Insights by Intermedia,” 2016). Currently, digital branchless banking is led by Diamond Yello, by MTN in partnership with Diamond Bank. Other major players are Pagatech, GTBank’s Mobile Money, Etranzact, Zenith Bank’s EaZyMoney. Figures 30-32 describe the breakdown of Nigerian population by their access and ownership to conventional banks and digital branchless banking.

## Pakistan

Pakistan is a lower middle income country in south Asia (“Pakistan | Data,” 2016). 29.5% of its population lives below the national poverty line and the majority of Pakistanis live in rural areas. About 71.24% of its population is rural and 30% is urban (Figure 2). In the rural areas, about 90% of its population has access to electricity. In urban areas, about 99% of its population has access to electricity. Therefore access to electricity in urban and rural areas is nearly equal (Figure 3). There is also a noticeable gap in literacy between males and females. In Pakistan, 69.5% of males are literate, while only 42.7% of females are literate. Evident in Figure 4, Pakistan is far from the  $y=x$  line. In terms of financial inclusion, this puts the female population at a disadvantage.

Compared to other nations on the sample, Pakistan has the lowest ratio of female to male labor participation (Figure 5). Additionally, Pakistan also has the second lowest ratio in terms of female to male earned income (Figure 6). This data suggests that their

female population has a lower level of income, which may reduce the amount of money available to be saved at a bank.

### Banking, Telecom, and Digital Financial Services

In Pakistan, there are 7.3 ATMs and 9.4 bank branches per 100,000 adults. Assets of the largest banks are fairly concentrated as 60.1% belong to the five largest banks. In 2011, it was estimated that less than 10 % of the population has access to formal financial accounts. As of 2015, the number of financially included within Pakistan's population has not increased and still hovers around 10% ("Pakistan · Financial Inclusion Insights by Intermedia," 2016). There are five mobile network operators: Mobilink, Telenor, Vong (Paktel), Ufone, and Warid.

The first digital financial service was started in October 2009(Evans & Pirchio, 2015) . Currently, the digital financial service is led by Easy Pasia, which is Telenor's brand. In delivering Easy Pasia, Telenor partnered with Tameer Microfinance Bank. The country launched its national financial inclusion plan in May 2015 ("What Will It Take for Pakistan to Achieve Financial Inclusion?," 2016). The other industry players are UBL Bank, Mobilink (in partnership with Waseela Bank), Ufone, Warid Telecom (in partnership with Bank Alfalah), and Zong (Evans & Pirchio, 2015). Figures 33-35 describe the breakdown of Pakistan's population by their access and ownership to conventional banks and digital branchless banking.

## Rwanda

Rwanda is a low income country in Sub-Saharan Africa (“Rwanda | Data,” 2016). 44.9% of its population lives below the national poverty line and the majority of its population lives in rural areas (Figure 2). In Rwanda, there is an extreme disproportion in electricity coverage between rural and urban areas (Figure 3). Electricity access only covers 7.7% of the rural population. However, in urban areas, 61.5% of its population has access to electricity. This data suggests that it can be difficult for traditional banks to serve the rural population. Both males and females have nearly the same literacy rate (Figure 4). This may help ease the barriers of access to formal financial services based on gender.

Compared to other nations on the sample, Rwanda has the highest female to male labor participation rate (Figure 5). On top of that, Rwanda also has an almost equal ratio of female to male earned income (Figure 6). The work force participation rate and similar wage ratio between males and females suggests that, at the aggregate level, the female population may have reasonably enough residual income to demand formal financial services. Additionally, on average, Rwandan women have about four children and this may add to the demand for formal financial services so that they can better manage their household finances.

### Banking, Telecom, and Digital Financial Services

In Rwanda, there are 5.3 ATMs and 4.12 bank branches per 100,000 adults. Assets of the largest banks are concentrated. The five largest banks own 95.3% of the assets. There

are three mobile network operators: MTN, Tigo, and Airtel. In 2008, it was estimated that only 14% of adults in Rwanda were financially included (National Institute of Statistics Rwanda, 2008).

The digital financial service was started in February 2010 (Evans & Pirchio, 2015). Furthermore in 2015, the number of adults whom were financially included doubled, reaching 38% (Kim, 2014; “Rwanda | Data,” 2016). Most of them became financially included through digital financial services (“Rwanda · Financial Inclusion Insights by Intermedia,” 2016), led by MTN’s mobile money in partnership with Commercial Bank of Rwanda and KCB. The other competitors are Tigo and Airtel which partner with KCB (Evans & Pirchio, 2015). Figures 36-38 describe the breakdown of Rwanda’s population by their access and ownership to conventional banks and digital branchless banking.

## Tanzania

Tanzania is a low income country in Sub-Saharan Africa (“Tanzania | Data,” 2016). About 28.2% of its population lives below the national poverty line and the majority of its population (68%) live in rural areas (Figure 2). Access to electricity only reaches 3.6% of its rural population and 46% of its urban population. This stark difference can be seen in the graph as Tanzania is very far from the  $y=x$  line (Figure 3). However, literacy rates between the male and female population does not differ much. 85% of Tanzania’s male population is literate; while, 76% of Tanzania’s female population is literate (Figure 4). Compared to other nations on the sample, Tanzania has a somewhat high female to male



labor participation ratio and earned income ratio (Figure 5 and 6). This suggests that the female population will have about the same demand for financial services.

### Banking, Telecom, and Digital Financial Services

In Tanzania, there are 5.7 ATMs and 2.3 bank branches per 100,000 adults. The five largest banks are estimated to hold 64% of the assets. There are several major mobile network operators: Vodafone, Airtel, Tigo, Zantel, TTCL, and Benson. In 2011, it was estimated that only 17% of Tanzania's adults had access to a formal financial account ("Tanzania | Data," 2016).

The first digital financial service was started in April 2008 (Evans & Pirchio, 2015). In 2015, nearly 62% of Tanzanians were financially included ("Tanzania · Financial Inclusion Insights by Intermedia," 2016) through digital financial services. As of 2015, the lead service provider was Vodacom's m-pesa ("Tanzania · Financial Inclusion Insights by Intermedia," 2016). In Tanzania m-pesa's competitors are Tigo's Tigo Cash, Airtel Money (delivered in partnership with Citibank, Standard Chartered, and Tanzania Postal Bank), and Etisalat's ezyPesa (Evans & Pirchio, 2015). Figures 39-41 describe the breakdown of Tanzania's population by their access and ownership to conventional banks and digital branchless banking.

#### 2.4.6. Hofstede's cultural dimensions of the countries in the sample

In this section we look at the nation's Hofstede cultural dimensions: masculinity, power distance, individualism, indulgence, long term orientation, and uncertainty

avoidance(Hofstede, 1980). These dimensions range from 0 (lowest) to 100 (highest). The first dimension is masculinity. This dimension measures the society's preference for achievement, competitiveness, and material reward for successes. Roughly, Ghana, Tanzania, Indonesia, and Pakistan score below 50, while Bangladesh, India, Kenya, and Nigeria score higher on the spectrum for masculinity (Figure 8). Relative to societies with a high degree of masculinity, societies with a lower score of masculinity tend to have the preference of caring for others. In the context of financial inclusion, a lower score of masculinity suggests that the society will tend to have higher drive to expand financial inclusion.

The second dimension is power distance. This dimension measures to what extent the marginalized segments of society accept that power is unequally distributed or struggle for equality. Countries in my sample score mostly above 50. In other words, they have a tendency to accept differences in power. The country with the lowest score is Pakistan, while the rest—such as Kenya, Tanzania, India, Indonesia, Bangladesh, Ghana, and Nigeria score quite high (Figure 9). In the context of financial inclusion, a higher score on power distance could signal that the society perhaps accepts unequal access to formal financial services more than those that score low on power distance.

The third dimension is individualism. This dimension measures the preference for a loosely-knit social framework in which individuals are expected to take care of only themselves and their immediate families. Countries in my sample mostly score low on individualism (vastly below 50), with the exception of India (Figure 10). A low score on individualism may indicate that relatives or members of a particular group take care of others in the society. In this type of society we can expect to see shared use of resources

by a group or a community is more common than sole possession and use of resources by an individual. In this society one is more likely to see a larger presence of shared or joint accounts (An account used and accessed by more than one person).

The fourth dimension is indulgence. This dimension measures to what extent the society places restraints on an individual's options for amusement. Pakistan scores zero in this dimension, which indicates that their society places a high degree of restraint on their population's options for amusement. Bangladesh, India, Indonesia, and Tanzania also score quite low in this dimension. In my sample, Ghana and Tanzania have the highest score, while no data is available for Kenya and Rwanda (Figure 11). In terms of saving or spending income, a low score in indulgence suggests that the societies in those aforementioned countries may have more of a drive to save than those with a higher score.

The fifth dimension is long term orientation (LTO). Societies with a low score in this dimension, prefer to maintain time-honored traditions and norms while viewing societal change with suspicion. Those with a high score in this category take a more pragmatic approach, they encourage thrift and improvements in modern education as a way to prepare for the future (Hofstede, 1980). In my sample most countries have a somewhat low score in this dimension with the exception of Indonesia. There is no data on Kenya and Rwanda. In terms of financial inclusion, a low score on LTO can be a barrier of change, since the society will view any new changes—i.e. change in the forms of widening formal financial services and forms of delivery—with suspicion. Thus, financial inclusion in

societies with low LTO scores can be more difficult to obtain compared to societies with a higher LTO score.

The sixth dimension is uncertainty avoidance. This dimension measures to what extent citizens of countries feel uncomfortable with uncertainty and ambiguity. In this dimension, India, Indonesia, Kenya, and Tanzania score lower than Nigeria, Bangladesh, Ghana, and Pakistan. In the context of using new digital financial services, this uncertainty avoidance may be associated with relatively slow take-off speed since society tends to be reluctant to adjust to new behaviors or new ideas.

#### 2.4.7. Country selection for analyses of financial inclusion through digital financial services

From figures 15-40, we see that not all countries have financially included those whom are unbanked through digital branchless banking. For example, in 2014, India , formed a government-led initiative the “Pradhan Mantri Jan-Dhan Yojana” (Prime Minister’s People’s Wealth Scheme, or PMJDY). The PMJDY provided unbanked Indians with zero-balance bank accounts—delivering access to a full range of financial services, including pension, credit, and insurance. As much as 255.1 million accounts have been created so far for the previously unbanked Indians (“Pradhan Mantri Jan-Dhan Yojana | Department of Financial Services | Ministry of Finance,” 2016). India’s government-backed approach is different from the rest of the countries’ approaches in the sample. Moreover, in the case of Indonesia, digital financial service has not reached the previously unbanked. Thus, for Indonesia, it is only possible to analyze the socio-economic factors that are associated with the likelihood to access or to own an account at a conventional bank. Further analysis to determine to what extent digital banking financially includes the

previously unbanked cannot be done, since this kind of population does not yet exist in the data sample that I have. Therefore, in my empirical analysis for digital financial inclusion, only data from Bangladesh, Ghana, Kenya, Nigeria, Pakistan, Rwanda, and Tanzania was used.

## 2.4. EMPIRICAL FINDINGS

### 1. Being Female and the associated likelihood to be financially included through conventional banks

If we only look at the subsample of females that are currently being financially included through both conventional and digital branchless banking, being female is strongly associated with a lesser likelihood of being financially included—in terms of both access and ownership of a conventional bank account. This finding is consistent in almost all country samples: Bangladesh, Ghana, Indonesia, Kenya, Pakistan, Rwanda, and Tanzania (Model 1 and 2 in table 17-24,  $p < 0.001$  (\*\*\*)). However, results based on data from Nigeria is not statistically significant. This suggests that females are slightly more likely to have access to a conventional bank account (model 1), but less likely to own a traditional bank account (model 2).

### Being Female and the associated likelihood to be financially included through digital branchless banking

Models 3 and 4 present estimations on the associated likelihood of females being financially included through digital branchless banking relative to everyone who is banked (having account at a conventional bank and/or digital branchless bank). In Ghana and Kenya, relative to the banked population, being female is positively associated with

financial inclusion through digital branchless banking in terms of access and ownership. This is also seen in the Venn diagram (Figures 7 and 16) for Kenya and Ghana where access and ownership overlap. In other words, digital branchless banking reaches out female populations whom were traditionally excluded by the traditional banks. In Tanzania, inclusion patterns for female is only significant for access (significant at  $p < 0.05$  (\*)) but not for ownership. Data also shows that in Bangladesh being female is still negatively associated with the likelihood of being included through digital branchless banking (significant at  $p < 0.001$  (\*\*\*)). Although the sign for female variable is positive in Nigeria, Pakistan, Rwanda, which may hint at a pattern of financial inclusion for female, estimation results are not statistically significant.

Models 5 and 6 present estimations on the associated likelihood of females being financially included through digital branchless banking relative to everyone who is still unbanked. Data shows that in Bangladesh, Pakistan, Rwanda, and Tanzania, being female is associated with a lesser likelihood of being financially included through digital financial service. In Ghana, Kenya, and Nigeria, the sign for female variable is positive (with one exception of financial inclusion in terms of ownership in Ghana), yet they are not statistically significant. This hints that financial inclusion may have started reaching traditionally excluded women, although it has not yet reached enough.

2. Rural residency and the associated likelihood to be financially included through conventional banks

If we only look at the subsample that is currently being financially included through both conventional and digital branchless banking, rural residency is strongly associated with a lesser likelihood to be financially included—in terms of both access and ownership of a conventional bank account. This finding is consistent in almost all country samples: Bangladesh, Ghana, Indonesia, Kenya, Pakistan, Nigeria, and Rwanda, (Model 1 and 2 in table 17-24,  $p < 0.001$  (\*\*\*)). However, results for Tanzania based upon the relative data is not statistically significant.

Rural residency and the associated likelihood to be financially included through digital financial services

Models 3 and 4 present estimations on the associated likelihood of being rural resident and being financially included through digital branchless banking relative to everyone who is already banked (having account at a conventional bank and/or digital branchless bank). In Ghana, Kenya, and Rwanda, relative to the already banked population, rural residency is positively associated with financial inclusion through digital branchless banking in terms of access. Positive association with ownership is only found in Kenya. This indicates that in rural areas, people access digital financial accounts without always owning it. It could be that they access it through agents or their family members or relatives' mobile phones. Other countries in the sample—such as Bangladesh, Nigeria, Pakistan—although the signs are positive, are not significant.

Next, we look at models 5 and 6 to tease out if rural residents are more likely to be included through digital branchless banking relative to those whom are still unbanked. We see that rural residency is negatively and statistically significantly associated with the

likelihood of being financially included through digital branchless banking services in Bangladesh, Kenya, Pakistan, Rwanda, and Tanzania. Rural residency variables in Ghana and Nigeria follow the exclusion pattern although they are not statistically significant.

### 3. Poverty and the associated likelihood to be financially included through conventional banks

If we only look at the subsample that is currently being financially included through both conventional and digital branchless banking, poverty is strongly associated with a lesser likelihood to be financially included—in terms of both access and ownership of a conventional bank account. This finding is consistent in almost all country samples: Bangladesh, Ghana, Indonesia, Kenya, Pakistan, and Rwanda, (Model 1 and 2 in table 17-24,  $p < 0.001$  (\*\*\*)). However, results for Nigeria and Tanzania based on current data are not as statistically significant as the other six countries. In Nigeria poverty is associated with a lower likelihood of accessing a formal bank account  $p < 0.1$ (+). It is also negatively associated with ownership of a formal bank account. Nonetheless, we cannot conclude its association with ownership since in model 2, it lacks statistical significance.

### Poverty and the associated likelihood to be financially included through digital financial services

Model 3 and 4s present estimations on the associated likelihood of being poor and financial included through digital branchless banking relative to everyone who are banked



(having account at a conventional bank and/or digital branchless bank). Models 5 and 6 tease out the likelihood of being financially included with poverty with respect to those whom are still unbanked. In models 3 and 4, data shows that in Ghana, Kenya, and Rwanda, the likelihood of poverty variable is positively and statistically significantly associated with access and ownership of a digital bank account. In other words, digital branchless banks financially include those whom tend to be more likely to be poorer compared to those whom already financially included through conventional banks. However, in models 5 and 6, data shows that in those same three countries, Ghana, Kenya, and Rwanda, the likelihood of poverty variable is negatively and statistically significantly associated with access and ownership of a digital bank account. Thereby, digital branchless banks financially include those whom tend to be more likely to be poor in comparison to those whom already are financially included through conventional banks. But those that are included through digital branchless banking are less likely to be poor compared to those whom were still unbanked at the time of data collection. Tanzania's data shows that poverty is negatively and statistically significantly associated with the likelihood to be financially included in models 3,4,5, and 6. Bangladesh's and Pakistan's data shows that poverty is positively and statistically significantly associated with access to digital branchless banking (model 3 only). Poverty is negatively and statistically significantly associated with access and ownership in models 5 and 6 for Bangladesh, and only statistically significant in model 6 for Pakistan.

4. Being literate and the associated likelihood to be financially included through conventional banks

If we only look at the subsamples that are currently being financially included through both conventional and digital branchless banking, being literate is strongly associated with a higher likelihood to be financially included—in terms of both access and ownership of a conventional bank account. This finding is consistent and statistically significant in almost all countries in the samples: Bangladesh, Ghana, Kenya, Pakistan, and Rwanda, (Model 1 and 2 in table 17-24,  $p < 0.001$  (\*\*\*)). However, results for Indonesia's data are not as statistically significant as the other five countries. In Indonesia, being literate is positively associated with a higher likelihood of owning a formal bank account (Table 18, Model 2)  $p < 0.1$ (+), yet the same cannot be inferred for the likelihood of accessing a formal bank account (Table 18, Model 1).

Being literate and the associated likelihood to be financially included through digital financial services

Model 3s and 4 present estimations on the associated impact of being literate with the likelihood of being financially included through digital branchless banking relative to everyone who are banked (having account at a conventional bank and/or digital branchless bank). Models 5 and 6 tease out the likelihood of being financially included with being literate with respect to those whom are still unbanked. In models 3 and 4, data shows that in Bangladesh and Pakistan, being literate is negatively and statistically significantly associated with access to a digital bank account. In other words, digital branchless banks financially include those whom tend to be more likely to be illiterate compared to those whom are already financially included through conventional banks. In models 5 and 6, data reveals that among all countries in the sample, the literacy variable is positively and statistically significantly associated with access and ownership of a digital bank account.

Thus, digital branchless banks financially include those whom tend to be more likely to be less literate compared to those whom are already financially included through conventional banks. But those that are included through digital branchless banking are more likely to be literate compared to those whom were still unbanked at the time of data collection.

## 2.6. DISCUSSION AND CONCLUSION

This research examines the social and economic barriers of financial inclusion in emerging markets. Using The Bill and Melinda Gates Foundation financial inclusion survey data, my findings demonstrate that women, rural residents, and impoverished residents are less likely to access and/or own a formal financial account in conventional non-digital branchless banks. This means that despite the many efforts to spread equal access for economic participation, there is still a great deal of work left to complete to help financially-excluded women in emerging markets<sup>1</sup>. My analysis shows that digital branchless banks can better reach the previously underbanked population and can be an answer to the problem of financial exclusion. While it is not ultimately a silver bullet; it can still be part of the solution even if it is not a fix all remedy

In terms of the gender gap, the Kenyan experience shows that digital banking can be a path for financial inclusion. At the time of writing, Kenya's digital financial service is the most advanced and developed in my sample. This is in agreement with past studies on Kenya that demonstrate digital financial inclusion can minimize gender gap (Mbiti & Weil, 2011). The pattern of reaching out to underbanked women is found only in Ghana, Kenya, and to some extent Tanzania. Bangladesh, Pakistan, and Rwanda paint a different picture

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<sup>1</sup> Ernst & Young 2015 survey indicates that over 70% of beneficiaries of the financial inclusion programs are women (Ahmed-Karim & Alders-Sheya, 2015)

as, in these countries, being female is associated with a lesser likelihood of being financially included through digital financial services. Thereby, financial inclusion there, at the time of the data collection, seems to indicate that it has not benefited the unbanked women and that it may have the potential of furthering a gender gap if left unaddressed. Tanzania—perhaps—paints a transitional stage; it has begun to expand formal financial service access to women, but it has not yet been able to systematically reverse the pattern of financial exclusion associated with its female population.

In terms of the rural-urban residency gap, data shows that rural residency reduces the likelihood to be financially included in all countries in the sample. Digital branchless banking shows a mixed pattern of financial inclusion. In Ghana, relative to the banked population, users whom access digital banks are more rural. However, the same cannot be said for users whom own digital bank accounts. In Kenya, relative to the banked population, digital branchless banking does reach rural population. Yet, rural residency still breeds disadvantages. For instance, those who are still excluded in the presence of both conventional and digital branchless banking are overwhelmingly rural residences. In other words, the digital financial service precludes residences within the rural group. Data from Tanzania also shows this pattern as rural residency reduces the likelihood of being financially included. Other countries which are less advanced than Kenya and Tanzania in terms of the penetration of digital branchless banking in the sample exhibit similar patterns, although they lack statistical significance.

In terms of income and wealth inequality, the poverty likelihood variable is a persistent and statistically significant determinant of financial exclusion by the traditional conventional banks. But, digital branchless banking has not fully addressed inequality of

access and ownership, which, may consequently worsen inequality. On one hand, compared to the population that is already financially included through conventional banks, data shows that digital branchless banking reach populations that are more likely to be poor. Yet, on the other hand, if we are comparing the segment of population that is now financially included through digital branchless banking with those whom are still unbanked, we sometimes see that those who are more likely to be poor have a higher likelihood to not have a digital financial account as well. This suggests that for poorer segments of the population, digital branchless banking is a viable substitute of conventional banks' formal financial services.

Analyses show that literacy is a strong determinant to financial inclusion. Data also shows different stages of development of digital financial services in countries in the sample. Although the number of digital financial services in emerging markets is too small for systematic regression-based hypothesis testing, we can see how theory of market emergence and industrial organization perspective works in explaining the differences in development stages and speed of different countries' digital financial services. There are countries that experience slow growth of digital financial services and failures to reach the critical mass necessary to begin profiting. The digital financial service emerges as two historically distinct industries, banking and mobile network operating, converge (Ozcan & Santos, 2015; Santos & Eisenhardt, 2009).

Three major possible explanations why convergence can be hard are firstly, historical dominance reduces the likelihood of compromise and appropriate resource commitment by parties involved (Ozcan & Santos, 2015). Secondly, data also suggests that compared to countries with slow growth, countries with successful digital financial

services tend to have imperfect competition as indicated by the few number of entrants at its beginning. This is in line with the prediction that rapid technological progress requires some forms of a balanced alliance and competition, so that firms have enough incentive to invest and are able to appropriate the resulting innovation in return (Jorde & Teece, 1990; Teece, 1986, 1992). Thirdly, appropriation of innovation, in a way that confers a competitive advantage, often requires complementary assets (Christmann, 2000; Teece, 1986). Therefore, large firms with market power and capital tend to be better positioned to appropriate innovation (Schumpeter, 1950; Winter, 2006). Presence of multinational ownership in regions with relatively swift take off and successful digital financial services—such as Vodafone’s Safaricom m-pesa in Kenya<sup>2</sup>, Vodafone’s Vodacom in Tanzania, MTN in Rwanda<sup>3</sup>, Orange in Kenya<sup>4</sup>, and Telenor in Pakistan<sup>5</sup>, seem to provide anecdotal support to this finding.

Overall, this research shows that digital branchless banking in its most advanced stage can reach the previously underbanked population. Digital branchless banking if it continues to be developed can be a pathway for financial inclusion. In all countries with developed digital branchless banking, more parts of society, who were previously unbanked, become banked—i.e. having access to formal financial services. A subset of previously marginalized women, rural residences, the poorer segments of society, and illiterate population became better financially included through digital branchless banking.

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<sup>2</sup> Vodafone is a British multinational telecommunications company

<sup>3</sup> MTN is a South-African multinational telecommunications company

<sup>4</sup> Orange is a French multinational telecommunications company

<sup>5</sup> Telenor is a Norwegian multinational telecommunications company

However, it is also a double-edged sword. There are various socio-economic barriers which can further inequality between those who become banked through digital branchless banking and those who still do not have access to digital branchless banking. As we can see from the empirical results, these socio-economic barriers can potentially be self-reinforcing or become cumulative disadvantages, which in turn can ultimately result in a larger digital divide across societal segments.

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Table 1 Summary statistics: Bangladesh

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Age	11,506	34.44	15.17	15	99
Rural	11,506	0.692	0.462	0	1
LnHHsize	11,506	0.967	0.423	0	1.386
DocStat	11,506	1.161	0.611	0	6
Literacy	11,506	0.555	0.497	0	1
Female	11,506	0.497	0.500	0	1
PovLhood	11,506	37.60	28.10	0	99
TradBanked_A	11,506	0.174	0.379	0	1
TradBanked_O	11,506	0.161	0.368	0	1
DBIncl_A1	3802	0.478	0.5	0	1
DBIncl_O1	2,242	0.153	0.360	0	1
DBIncl_A2	9,396	0.193	0.395	0	1
DBIncl_O2	9,396	0.0332	0.179	0	1

Table 2 Summary statistics:Ghana

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Age	5,974	35.16	15.58	15	94
Rural	5,974	0.460	0.498	0	1
LnHHsize	5,974	1.259	0.665	0	1.946
DocStat	5,974	2.315	1.237	0	8
Literacy	5,974	0.752	0.432	0	1
Female	5,974	0.525	0.499	0	1
PovLhood	5,974	35.81	32.58	0	99
TradBanked_A	5,974	0.360	0.480	0	1
TradBanked_O	5,974	0.340	0.474	0	1
DBIncl_A1	3,042	0.289	0.453	0	1
DBIncl_O1	2,636	0.227	0.419	0	1
DBIncl_A2	3,838	0.229	0.420	0	1
DBIncl_O2	3838	0.153	0.36	0	1

Table 3 Summary statistics:India

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Age	90,132	36.72	15.98	15	86
Rural	90,132	0.675	0.468	0	1
LnHHsize	90,132	1.157	0.499	0	1.609
DocStat	90,132	3.135	1.376	0	9
Literacy	90,132	0.652	0.476	0	1
Female	90,132	0.489	0.500	0	1
PovLhood	90,132	71.80	29.51	0	100
TradBanked_A	90,132	0.559	0.496	0	1
TradBanked_O	90,132	0.552	0.497	0	1
DBIncl_A1	49,916	0.000277	0.0166	0	1
DBIncl_O1	49,306	0.000250	0.0158	0	1
DBIncl_O2	40,224	0.000239	0.0154	0	1
DBIncl_A2	40,224	0.000352	0.0188	0	1



Table 4 Summary statistics:Indonesia

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Age	5,761	38.42	16.10	15	98
Rural	5,761	0.483	0.500	0	1
LnHHsize	5,761	1.067	0.531	0	1.792
DocStat	5,761	3.132	1.232	0	9
Literacy	5,761	0.936	0.246	0	1
Female	5,761	0.512	0.500	0	1
PovLhood	5,761	71.18	26.01	0	100
TradBanked_A	5,761	0.267	0.442	0	1
TradBanked_O	5,761	0.198	0.398	0	1
DBIncl_A1	1,522	0	0	0	0
DBIncl_O1	1,109	0	0	0	0
DBIncl_A2	4,239	0	0	0	0
DBIncl_O2	4,239	0	0	0	0

Table 5 Summary statistics:Kenya

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Age	2,969	33.36	15.19	15	93
Rural	2,969	0.638	0.481	0	1
LnHHsize	2,956	1.335	0.633	0	2.890
DocStat	2,969	2.204	1.250	0	8
Literacy	2,969	0.822	0.382	0	1
Female	2,969	0.512	0.500	0	1
PovLhood	2,969	47.46	33.87	0	100
TradBanked_A	2,969	0.292	0.455	0	1
TradBanked_O	2,969	0.276	0.447	0	1
DBIncl_A1	2,325	0.606	0.489	0	1
DBIncl_O1	2,080	0.575	0.494	0	1
DBIncl_A2	2,051	0.634	0.482	0	1
DBIncl_O2	2051	0.514	0.5	0	1

Table 6 Summary statistics:Nigeria

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Age	5,854	33.26	15.03	15	102
Rural	5,854	0.565	0.496	0	1
LnHHsize	5,854	1.142	0.628	0	1.946
DocStat	5,854	2.275	1.535	0	9
Literacy	5,854	0.823	0.382	0	1
Female	5,854	0.502	0.500	0	1
PovLhood	5,854	72.71	27.63	0	100
TradBanked_A	5,854	0.503	0.500	0	1
TradBanked_O	5,854	0.434	0.496	0	1
DBIncl_A1	3,120	0.000805	0.0284	0	1
DBIncl_O1	2,770	0.000869	0.0295	0	1
DBIncl_A2	2,736	0.000816	0.0286	0	1
DBIncl_O2	2,736	0.000589	0.0243	0	1

Table 7 Summary statistics: Pakistan

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Age	5,919	34.27	13.52	15	95
Rural	5,919	0.670	0.470	0	1
LnHHsize	5,919	1.161	0.349	0	1.386
DocStat	5,919	2.119	1.022	0	6
Literacy	5,919	0.599	0.490	0	1
Female	5,919	0.477	0.499	0	1
PovLhood	5,919	33.05	30.46	0	100
TradBanked_A	5,919	0.0814	0.273	0	1
TradBanked_O	5,919	0.0763	0.265	0	1
DBIncl_A1	902	0.452	0.498	0	1
DBIncl_O1	501	0.0273	0.163	0	1
DBIncl_A2	5,400	0.0731	0.260	0	1
DBIncl_O2	5,400	0.00212	0.0460	0	1

Table 8 Summary statistics:Rwanda

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Age	1,934	35.00	15.35	15	101
Rural	1,934	0.835	0.371	0	1
LnHHsize	1,934	1.276	0.516	0	1.792
DocStat	1,934	1.064	0.585	0	5
Literacy	1,934	0.681	0.466	0	1
Female	1,934	0.531	0.499	0	1
PovLhood	1,934	79.79	22.90	3	100
TradBanked_A	1,934	0.181	0.385	0	1
TradBanked_O	1,934	0.163	0.370	0	1
DBIncl_A1	585	0.441	0.497	0	1
DBIncl_O1	523	0.434	0.496	0	1
DBIncl_A2	1,594	0.174	0.380	0	1
DBIncl_O2	1,594	0.155	0.362	0	1

Table 9 Summary statistics:Tanzania

	(1)	(2)	(3)	(4)	(5)
VARIABLES	N	mean	sd	min	max
Age	2,956	35.05	15.31	15	98
Rural	2,956	0.666	0.472	0	1
LnHHsize	2,956	0.845	0.633	0	1.609
DocStat	2,956	0.906	0.790	0	6
Literacy	2,956	0.872	0.334	0	1
Female	2,956	0.525	0.499	0	1
PovLhood	2,956	63.94	31.73	0	100
TradBanked_A	2,956	0.252	0.434	0	1
TradBanked_O	2,956	0.201	0.401	0	1
DBIncl_A1	1,758	0.580	0.494	0	1
DBIncl_O1	1,486	0.602	0.490	0	1
DBIncl_A2	2,209	0.464	0.499	0	1
DBIncl_O2	2,209	0.393	0.489	0	1

Table 10 Cross-correlation table: Bangladesh

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1.Female	1.00												
2.Rural	-0.05	1.00											
3.PovLhood	0.00	0.20	1.00										
4.Literacy	-0.02	-0.16	-0.21	1.00									
5.DocStat	-0.15	-0.06	-0.11	0.12	1.00								
6.LnHHsize	-0.04	-0.06	-0.63	0.03	0.03	1.00							
7.Age	-0.18	0.07	-0.06	-0.35	0.09	0.11	1.00						
8.TradBanked_A	-0.09	-0.11	-0.14	0.20	0.30	-0.00	0.06	1.00					
9.TradBanked_O	-0.09	-0.10	-0.13	0.19	0.29	-0.00	0.07	0.96	1.00				
10.DBIncl_O1	-0.13	-0.02	-0.05	0.05	-0.09	0.11	-0.24	-0.97	-1.00	1.00			
11.DBIncl_A1	-0.14	-0.02	-0.04	0.04	-0.10	0.10	-0.23	-1.00	-0.97	0.97	1.00		
12.DBIncl_O2	-0.11	-0.06	-0.08	0.11	0.08	0.05	-0.08	.	.	1.00	0.36	1.00	
13.DBIncl_A2	-0.21	-0.07	-0.06	0.14	0.12	0.04	-0.10	.	.	0.36	1.00	0.36	1.00

Table 11 Cross-correlation table: Ghana

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
Female	1.00												
Rural	-0.01	1.00											
PovLhood	-0.00	0.35	1.00										
Literacy	-0.13	-0.15	-0.32	1.00									
DocStat	-0.14	-0.19	-0.20	0.22	1.00								
LnHHsize	-0.03	-0.12	-0.63	0.13	0.05	1.00							
Age	0.08	0.01	0.08	-0.29	-0.01	-0.03	1.00						
TradBanked_A	-0.13	-0.17	-0.21	0.17	0.30	0.08	0.06	1.00					
TradBanked_O	-0.14	-0.16	-0.22	0.17	0.31	0.08	0.06	0.96	1.00				
DBIncl_O1	0.11	0.08	0.11	-0.03	-0.16	-0.06	-0.13	-0.97	-1.00	1.00			
DBIncl_A1	0.10	0.09	0.11	-0.03	-0.16	-0.06	-0.12	-1.00	-0.97	0.97	1.00		
DBIncl_O2	-0.01	-0.07	-0.10	0.13	0.12	0.02	-0.07	.	.	1.00	0.76	1.00	
DBIncl_A2	-0.00	-0.07	-0.12	0.12	0.09	0.03	-0.08	.	.	0.76	1.00	0.76	1.00



Table 12 Cross-correlation table: Kenya

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
Female	1.00												
Rural	-0.08	1.00											
PovLhood	0.06	0.34	1.00										
Literacy	-0.10	-0.20	-0.43	1.00									
DocStat	-0.22	-0.14	-0.35	0.23	1.00								
LnHHsize	0.13	0.18	0.58	-0.11	-0.12	1.00							
Age	-0.11	0.16	0.12	-0.27	0.04	0.04	1.00						
TradBanked_A	-0.17	-0.18	-0.34	0.23	0.45	-0.09	0.07	1.00					
TradBanked_O	-0.18	-0.18	-0.34	0.23	0.45	-0.09	0.08	0.96	1.00				
DBIncl_O1	0.18	0.15	0.26	-0.13	-0.39	0.07	-0.10	-0.97	-1.00	1.00			
DBIncl_A1	0.16	0.15	0.26	-0.12	-0.39	0.07	-0.09	-1.00	-0.97	0.97	1.00		
DBIncl_O2	-0.06	-0.11	-0.30	0.34	0.31	-0.07	-0.00	.	.	1.00	0.78	1.00	
DBIncl_A2	-0.03	-0.16	-0.30	0.40	0.24	-0.07	-0.07	.	.	0.78	1.00	0.78	1.00

Table 13 Cross-correlation table: Pakistan

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
Female	1.00												
Rural	-0.08	1.00											
PovLhood	0.06	0.34	1.00										
Literacy	-0.10	-0.20	-0.43	1.00									
DocStat	-0.22	-0.14	-0.35	0.23	1.00								
LnHHsize	0.13	0.18	0.58	-0.11	-0.12	1.00							
Age	-0.11	0.16	0.12	-0.27	0.04	0.04	1.00						
TradBanked_A	-0.17	-0.18	-0.34	0.23	0.45	-0.09	0.07	1.00					
TradBanked_O	-0.18	-0.18	-0.34	0.23	0.45	-0.09	0.08	0.96	1.00				
DBIncl_O1	0.18	0.15	0.26	-0.13	-0.39	0.07	-0.10	-0.97	-1.00	1.00			
DBIncl_A1	0.16	0.15	0.26	-0.12	-0.39	0.07	-0.09	-1.00	-0.97	0.97	1.00		
DBIncl_O2	-0.06	-0.11	-0.30	0.34	0.31	-0.07	-0.00	.	.	1.00	0.78	1.00	
DBIncl_A2	-0.03	-0.16	-0.30	0.40	0.24	-0.07	-0.07	.	.	0.78	1.00	0.78	1.00

Table 14 Cross-correlation table: Nigeria

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
Female	1.00												
Rural	-0.14	1.00											
PovLhood	0.02	0.09	1.00										
Literacy	-0.12	-0.09	-0.05	1.00									
DocStat	-0.20	-0.11	-0.04	0.30	1.00								
LnHHsize	0.05	-0.13	-0.65	0.09	0.09	1.00							
Age	-0.06	-0.01	0.03	-0.23	0.06	-0.02	1.00						
TradBanked_A	-0.07	-0.18	-0.08	0.28	0.40	0.16	0.08	1.00					
TradBanked_O	-0.13	-0.16	-0.11	0.28	0.43	0.18	0.09	0.89	1.00				
DBIncl_O1	0.01	0.02	0.02	0.01	-0.01	-0.03	-0.04	-0.71	-1.00	1.00			
DBIncl_A1	0.03	0.02	0.02	0.00	-0.01	-0.04	-0.03	-1.00	-0.71	0.71	1.00		
DBIncl_O2	0.02	0.01	0.02	0.01	0.00	-0.03	-0.02	.	.	1.00	0.71	1.00	
DBIncl_A2	0.00	-0.01	0.02	0.02	0.01	-0.02	-0.03	.	.	0.71	1.00	0.71	1.00

Table 15 Cross-correlation table: Rwanda

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
Female	1.00												
Rural	-0.01	1.00											
PovLhood	0.07	0.42	1.00										
Literacy	-0.12	-0.13	-0.27	1.00									
DocStat	-0.11	-0.24	-0.27	0.12	1.00								
LnHHsize	-0.03	0.00	-0.36	-0.00	0.02	1.00							
Age	0.04	0.08	0.11	-0.40	-0.01	0.07	1.00						
TradBanked_A	-0.13	-0.30	-0.29	0.19	0.27	-0.06	-0.03	1.00					
TradBanked_O	-0.14	-0.28	-0.28	0.18	0.28	-0.05	-0.02	0.94	1.00				
DBIncl_O1	0.04	0.13	0.07	0.05	-0.17	0.12	-0.18	-0.95	-1.00	1.00			
DBIncl_A1	0.02	0.18	0.09	0.03	-0.15	0.10	-0.18	-1.00	-0.95	0.95	1.00		
DBIncl_O2	-0.14	-0.15	-0.25	0.22	0.16	0.04	-0.14	.	.	1.00	0.87	1.00	
DBIncl_A2	-0.12	-0.16	-0.24	0.23	0.15	0.02	-0.16	.	.	0.87	1.00	0.87	1.00

Table 16 Cross-correlation table: Tanzania

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
Female	1.00												
Rural	-0.06	1.00											
PovLhood	0.02	0.25	1.00										
Literacy	-0.08	-0.04	-0.12	1.00									
DocStat	-0.10	-0.12	-0.23	0.07	1.00								
LnHHsize	-0.07	-0.13	-0.59	-0.00	0.05	1.00							
Age	-0.09	0.08	0.02	-0.14	0.13	-0.02	1.00						
TradBanked_A	-0.07	-0.01	0.07	0.08	0.06	-0.16	0.06	1.00					
TradBanked_O	-0.07	-0.01	0.03	0.06	0.09	-0.15	0.06	0.87	1.00				
DBIncl_O1	0.02	-0.07	-0.19	0.03	0.02	0.22	-0.07	-0.96	-1.00	1.00			
DBIncl_A1	0.03	-0.07	-0.19	0.03	0.02	0.22	-0.06	-1.00	-0.96	0.96	1.00		
DBIncl_O2	-0.10	-0.15	-0.25	0.17	0.21	0.05	0.03	.	.	1.00	0.87	1.00	
DBIncl_A2	-0.08	-0.15	-0.27	0.18	0.21	0.06	0.01	.	.	0.87	1.00	0.87	1.00

Table 17 Regression results: Bangladesh

	1	2	3	4	5	6
VARIABLES	TradBanked_A	TradBanked_O	DBIncl_A1	DBIncl_O1	DBIncl_A2	DBIncl_O2
Female	-0.0332*** (0.00691)	-0.0304*** (0.00665)	-0.161*** (0.0165)	-0.149*** (0.0163)	-0.167*** -0.00876	-0.0429*** -0.00429
Rural	-0.0403*** (0.00824)	-0.0360*** (0.00799)	0.0252 (0.0164)	-0.00418 (0.0170)	-0.0398*** -0.0103	-0.0117* -0.00535
PovLhood	-0.00158*** (0.000157)	-0.00147*** (0.000152)	0.00254*** (0.000410)	-0.000189 (0.000423)	-0.000397* -0.000197	-0.000316*** -0.0000838
Literacy	0.121*** (0.00757)	0.118*** (0.00734)	-0.150*** (0.0179)	-0.0138 (0.0164)	0.0614*** -0.00933	0.0227*** -0.00377
DocStat	0.154*** (0.00671)	0.146*** (0.00669)	-0.127*** (0.00989)	-0.0546*** (0.0107)	0.0834*** -0.0101	0.0282*** -0.00728
LnHHsize	-0.0967*** (0.0104)	-0.0921*** (0.0100)	0.188*** (0.0244)	0.112*** (0.0237)	0.0192 -0.0122	0.00903+ -0.00517
Age	0.00289*** (0.000233)	0.00305*** (0.000226)	-0.0103*** (0.000573)	-0.00819*** (0.000656)	-0.00265*** -0.000267	-0.000848*** -0.000127
Constant	0.0257 (0.0211)	0.00479 (0.0205)	0.884*** (0.0511)	0.493*** (0.0510)	0.273*** -0.0264	0.0540*** -0.0113
Observations	11,506	11,506	3,802	2,242	9396	9396
R-squared	0.135	0.132	0.168	0.151	0.09	0.044

Robust standard errors in parentheses

\*\*\* p&lt;0.001, \*\* p&lt;0.01, \* p&lt;0.05, + p&lt;0.1

Table 18 Regression results: Indonesia

Note: At the time of survey, digital financial service in Indonesia had not been used to achieve financial inclusion. Out of 5761 respondents, only 4 respondents used digital financial service. These 4 respondents were not previously unbanked. Hence, model 3,4,5,6 are not calculated.

	(1)	(2)
VARIABLES	TradBanked_A	TradBanked_O
Female	-0.0229* (0.0113)	-0.0474*** (0.0100)
Rural	-0.0656*** (0.0119)	-0.0675*** (0.0105)
PovLhood	-0.00535*** (0.000267)	-0.00493*** (0.000249)
Literacy	0.0176 (0.0204)	0.0269+ (0.0156)
DocStat	0.0734*** (0.00491)	0.0701*** (0.00442)
LnHHsize	-0.116*** (0.0121)	-0.0886*** (0.0107)
Age	0.000790* (0.000361)	0.000748* (0.000311)
Constant	0.538*** (0.0456)	0.427*** (0.0400)
Observations	5,761	5,761
R-squared	0.184	0.206

Robust standard errors in parentheses

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1

Table 19 Regression results: Ghana

	1	2	3	4	5	6
VARIABLES	TradBanked_A	TradBanked_O	DBIncl_A1	DBIncl_O1	DBIncl_A2	DBIncl_O2
Female	-0.0918*** (0.0124)	-0.0971*** (0.0122)	0.0835*** (0.0169)	0.0742*** (0.0170)	0.00458 (0.0143)	-0.00576 (0.0124)
Rural	-0.0566*** (0.0132)	-0.0408** (0.0130)	0.0372* (0.0185)	0.0171 (0.0187)	-0.0159 (0.0145)	-0.0161 (0.0124)
PovLhood	-0.00211*** (0.000260)	-0.00226*** (0.000254)	0.00106** (0.000393)	0.00126** (0.000410)	-0.00138*** (0.000282)	-0.000899*** (0.000242)
Literacy	0.105*** (0.0155)	0.104*** (0.0152)	-0.0237 (0.0260)	0.0108 (0.0276)	0.0711*** (0.0165)	0.0727*** (0.0139)
DocStat	0.0909*** (0.00489)	0.0916*** (0.00485)	-0.0598*** (0.00579)	-0.0412*** (0.00559)	0.0237*** (0.00677)	0.0309*** (0.00587)
LnHHsize	-0.0356** (0.0116)	-0.0320** (0.0114)	-0.0112 (0.0168)	-0.0119 (0.0173)	-0.0449*** (0.0136)	-0.0345** (0.0120)
Age	0.00352*** (0.000440)	0.00338*** (0.000434)	-0.00498*** (0.000598)	-0.00405*** (0.000608)	-0.00149** (0.000483)	-0.000701+ (0.000411)
Constant	0.141*** (0.0358)	0.123*** (0.0353)	0.571*** (0.0511)	0.415*** (0.0519)	0.299*** (0.0402)	0.155*** (0.0338)
Observations	5,974	5,974	3,042	2,636	3,838	3,838
R-squared	0.143	0.149	0.085	0.060	0.033	0.035

Robust standard errors in parentheses

\*\*\* p&lt;0.001, \*\* p&lt;0.01, \* p&lt;0.05, + p&lt;0.1



Table 20 Regression results:Kenya

	1	2	3	4	5	6
VARIABLES	TradBanked_A	TradBanked_O	DBIncl_A1	DBIncl_O1	DBIncl_A2	DBIncl_O2
Female	-0.0680*** (0.0159)	-0.0860*** (0.0152)	0.0820*** (0.0197)	0.106*** (0.0214)	0.0336 (0.0298)	0.0236 (0.0262)
Rural	-0.0962*** (0.0174)	-0.0968*** (0.0167)	0.0922*** (0.0204)	0.104*** (0.0219)	-0.104** (0.0318)	-0.0577* (0.0284)
PovLhood	-0.00288*** (0.000343)	-0.00282*** (0.000328)	0.00312*** (0.000427)	0.00304*** (0.000447)	-0.00194** (0.000679)	-0.00274*** (0.000599)
Literacy	0.0693*** (0.0206)	0.0656** (0.0199)	-0.0495 (0.0315)	-0.0590+ (0.0352)	0.295*** (0.0340)	0.228*** (0.0310)
DocStat	0.127*** (0.00682)	0.125*** (0.00691)	-0.129*** (0.00794)	-0.126*** (0.00905)	0.0873*** (0.0141)	0.137*** (0.0122)
LnHHsize	0.0765*** (0.0156)	0.0719*** (0.0154)	-0.0857*** (0.0191)	-0.0752*** (0.0206)	0.00913 (0.0283)	0.0376 (0.0263)
Age	0.00374*** (0.000561)	0.00390*** (0.000547)	-0.00478*** (0.000733)	-0.00535*** (0.000771)	0.00461*** (0.000942)	0.00566*** (0.000879)
Constant	-0.0387 (0.0412)	-0.0405 (0.0408)	1.022*** (0.0533)	1.017*** (0.0613)	0.249*** (0.0702)	0.0337 (0.0675)
Observations	2,956	2,956	2,313	2,070	2,040	2,040
R-squared	0.290	0.301	0.240	0.225	0.199	0.236

Robust standard errors in parentheses

\*\*\* p&lt;0.001, \*\* p&lt;0.01, \* p&lt;0.05, + p&lt;0.1

Table 21 Regression results:Nigeria

	1	2	3	4	5	6
VARIABLES	TradBanked_A	TradBanked_O	DBIncl_A1	DBIncl_O1	DBIncl_A2	DBIncl_O2
Female	0.00296 (0.0135)	-0.0487*** (0.0131)	0.000726 (0.00156)	0.00132 (0.00175)	0.000945 -0.00168	0.00157 -0.00156
Rural	-0.113*** (0.0138)	-0.0841*** (0.0133)	0.000624 (0.00132)	0.00173 (0.00141)	0.000241 -0.00123	0.000981 -0.000981
PovLhood	0.000511+ (0.000293)	-9.43e-05 (0.000287)	-1.01e-05 (1.55e-05)	-5.33e-06 (2.16e-05)	-0.00000225 -0.00000805	-0.00000662 -0.00000677
Literacy	0.258*** (0.0188)	0.242*** (0.0174)	0.000592 (0.000597)	0.000823 (0.000844)	0.000647 -0.00059	0.000583 -0.000587
DocStat	0.105*** (0.00419)	0.113*** (0.00413)	-0.000171 (0.000134)	-0.000135 (0.000124)	0.000195 -0.000217	0.000215 -0.000216
LnHHsize	0.0880*** (0.0140)	0.0843*** (0.0133)	-0.00256 (0.00255)	-0.00265 (0.00317)	-0.0015 -0.00166	-0.00165 -0.00165
Age	0.00474*** (0.000525)	0.00455*** (0.000513)	-7.57e-05 (5.97e-05)	-8.88e-05 (7.23e-05)	-0.000038 -0.0000294	-0.0000273 -0.0000274
Constant	-0.181*** (0.0424)	-0.190*** (0.0410)	0.00665 (0.00536)	0.00594 (0.00655)	0.0023 -0.00168	0.00142 -0.00143
Observations	5,854	5,854	3,120	2,770	2736	2736
R-squared	0.237	0.258	0.004	0.006	0.002	0.003

Robust standard errors in parentheses

\*\*\* p&lt;0.001, \*\* p&lt;0.01, \* p&lt;0.05, + p&lt;0.1

Table 22 Regression results:Pakistan

	1	2	3	4	5	6
VARIABLES	TradBanked_A	TradBanked_O	DBIncl_A1	DBIncl_O1	DBIncl_A2	DBIncl_O2
Female	-0.0669*** (0.00648)	-0.0645*** (0.00629)	0.0569 (0.0405)	0.0168 (0.0296)	-0.0702*** -0.00787	-0.00107 -0.00156
Rural	-0.0454*** (0.00802)	-0.0433*** (0.00781)	0.0272 (0.0323)	0.0222 (0.0175)	-0.0208* -0.00834	0.000807 -0.00149
PovLhood	-0.000832*** (0.000107)	-0.000761*** (0.000103)	0.00356*** (0.000551)	0.000191 (0.000244)	0.000034 -0.000122	-2.67e-05* -0.0000121
Literacy	0.0769*** (0.00691)	0.0763*** (0.00666)	-0.126** (0.0417)	0.0113 (0.0251)	0.0327*** -0.00788	0.00232* -0.00103
DocStat	0.0430*** (0.00433)	0.0394*** (0.00421)	-0.106*** (0.0137)	-0.0135+ (0.00813)	0.0143*** -0.00415	0.000414 -0.000541
LnHHsize	-0.0468*** (0.0135)	-0.0487*** (0.0133)	0.342*** (0.0244)	0.0322* (0.0139)	0.0952*** -0.00769	0.00284* -0.00137
Age	0.00138*** (0.000313)	0.00147*** (0.000301)	-0.0105*** (0.00128)	-0.000808 (0.000933)	-0.00116*** -0.000283	-0.00000877 -0.0000509
Constant	0.0411+ (0.0241)	0.0379 (0.0235)	0.673*** (0.0881)	0.0338 (0.0645)	0.00162 -0.0213	-0.00218 -0.0045
Observations	5,919	5,919	902	501	5400	5400
R-squared	0.111	0.108	0.285	0.030	0.045	0.002

Robust standard errors in parentheses

\*\*\* p&lt;0.001, \*\* p&lt;0.01, \* p&lt;0.05, + p&lt;0.1

Table 23 Regression results:Rwanda

	1	2	3	4	5	6
VARIABLES	TradBanked_A	TradBanked_O	DBIncl_A1	DBIncl_O1	DBIncl_A2	DBIncl_O2
Female	-0.0714*** (0.0180)	-0.0767*** (0.0174)	0.0293 (0.0416)	0.0254 (0.0444)	-0.0738*** (0.0216)	-0.0903*** (0.0209)
Rural	-0.172*** (0.0334)	-0.139*** (0.0325)	0.141** (0.0510)	0.0864 (0.0533)	-0.0930* (0.0418)	-0.0612 (0.0402)
PovLhood	-0.00307*** (0.000568)	-0.00293*** (0.000552)	0.00190+ (0.00101)	0.00176+ (0.00106)	-0.00286*** (0.000750)	-0.00311*** (0.000727)
Literacy	0.0781*** (0.0194)	0.0679*** (0.0187)	0.0927 (0.0596)	0.103 (0.0635)	0.110*** (0.0206)	0.0832*** (0.0207)
DocStat	0.118*** (0.0178)	0.122*** (0.0176)	-0.103*** (0.0286)	-0.119*** (0.0295)	0.103*** (0.0264)	0.101*** (0.0254)
LnHHsize	-0.0989*** (0.0202)	-0.0925*** (0.0193)	0.111** (0.0429)	0.135** (0.0460)	-0.0264 (0.0234)	-0.0203 (0.0221)
Age	0.00191*** (0.000567)	0.00202*** (0.000549)	-0.00824*** (0.00167)	-0.00806*** (0.00181)	-0.00140* (0.000625)	-0.00119* (0.000607)
Constant	0.488*** (0.0736)	0.425*** (0.0711)	0.389* (0.155)	0.416* (0.165)	0.446*** (0.0899)	0.432*** (0.0848)
Observations	1,934	1,934	585	523	1,594	1,594
R-squared	0.187	0.179	0.121	0.116	0.119	0.118

Robust standard errors in parentheses

\*\*\* p&lt;0.001, \*\* p&lt;0.01, \* p&lt;0.05, + p&lt;0.1

Table 24 Regression results:Tanzania

	1	2	3	4	5	6
VARIABLES	TradBanked_A	TradBanked_O	DBIncl_A1	DBIncl_O1	DBIncl_A2	DBIncl_O2
Female	-0.0589*** (0.0165)	-0.0582*** (0.0153)	0.0465* (0.0237)	0.0360 (0.0256)	-0.0576** (0.0208)	-0.0702*** (0.0205)
Rural	-0.0219 (0.0180)	-0.0130 (0.0166)	-0.0149 (0.0254)	-0.0285 (0.0272)	-0.0921*** (0.0233)	-0.0918*** (0.0231)
PovLhood	-0.000111 (0.000320)	-0.000547+ (0.000293)	-0.00183*** (0.000512)	-0.00127* (0.000550)	-0.00412*** (0.000412)	-0.00362*** (0.000407)
Literacy	0.0918*** (0.0219)	0.0571** (0.0207)	0.00129 (0.0421)	0.0384 (0.0471)	0.186*** (0.0267)	0.175*** (0.0248)
DocStat	0.0253* (0.0117)	0.0353** (0.0111)	0.00339 (0.0153)	-0.00746 (0.0161)	0.101*** (0.0130)	0.104*** (0.0128)
LnHHsize	-0.124*** (0.0154)	-0.119*** (0.0140)	0.117*** (0.0258)	0.139*** (0.0279)	-0.0760*** (0.0192)	-0.0680*** (0.0186)
Age	0.00152** (0.000551)	0.00136** (0.000511)	-0.00167* (0.000836)	-0.00159+ (0.000902)	0.000426 (0.000688)	0.000855 (0.000670)
Constant	0.253*** (0.0499)	0.246*** (0.0462)	0.633*** (0.0794)	0.590*** (0.0867)	0.620*** (0.0600)	0.509*** (0.0583)
Observations	2,956	2,956	1,758	1,486	2,209	2,209
R-squared	0.045	0.044	0.068	0.067	0.139	0.131

Robust standard errors in parentheses

\*\*\* p&lt;0.001, \*\* p&lt;0.01, \* p&lt;0.05, + p&lt;0.1

Figure 1 Venn diagram visualization.

CB=Access and/or ownership through conventional banks. DFS=Access to/ownership of formal account by way of digital financial service. The overlap represent population who have both conventional and digital financial service

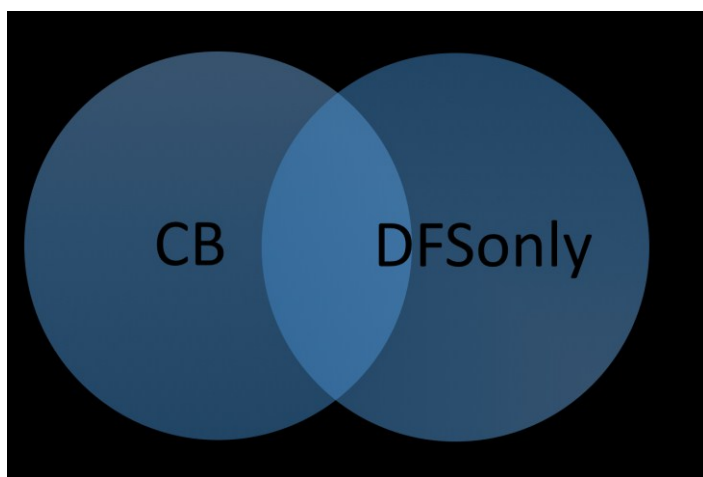


Figure 2 Percentage of urban and rural population by country

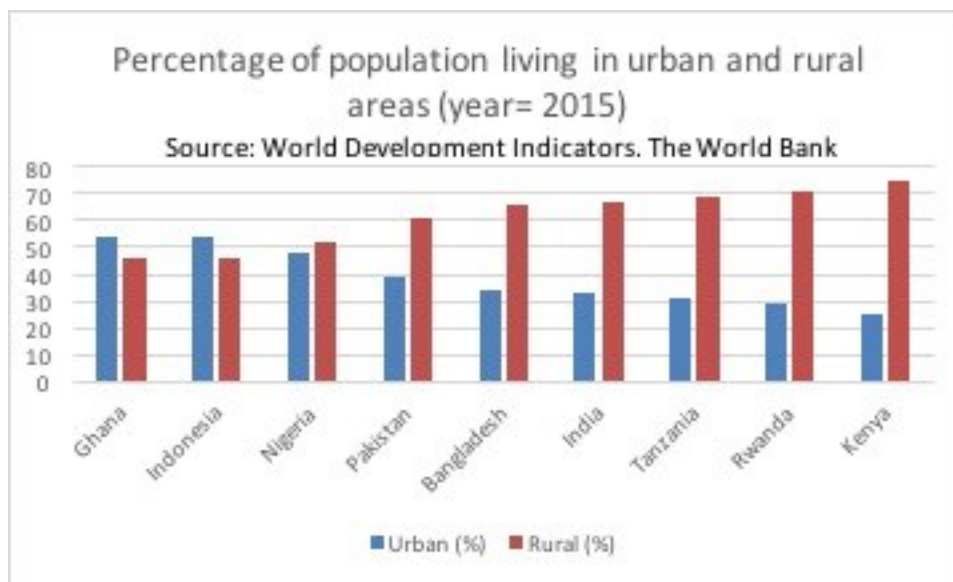


Figure 3 Access to electricity in rural and urban areas by country

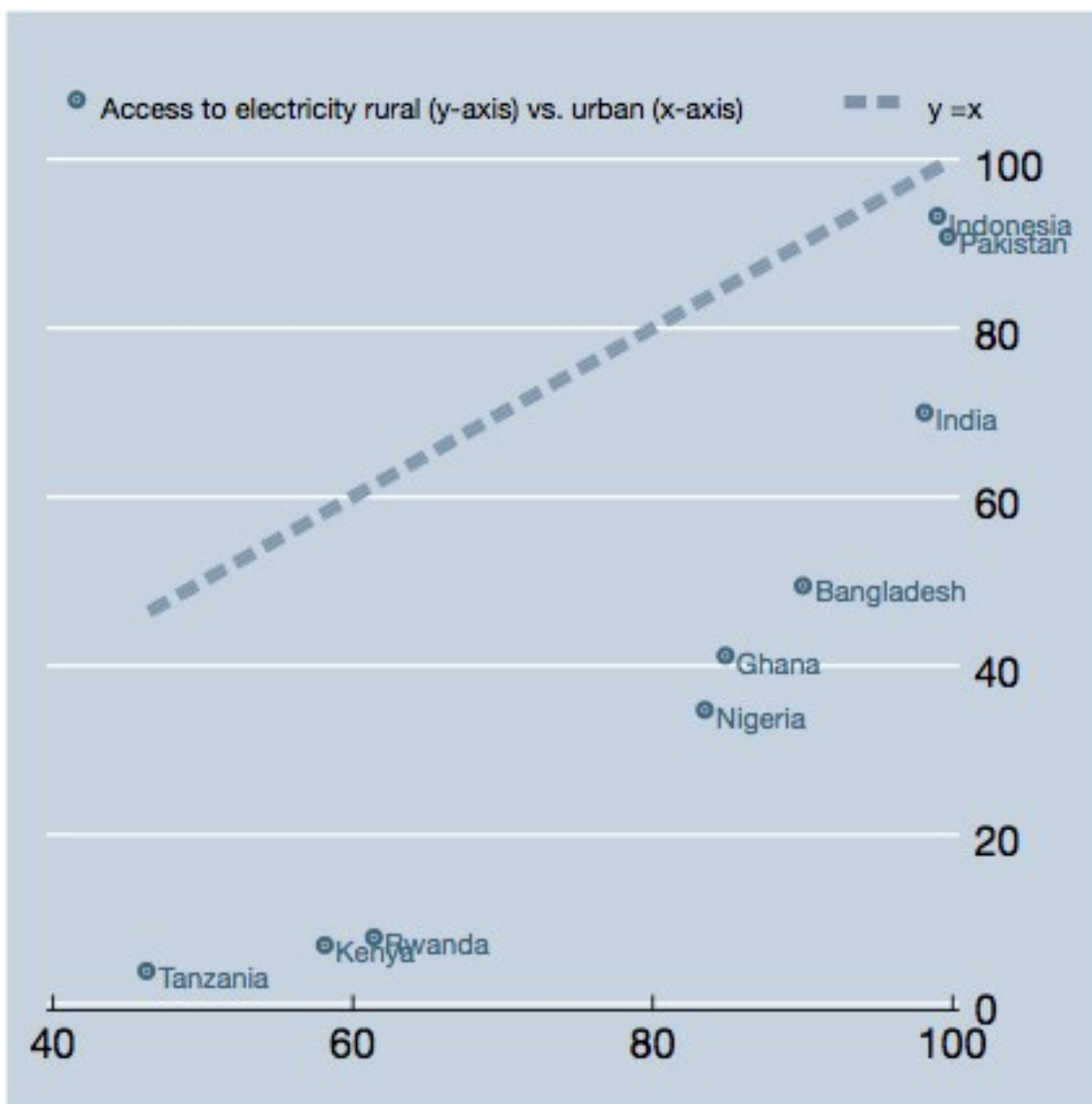




Figure 4 Literacy rate by country

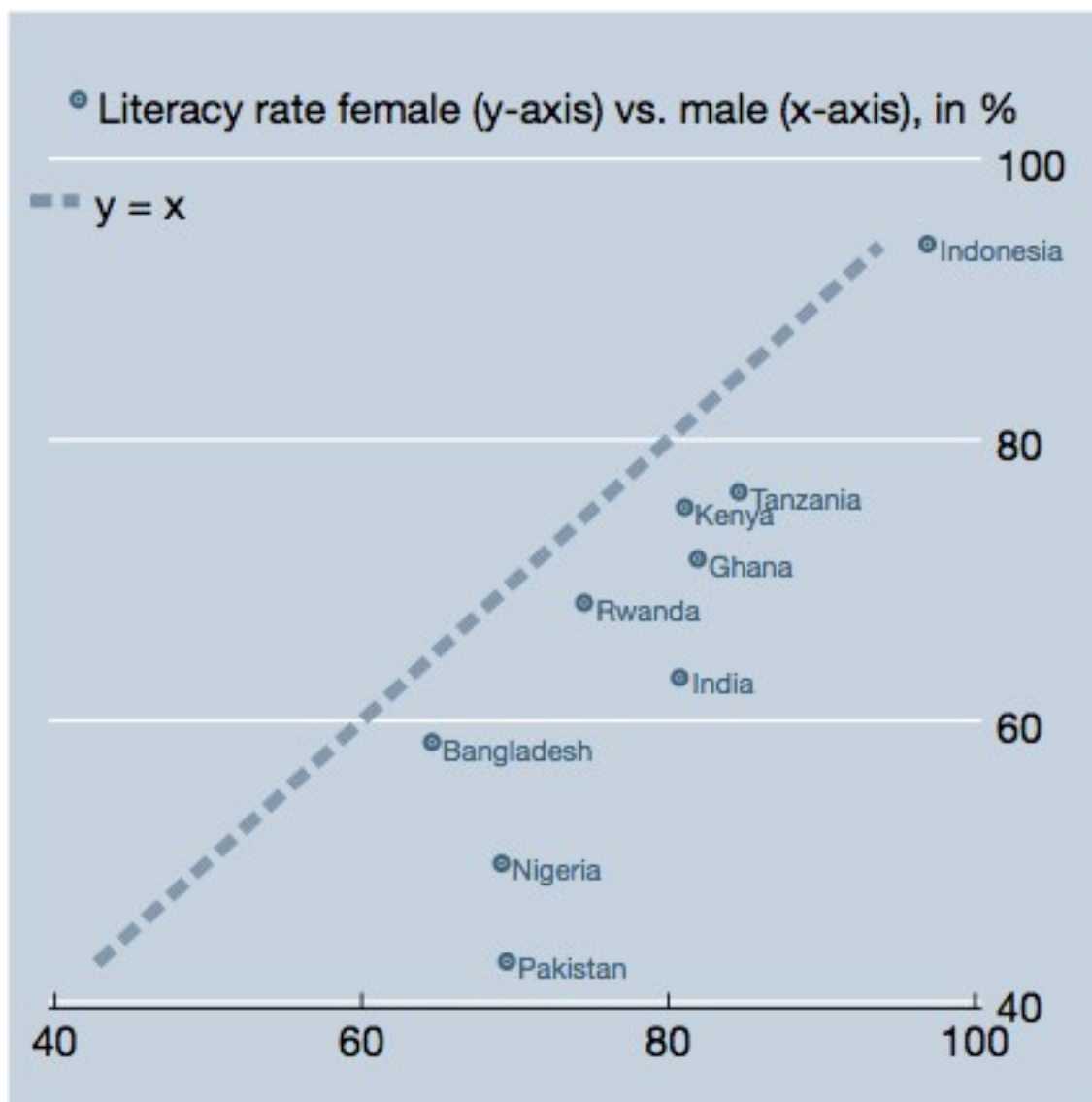


Figure 5 Labor participation ratio by country

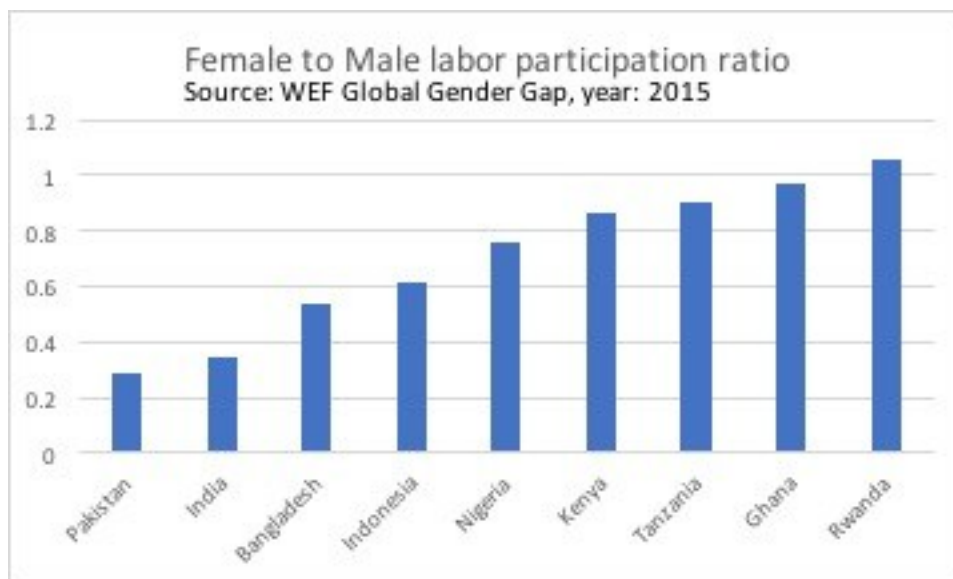


Figure 6 Earned income ratio (Female to Male) by country

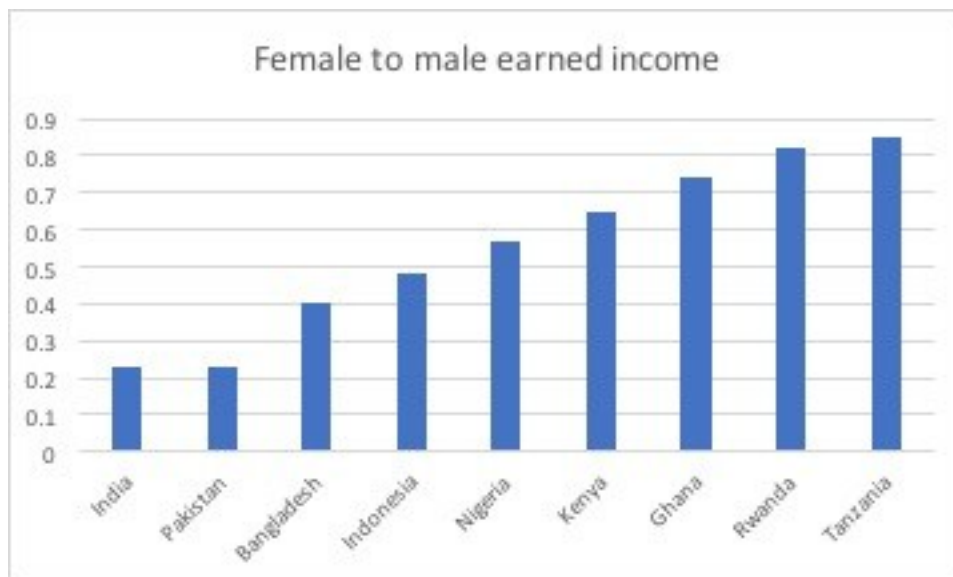


Figure 7 Fertility rate by country

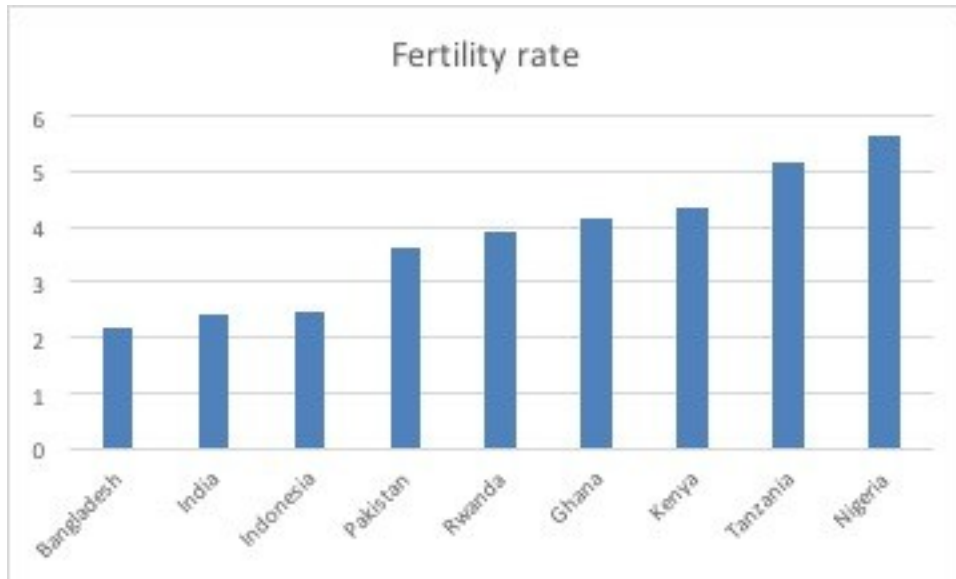
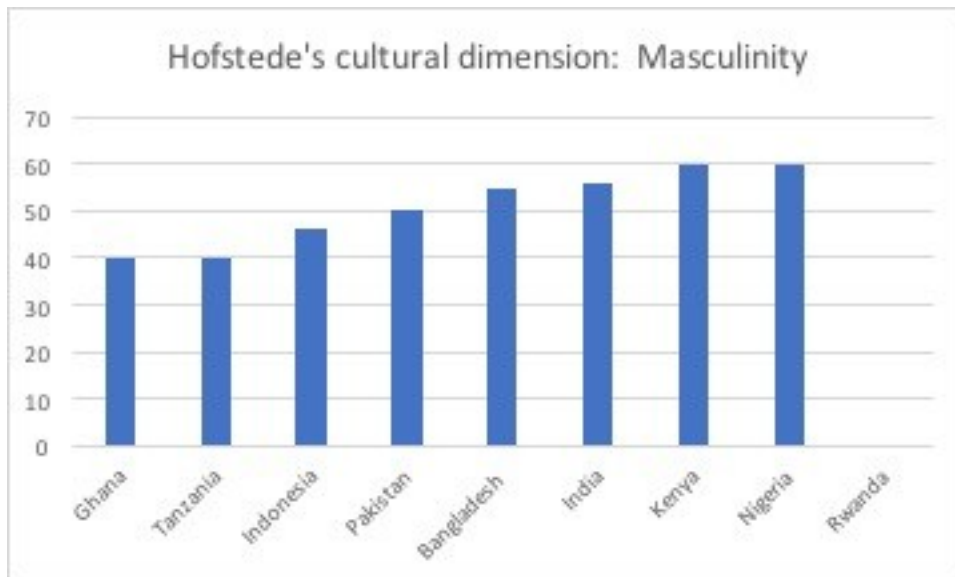
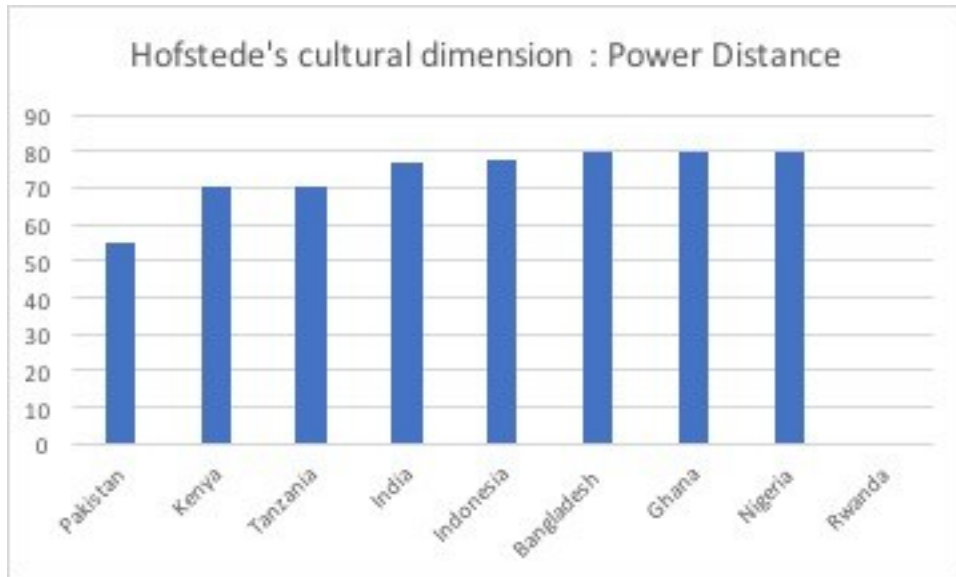


Figure 8 Hofstede's cultural dimension: Masculinity



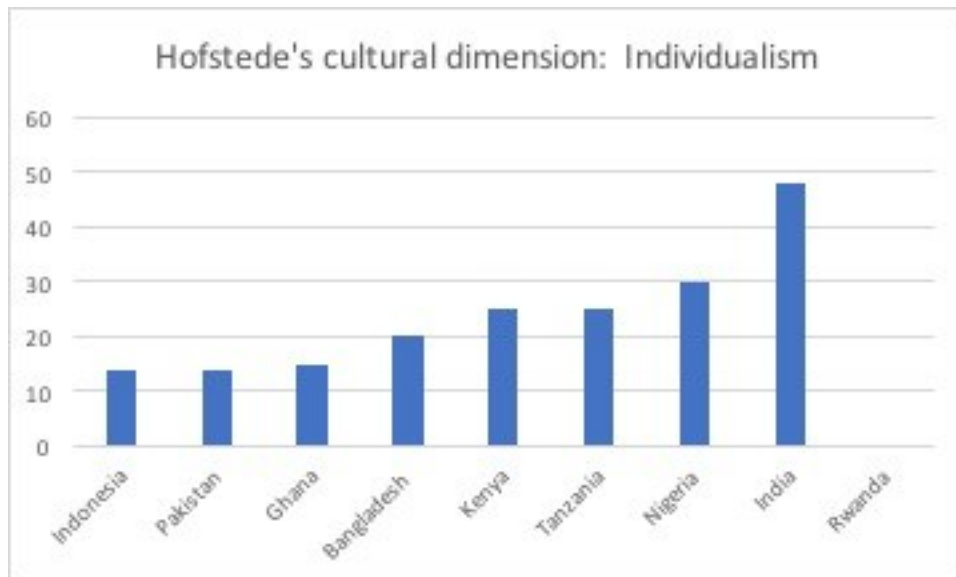
Note: Rwanda: no data

Figure 9 Hofstede's cultural dimension: Power distance



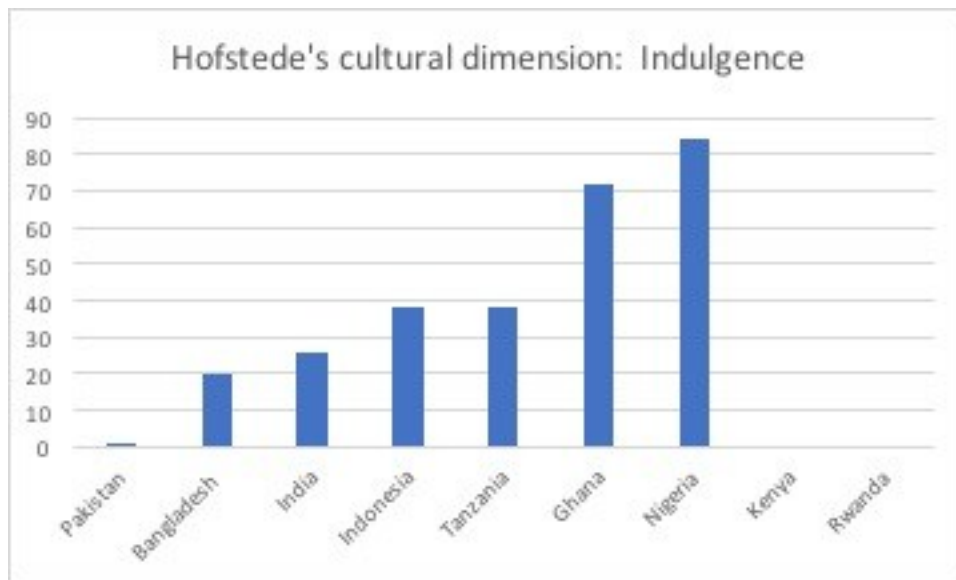
Note: Rwanda: no data

Figure 10 Hofstede's cultural dimension: Individualism



Note: Rwanda: no data

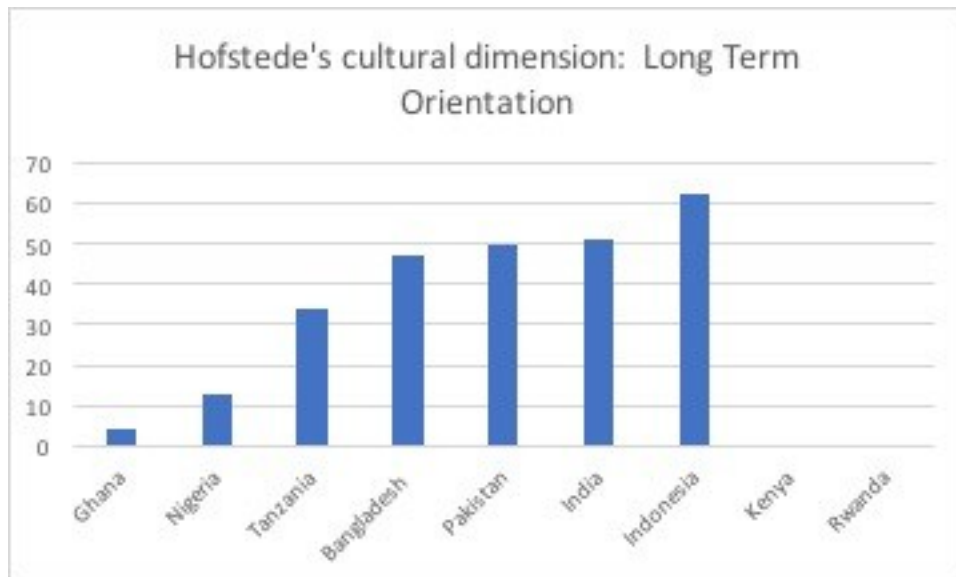
Figure 11 Hofstede's cultural dimension: Indulgence



Note: Rwanda and Kenya: no data. Pakistan = 0 (zero)

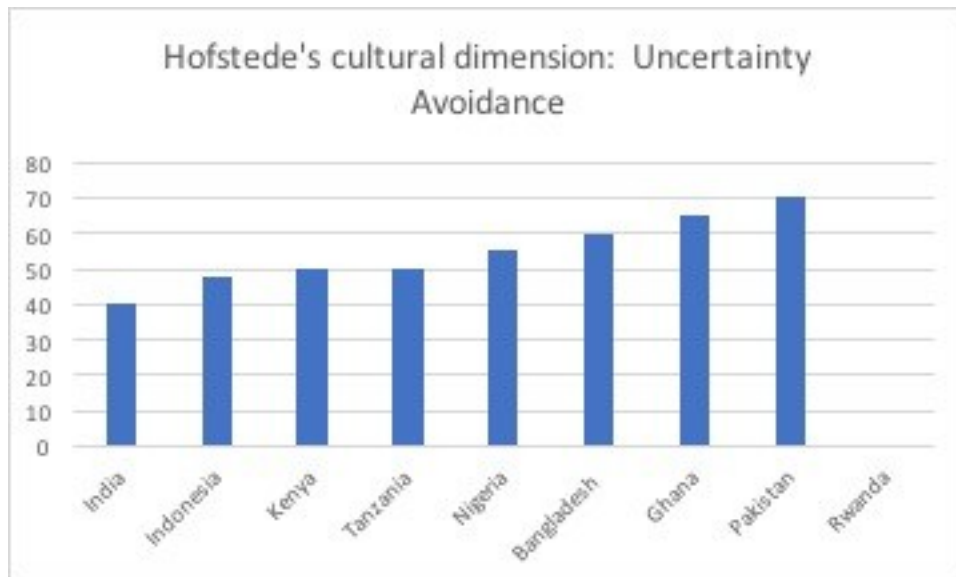


Figure 12 Hofstede's cultural dimension: Long Term Orientation



Note: Kenya and Rwanda: no data

Figure 13 Hofstede's cultural dimension: uncertainty avoidance



Note: Rwanda: no data

Figure 14 Mobile cellular subscription by country

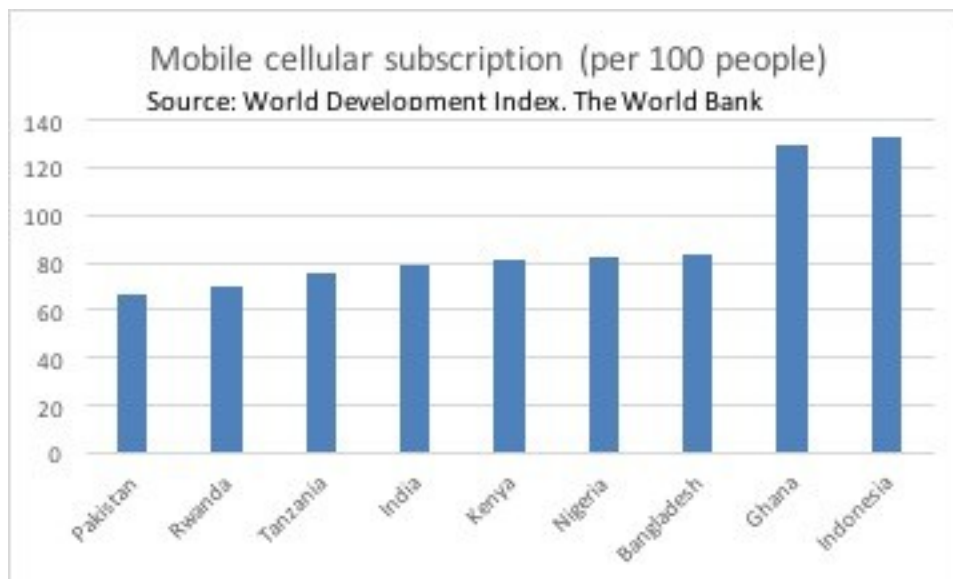


Figure 15 Bangladesh. AccessCB=1430 (12%), AccessDB=1629(16%), AccessCB/DB=680(6%),AccessNone=7704(67%)

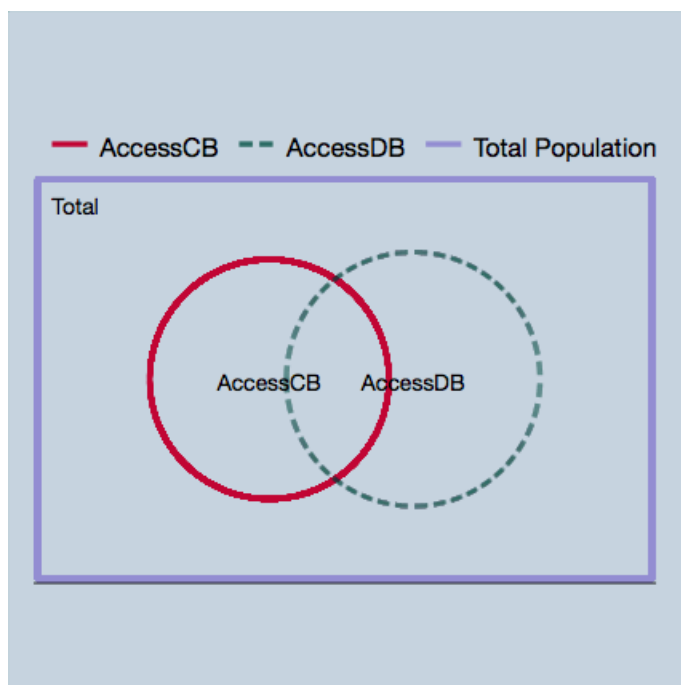


Figure 16 Bangladesh. OwnCB=1780(14%), OwnDB=278(3%), OwnCB/DB=184(2%), OwnNone=9264(81%)

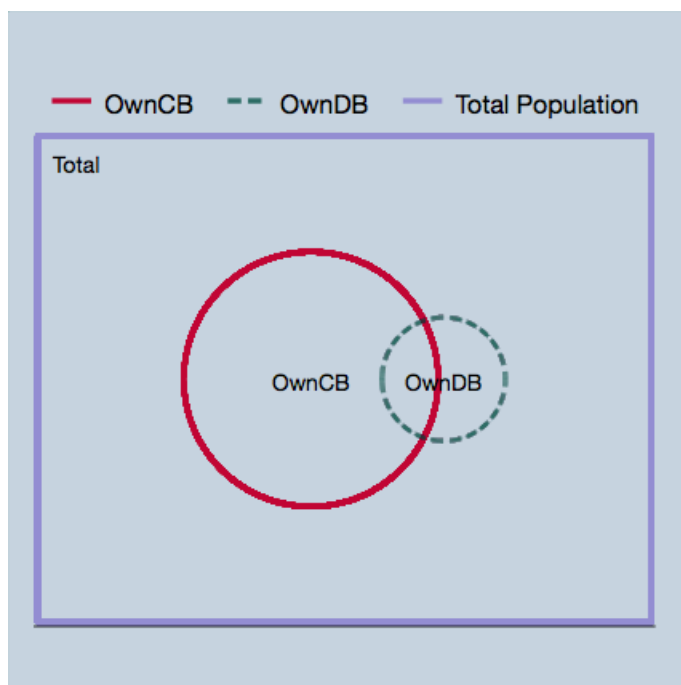


Figure 17 Bangladesh. AccessDB=1910(17%), AccessDB/OwnDB=462(4%), OwnDB=0 (0%), NoDB=9134(79%)

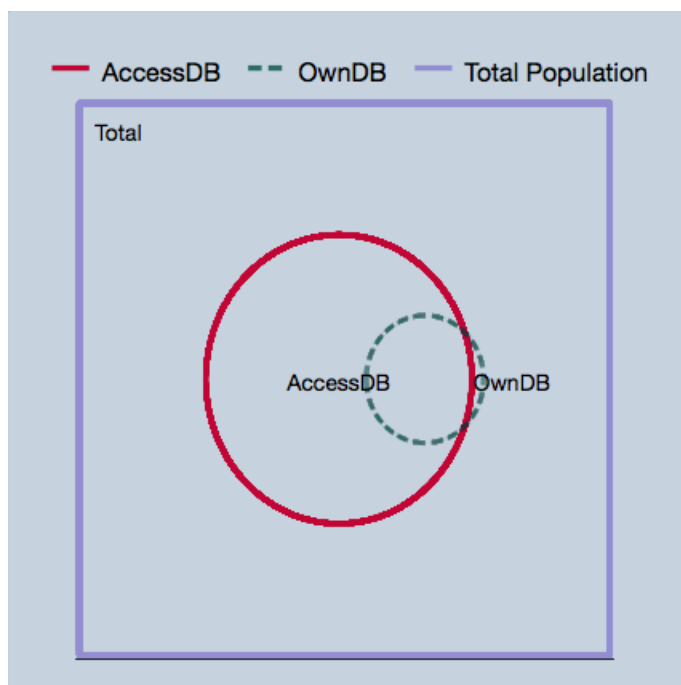


Figure 18 Ghana. AccessCB=1236 (21%), AccessDB=906 (15%),  
AccessCB/DB=900(15%), AccessNone=2932(49%)

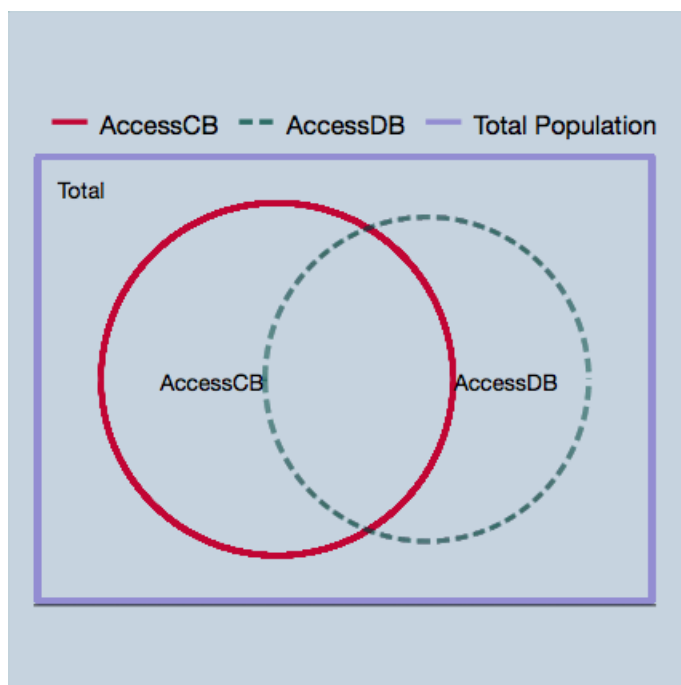


Figure 19 Ghana. OwnCB=1390(24%), OwnDB=630(10%), OwnCB/DB=628(10%), OwnNone=3326(56%)

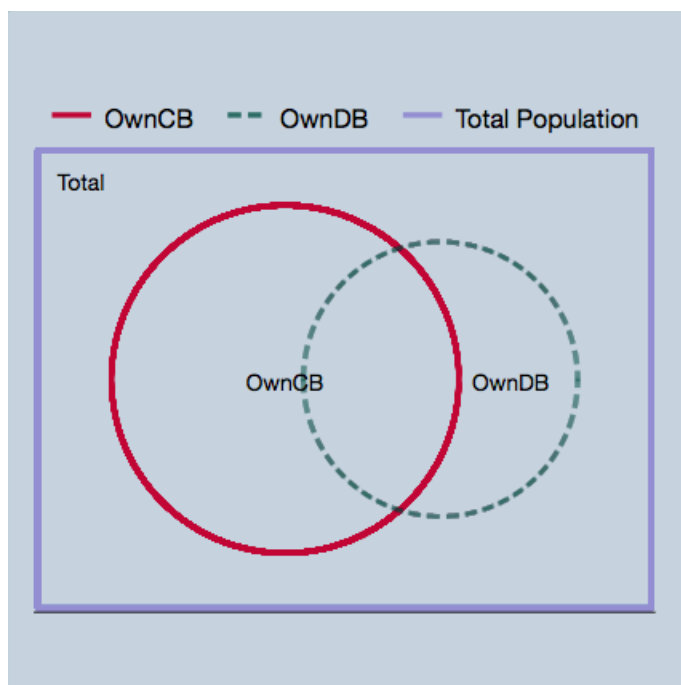




Figure 20 Ghana. AccesDB=566 (9%), OwnDB=18 (0%),  
AccessDB/OwnDB=1240(21%),NoDB=4150(69%)

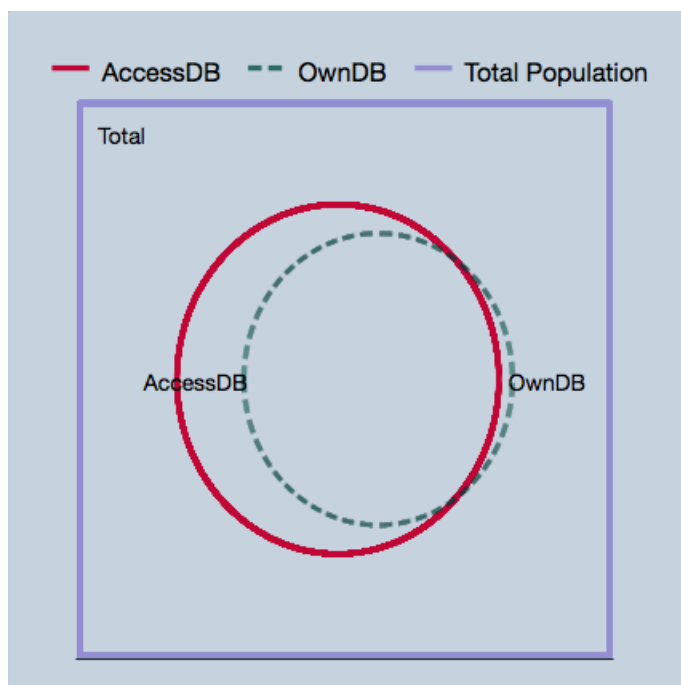


Figure 21 India. AccessCB=49748(56%), AccessDB=8(0%),AccessCB/DB=160(0%),  
AccessNone=40216(44%)

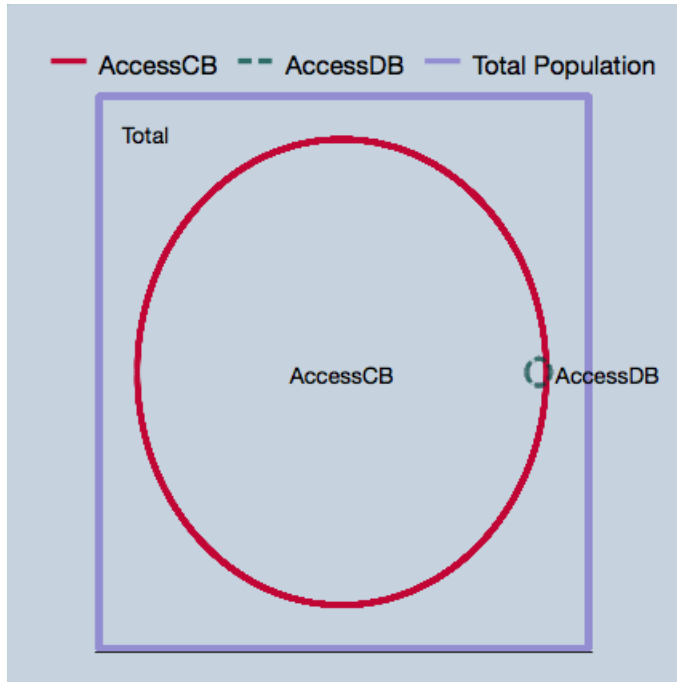


Figure 22 India. OwnCB=49154(55%), OwnDB=8(0%), OwnCB/DB=144(0%),OwnNone=40826(45%)

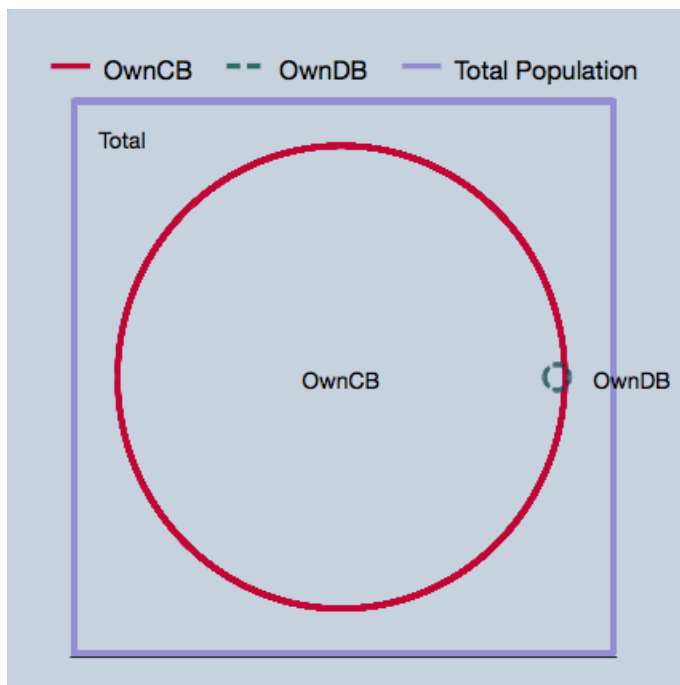


Figure 23 India. AccessCB=20, OwnCB=4, AccessCB/OwnCB=148, NoDB=89960

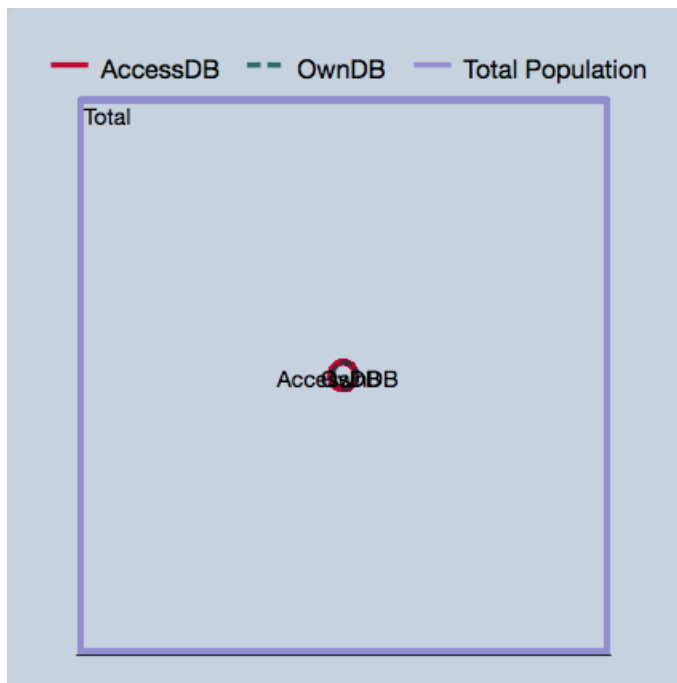


Figure 24 Indonesia. AccessCB=1518(27%), AccessDB=0(0%), AccessCB/DB=4(0%), AccessNone=4239(73%)

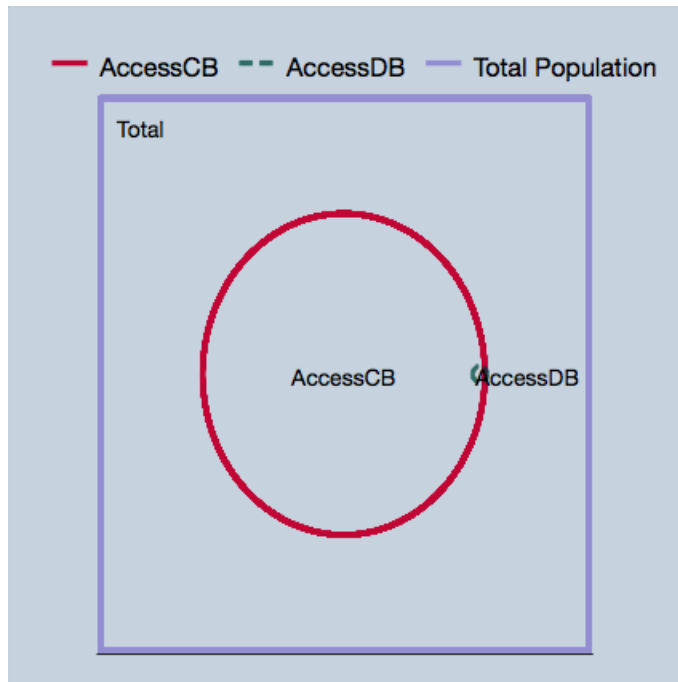


Figure 25 Indonesia. OwnCB:1105 (20%), OwnDB=0(0%),  
OwnCB/DB=4(0%),OwnNone:4652(80%)

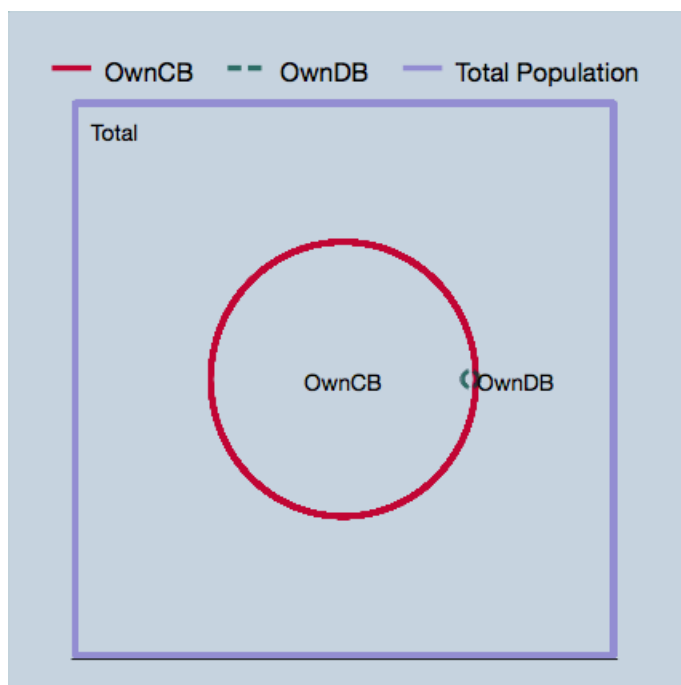


Figure 26 Indonesia. AccessDB/OwnDB=4(0%), NoDB=5753

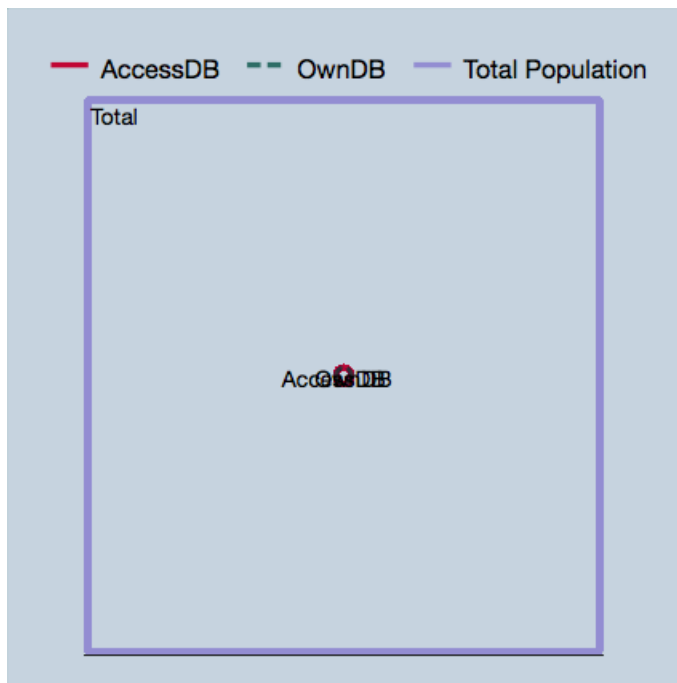


Figure 27 Kenya. AccessCB=40 (1.1%), AccessDB=1407(47%), AccessCB/DB=878(30%), AccessNone=644(22%)

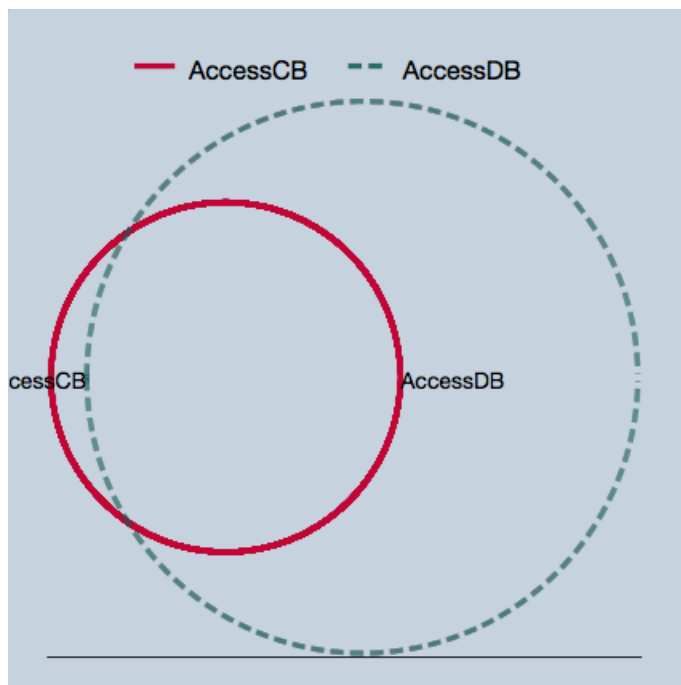




Figure 28 Kenya. OwnCB=52 (2%), OwnDB=1217(41%), OwnCB/DB=814(27%), OwnNone=886(30%)

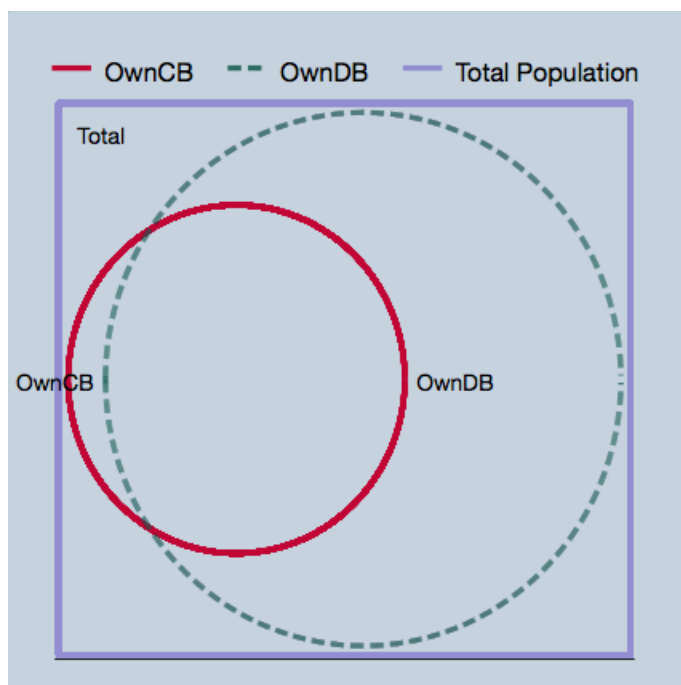


Figure 29 Kenya. AccessDB=260(9%),  
OwnDB=6(0%),AccessDBOwnDB=2025(68%),NoDB=678(23%)

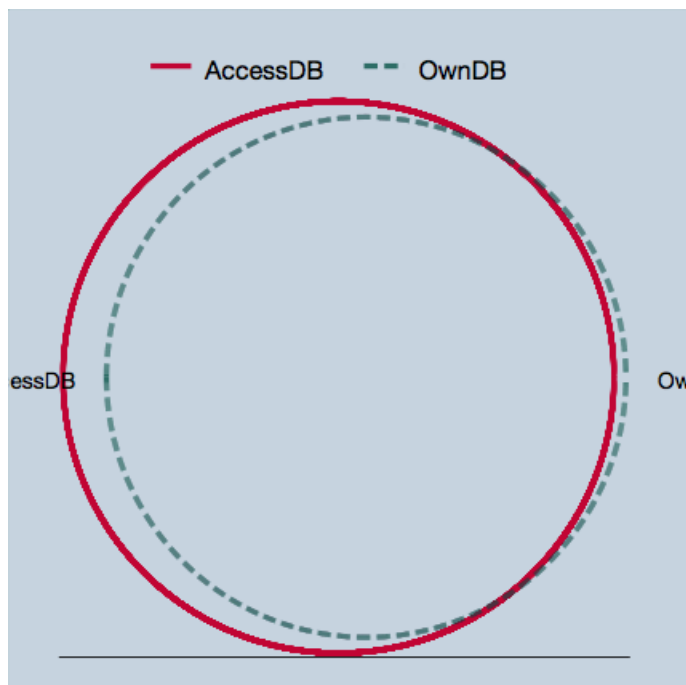


Figure 30 Nigeria. AccessCB=3079 (53%), AccessDB=2(0%), AccessCB/DB=39(1%),  
AccessNone=2734(47%)

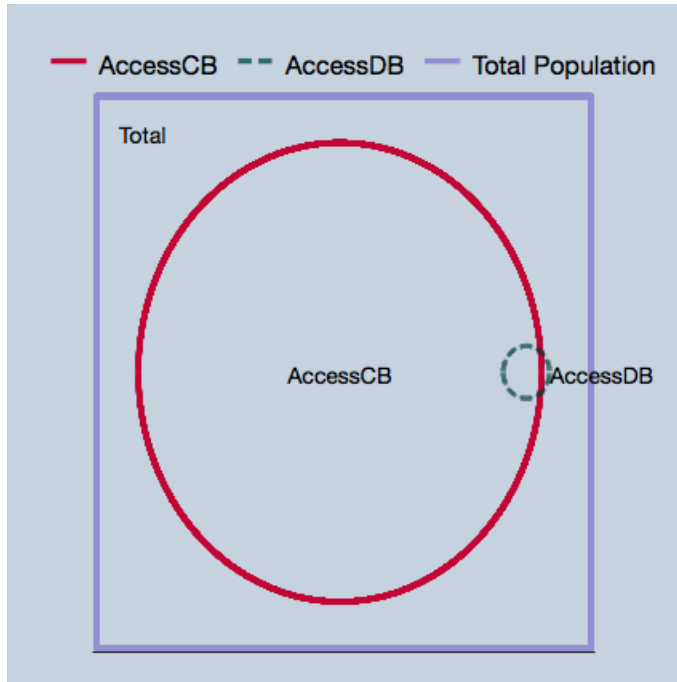


Figure 31 Nigeria. OwnCB=1780(14%),OwnDB=278(3%),  
OwnCB/DB=184(2%),OwnNone=9264(81%)

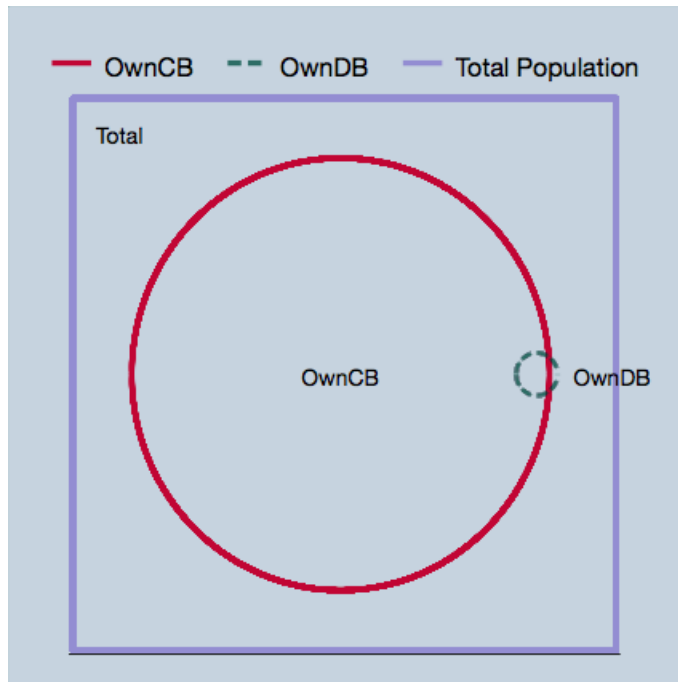


Figure 32 Nigeria. AccessDB=14 (0%), OwnDB=0(0%),AccessCB/DB=27(0%),NoDB=5813(99%)

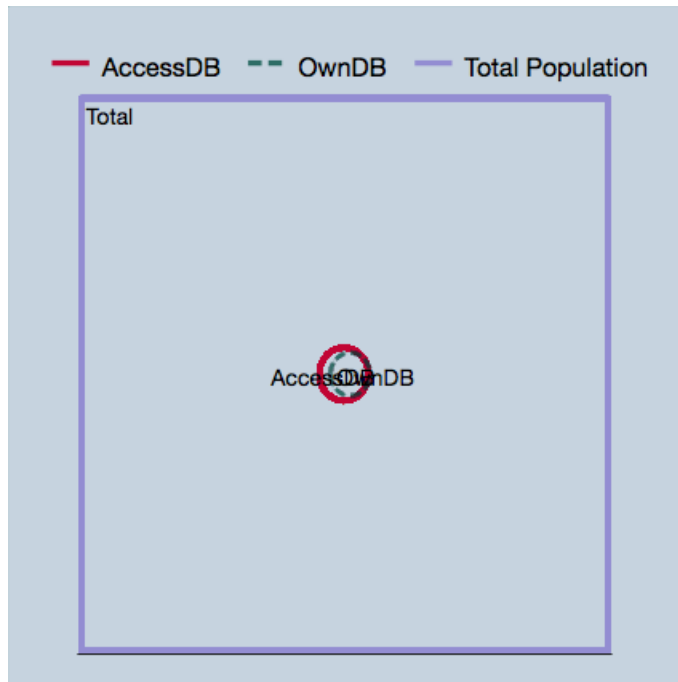


Figure 33 Pakistan. AccessCB=424(8%), AccessDB=383(7%), AccessCB/DB=95(2%),AccessNone=5017(85%)



Figure 34 Pakistan. OwnCB=483(8%), OwnDB=11(0.2%), OwnCB/DB=7(0.1%), OwnNone=5418(92%)

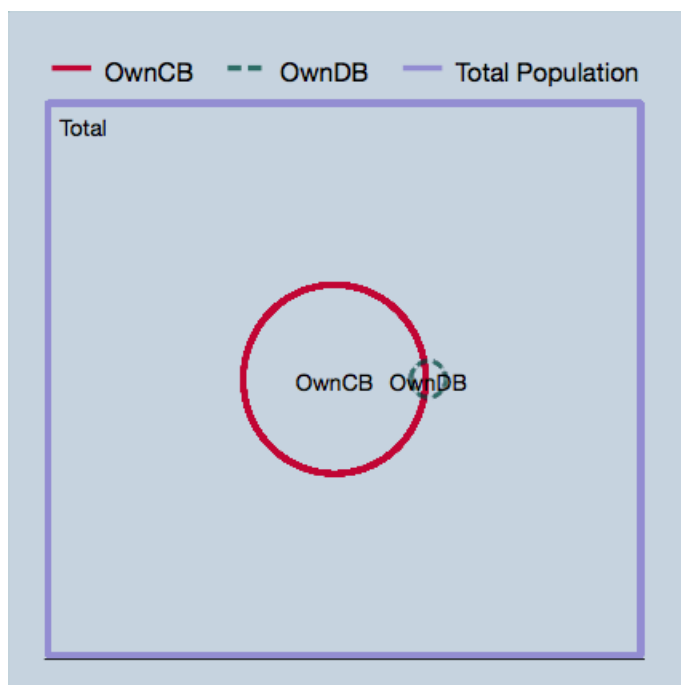


Figure 35 Pakistan. AccessDB=460 (8%), OwnDB=0(0%), AccessDB/OwnDB=18(0%),NoDB=5441(92%)





Figure 36 Rwanda. AccessCB=155(8%), AccessDB=245(13%),  
AccessCB/DB=185(10%),AccessNone=1349(70%)

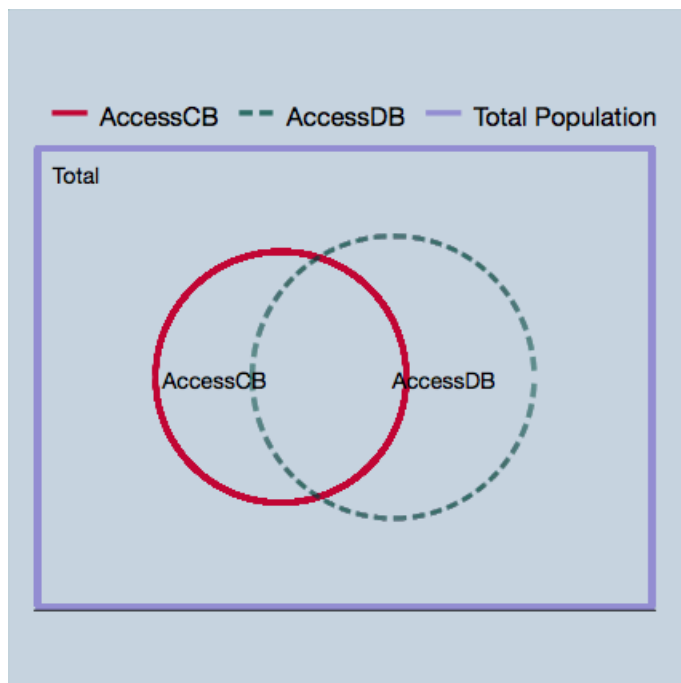


Figure 37 Rwanda.OwnCB=140 (7%), OwnDB=231 (12%),  
OwnCB/DB=164(8%),OwnNone:1399(72%)

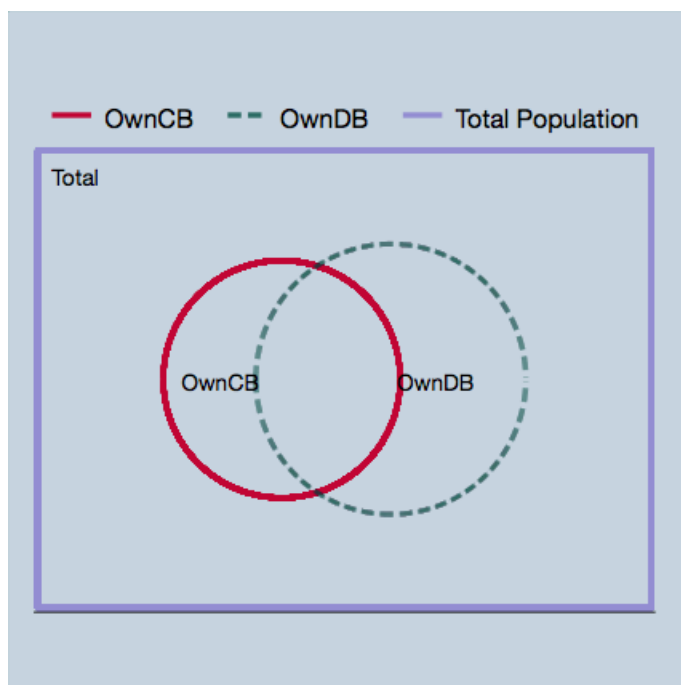


Figure 38 Rwanda AccessDB=51(3%),  
OwnDB=16(1%),AccessDBOwnDB=379(28%),NoDB=1488(77%)

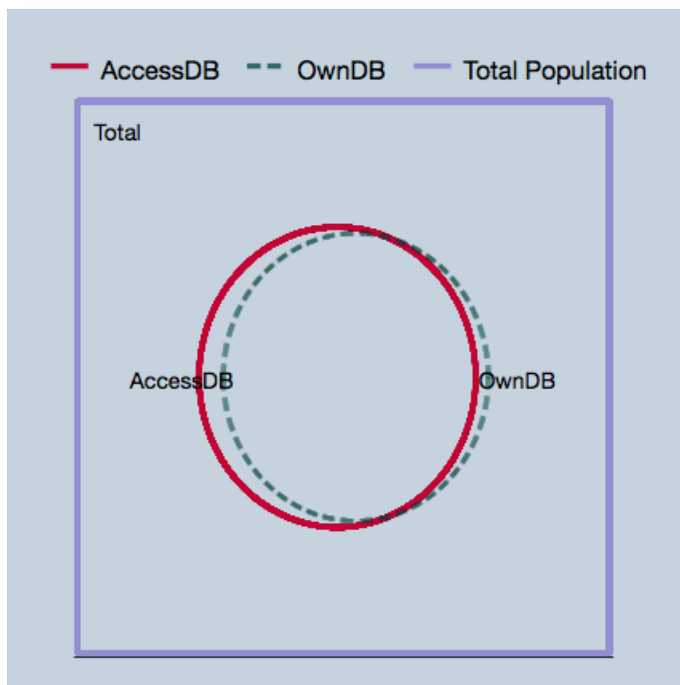


Figure 39 Tanzania. AccessCB=473(16%), AccessDB=1011(34%),  
AccessCB/DB=274(9%), AccessNone=1198(41%)

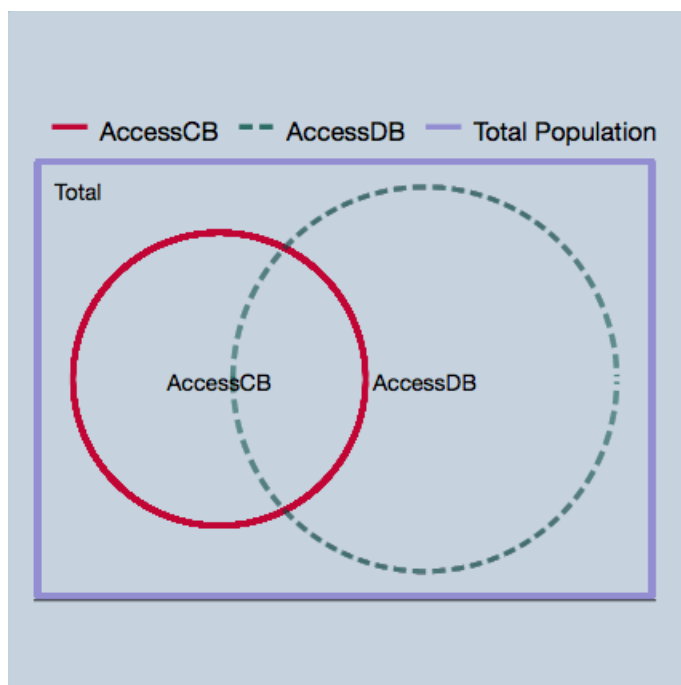


Figure 40 Tanzania. OwnCB: 384(13%), OwnDB: 889(30%), OwnCB/DB=213(7%),  
OwnNone=1370(50%)

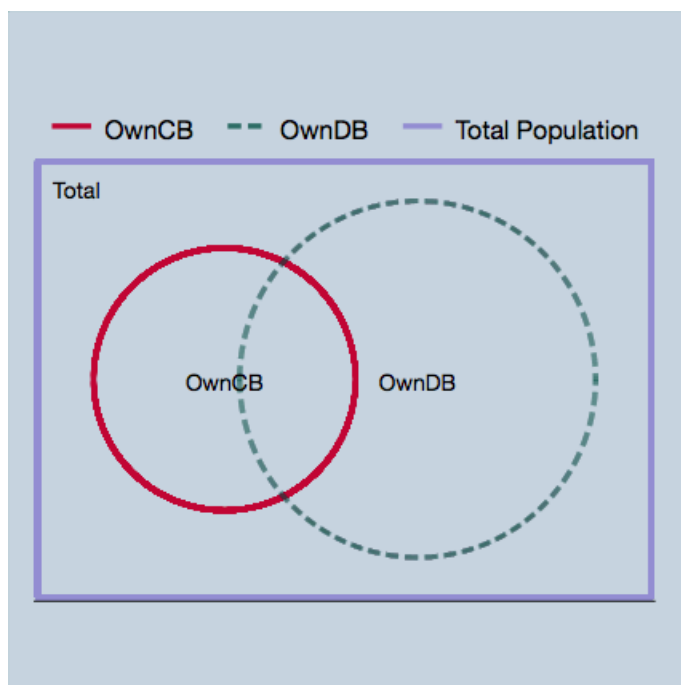


Figure 41 Tanzania. AccessDB: 384(13%), OwnDB=889(30%),  
AccessDB/OwnDB=213(7%), NoDB=1470(50%)

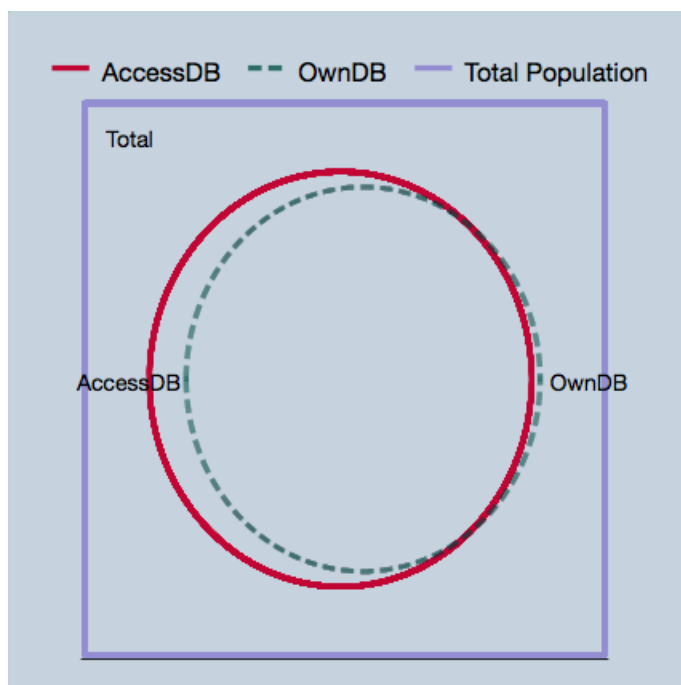


Figure 42 Graphical representation of Model 1 Dependent Variable and Sample used in the regression

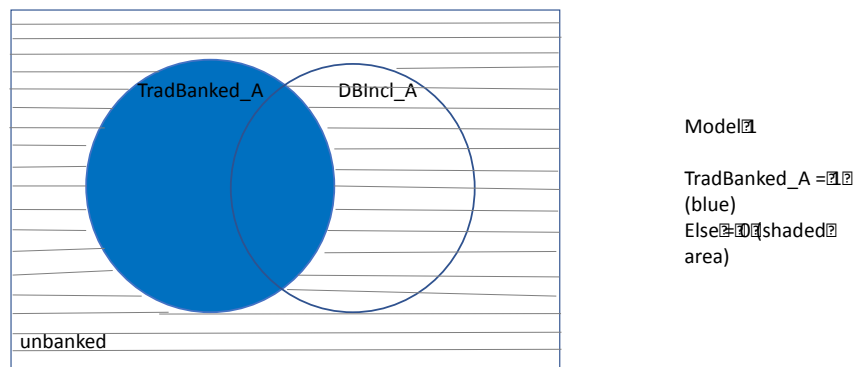


Figure 43 Graphical representation of Model 2 Dependent Variable and Sample included in the regressions

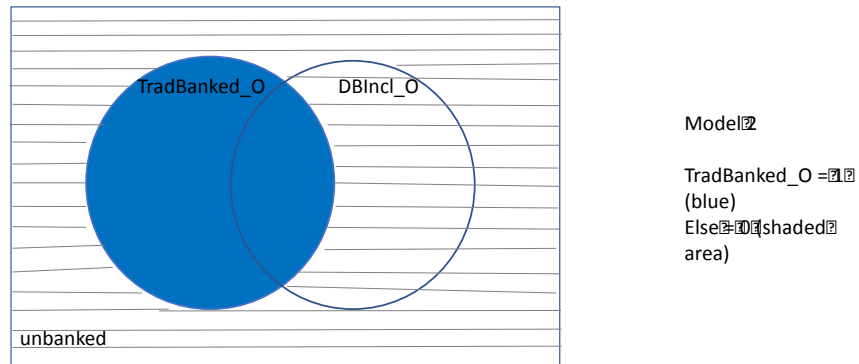




Figure 44 Graphical representation of Model 3 Dependent Variable and Sample included in the regression

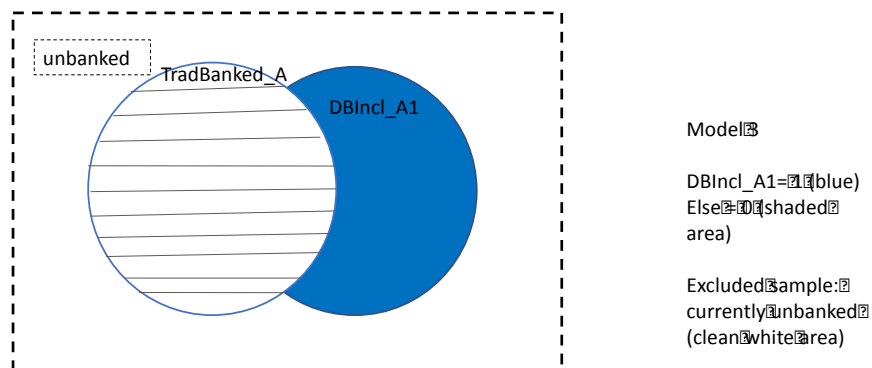


Figure 45 Graphical representation of Model 4 Dependent Variable and Sample included in the regression

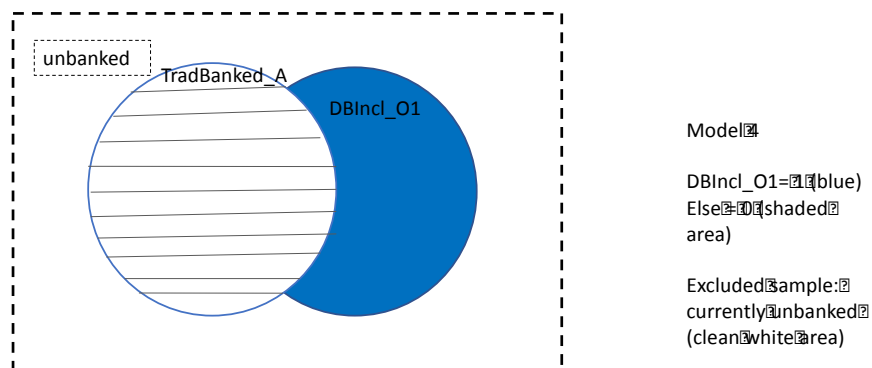


Figure 46 Graphical representation of Model 5 Dependent Variable and Sample included in the regression

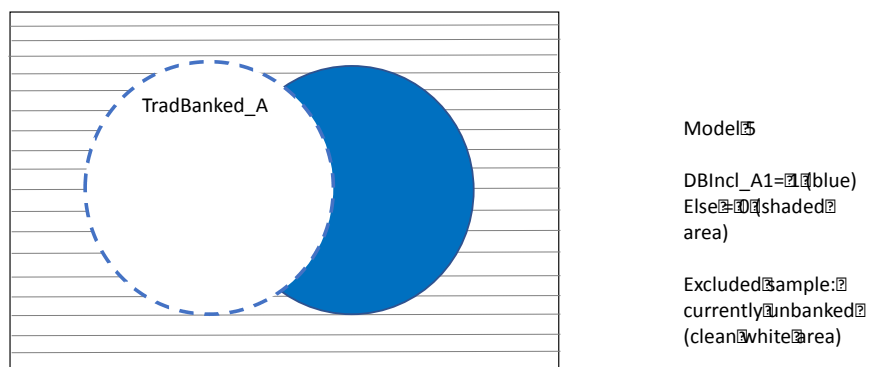
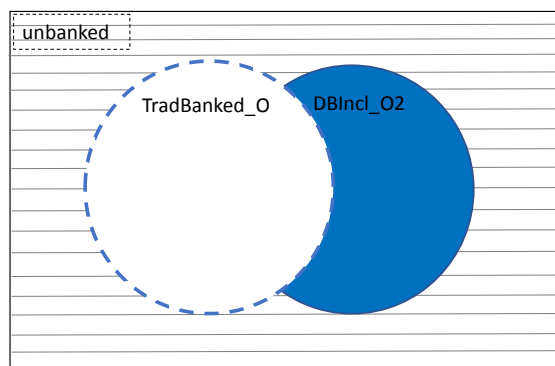


Figure 47 Graphical representation of Model 6 Dependent Variable and Sample included in the regression



Model 6

DBIncl\_O2=1 (blue)

Else=0 (shaded area)

Excluded Sample:

Banked through conventional bank

(clean white area)

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## CHAPTER 3. ESSAY 2. OWNERSHIP STRUCTURE AND ECONOMIC PERFORMANCE: AN EVIDENCE FROM THE INDONESIAN BANKING SECTOR

### 3.1 ABSTRACT

Research on the impact of ownership structure on a firm's performance has its roots in Financial Economics, yet the strategy field also increasingly recognizes the importance of ownership on a firm's economic performance. While share concentration is an important determinant of a firm's performance, past research has only implicitly acquiesced to the idea that heterogeneity of owners' capabilities play a role in explaining the magnitude of impact of share concentration on a firm's economic performance. Drawing on the agency theory, this study will analyze how ownership structure, for example, share concentration and owners' identities influence a firm's economic performance.

By using a novel and comprehensive banking dataset that was parsed from the Indonesian Financial Services Authority's quarterly reports, I was able to employ fixed-effect estimation to obtain statistically precise estimates of the effect of owners' identities and the ensuing concentration on economic performance. In this research, economic performance is proxied using four measurements: Return on Assets; Return on Equity; Operating Expense to Revenue Ratio and Non-performing Loan.

## 3.2 INTRODUCTION

Literature on corporate governance has established the importance of ownership structure on economic performance (Desender, Aguilera, Lópezpuertas-Lamy, & Crespi, 2016; Douma, George, & Kabir, 2006; Pedersen & Thomsen, 1999; Shleifer & Vishny, 1997; Short, 1994; Thomsen & Pedersen, 2000). One of the elements of ownership structure commonly researched is ownership concentration. Aided with an agency theory lens, strategic management literature seeks explanations on the link between ownership concentration and corporate strategy, as well as firms' performance (Denis, Denis, & Sarin, 1999). In the context of developed economies, principal-agent goal incongruence was found to be an antecedent of corporate strategy in the form of unrelated mergers and acquisitions. These are a set of strategies that benefit managers more than owners and negatively impact a firm's economic performance (Arikan & Stulz, 2016; Lane, Cannella, & Lubatkin, 1998). The impact of diversification was tested on different emerging economies. It was found that the impact was the opposite: diversification improves the firm's performance in the least developed environments (Chakrabarti, Singh, & Mahmood, 2007).

Adding to past research on the impact of ownership structure on performance, this essay focuses on both owner identity and concentration dimensions of ownership structure. Evidence points out the importance of owner identities (R. Dharwadkar, Goranova, Brandes, & Khan, 2008; Douma et al., 2006; Pedersen & Thomsen, 1999). I argue that different owners' identities translate to varied objectives, monitoring incentives, and capability, and thus owners' identities impact a firm's performance differently. Next, ownership concentration is a proxy of the magnitude of shareholder potential power

(Desender et al., 2016; Douma et al., 2006; Pedersen & Thomsen, 1999; Thomsen & Pedersen, 2000). Power is the ability to influence others to do what you want them to do. However, the effect of power on an outcome is inextricably intertwined with the entity which wields it (Heimans & Timms, 2014; Nye, 1990; Patel & Cooper, 2014). Alongside the direct effects of identity and power, this essay also takes into account the joint effect of power and identity to assess their implications on firms' economic performance.

The strength of governance on corporate control also impacts a firm's performance (Guillén & Capron, 2015). This can mask or compensate for an owner's lack of ability to monitor managers. For example, the United Kingdom and Canada, are both developed nations and both have strong corporate control governance. Minority shareholders, those with smaller shares compared to the major shareholders, can exert influence to monitor managers and mitigate agency problems (B. Dharwadkar, George, & Brandes, 2000). In other words, the strength of governance can compensate for a shareholder's lack of capacity to minimize agency problems. To minimize the likelihood of interference from compensating effects of strong corporate governance that are inherently embedded in advanced economic settings, I used an emerging market data to test the impact of several most prevalent ownership identities on performance for this study. In line with Thomsen and Pedersen's study on the largest European companies (2000), I found that owners' identities have statistically significant impact on performance. Lastly, I find that the magnitude and significance of impact of concentration on performance is influenced by owner identity.

This essay reveals three main contributions to the literature and practice of strategic management. First, data on ownership structure in emerging markets has been and is still

currently scarce (Daily, Dalton, & Rajagopalan, 2003). Due to this scarcity, theory-based conjectural papers on how corporate governance in emerging markets may differ outgrew their empirically supported counterparts. Given these theories, we can strongly infer that emerging markets differ, but less is known about differences in what, by how much, and how significant these differences are. Data scarcity on emerging economies also hinder theory testing. Many papers on emerging economies have to settle with either cross-sectional analysis, which is vulnerable to spurious explanatory power, or longitudinal data analysis with inappropriate matching of T/N ratio and estimation methods and insufficient granularity that also leads to spurious explanatory power. This prevents a legitimate hypothesis testing with adequate control over endogeneity issues, panel contemporaneous correlation, heteroskedasticity and occasional time-trend. In this paper, I am using 40-quarter long data and a fixed-effects estimation methods that also takes into account aforementioned issues in variance-covariance matrix. This allows for a more precise hypothesis testing on the ownership effect on performance as conservatively as possible. Second, data analysis indicates that there are gains from ownership restructuring to establish a better fit between ownership structure and value-maximizing corporate strategy. Third, analysis indicates that contrary to popular belief and cross-sectional analysis, this essay provides evidence that foreign ownership does not always improve a firm's performance. In other words, while it may impact overall industry performance, it does not always positively impact an individual firm.

### 3.3 THEORETICAL DEVELOPMENT AND HYPOTHESES

#### **Share Concentration and Performance**

Agency theory has been the dominant theoretical lens to analyze the impact of ownership structure on performance (B. Dharwadkar et al., 2000; La Porta, Lopez-De-Silanes, Shleifer, & Vishny, 2000; Pedersen & Thomsen, 1999; Shleifer & Vishny, 1997). Agency theory explains that the goals between principal (owner) and agency(manager) may differ (Alchian & Demsetz, 1972; Jensen & Meckling, 1976). Principals want to maximize performance on returns and profits, whereas agents may have other selfish interests. Due to this self-interest, agents pursue goals that maximize their own benefits. This pursuit can erode principals' returns. In the context of firm performance, holding superior resources does not directly lead to superior performance; expropriation by unmonitored agents can minimize the impact of a firms' superior resources (Coff, 2012). A seminal paper by Amihud and Lev argued that companies controlled by large blocks of holders reduces diversification strategy value and places limits on an effective diversification strategy (Amihud & Lev, 1981). While another paper questions the findings of Amihud and Lev (Lane et al., 1998), subsequent papers, both in the fields of finance and strategy, find supporting evidence for agency problems (Denis et al., 1999; Douma et al., 2006; Pedersen & Thomsen, 1999). An important dimension of ownership structure, the ownership concentration, was found to be an important determinant of performance. The higher the ownership concentration, the less likely for value-reducing diversification to occur (Bergh, 1995). High ownership concentration implies high stakes being carried by the top owner. It gives rise to principal's strong incentive to monitor, hence value-reducing diversification is curbed. Larger owners will have a stronger motive to monitor and more power to pursue their objectives and this should increase the inclination of managers to maximize value (Thomsen & Pedersen, 2000).

*Hypothesis 1: Ownership concentration positively impacts performance.*

### **Top Owner Identities and Performance: Financial institution, Conglomerate, and Government as Top Owners**

Another important dimension of ownership structure is the top owner's identity (Pedersen & Thomsen, 1999). The standard assumption in agency theory is that an owner wants to maximize profit. Yet, there are new studies which increasingly provide indications of the heterogeneity of owners' strategic goals and the advice of scholars in recommending the examination of ownership in emerging economies which include distinctions of owner identities since different owners may have different goals, objectives, and motivations to monitor (Douma et al., 2006). Geographical country of origin is likely the most visible difference (Choi & Contractor, 2016; Schmitt & Van Biesebroeck, 2013) influencing a firm's strategic goals whenever it interacts with other firms outside of its home country. The theory on internationalization (Dunning, 1995; Dunning, Fujita, & Yokova, 2007; Dunning & Pitelis, 2008; Rugman & Verbeke, 2007, 2007) further provides an affirmation that foreign entities have distinct strategic goals with those of domestic entities. Within a country, literature on financial economics have, for decades, provided empirical support on the difference between private institutions and government (La Porta, Lopez-de-Silanes, & Shleifer, 1999; Shleifer & Vishny, 1997). While the development of theory which affirms a clean-cut distinction between government and private ownership has been lagging behind its empirical research counterpart, the latest literature in financial economics (Carvalho, 2014; La Porta, Lopez-De-Silanes, & Shleifer, 2002; Sapienza, 2003), international business (Cuervo-Cazurra, Inkpen, Musacchio, & Ramaswamy, 2014) and strategic management (Lazzarini, 2015; Stevens, Xie, & Peng, 2016) provide empirical



evidence that government is a distinct identity from private owners. In the next sections, I review literature on various and most prevalent owner identities and their associated impacts on a firm's performance. The most prevalent owner identities are domestic financial, domestic conglomerate, government, foreign financial and non-financial institutions (Chang, 2003; Douma et al., 2006; Gill & Kaur, 2015; Patel & Cooper, 2014; Pedersen & Thomsen, 1999). I will compare all of these owner identities relative to non-financial institutions, since, compared to other owner identities, the latter is the least prevalent owner identity in Indonesia.

#### Financial institutional ownership

Ability, incentive, and goals vary among different owners, so effective monitoring to quench agency problems varies (Cao, Liu, & Tian, 2014). Compared to non-financial institutions, both foreign and domestic, financial institutions may have much more experience and familiarity in the financial industry, technical know-how, incentive to monitor, and these may endow them with superior monitoring capability. Yet, foreign entities can also be at a disadvantage compared to local firms when it comes to monitoring. For example, the many institutional voids which are prevalent in emerging markets (Palepu & Khanna, 2005) pose enormous information asymmetry challenges to foreign owners in mitigating agency problems. These differences in institutional contexts can invert advantages into becoming disadvantages (Douma et al., 2006). Local firms are often more likely to have unique access to privileged information (Betschinger, 2015). Additionally, emerging markets may also pose new and unfamiliar problems that render monitoring advantages of little to no value in emerging markets. Dharwadkar et al. (2000) argue that due to a weak governance context, in addition to classic principal-agency problem,

emerging markets are also plagued with a principal-principal problems. This type of problem is uncommon in the context of advanced economies (B. Dharwadkar et al., 2000). Foreign financial entities' superior ability to monitor agency may not be transferable in handling principal-principal problems, which is unique to emerging markets. This idiosyncratic problem is further exacerbated since foreign entities need to do monitoring at a distance that are farther in proximity and performed less frequently than domestic entities (Tschoegl, 1987). Sometimes financial institution's investment horizon is shorter than non-financial institution's investment horizon (Douma et al., 2006). This shorter investment horizon can further dampen owner's monitoring ability and impacts the firm's performance. Ties to companies at different stages also help to internalize transactions between firms, minimizing transaction costs even as asset specificity and transaction frequency increase (Williamson, 1981). For example, compared to financial firms, non-financial firms may have more direct and faster access to credit by internalizing relationships with banks, while close connections help banks minimize information asymmetry. This mutually beneficial relationship (Carvalho, Ferreira, & Matos, 2015) further strengthens a non-financial firm's comparatively longer investment horizon (Douma et al., 2006). Overall, relative to non-financial institutions, foreign and domestic financial institution owners may be both less able to monitor and less incentivized.

*Hypothesis 2: Economic performance is lower if the largest owner is a foreign financial institution.*

*Hypothesis 3: Economic performance is lower if the largest owner is a domestic financial institution.*

Conglomerate family ownership has both advantages and disadvantages. In a familial business, there can be clan culture (Ouchi, 1980) that may reduce agency problems (Miller & Le Breton-Miller, 2005; Miller, Le Breton-Miller, & Lester, 2011). As family ownership stake increases, agency problems can decrease (Wen-Hsien Tsai, Jung-Hua Hung, Yi-Chen Kuo, & Lopin Kuo, 2006). Family ownership may also reduce informational asymmetry between owner and managers (Craig & Dibrell, 2006; Wenyi Chu, 2009) since the managers are also family members. Family ownership can also impact performance due to the fact the family owners tend to be more profit oriented compared to other owner categories (Schulze, Lubatkin, & Dino, 2003) and are able to develop better relationships with customers (Hsiang-Lan Chen & Wen-Tsung Hsu, 2009). These interpersonal ties, inward with managers and outward with customers, reduce opportunistic behavior that may positively impact a firm's performance (Silva & Majluf, 2008).

*Hypothesis 4: Performance is higher if the largest owner is a conglomerate.*

#### Government ownership

The primary rationale of government-owned enterprises is to correct market failures by acting differently from profit maximizing private sectors (Arrow, 1969). In this sense, government owned enterprises may have goals other than economic performance. The impact of government ownership on firms revolves around three major views. First, from a development economics perspective, government ownership exists to overcome market inefficiencies such as externalities and monopolies which results in overall welfare improvement (Stiglitz, 1993). Second, from a political perspective, businesses owned by governments can be used by politicians to pursue specific political goals (La Porta et al., 2002; Shleifer & Vishny, 1994). In the theory of misgovernance, Banerjee argues that

while government ownership initially exists to maximize social welfare, agency problems, in the form of weak incentives and monitoring, generates corruption and misappropriation (Banerjee, 1997). Agency theory predicts that in the presence of agency problems, government ownership negatively impacts performance.

*Hypothesis 5: Performance is lower if the largest owner is government.*

#### Moderating impact of share concentration

Share concentration determines relative power (Douma et al., 2006; Pedersen & Thomsen, 1999). This is because the higher the share concentration, the more likely that the holder has a cohesive block that allows the corresponding owner to pursue its goals. On the other hand, small stakeholders are less likely to be able to act as a united cohesive block to pursue their goals.

*Hypothesis 6: Impact of the largest owner identity on performance will be stronger as its ownership concentration increases.*

### 3.4. DATA AND METHODOLOGY

#### **Models and specification search**

In accordance with prior studies which examine the impact of ownership on economic performance using agency theory, the following specification forms the backbone of my regression analysis:

$$Y_{it} = \beta X_{it} + \beta C_{it} + \varepsilon$$

With matrix  $Y$  representing firm economic performance variables, matrix  $X$  contains  $K$  regressors (in this case ownership variables),  $C$  represents control variables, and  $\varepsilon$  represents a generalized error term.

Past research argued that because ownership is stable, cross-sectional analysis is sufficient (Douma et al., 2006). While my data is longitudinal, to remove doubt around whether it is more suitable to conduct cross-sectional or panel analysis, I graphed all ownership and dependent variables for every bank in my sample to visually inspect if there is a change over time. If there is no change over time, then a cross-sectional methodology is indeed the appropriate choice. Next, I performed Breusch-Pagan's Lagrange Multiplier Test to adjudicate whether cross-sectional or panel analysis specifications are appropriate for my data (Breusch & Pagan, 1980). Breusch-Pagan's Lagrange Multiplier Test rejects the null hypothesis that there is no panel effect with p-value equal to 0.000 for all models I use. In other words, the probability that there is no panel effect is estimated to be 0.000. Aided by both visual inspections over graphical representations of my variables and a formal test result, I analyzed my data as panel data.

By looking at the ratio of my panel units and time dimension, a choice between selecting a cross-sectional or panel time series was made. In a time series cross-sectional analysis, asymptotics properties hinge on  $T \rightarrow \infty$ , while in a panel analysis the asymptotics properties of my estimates hinge on  $N \rightarrow \infty$  (Greene, 2011). My data has significantly larger  $N$  than  $T$ , making a panel analysis a more appropriate choice. The regression for panel data framework takes the following form:

$$y_{it} = x'_{it}\beta + z_{it} + \varepsilon_{it}$$

I performed the Hausman Test to compare fixed effect or random effect estimates in my analysis. For all models, the resulting p-value calculation from Hausman Test is  $p < 0.05$ , indicating that a fixed effect is a more appropriate estimator compared to its random effect alternative. In this essay, all fixed-effect estimations were performed following this framework:

$$y_{it} = x'_{it}\beta + \alpha_1 + \varepsilon_{it}$$

In which,  $\alpha_1 = \mathbf{z}'_i\boldsymbol{\alpha}$  embodies all observable effects and specifies an estimable conditional mean.  $\alpha_1$  represents firm-specific and time-specific terms in the regression models I am estimating. Fixed-effect estimations involve trade-offs between obtaining consistency at the expense of efficiency. In other words, parameters estimated using a fixed effect converge in probability to its true value. Drawbacks from lack of efficiency is the result of relatively large standard errors that stem from an asymptotically inefficient variance-covariance matrix. The resulting estimated standard errors, which are larger than true standard errors, will understate the significance of a variable.

Next, I performed a modified Wald Test following Greene (2011) for the resulting estimations. I also performed a Lagrange Multiplier Test (Wooldridge, 2002) to see if there is an autocorrelation issue. From these tests, while the errors are heteroskedastic, they are not auto-correlated. In all of my models, I estimated the variance-covariance matrices that take into account heteroskedasticity. From a theoretical standpoint, since my data involves the banking industry, there can be some form of cross-sectional dependence which may influence the estimation of variance-covariance matrix. For example, past research on

banking in the United States indicates a presence of contagion effect (Elyasiani, Kalotychou, Staikouras, & Zhao, 2015; Kleinow & Moreira, 2016) and possibly other spatial dependencies. The state of the art approach may involve modeling the cross-sectional dependence (or other forms that distort variance-covariance matrix) to identify and correct standard errors, which may currently not be available nor an appropriate approach for two reasons: contagion transmission mechanisms are still disputed, even in the context of advanced economies and data availability and compared to advanced economies, banking in emerging markets has a lesser degree of financial depth. To be conservative, a classical econometrics approach, while perhaps less precise, is the more suitable choice to accommodate possible existence of cross-sectional dependence among the firms in my study. I am correcting for both cross-sectional dependence and heteroskedasticity.

From a theory testing standpoint, the use of fixed effect estimators and the correction of a variance-covariance matrix to allow both cross-sectional dependence and panel heteroskedasticity is a careful and conservative approach. This approach will likely result in estimates that are as robust as possible to spurious explanatory power. In addition to formal tests for specification search I mentioned above, to affirm the consistency of the resulting estimates, I checked whether the resulting residuals from my fixed-effect estimations have a mean of zero and are normally distributed.

## **Data**

To test resource-based view hypotheses, effects from institutions that may impact firm performance needed to be minimized. Emerging markets tend to possess weak governance (B. Dharwadkar et al., 2000), meaning data from emerging markets provides

fertile empirical grounds for hypothesis testing. In particular, I used ownership data from the Republic of Indonesia Financial Services Authority. This data contains banks' financial performance and shareholding. To minimize the problem of endogeneity in the form of self-selection, I used data from the banking sector as banks in Indonesia are legally obliged to file financial reports on a quarterly basis. The raw data came in a format which requires further processing prior to analysis. To ensure the highest data integrity possible, data parsing, mining and reshaping were conducted mostly in Stata instead of manually. Observations that are seemingly too high, too low, or fall outside expected range were double checked with reports posted at the bank's website. Whenever there is data availability on banks' websites, extra care is taken to ensure data quality. This is done by randomly double-checking observations to confirm whether their values are in agreement with those posted on the bank's website. To select my final sample, I adopt the following criteria. I selected a continuous time period for which the dataset reports the maximum number of firms with the most complete information. As this study focuses on a resource-based view and following past research on ownership and economic performance, wholly owned subsidiaries are excluded from the sample. Finally, a few additional firms are also excluded due to lack of within-group observations on important variables. This leads to a final sample size of 137 firms with data spanning over 40 quarters. I also graphed all variables to inspect for oddities that may interfere with my estimations.

### **Definition of Variables and Performance measures**

In this essay, four performance measures were used. Past studies used Return on Assets (ROA) as the main proxy of firm performance (Douma et al., 2006; Pedersen & Thomsen, 1999). ROA is defined as operating earnings before interest, depreciation, and



taxes over total assets. I also include three supplementary economic performance measures: Return on Equity (ROE); Ratio of Operating Expensive to Operating Revenue (OEOR) and Non-Performing Loans (NPL). ROE and ROA are both important components that reflect a bank's performance. ROE measures how well investors' equity stakes are generating income, while ROA measures how well assets are managed to produce income. OEOR is a proxy of a firm's operational efficiency, it is a ratio of operational expenses to operational revenue. Lastly, NPL (Non-performing loan) is used as a performance measure. These four performance measures were used to provide a more complete outlook on firm economic performance.

### **Explanatory Variables**

In this essay explanatory variables can help evaluate ownership structure, which is measured in two dimensions: an owner's identity and ownership concentration. Informed by theories and empirics in internationalization and government ownership in financial economics literature, I made a distinction between foreign and domestic shareholders. Literature in strategy and financial economics also informs the convention of differentiating between non-financial and financial institutions, as these entities have different goals. Finally, distinctions between all of those private institutions and government is made. Politics and development theories used in both financial economics and strategy (Carvalho, 2014; Cuervo-Cazurra et al., 2014) point out that governments carry missions, goals and resources which may differ from private entities, therefore making sense to be analyzed across different owner categories.

## Control Variables

Following past research on ownership and firm performance, I control for firm size (here size is proxied by bank total assets). I also control for two prominent factors: firm-specific heterogeneity by including bank fixed effects; and variation throughout the year (e.g., currency fluctuation, business cycles and overall macroeconomic contraction or expansion) by including quarterly fixed effects. Table 1 presents summary statistics of the sample and table 2 presents the correlation matrix.

## Variable Descriptions

### Performance

#### variables

ROA	Return on Assets (Earning before interests, taxes and depreciation)/ (Total Assets) , in %
ROE	Return on Equity (Earning before interests, taxes, and depreciation)/(Shareholder's equity) , in %
OEOR	Ratio of Operating Expenses/ Operating Revenue, in %
NPL	Non performing loans, in %

### Ownership

#### structure

#### Concentration

Con	Ownership share of the largest shareholder, in %
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### Identity

	Dummy variable, takes value of 1 if the largest owner is a
ForFinLed	foreign financial institution
	Dummy variable, takes value of 1 if the largest owner is a
DomFinLed	domestic financial institution
	Dummy variable, takes value of 1 if the largest owner is a
DomCongloLed	domestic conglomerate
	Dummy variable, takes value of 1 if the largest owner is
GovLed	government
Non-FinancialLed	Reference point, omitted dummy variable
<b>Control</b>	
Total assets	Banks' total asset in Indonesian Rupiah
Bank fixed effects	136 dummies to control for bank-idiosyncratic effects
	39 dummies to capture time-specific effects at quarter-
Quarter fixed effects	level

### 3.5. EMPIRICAL FINDINGS

Hypothesis 1 predicts that the relationship between the largest share concentration and economic performance is positive—meaning that the higher the concentration the better the economic performance. This hypothesis is not supported in Model 2 and 10. Model 2 uses Return on Assets (ROA) as a measure of economic performance, while model 10 uses Return on Equity (ROE) as a measure of economic performance. Interestingly, Models 16 and 24 refute hypothesis 1. Model 16 uses efficiency, which is proxied as the

ratio of expenditure to revenue (OEOR), as the dependent variable, while Model 24 uses non-performing loan (NPL) as the dependent variable.

On the impact of the top owners' identities on performance, hypothesis 2 predicts that relative to non-financial top owner, foreign, financial largest owner negatively impacts performance. This hypothesis is supported in 2, 10, 16, and 24. In other words, this hypothesis is supported in all economic performance measures from ROA, ROE, OEOR, to NPL. Hypothesis 3 predicts that as a top owner, relative to non-financial top owner, domestic financial institution positively impacts performance. This hypothesis is supported in Model 2 and 16 when the dependent variables are ROA and OEOR. Results in Model 10 are not statistically significant, although it has the expected sign. Hypothesis 3 is refuted in model 24. Hypothesis 4 predicts that as a top owner, relative to non-financial institution, domestic conglomerate positively impacts economic performance. This hypothesis is supported in model 2, 10, 16. Model 2, 10, and 16 use ROA, ROE, and OEOR as proxy of economic performance respectively. Hypothesis 4 is refuted in Model 24 where the dependent variable is proxied as non-performing loan. Hypothesis 5 predicts that as a top owner, relative to non-financial institution, government negatively impacts performance. This hypothesis is only supported in Model 24 when economic performance is measured as NPL.

On the interaction effects between identities of the top owner and share concentration, Hypothesis 6 predicts that concentration moderates the impact of identity on economic performance. This hypothesis is supported in models 4, 11, 18, 19, 26, 27, and 28, but not in other interaction models (Models 4-28). Ownership concentration moderates the impact of foreign financial institution when the dependent variable is

proxied as ROA, ROE, and OEOR, but not when the dependent variable is NPL. Ownership concentration moderates the impact of domestic financial institution when dependent variable is proxied as OEOR and NPL. Ownership concentration moderates the impact of conglomerate and government on economic performance only when the dependent variable is NPL, but not when the economic performance is proxied by other measures. However, there are reasons to believe that these results should be interpreted with caution as they may be subject to multicollinearity. Wooldridge (2012) argued that multicollinearity is a problem that cannot be clearly defined: while clearly low correlation among independent variables is preferred, multicollinearity does not violate OLS assumption. So, in the next section, I will only discuss further results that are not subject to multicollinearity concern.

### 3.6. DISCUSSION AND CONCLUSION

This research examines the relationship between the share concentration and the identity of the largest owner on four measures of economic performance: ROA, ROE, OEOR, and NPL. Using Indonesian banking data, I found some supporting empirical evidence on the impact of ownership structure on economic performance. In this research, economic performance is proxied by return on assets (ROA), return on equity (ROE), ratio of operating expense to operating revenue (OEOR), and non-performing loan (NPL).

This research found that owners' identities are an important dimension of ownership structure which influence a firm's performance. Past research on emerging markets using Indian data by Douma *et al* (2006) shows a negative impact of ownership by foreign financial institutions. Similarly, this paper shows negative impact of foreign financial

institution ownership on ROA, ROE, OEOR, and NPL. In addition to agency theory explanation, there are other theories that shed light why foreign financial ownership may negatively impact performance. First, agency theory suggests that since foreign ownership may be more fragmented, owners are less incentivized and less able to perform an effective monitoring role, which results in negative impact to performance (Douma et al., 2006). Past research postulates that foreign companies have superior experience and monitoring capabilities, and this valuable experience positively impacts firm performance (Chhibber & Majumdar, 1999). However, liability of foreignness suggests that foreign entities face additional costs, social and economic, and these costs impact a firm's performance. These theories could be at play and determining the strength of their respective explanatory power in the context of emerging economies present opportunities for further research.

Domestic owners' identities were also found to be important determinants on performance. While in the context of advanced economies, family and government ownership were generally associated with negative impact on performance (Thomsen & Pedersen, 2000). In the context of emerging economies, this is not always the case. The result of this research stands in contrast with past findings in an advanced economies context. First, relative to non-financial ownership, analysis indicates that domestic conglomerate family ownership and domestic financial ownership positively impact performance. Second, government ownership does not always significantly and negatively impact performance. Government ownership does add non-performing loan, but data does not show conclusive negative impact on performance when it is proxied by other measures such as ROA, ROE, and OEOR. These findings suggest that emerging economies are more

than just a different context and that there may be limitations with current theories that have yet to be explored further.

Third, the time dimension also merits further exploration. Past theorization in the context of advanced economies happened in the 1990s, in the context of healthy economic stability and positive long term expectation of Eurozone integration. By contrast, in the writing of this paper (2016), macroeconomic indicators are becoming increasingly different from those used in the 1990s. There are extended periods of quantitative easing in advanced economies and increasing skepticism on economic integration in an advanced economies context which may impact ownership's time dimension, monitoring, and risk-taking behavior<sup>6</sup>. Recent research found that flow of capital is increasingly fickle, not merely in emerging markets, but also increasingly true in advanced economies (Bluedorn, 2013). Similarly, the lack of significance of concentration effect in this research may also be a reflection of this fickleness—something of increasing importance yet which is downplayed in past research. While data on emerging economies tend to be difficult to construct (La Porta et al., 1999) due to increasingly different capital flow patterns, research on ownership and performance in emerging economies utilizing panel data is likely more informative than reliance on cross-sectional data. This is a practice which was commonly done due to data constraint. Finally, this paper shows that owner's identity dimension is crucial in understanding corporate governance in emerging markets. This is perhaps more

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<sup>6</sup> A case in point is Brexit. Brexit is a referendum that calls for the United Kingdom to leave the Eurozone. Past theoretical perspectives on ownership relying on advanced economies tend to find a positive impact of ownership by financial institutions. This is especially true if the companies were based in the United Kingdom (Thomsen & Pedersen, 2000). Recent observations suggest that this pattern is less certain (S&P Global Ratings, 2016). While longitudinal data may not yet be available, theories can benefit from additional review using more current data.

so than in advanced economies since emerging economies are characterized by weak internal and external governance (B. Dharwadkar et al., 2000).

The strategic management implications of these findings are as follows: First, gains in performance can be achieved by restructuring ownership structure. Second, in contrast to theories and findings in the context of advanced economies, the findings in this paper present different implications for corporate strategy. In an advanced economies context, a performance-enhancing strategy is more likely to be successful if top ownership is financial institution, while in India it is more likely to be successful if leaders are foreign non-financial institutions. These findings likely cannot be extrapolated to the Indonesian context as the data shows. Therefore, theories in corporate governance can benefit greatly from additional review using more comprehensive data from emerging economies.

While my findings can only provide propositions instead of axiomatic results, this research paves directions for future research as follows. This research shows that foreign ownership does not always associated with higher performance. This indicates that there are at least three theories at play: resource based view, agency theory, and liability of foreignness. Theory on corporate governance can be furthered by looking into determinants when liability of foreignness counteracts resource and capability advantages. Next, if we look at the data feature, we see that large block holding is common. This is in line with La Porta's seminal observation that large block holding pattern of ownership is found in many countries' corporate governance (1999). However, this data feature inadvertently becomes a dilemmatic limitation. From econometrics stand point, this poses a catch-22. A study of top shareholders needs to be done to determine the presence of a large block holding pattern, yet this large block holding pattern gives rise to potential interference due to



multicollinearity. Future research can be improved in several ways. In terms of the estimation model and method, future research can develop a theoretically valid model which corresponding estimation method allows solution approximation methods other than least square. While in terms of data, researchers can look at the various data in emerging markets that may exhibit not so much pattern of large block holding ownership. Additionally, getting more data can also offer some solution if least square is used (Wooldridge, 2012), since by increasing the sample size it may be possible to obtain smaller standard error. This way solution approximation can be optimally accomplished by way of least square while minimizing multicollinearity interference. Lastly, this research suggests that not all owners are equal. Future investigation should explore when identity matters more than concentration, when they matter less than concentration, and what determine the differences and why.

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Table 25 Summary Statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
<b>Concentration</b>					
Con	4,465	54.62	32.45	2.631	100
<b>Identity</b>					
ForFinLed	4,458	0.301	0.459	0	1
DomFinLed	4,458	0.206	0.404	0	1
DomCongloLed	4,458	0.117	0.321	0	1
GovLed	4,458	0.222	0.416	0	1
Non-Financial	4,465	0.060	0.238	0	1
<b>Interaction identity x Con</b>					
ForFinLedXcon	4,458	25.23	40.71	0	100
DomFinLedXcon	4,458	10.93	24.52	0	100
DomCongloLedXcon	4,458	4.363	13.56	0	100
GovLedXcon	4,458	7.41	19.73	0	100
Total Asset	4,456	2.13E+07	6.33E+07	13,180	6.75E+08
ROE	4,464	12.68	33.36	-981.6	104.5
ROA	4,464	2.237	4.712	-153	47
OEOR	4,446	83.09	47.46	10.89	1,335
NPL	4,436	2.369	4.578	0	81.9

Table 26 Cross-correlation table

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Con	1.00														
ForFinLed	0.59	1.00													
DomFinLed	-0.02	-0.33	1.00												
DomCongloLed	-0.19	-0.23	-0.18	1.00											
GovLed	-0.34	-0.35	-0.27	-0.19	1.00										
NonFinLed	0.01	-0.16	-0.12	-0.09	-0.13	1.00									
ForFinLedXcon	0.69	0.94	-0.31	-0.22	-0.33	-0.15	1.00								
DomFinLedXcon	0.15	-0.29	0.87	-0.16	-0.23	-0.11	-0.27	1.00							
DomCgLedXcon	-0.08	-0.21	-0.16	0.88	-0.17	-0.08	-0.19	-0.14	1.00						
GovLedXcon	0.06	-0.24	-0.19	-0.13	0.70	-0.09	-0.23	-0.16	-0.12	1.00					
ROA	0.00	0.03	-0.05	-0.07	0.16	-0.08	0.04	-0.03	-0.06	0.07	1.00				
ROE	-0.09	-0.04	-0.05	-0.06	0.20	-0.07	-0.03	-0.05	-0.03	0.06	0.51	1.00			
OEOR	-0.01	-0.03	0.04	0.08	-0.11	0.08	-0.04	0.02	0.08	-0.04	-0.66	-0.50	1.00		
NPL	-0.00	0.00	-0.00	-0.00	0.01	-0.03	0.00	-0.00	-0.04	0.04	-0.21	-0.11	0.24	1.00	
TotAs	0.04	-0.03	-0.11	-0.10	0.12	-0.04	-0.04	-0.10	-0.09	0.25	0.05	0.09	-0.06	0.01	1.00

Table 27 Result of fixed-effects regression analysis correcting for panel heteroskedasticity and contemporaneous correlations. Firm performance measured by ROA.

VARIABLES	(1) ROA	(2) ROA	(4) ROA	(5) ROA	(6) ROA	(7) ROA
Con	-0.00332 (0.00717)	0.00276 (0.00639)	0.0131+ (0.00790)	-0.00105 (0.00793)	0.00145 (0.00672)	-0.00202 (0.00709)
<b>Identity</b>						
ForFinLed		-1.104** (0.365)	1.707** (0.653)	-1.016** (0.355)	-1.070** (0.349)	-1.024** (0.376)
DomFinLed		1.255** (0.410)	1.138** (0.393)	0.718 (0.707)	1.258** (0.410)	1.259** (0.411)
DomCongloLed		2.503*** (0.638)	2.436*** (0.622)	2.495*** (0.636)	1.906* (0.938)	2.425*** (0.627)
GovLed		1.164 (1.131)	1.082 (1.123)	1.104 (1.177)	1.180 (1.128)	-0.168 (0.418)
NONFinancial		0				
<b>Interaction Identity x concentration</b>						
ForFinLedXcon			-0.0441*** (0.0116)			
DomFinLedXcon				0.0107 (0.0116)		
DomCongloLedXcon					0.0159 (0.0227)	
GovLedXcon						0.0336 (0.0347)
totAs	3.93e-09*** (7.79e-10)	4.19e-09*** (1.03e-09)	4.79e-09*** (1.09e-09)	4.03e-09*** (1.13e-09)	4.18e-09*** (1.03e-09)	5.44e-09** (2.10e-09)
Constant	5.766*** (1.288)	4.019* (1.985)	3.355 (2.055)	4.345* (2.182)	4.083* (1.994)	3.359 (2.508)
Observations	4,456	4,449	4,449	4,449	4,449	4,449
R-squared	0.248	0.260	0.263	0.260	0.260	0.261
Number of bankid	135	135	135	135	135	135
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors in parentheses

\*\*\* p<0.001, \*\* p<0.01, \* p<0.05, + p<0.1

Table 28 Result of fixed-effects regresion analysis correcting for panel heteroskedasticity and contemporaneous correlation. Performance is measured as ROE

VARIABLES	(8) ROE	(10) ROE	(11) ROE	(12) ROE	(13) ROE	(14) ROE
Con	-0.0385 (0.0386)	-0.00487 (0.0327)	0.0276 (0.0418)	-0.0309 (0.0537)	-0.0120 (0.0360)	0.0266 (0.0339)
<b>Identity</b>						
ForFinLed		-4.587** (1.684)	4.214 (4.376)	-3.987* (1.723)	-4.404** (1.659)	-5.114** (1.896)
DomFinLed		3.535 (2.843)	3.166 (2.756)	-0.145 (5.902)	3.548 (2.843)	3.511 (2.850)
DomCongloLed		5.697+ (3.009)	5.488+ (2.952)	5.639+ (3.012)	2.444 (5.586)	6.209* (2.821)
GovLed		-13.22 (9.296)	-13.47 (9.237)	-13.63 (9.674)	-13.13 (9.275)	-4.436 (2.917)
NONFinancial		0				
ForFinLedXcon			-0.138* (0.0562)			
DomFinLedXcon				0.0733 (0.0840)		
DomCongloLedXcon					0.0867 (0.0910)	
GovLedXcon						-0.222 (0.283)
totAs	1.20e-08* (5.85e-09)	-2.72e-09 (7.47e-09)	-8.53e-10 (7.80e-09)	-3.86e-09 (8.38e-09)	-2.76e-09 (7.48e-09)	-1.09e-08 (1.67e-08)
Constant	67.08* (26.18)	82.11** (28.88)	80.03** (29.14)	84.35** (29.87)	82.47** (28.90)	86.46** (31.57)
Observations	4,456	4,449	4,449	4,449	4,449	4,449
R-squared	0.299	0.303	0.304	0.303	0.303	0.304
Number of bankid	135	135	135	135	135	135
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 29 Result of fixed-effects regression analysis correcting for panel heteroskedasticity and contemporaneous correlations. Performance is measured as ratio of operating expenditure and revenue

VARIABLES	(15) OEOR	(16) OEOR	(18) OEOR	(19) OEOR	(20) OEOR	(21) OEOR
Con	0.235*** (0.0628)	0.130** (0.0501)	0.0185 (0.0471)	0.241** (0.0797)	0.143** (0.0530)	0.121* (0.0552)
<b>Identity</b>						
ForFinLed		20.90*** (5.303)	-9.317 (8.983)	18.39*** (4.954)	20.57*** (5.120)	21.05*** (5.322)
DomFinLed		-8.073** (2.755)	-6.824** (2.587)	7.547 (6.010)	-8.083** (2.766)	-8.066** (2.763)
DomCongloLed		-24.42*** (6.884)	-23.70*** (6.700)	-24.17*** (6.841)	-18.39* (8.545)	-24.56*** (6.799)
GovLed		5.117 (7.956)	6.000 (7.907)	6.859 (8.269)	4.962 (7.939)	2.637 (2.731)
NONFinancial		0				
ForFinLedXcon			0.475** (0.172)			
DomFinLedXcon				-0.311** (0.107)		
DomCongloLedXcon					-0.160 (0.255)	
GovLedXcon						0.0626 (0.246)
totAs	-2.77e-08*** (7.48e-09)	-1.16e-08 (8.71e-09)	-1.81e-08* (8.85e-09)	-6.82e-09 (9.65e-09)	-1.16e-08 (8.72e-09)	-9.33e-09 (1.53e-08)
Constant	56.71*** (10.23)	55.10*** (14.42)	62.25*** (14.73)	45.61** (16.30)	54.45*** (14.49)	53.87** (18.04)
Observations	4,443	4,436	4,436	4,436	4,436	4,436
R-squared	0.281	0.296	0.300	0.298	0.296	0.296
Number of bankid	135	135	135	135	135	135
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes

Table 30 Result of fixed-effects regression analysis correcting for panel heteroskedasticity and contemporaneous correlations. Performance is measured as NPL

VARIABLES	(22) NPL	(24) NPL	(25) NPL	(26) NPL	(27) NPL	(28) NPL
Con	0.00881* (0.00347)	0.00698* (0.00329)	0.00725+ (0.00398)	-0.00294 (0.00476)	0.0157*** (0.00393)	0.00120 (0.00360)
<b>Identity</b>						
ForFinLed		1.352*** (0.298)	1.421** (0.507)	1.583*** (0.295)	1.142*** (0.298)	1.442*** (0.299)
DomFinLed		0.793* (0.375)	0.790* (0.372)	-0.652 (0.769)	0.801* (0.373)	0.780* (0.374)
DomCongloLed		1.689*** (0.485)	1.688*** (0.483)	1.674*** (0.479)	5.499*** (1.050)	1.584** (0.483)
GovLed		1.724*** (0.442)	1.722*** (0.440)	1.559*** (0.471)	1.627*** (0.441)	0.182 (0.363)
NONFinancial		0				
ForFinLedXcon			-0.00109 (0.00707)			
DomFinLedXcon				0.0288** (0.0105)		
DomCongloLedXcon					-0.101*** (0.0190)	
GovLedXcon						0.0389** (0.0121)
totAs	-6.16e-09*** (1.28e-09)	-4.38e-09*** (1.32e-09)	-4.36e-09** (1.33e-09)	-4.82e-09*** (1.35e-09)	-4.32e-09** (1.32e-09)	-2.94e-09* (1.47e-09)
Constant	6.481*** (0.905)	4.372*** (1.080)	4.355*** (1.096)	5.233*** (1.186)	3.932*** (1.083)	3.631** (1.178)
Observations	4,428	4,421	4,421	4,421	4,421	4,421
R-squared	0.357	0.362	0.362	0.364	0.371	0.364
Number of bankid	135	135	135	135	135	135
Bank Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Quarter Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes



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## CHAPTER 4. ESSAY 3. WOMEN ON BOARD AND BANK'S PERFORMANCE

*“What would have happened if Lehman Brothers had been Lehman Sisters?”* (Lagarde, Christine, 2015)

### 4.1.ABSTRACT

A central debate in corporate governance literature concerns the relationship between the increase in women representation on the board and firm performance. I advance this discussion by measuring women representation and its impact on firm economic performance by using data from an emerging market banking industry in which a legislative or an affirmative action on women quota is absent. In the past, research was done in the context of countries in developed economies since data tended to be readily available. However, developed economies tend to already enact some forms of affirmative actions—some compulsory and some voluntary—to increase women participation. Moreover, countries such as the United States and the United Kingdom announce their director nomination. Hence the relationship between performance and director nomination can go both ways. I use data from an emerging economy in which director nomination is not prominently announced thus the prevalence of women directors is mostly exogenous to performance.

Using both resource dependence and agency theory, and a novel emerging market data, I tested the effect of women representation on economic performance using the fixed effects estimation method. This essay offers two main contributions. First, this empirical

finding provides empirical evidence that women representation is positively associated with firm performance. Secondly, this conclusion also provides support to Konrad's (2006) *critical mass* argument. For firms to be able to derive positive benefits from female directors, having just one or a few women may not be meaningful and that it may just lead to *tokenism* (Kanter, 1993) instead of actual influence that leads to an impact on performance.

## 4.2.INTRODUCTION

The central tenet in their No.1 best selling human rights book, Pulitzer winners Nicholas Kristof and Sheryl WuDunn argued that the key to economic progress lies in unleashing women's' potential (Kristof & WuDunn, 2010). However, in the context of corporate life, past research finds mixed results. From a strategic management perspective, theory and evidence remain inconclusive. On the one hand, research claims that an increase in female participation is found to reduce economic performance (Ahern & Dittmar, 2012). Media reports also supported that the political correctness of British's FTSE 100 to increase female participation wreaks havoc on a firm's performance (Judge, 2003). On the other hand, many researchers claim that women's participation improves performance (Martín-Ugedo & Minguéz-Vera, 2014; Short, Toffel, & Hugill, 2014). While countries<sup>7</sup> have begun to adopt affirmative action policies that require female representation, lack of knowledge on the systematic impact of such policy is unsettling. Adding to the debate whether women's participation increases or reduces firm performance, this essay aims to

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<sup>7</sup> Some notable studies were done in the context of European countries and Malaysia. European countries passed legislation in 2010, while Malaysia passed legislation in 2012.

provide an econometrically cleaner estimate for more robust inference on the effect of women's participation in economic performance.

Mixed qualitative and quantitative research findings suggest that the relationship between the representation of women on the board and firm performance are complicated (Abdullah, Ismail, & Nachum, 2016) and that this relationship is ripe for a more stringent testing to address several shortcomings in the existing literature. Past literature is dominated by the institutional context in which female representation has become a type of affirmative action—some come in the form of legislation that imposes sanctions, some come in the shape of disclosure requirements, and the rest come in the form of legislations with some other consequences for lack of compliance. In those institutional contexts, in addition to the central characters that lead to the female representation to impact to firm performance, there are also three institutional pressures that are most likely to be at play.

Long standing institutional theory and evidence supports that coercive, normative, and mimetic isomorphism leads to firms obtaining and maintaining legitimacy. This then resulted in an actual increase in firm performance (Brahm & Tarzijan, 2014; DiMaggio & Powell, 1983; Doshi, Dowell, & Toffel, 2013; Schnatterly & Johnson, 2014). Hence it is still imprecise if the measured impact of female representation on firm performance had been due to increase in compliance that leads to rising in legitimacy effect (as postulated by institutional theory) or intrinsically due to female representation effect. This essay aims to provide a clearer measure of women's representation's natural effect. Specifically, as my identification strategy, to minimize confounding institutional effect, instead of using data from countries with the representation of women legislations, I chose a national context in which there was no legislation (at least up to at the time of this study) and relatively weak

minority shareholder protection. Additionally, I also chose banking to be the industry context, since it is an industry in which female representation has traditionally been comparatively small (Isidro & Sobral, 2015).

Following strategic management research stream on the effect of women directors on firm performance, the impact of female participation on board is conceptualized as influenced by the corporate governance structure (Abdullah et al., 2016; Black, Jang, & Kim, 2006; Klapper & Love, 2004). Presently, this study is among the first to examine female's board participation and firm performance in an emerging market and in the absence of affirmative action that mandates female quota representation. I tested the representation of women value creation in the context of the Indonesian banking industry. The unique dataset is constructed from Indonesian banks' quarterly financial report by classifying each board of director's gender. The raw data contains about 32,000 names, with about 6,000 unique names.

I extended the development of the theory of value creation by female representation in two ways. First, this essay provides a precise estimation of the impact of women's representation on firm performance. Two, the novel dataset allows me to employ fixed effect estimates to offer an econometrically more accurate assessment of the influence of female representation on firm performance, which allows me to control for unobserved time-invariant factors. Despite the robustness of fixed effect estimation, this method of evaluation has not been widely used in the female directorship literature since constructing a panel data of corporate governance in emerging market is inherently difficult (La Porta, Lopez-de-Silanes, & Shleifer, 1999). Most of them have been using cross-sectional OLS

and GLS random effect estimation. While they are efficient estimators, there is still a probability that the results are subject to many endogeneities.

### 4.3. LITERATURE REVIEW AND HYPOTHESES

#### DEVELOPMENT

##### **Resource dependence theory and agency theory**

This section presents past research and findings on female representation's impacts—both possible negative and positive—based on resource dependence theory and agency theory. These are the dominant major theories in the literature of female directors (Carter, D'Souza, Simkins, & Simpson, 2010; Dunn, 2012; Hillman, Shropshire, & Cannella Jr., 2007; Kabongo, Chang, & Li, 2013; Lückerath-Rovers, 2013; Mateos de Cabo, Gimeno, & Nieto, 2012). Men and female directors differ systematically (Adams & Funk, 2012). The increase in women's participation increases diversity in the board composition in firms with few or no female directors. This increase in gender diversity dimension alters the logic of the main theories that commonly connect board structure and firm performance: agency theory and resource dependence theory (Abdullah et al., 2016). First, from the perspective of resource-dependence theory (Pfeffer, 1972, 1973), with an increase in diversity, firms are able to acquire more diverse resource—such as expertise, skills, knowledge, reputation, and relational capital (Hillman et al., 2007). Empirical evidence also supports the logic of resource dependence theory that firms also access the resource through their board of directors (Boyd, 1990; Westphal, 1999). Second, from the perspective of agency theory (Jensen & Meckling, 1976), female participation increases monitoring and compliance (Kastlunger, Dressler, Kirchler, Mittone, & Voracek, 2010; Short et al., 2014).

There are three main rationales for anticipating that female participation on board will enhance firm performance (Konrad & Kramer, 2006). First, research with correctly specified systematic tests found that on average women tend to have more collaborators and have a more collaborative approach to leaderships and mentorship (Bozeman & Gaughan, 2011; Konrad & Kramer, 2006). In line with resource dependence theory, an increase in collaboration can lead to increase of firm's access to support. Second, social psychology offers insight that men are pressured to prove characters associated with masculinity—i.e. to “Man-up” (Gibson & Lawrence, 2010; Reed, 2014). Konrad and Kramer (2006) observe that in the context of the board of directorship, this can create pressure to always know everything. On the other hand, this sort of obligation is not socially constructed in women. As a result, when enabled, women can be more willing and unafraid to ask questions since there is less social pressure. In the context of board leadership, this is a valuable capability that can add value to firms. Third, while asking difficult questions can be substantial for the value that board of directors adds to the firm performance, female representation is found to reduce conflicts (Nielsen & Huse, 2010). Their representation broadens board discussions and considers more angles (Konrad & Kramer, 2006).

From the perspective of agency theory, past research also found several positive associations between female representation and firm performance. First, women tend to excel in monitoring and complying with rules and regulations. In the context of security frauds, increase in female representation is negatively associated with some scams (Cumming, Leung, & Rui, 2015). In the context of auditing activities, increase the number of female representation is also positively associated with the audit team ability to find



violations (Short et al., 2014). Research also found that women tend to hold management accountable for performance firmly compared to male board or director members (Triana, Miller, & Trzebiatowski, 2013). These are significant positive monitoring features that were particularly valuable for firms in the context of emerging markets in which external corporate governance tend to be weaker compared to advanced economies countries (Abdullah et al., 2016; Adams & Ferreira, 2009; Dharwadkar, George, & Brandes, 2000; Douma, George, & Kabir, 2006).

To form an informed hypothesis, in addition to presenting theory and evidence that predicts female representation in the boardroom will positively impact firm performance, I also discuss other research that argues the reverse is genuine and research which present situations in which women's representation can negatively affect performance. A deep study by Ahern and Dittmar (2012) showed that increase in women's participation diminishes a firm's value<sup>8</sup>. In that study, an increase in women's participation had been initially resisted.

While the legislation suggesting for voluntary compliance was started in December 2003, by July 2005, many companies were found to be delinquent. Hence female representation might not be welcomed. The literature on the board of director homophily found that women may not always be well received by members who were used to the idea that absence of female representation as the norm (Perrault, 2015). An entrenched homophily, which termed by Perrault (2015) as old boys network, can be a powerful force

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<sup>8</sup> The context of Ahern & Dittmar (2012) study is Norway. In July 2005, the Norwegian government found that voluntary compliance program that require at least 40% women participation had not worked. Hence in January 2006, women representation requirement becomes a compulsory law. By April 2008, all firms were in compliance.

to firm value: incumbent directors' homophily may preclude the newly introduced female board members from critical information sharing thus effectively diminishing overall board effectiveness.

Next, a seminal work by Rosabeth Moss Kanter on *tokenism* (Kanter, 1993) also helps shed lights why female participation may have no effect or even negative effect on firm performance. Tokenism is a phenomenon in which companies deflects accusation of discrimination by creating the appearance of social inclusiveness. In tokenism, instead of wielding real influence, female participation was part of businesses' effort to create inclusiveness appearance to maximize legitimacy. In other words, real function and power are decoupled from the job title (Meyer & Rowan, 1977). In this type of environment, female representation will not lead to improvement in firm performance.

Another possible explanation as to why women's representation may not necessarily increase firm performance is the absence of necessary critical mass (Konrad, Kramer, & Erkut, 2008). Female directors perceive that information flow and engagement in social interactions increases as the women's participation ratio increases. Furthermore, when women's representation is small, there is a tendency to treat the women as a *token*, instead of productive members with influence (Elstad & Ladegard, 2012; Mathisen, Ogaard, & Marnburg, 2013).

In summary, female board members are intrinsically different from male members, and that these various characteristics bring value to the firm they are in. However, the effectiveness depends as well on the institution they are in: Resistance to female participation dampens the value creation.

*Hypothesis 1a: Women representation positively impacts economic performance*

*Hypothesis 1b: Women representation negatively affects economic performance*

***Moderating role of government ownership***

There are reasons to anticipate that government ownership will influence the extent of the impact of female representation. For some government, women's participation is an obligation due to affirmative action (Abdullah, et.al., 2016, Ahern & Ditmars, 2012). Because it is a form of affirmative action, as presented in Ahern & Ditmars (2012), in the case of Norway, legislation-imposed obligation to recruit women had to be met. The impact of this obligated appointment can affect a firm in two ways. First, it is possible that additional board members are appointed, and due to their qualification, they reduce agency cost by reducing the likelihood that the entire board members are under the influence of management and CEO (Bebchuk & Fried, 2006). Secondly, since the government may face higher pressure compared to the pressure to conform may be met ceremonially instead of substantively (Meyer & Rowan, 1977). This means that instead of changing the board structure to actually reflect equal power distribution between men and women—i.e. substantively implementing affirmative action, the organization adopts several ways to look as if it is implementing the affirmative action while resisting it in practice—i.e. ceremonial implementation. This ceremonial implementation can be met with recruiting less qualified women for the more qualified women. It can also be met with tokenism (Kanter, 1993). In other words, it could be that the appointed women are qualified, yet they are only given symbolic authority instead of substantive authority and access to necessary information to make an impact on firm's performance.

Unique to government-owned companies, the research found organizational imprinting behavior (Han, Zheng, & Xu, 2014). Organizational imprinting behavior

explains that in the context of firms owned by the government, there is a higher likelihood of compliance with state's regulation and law compared to companies which are not belonging to the government. In businesses where organizational imprinting behavior is observed, law and regulations are enforced and implemented. Companies with relatively high government ownership may be the right institution to begin gradual transformation (Aharonson & Bort, 2015; Klimina, 2014) since there can be a greater likelihood of implementation of the new rules and regulations due to organizational imprinting. So, the reverse can also be true that government ownership may enhance female board of director monitoring function. Hence:

*Hypothesis 2a: Government ownership positively moderates the relationship between women's representation and economic performance*

*Hypothesis 2b: Government ownership negatively moderates the relationship between female representation and financial performance*

## 4.4.DATA AND METHODOLOGY

### **Data**

Past research on the effect of female representation on performance was mostly using advanced economies data from countries such as the US, UK, and other European countries which tend to announce their director nomination. Arguably, hence the relationship between performance and director nomination can go both ways—i.e. because the firm performs well, it recruits more female directors. I use data from an emerging economy in which director nomination is not prominently announced thus the prevalence of female director is mostly exogenous to performance. The empirical context of this essay is the Indonesian banking industry. The raw data was obtained from Financial Services Authority

of Indonesia (Otoritas Jasa Keuangan, OJK). OJK is an Indonesian government agency which regulates and supervises the financial services industry. The length of the data used in this essay is 18 quarters (2010 quarter 1 to 2014 quarter 2). From theory and identification strategy standpoint, Indonesia is an ideal choice for this study for three primary reasons.

Firstly, by contrast to countries with compulsory affirmative action, the absence of affirmative action reduces endogeneity in various forms that come from institutional effects. Secondly, much past research on gender effect was done in countries where minority shareholder protection is high. Pressure from shareholders can be robust enough to make a firm adopt a politically correct stance to increase board gender identity. Also, in past research, countries with substantial minority shareholder protection tend to also be countries which pass legislations or strong recommendation to increase female representation. So, in addition to being intrinsically qualified, there are at least two more ways how women's representation increases in those countries' institutional settings and the effect on these different mechanisms may have not been adequately controlled to yield cleaner estimate of women's participation effects. Thirdly, the strong institutional context may produce an unforeseen crosstalk among omitted (or unaccounted) variables, which can exacerbate endogeneity problems. By contrast, as of 2016 Indonesia has no legislation that imposes female on board quota and has weak minority shareholder position (Guillén & Capron, 2015), from measurement and theoretical standpoint, the country's institutional context provides relatively small likelihood of interference from institutional-related endogeneity problems that may smear my estimations on the effect of female participation on firms' performance.

I construct a database containing information on owners and board of directors names. The sample starts with +/- 32,000 board of director names, with around 6,000 unique names. Each unique name was cross-checked with available information on the internet to assign its gender identity. Next, this name and sex set was linked to the quarterly financial performance database.

### **Primary model and estimation**

By prior studies examining the impact of board gender diversity on firm performance (Abdullah et al., 2016; Hillman et al., 2007; Liu, Wei, & Xie, 2014), the following is the primary regression model:

*Bank performance*<sub>*i,t*</sub>

$$= \alpha_o + \beta_1 \text{Board gender diversity}_{i,t} + \beta_2 \text{Government ownership}_{i,t} \\ + \beta_3 \text{Control variables}_{i,t} + \gamma_i + \lambda_t + \varepsilon_{i,t}$$

with

$\gamma_i$  representing bank fixed effects,  $\lambda_t$  representing quarter fixed effects, and  $\varepsilon_{i,t}$  as residuals.

*Bank performance*

Firm performance is measured using three different proxies: return on asset (ROA) and non-performing loan (NPL). Summary statistics are presented in Table 1, while pairwise correlation is shown in Table 2.

*Board gender diversity: percent of female representation*

The principal interest in this essay is gender diversity. I operationalize gender diversity as an increase of representation of female on board (Adams & Ferreira, 2009;

Ahern & Dittmar, 2012; Liu et al., 2014) as in this essay's data, female representation is low, and any increase in representation corresponds to increase in gender diversity. Figure 1 presents the average of women directors in my sample.

#### *Government ownership*

Past research finds that government ownership moderates relationship between female participation and firm performance (Abdullah et al., 2016). To test whether government ownership moderates the impact of women representation, and interactions variable was generated. The ratio between panel units and time units of my data indicates that the data is a panel data. I used fixed-effect estimation correcting for heteroscedasticity to estimate the equation parameters.

#### **Diagnostics and Identifying influential observations**

Fixed-effect estimation of a panel data involves two steps: first, data transformation and second, evaluation of the transformed data. To achieve best fair linear estimate, this paper employs OLS to estimate the processed data. Next, I calculated residuals and their associated leverage. For this essay, there is also two observations that have high residuals (high deviation from mean zero expectation) and high leverage

### **4.5.EMPIRICAL FINDINGS**

Hypothesis 1a predicts that female representation is positively associated with economic performance, while hypothesis 1b states that the reverse is the case. Hypothesis 1a is supported in model 1 and model 3 that increase in female director representation positively impacts performance by increasing Return on Assets (ROA) and decreasing Non-Performing Loans (NPL). Hypothesis 1b that increase in female director

representation reduces performance is not supported. This finding is in line with past finding that increase in women's representation positively impact performance (Abdullah et al., 2016; Konrad et al., 2008; Liu et al., 2014).

Hypothesis 2a predicts that government ownership positively enhances the impact of female representation on firm's performance. This assumption is not backed up by any model. Hypothesis 2b predicts that government ownership negatively moderates the effect of women's representation on firm performance. This hypothesis is supported in model 2, but not in model 4. Government ownership negatively moderates the impact of female director representation when economic performance is measured by ROA. When the economic performance is measured by NPL, the interaction variable has the expected sign of decreasing economic performance (by increasing NPL), but it is not statistically significant.

## 4.6.DISCUSSION AND CONCLUSIONS

This study seeks to deepen our understanding of the associated impact of female ownership on firm's economic performance. Our findings support resource dependence theory and agency theory that increase in board diversity positively affect performance. In this research, female representation is used as a measure of a dimension of board diversity. This finding is in line with past research on the impact of women's representation on firms' performance (Abdullah et al., 2016; Elstad & Ladegard, 2012; Hillman et al., 2007; Konrad et al., 2008; Liu et al., 2014; Nielsen & Huse, 2010).



This research also adds to the previous literature by highlighting that diversity confers significant added value to the firm. An all-male board of directors does not experience definitely added value without the inclusion of female board of director. Corollarily, the all-female board of directors is suboptimal, compared to those composed of an optimal mix of male and female board of directors.

Next, past research on gender diversity and performance postulate that ownership identities moderate the impact of gender diversity on performance (Abdullah et al., 2016). My findings partially agree with past findings. I find that not all owner's identities moderate the impact of women on board. Government ownership, however, does somewhat reduce the impact of female directors on performance as measured by Return on Asset (ROA), but not as measured by Non-Performing Loans (NPL). It could be that banks that are owned by the government have inherently different missions from banks that have no government ownership. State-owned banks may have social missions to lend to risky segments or be subjected to politicians' lending schemes (Sapienza, 2003). Abdullah *et. al.* (2016) argued that in Malaysia, government-owned firms are subject to higher pressure to include more women on the board. This can result in nominations of less qualified women and thus diminish their positive impacts. This research, however, does not look at directors' qualifications. Future research should construct data to further confirm or refute whether the jointly determined negative impact is due to qualification or other variables that we have yet to discover since data has yet to be developed.

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Table 31 Summary statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
TopCon	1,767	54.62	32.45	2.631	100
LDR	1,767	97.71	189.1	0	7,641
ROA	1,767	2.237	4.712	-153.0	47
NPL	1,767	2.369	4.578	0	81.90
femPercent	1,767	9.700	15.36	0	100
totAs	1,767	2.133e+07	6.326e+07	13,180	6.747e+08
GovtXfemPercent	1,767	2.25e-06	523.2	-106.0	9,894
Govt	1,767	-0.000834	39.78	-21.88	117.3

### Table 32 Cross-correlation

[illegible]

Table 33 Regression result. Estimated effect of women representation on return on assets (ROA)

VARIABLES	(1) ROA	(2) ROA
femPercent	0.00365* (0.00146)	0.00584** (0.00184)
Govt	0.00413* (0.00167)	0.00413* (0.00169)
<b>Interactions</b>		
GovtXfemPercent		-8.53e-05+ (4.55e-05)
<b>Control</b>		
Total Assets	2.69e-09*** (5.68e-10)	2.50e-09*** (5.71e-10)
TopCon	0.00413* (0.00167)	0.00413* (0.00169)
LDR	0.000729 (0.000835)	0.000992 (0.000849)
Constant	2.743*** (0.361)	2.838*** (0.365)
Observations	1,766	1,766
Number of bankid	118	118
Bank Fixed Effects	Yes	Yes
Quarter Fixed Effects	Yes	Yes

Robust standard errors in parentheses

\*\*\* p&lt;0.001, \*\* p&lt;0.01, \* p&lt;0.05, + p&lt;0.1

Table 34 Regression result. Estimated effect of women representation on non-performing loan (NPL)

VARIABLES	(3) NPL	(4) NPL
femPercent	-0.00407* (0.00192)	-0.00501* (0.00213)
Govt	-0.00946*** (0.00263)	-0.00944*** (0.00263)
<b>Interactions</b>		
GovtXfemPercent		5.80e-05 (4.97e-05)
<b>Control</b>		
Total Assets	-6.41e-09*** (7.91e-10)	-6.36e-09*** (7.91e-10)
TopCon	-0.00946*** (0.00263)	-0.00944*** (0.00263)
LDR	0.00134 (0.000886)	0.00130 (0.000887)
Constant	6.181*** (0.480)	6.144*** (0.481)
Observations	1,766	1,766
Number of bankid	118	118
Bank Fixed Effects	Yes	Yes
Quarter Fixed Effects	Yes	Yes

Robust standard errors in parentheses

\*\*\* p&lt;0.001, \*\* p&lt;0.01, \* p&lt;0.05, + p&lt;0.1

Table 35 Regression diagnostic: Results after removing 2 banks with the highest residual and leverage

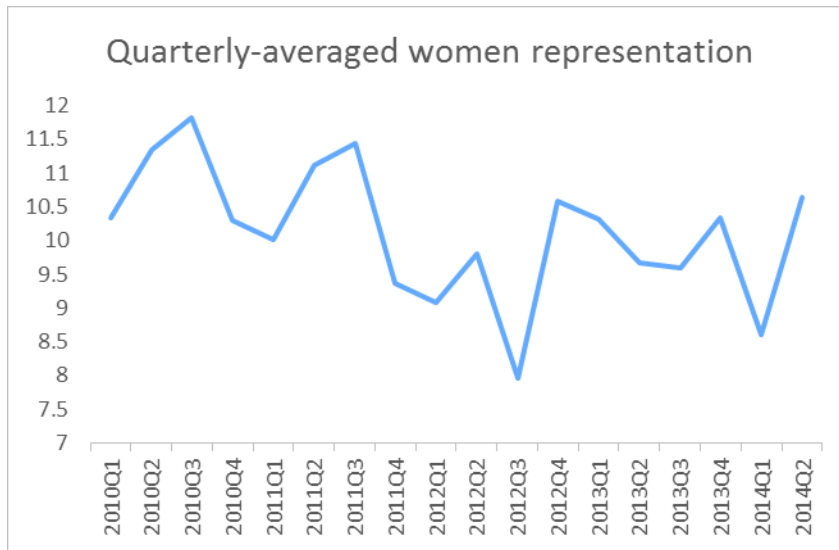
VARIABLES	(1) ROA	(2) ROA
femPercent	0.00801* (0.00317)	0.0136*** (0.00350)
TopCon	0.00845* (0.00411)	0.00809* (0.00409)
Demean_Gov	-0.00824 (0.0104)	-0.00522 (0.0104)
Demean_GTxF		-0.000316*** (8.53e-05)
Constant	2.459* (1.100)	2.680* (1.098)
Observations	1,761	1,761
Number of bankid	116	116
Bank Fixed Effects	Yes	Yes
Quarter Fixed Effects	Yes	Yes



Table 36 Regression diagnostic: Results after removing 2 banks with the highest residual and leverage

VARIABLES	(3) NPL	(4) NPL
femPercent	-0.0109+ (0.00592)	-0.0113+ (0.00655)
TopCon	-0.0228** (0.00766)	-0.0228** (0.00766)
Demean_Gov	0.0305 (0.0195)	0.0303 (0.0195)
Demean_GTxF		2.06e-05 (0.000160)
Constant	6.101** (2.053)	6.086** (2.056)
Observations	1,761	1,761
Number of bankid	116	116
Bank Fixed Effects	Yes	Yes
Quarter Fixed Effects	Yes	Yes

Figure 48 Aggregated women representation per quarter



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