Corruption and Banks Profitability: Understanding sustainable financial inclusion in the ECOWAS Region

Abstract

This study examines the effects of corruption on banks profitability and the impact this may have on banks effectiveness in achieving their role in economic development through organizational inclusiveness. Using a dynamic panel model of all the commercial banks in the Economic Community of West African States (ECOWAS), the study deepens our understanding of how institutional and regional contexts impact on organizational inclusiveness. The study reports a significant positive relationship between the perception of the level of national corruption and banks profitability. The study suggests that the control of corruption is important in reducing financial exclusion and enhances financial market development in Africa.

JEL Classification: E44, F36, G21,

Keywords: Corruption, Banks Profitability, Net Interest Margin, ECOWAS, and Regional Analysis.

1. Introduction

This study examines the impacts of corruption on banks profitability and its effect on financial inclusion in ECOWAS, a context with regional economic cooperation. Banks are vital to economies (Chen et al., 2015) because they have first order impacts on economic growth and enhances inclusiveness and global economic development (Beck et al., 2006; Barth et al., 2009). They achieve these by facilitating inclusive business through personal and corporate capital investments, and play important roles in channeling funds from the surplus end to the investment end of the economy (Chen et al., 2015). Thus, banks are crucial to the effective allocation of scarce resources in a way that ensures the inclusiveness of all stakeholders especially through their lending operations, which is also a source of their income (Houston et al., 2011).

However, these roles may not be realized effectively in context with high prevalence of corruption. Whilst there is a well-established literature in international development, economics and politics on corruption (Aidt, 2009; Mauro, 1995; Rose-Ackerman, 1999; Shleifer and Vishny, 1993; Wei, 2000), surprisingly, there is limited research on the impact of corruption on banking operations. Furthermore, while extant studies (for example, Short, 1979; Bourke, 1989; Molyneux and Thornton, 1992; Demirguc-Kunt and Huizinga, 1999; Ahokpossi, 2013), have examined the determinants of banks profitability, studies that have explicitly addressed the impact of corruption on banks profitability and its effect on financial

inclusions are rare. The few available studies focused mainly on the control of corruption in bank lending (Beck et al., 2006; Barth et al., 2009; Houston et al., 2011).

Furthermore, this study offers a unique dimension to the extant literature by focusing on banks in ECOWAS countries in Africa, which is a clear departure from the overwhelming attention in the literature, where investigations have centered on individual country or cross-country analyses without specific attention on the regional implications. Moreover, there is a dearth of studies on the determinants of banks profitability in Africa. Yet, the African financial market presents different features to those in the extant literature (Demetriades and Fielding, 2012). Recent literature has highlighted the under-developed nature of the African financial market. For example, Andrianova et al., (2015) note the paradox of high bank liquidity yet low lending rate in the African banking sector. These suggest the need to generate deeper understanding of the features of this market to understand its banking structure and inclusive nature better. This study extends the literature by examining how corruption affects banks profitability, thereby deepening our understanding on the impacts of external and non-business factors such as corruption on banks profitability in a relatively under-developed financial market.

Using all the 123 commercial banks operating in the fifteen ECOWAS countries, the study covered a period of 2002-2016 inclusive, due to lack of data for subsequent years, thus giving 1845 firm-year observations. The study directly contributes to the literature on banks profitability and financial inclusion by focusing on the impacts of corruption on banks profitability and its effect on banks' role in economic development through organizational inclusiveness. Whilst extant studies report mixed findings on the impacts of corruption on

economic performance, this study provides first empirical evidence on the effects of corruption on banks profitability in the ECOWAS region. The study finds that corruption matters for banks profitability within ECOWAS region. Secondly, the study provides additional evidence on the determinants of banks profitability from a context with features that are different to those in extant literature. Furthermore, banking in Africa is still at the emergent state and it provides a suitable platform to test the structure-conduct-performance theory. The findings from this study seem to support this theoretical frame. Thirdly, this study advanced the international comparative banking research by considering the effects of regional banking differences on banks profitability. This responds directly to the call by Ahokpossi (2013) for more regional analysis in banking research and reinforces the very essence of economic cooperation and inclusiveness, where there is reasonable coordination and information sharing amongst member states. These findings have implications for financial market development in Africa.

The study has six sections. Section 2 presents background information on ECOWAS and the African banking sector. Section 3 addresses the literature, which highlights key findings from existing studies and formulates the hypothesis in the study. Section 4 presents the methodology and the data used in the study. Section 5 explains the findings and their implications and section 6 presents the conclusion.

2. Literature, theory and hypothesis

2.1. Prior studies on corruption and banks profitability

Corruption is the dishonest behavior of an officeholder(s) (public or private) who uses their influence to secure undue advantage for corporate or personal gains (Rose-Ackerman, 1999; Shleifer and Vishny, 1993). The literature distinguished several types and classifications of corruption[1]. For example, Asongu (2013:38) categorized corruption into incidental, systematic and systemic levels. Incidental corruption includes 'petty bribery and involves opportunistic behavior of an individual or small group'. Systematic corruption describes a situation where although corruption may not be institutionalized and pervasive, it is recurrent, and systemic corruption describes a situation where the level of corruption is embedded in institutions and it is very pervasive. At this level, corruption is often accepted but may not be approved (Kpundeh, 1998). Corruption in banking may reflect the three levels described above depending on the context. Consequently, corruption in banking is a fundamental issue that runs contrary to the very basis of banking, and therefore deserves explicit attention in the literature.

However, while research into the determinants of banks profitability is well established and could be traced back to the seminal studies by Short (1979) and Bourke (1989), research into the impact of corruption in banking operations is rear. Existing evidence suggests that external factors in a country could affect banks profitability (Athanasoglou et al., 2014; Bikker and Hu 2002) but they have mainly focused on macroeconomic factors.

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[1] This study did not address the extensive debate about the type and categories of corruption because there are several studies that have dealt with these topics in extant studies (please see for example, Rose-Ackerman, 1999; Shleifer and Vishny 1993 amongst others for an extensive review on the topic of definition and types of corruption). This study focuses on corruption in the context of banking operations and explores the impact of the perception of the level of corruption in a country on banks profitability. It recognizes the difficulties of measuring firm level corruption and relied on aggregate measure of the perception of corruption based on the Transparency International Index.

There is therefore a dearth of studies on the effects of corruption on banking operations and profitability.

Extant studies on corruption in banking have focused mainly on the control of corruption in bank lending. For example, Beck et al., (2006) examine the relationship between banks supervisory policies and the degree to which corruption in lending impedes the ability of firms to raise external finance. They find that official supervision of lending process without strong legal and reliable institutions is worsening with corruption and political pressure, which aggravate the inefficient allocation of resources. They argue that the empowerment of private monitoring agents through transparent and adequate disclosure of information could curb corruption in bank lending. Barth et al., (2009) examine the effects of banks competition and information sharing in curbing corruption in bank lending. They argue that information asymmetry between lenders and borrowers often give bank officers high discretion, and lack of competition in the banking sector allows bank officers to exploit their strong bargaining power in lending decisions. Barth et al., (2009) demonstrate that banking competition and information sharing amongst lenders can reduce credit rationing through reduction in the effects of adverse selection and moral hazard in banks' lending decisions. Furthermore, Houston et al., (2011) examine the impact of the media and media ownership on corruption in bank lending. They find that state ownership of the media and media concentration are increasing function of corruption in bank lending. According to Houston et al., (2011), whilst state ownership of the media and media concentration exacerbate the positive link between official supervisory power and corruption, they weaken the negative link between private empowerment and monitoring and corruption in lending. These studies

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focused on the effects of corruption in bank lending on other enterprises, they did not address the effects of corruption on banks profitability.

Furthermore, both Flamini et al., (2009) and Ahokpossi (2013) emphasized the regional differences in the African banking sector as reflected in their profitability, and Liu et al., (2013) in a study on competition and stability in European banks note the importance of regional analysis in banking research. They argue that "significant differences among EU regions in terms of both economic development and competitive rivalry in banking markets may well have an influence on the stability of their financial systems" (p.178). This study builds on these arguments and examines the effects of corruption on banks profitability in a regional context with mutual economic cooperation and integration but with differences in the macroeconomic factors amongst member states.

ECOWAS is a 15 country regional economic bloc of countries in West Africa founded in 1975. The main purpose of the organization is to promote economic development through integration and by promoting trade and the free movement of member state citizens. Together the region has an estimated GDP of $721 billion and a total population of approximately 500million as at 2014 (World Bank Development Indicator, 2014). However, despite the economic cooperation, the countries in the bloc have distinctive characteristics and their levels of financial market development are not uniform. For example, countries such as Nigeria, Ghana, and Gambia have relatively high (6, 6, and 9) ratio of commercial banks branches per 100,000 adults population. This is unlike countries such as Niger, Sierra Leone and Guinea, which have low (1.5, 3, 2) ratios of commercial banks branches to adult

population compare to the global average of 11 banks (World Bank Financial Market Development Indicator, 2014).

ECOWAS aims to enhance market integration through a monetary union, a common currency, and a unified exchange rate under a common monetary authority. To facilitate these, the community adopted a Monetary Cooperation Programme (MCP) in 1987 that is to enhance the establishment of the West African Clearing House, now known as the West African Monetary Agency (WAMA). The MCP was also to achieve the merger of the English and French speaking countries' monetary arrangements. For example, whilst the French speaking West African countries have a long history of monetary union, the English speaking West African countries do not (Demetriades and Fielding, 2012). However, despite the differences in their historical antecedents, banks in West Africa share some common characteristics (Fosu, 2013).

2.2. Theoretical Framework

From the foregoing, the Structure-Conduct-Performance (SCP) paradigm (Bain 1956, 1966) appears suitable in helping us to understand the effect of corruption on banks operations and hence profitability within the West African region. The SCP paradigm posits that the market environment has a direct impact on the market structure. The market structure have a direct influence on firms' economic conduct which then affects its market performance. Therefore given the West African market environment (described above), the SCP suggests that banks performance is dependent on their structure, (i.e. number of bank and depositors; concentration, and barriers to entry) (Bain 1956); and conduct (i.e. pricing behavior, legal attitude and tactics) (Short, 1979; Molyneux et al, 1996).

In terms of structure, financial markets in Africa are underdeveloped and shallow; bank lending is low because of low financial intermediation (Allen et al., 2011). African financial markets have one of the lowest ratios of bank branches to population in the world (World Bank Development Indicator, 2014). There is high market power because the market is highly concentrated resulting in limited competition and enabling large banks to earn abnormal returns due to monopolistic competition (Flamini et al., 2009; Ahokpossi, 2013). There are significant barriers to new entrants especially due to the huge capital requirements and lack of banking infrastructure, which imply that the initial set up costs are prohibitive (Allen et al., 2011).

Banking conducts in Africa are also significantly different from popular norms in the literature. For example, the legal structure, institutions and financial policies are emerging and unstable coupled with the prevalence of corruption (Demetriades and Fielding, 2012). Investors' protection is generally weak due to weak judicial system and systemic corruption which heightens banks risk profile (Habib and Zurawicki, 2002). Low financial intermediation and uncertain banking conducts are likely indicators of the high operating risks that banks in this context face and these may partly explain the fact that banks in Africa have the highest net interest margin compare to banks in other regions of the world (Flamini et al., 2009; Demetriades and Fielding, 2012; Ahokpossi, 2013).

Furthermore, because the financial markets are shallow, there is a limited number of banking products, and banks revenue are less diversified relying heavily on net interest margin (Allen et al., 2011). These features make African banking market distinctive and

justify a closer analysis of the likely effect that one of the key features of the environment – corruption, have on the operations and hence the profitability of the banks in this context.

2.3. Hypothesis development

The literature presents conflicting views on the impacts of corruption on economic activities. For example, there is a general perception that corruption is bad because it obstructs economic growth through inefficient allocation of resources (Rose-Ackerman, 1999; Clark and Riis 2000; Mauro, 1995; Tanzi, 1998). Clark and Riis (2000) conclude that corruption does not lead to efficient resource allocation. Mauro (1995) argues that corruption reduces investment and the rate of growth in an economy. Tanzi (1998) observes that the reduction in investment is due to the high cost and uncertainty that corruption creates. Demirguc-Kunt and Huizinga (1999) find that corruption has more profound adverse consequences on interest margin and banks profitability in developing countries. The reason for this might be that developing countries experience a deeper corruption problem, evidenced in the higher lending costs that banks charge their borrowers as they try to mitigate credit risk. Park (2012) reports positive association between non-performing loan and the level of corruption in a country and Shleifer and Vishny (1993) suggest that firms in a country with high level of corruption face high operating costs for three reasons.

First, corruption weakens central government, making it ineffective and firms face the consequences of weak central government, including red tape and administrative delays. Second, corruption leads to distortions in public policy directions because government officials trade public policy for personal gains effectively to the highest bidders; and again firms are usually at the receiving end of the inconsistencies and distortions in public policy

since they incur the costs of their implementation. Third, corruption increases firms operating costs associated with legacy system because corrupt officials prefer to maintain the status quo and so resist change leading to rigid system that is hostile to innovation. The literature above argues that corruption deters economic growth, leads to inefficient resource allocation, and adds significantly to firms operating costs, which ultimately affect their profitability including the profitability of commercial banks. However, a section of the literature also argues that corruption facilitates economic decisions and enhances productive efficiency. This could be through re-allocation of otherwise inefficiently allocated resources due to political connectedness (Khwaja and Mian, 2005), especially in context with acute bureaucracy and systemic inefficiency. Furthermore, Chen et al., (2013) argue that corruption, in form of bribery, leads to more loans granted to firms that are more productive. Other studies argue that corruption could lead to efficiency gains by avoiding delay in slow moving administrative red tapes (Batabyal and Yoo, 2007) that could otherwise lead to inefficiency and increase operating costs. Thus, the literature presents mixed indications of the effects of corruption on profitability. Whilst corruption can increase banks operating costs due to inefficiency and the costs of preventing corruptions, it could also lead to increased banks revenue due to higher interest income as banks recognize the additional risks associated with corruption in their pricing strategy. This study main hypothesis based on the discussion above is as follows:

> H1: *There is no relationship between the perception of the level of corruption in a country and banks profitability*

3. Variable measurements

3.1. Dependent variable – Banks profitability

Consistent with Ahokpossi (2013), this study used net interest margin (NIM) as the measure of banks profitability. The study defines NIM as the difference between banks' interest income and interest expense divided by average assets. Whilst return on average asset (ROAA) reflects management efficiency in the utilization of banks assets, NIM reflects banks performance on interest income as a function of interest expense. NIM also reflects cost of financial intermediation by banks. The study obtains data for NIM from Bankscope.

3.2. Main independent variable – Corruption

This study used the Transparency International's corruption index as the measure of the level of perception of corruption in a country. The Transparency International (TI) launched the corruption perception index (CPI) in 1995, as a way to measure and fight corruption in a country's public sector. The index covered 177 countries in 2013 compare to 41 countries when it started in 1995. The TI derived the index score from a simple average of the normalized results based on experts and businesspersons' perceptions on a multiple survey on their perception of corruption in a country. These multiple surveys required respondents to rate their perception of corruption in a country. The TI index score is an aggregation of the scores from these multiple surveys. Thus, the components of the TI index score change depending on the number of independent surveys used in deriving it (Lambsdorff, 2008). The index score now ranges from zero to 100 compare to zero to 10 that it used to report from inception until 2011.

As in previous index scores, values closer to zero indicate high perception of national corruption and values close to 100(10 prior to 2012) represent countries with lower

perception of national corruption. Although increasing number of studies are using the CPI as a measure of the perception of corruption in a country (see for example, Chen et al., 2015; Park, 2012; Egger and Winner 2006; Wei, 2000), it has some defects. These include the fact that it is simply a measure of perception, which is different from the reality of corruption (Mocan, 2008; Dreher et al., 2007). Furthermore, Mocan (2008) argues that the index does not capture the breadth and depth of corruption because they are aggregate measures and De Maria (2008) questions the integrity of the survey suggesting that it is difficult to integrate several surveys into one broad based score.

However, consistent with Egger and Winner (2006), this study used the corruption perception index as the measure of the perception of corruption for three reasons. Firstly, it is a composite measure of corruption drawing on corruption indices from other notable organizations including the World Bank, The European Intelligent Unit; The World Economic Forum amongst others (please see Lambsdorff, 2008 for a detailed description and discussion of aggregation issues). Secondly, unlike other indices, which may include political stability and governance indicators, the focus of the TI's corruption index is purely on corruption, making it more reliable and relevant for this investigation. Thirdly, the CPI is highly correlated with other corruption indices (Wei, 2000; Lambsdorff, 2008) further enhancing its reliability.

To address the concern over aggregation of surveys, Chen et al., (2015) suggest that the index score could be modified to recognize the changes in the composite surveys and methodologies used in arriving at the index score. This could be achieved by scaling the index score for each year by the mean of the index score for all the countries in a sample for

that year. This procedure removes the likely negligible bias in the yearly index score and represents the corruption perception score of a country relative to the scores of the other countries in a sample. Consistent with Chen et al., (2015), this study used equation 1 below to derive the adjusted corruption index (AdjCI). Furthermore, in response to the criticism on aggregation and robustness of the measure, Lambsdorff (2008) argued that the index provides a realistic measure of perception of corruption because the process of aggregation reduces the individual survey's bias and enhances the validity of the scores, which may not be possible with individual survey. Egger and Winner (2006) made similar argument although Wei (2000) suggests that the poll of polls approach would only reduce measurement errors if the errors in individual surveys were independent.

Furthermore, consistent with previous studies (Chen et al., 2015; Park 2012) this investigation normalized the CPI index score. This is achieved by subtracting the actual index score from 10 (for index scores up to 2011), and for index score from 2012-2013, dividing the index score by 10 and subtracting from 10 so that high index scores represent high perception of national corruption and lower index scores represent lower perception of national corruption. The study used equations 2 and 3 below to achieve these respectively.

$$AdjCI_{i,t} = \frac{CI_{i,t}}{\left(\sum_{i=1}^{N} CI_{i,t}\right)\big/ N} \qquad\qquad 1$$

$$CPI_{i.t} = 10 - Adj\, CI_{i,t} \qquad\qquad 2$$
$$if\ t = 1995 - 2011$$

$$CPI_{i.t} = 10 - \left(Adj\, CI_{i,t}\big/ 10\right) \qquad\qquad 3$$
$$if\ t = 2012 - 2013$$

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Where

CI is the original corruption index score from TI; N is the number of countries in the sample in each year; Adj CI is the adjusted corruption index to account for changes in yearly index score

CPI = is the corruption perception index used in the study after all adjustments; i = country and t=time in years.

3.3. Control variables

To test the proposed hypothesis, there is the need to control for variables that have been identified by prior studies as influencing banks profitability. These are; bank specific factors and macro –economic factors.

3.3.1. Bank specific factors

Capital strength: Prior studies (Athanasoglou et al., 2008; Shehzad et al., 2013) have shown that high capital ratios indicate good financial health and that the capital strength of a bank could serve as a source of financial buffer in risk consideration. Consequently, majority of existing studies (Bourke, 1989; Berger, 1995; Demirguc-Kunt and Huizinga, 1999; and Goddard et al., 2004) all reported positive relationship between capital strength and banks profitability. Berger (1995) suggests that banks with high capital to asset ratio, signal information that future prospects are good by increasing capital. Similarly, Flamini et al., (2009) report positive relationship between capital strength and profitability in their study on banks in sub-Saharan Africa. Banking sectors in Africa have constantly experienced re-structuring and often these have focused on increasing their resilience to various forms of

'stress' through increased capital based. This study, therefore, expects a positive relationship between capital strength and banks profitability.

Credit risk: Banks encounter credit risk through increased default on loan repayment (i.e. bad debts) and when they are unable to meet the cash requirements of depositors due to lack of adequate reserves or inability to raise short-term funding (insolvency). Based on risk-return analysis, banks respond to potential high credit risks through higher lending rate that effectively price in the risks associated with the loan and thereby increases profit. This explains the positive relationship between credit risk and banks profitability reported in some studies (E.g., Al-Haschimi, 2007; Ahokpossi, 2013; and Flamini et al., 2009). However, other studies report negative relationship between these variables. For example, some earlier studies (E.g. Bourke, 1989; Molyneux and Thornton, 1992) reported negative relationship while some more recent studies (Athanasoglou et al., 2005) also report similar results. Due to the conflicting indications in the literature, this study did not predict a relationship between credit risk and banks profitability.

Cost management: Costs erode profits and thus have a negative impact on banks profitability. Banks with high cost to income ratio are likely to report low profits, and signal management inefficiency with adverse consequences on profitability (Pasiouras and Kasmidou, 2007). Since higher expenses normally mean lower profits and vice versa, this study expects cost to have a negative effect on banks' profits. Previous studies are unanimous in reporting negative relationship between operating costs and banks profitability (Athanasoglou et al., 2008; Bourke, 1989; Molyneux and Thornton 1992). Banks in Africa face unique operating environment due to market imperfections and absence of necessary

banking infrastructures. These conditions aggravate banks operating costs and consequently this study anticipates that cost will negatively affect the profitability of commercial banks in the region.

Liquidity: Liquidity and its management are important issues for banks. Banks with conservative liquidity management strategy tend to hold higher reserves and have high liquidity to capital ratio (Moyer et al., 2005). They also invest in liquid assets with lower returns compare to longer-term investments. On the other hand, banks that take the riskier and aggressive approach of investing in less liquid assets that yield more returns may be exposed to higher liquidity risk and bankruptcy costs (Carbó and Rodríguez, 2007). Previous studies provided mixed indications on the relationship between liquidity and banks profitability. For example, while, Bourke (1989) reported positive relationships, Molyneux and Thornton (1992); Kosmidou et al., (2008) and Pasiouras and Kosmidou (2007) all reported negative relationships. Kosmidou et al., (2007).

However, liquidity management poses additional risk factor to banks in Africa because banks in this region operate with significant information asymmetry suggesting high liquidity and credit risks. These also imply higher propensity to default on loans and advances (Andrianova et al., 2015). Consequently, these banks may have to hold additional cash to meet depositors' demand in a shallow financial market with limited opportunity for diversified income. Banks in this region respond to this uncertainty through high lending rates and concentration on short term lending with the attendant negative effects on financial market deepening and capital market development (Saunders and Schumacher 2000). Since liquid assets are associated with lower returns and banks in Africa maintain high liquidity to

ensure financial stability, this study expects a negative relationship between liquidity and profitability.

Bank size: Empirical evidence gives conflicting indications on the relationship between bank size and banks profitability. Whilst some studies report positive relationship, others report negative or no relationship at all. For example, Demirguc-Kunt and Huizinga (1999); Pasiouras and Kosmidou (2007); Bikker and Hu (2002) and Flamini et al., (2009) all reported positive relationships between bank size and profitability. The argument for this position is that since large banks have control over a larger percentage of the domestic market, and operate in a monopolistic market, lending rates will remain high while deposits rates for large banks are lower, because they are safer than smaller banks, and larger banks may therefore enjoy higher profits. However, a study by Dietrich and Wanzenrid's (2014) on the determinants of commercial banking profitability in low, middle and high-income countries find no empirical evidence to support that large commercial banks were more profitable than medium and small sized banks in all of the income groups. While, other studies (e.g. Berger et al., 1987; Micco et al., 2007) that also reported negative or no relationship between bank size and profitability, argue that banks profitability do not increase enough to offset the additional costs of expansion. For example, large banks in Africa face high operating costs typically due to high information asymmetry, low level of financial intermediation and shallow financial market. Consequently, the initial cost of product development, diversification and branch expansion may be prohibitive (Shehzad et al., 2013; Ahokpossi, 2013; Berger et al., 1987). Higher market imperfection and uncertainty may also affect cost recovery. Thus, the expected economies of scale may not materialize, resulting in

a negative relationship between banks size and profitability. This study, therefore, did not predict a relationship between bank size and profitability due to the conflicting indications in the literature.

3.3.2. *Macroeconomic factors*

Growth in GDP: Studies on pro-cyclicality of banks have shown that banks performance is sensitive to the state of the economy (Albertazzi and Gambacorta, 2009; Bikker and Hu, 2002). As a country's economy expands, banks should expect an increase in their profitability as existing businesses acquire loans for expansion, entrepreneurs acquire loans to fund startups and individuals acquire funds for personal use. Banks should therefore experience increase in interest income from the loans rendered and thus an increase in their profits (Albertazzi and Gambacorta, 2009). Panayiotis et al., (2005) report a significant positive relationship between general productivity level in an economy and banks profitability. This indicates that banks benefit during general increase in productivity in the economy. Similarly, Pasiouras and Kosmidou (2007) examine the factors influencing the profitability of domestic and foreign commercial banks in the European Union, and report that GDP is positively associated with the financial sector performance of a country. Dietrich and Wanzenried (2014) also report a positive relationship between GDP growth and banks profitability in middle and high-income countries but not in low-income countries. However despite the overwhelming evidence in the literature, few studies (E.g. Ahokpossi, 2013) did not find any relationship between GDP growth and banks profitability, while Flamini et al. (2009) only reported a marginal significance. Although there are reported instances of

negative or no relationship, there is a general expectation of a positive relationship between GDP growth and banks profitability.

Inflation rate: Empirical evidence regarding the relationship between inflation rate and banks profitability is inconclusive. For example, Dietrich and Wanzenried (2014); Ahokpossi (2013) and Flamini et al., (2009) all observe significant positive relationships between inflation rate and bank profitability. The authors argue that banks in sub-Saharan Africa are able to accurately predict the expected inflation rate, and therefore adjust their interest rates accordingly. However, Goddard et al., (2011) reported an insignificant relation between inflation and the persistence of banks' profits, while Sufian and Habibullah (2009) observe a negative relationship between inflation and NIM in their study of Bangladeshi banking sector. They argued that this might be because banks could not accurately predict expected inflation rate. Based on the arguments above and the mixed indications in the literature, this study did not predict a specific relationship between inflation rate and banks profitability.

Foreign direct investment (FDI: Empirical studies on the impact of FDI on banks profitability derive the links through spillover effects of FDI on economic growth, but available evidence is inconclusive (Almfraji and Almsafir 2013; Azman-Saini et al., 2010). Studies that argue for positive relationship between FDI and economic growth attribute the effects to spillover on hosts' countries. This could emerge in form of additional job creation, capital accumulation, and knowledge transfer on the host countries, which could positively affect economic growth. This in turn spills over into the banking sector, since a pro-cyclical relationship seems to exist between the two, and since banks exert first order impact on

economic growth. Consequently, increased economic growth arising from FDI could imply increase demand for bank loans for business expansion and new startups as well as increase in bank deposits, since economic growth may lead to additional personal savings, both with tendencies to increase banks profitability through interest income from increased banks deposits. Furthermore, African countries are major recipients of foreign direct investments and since Almfraji and Almsafir (2013) claim that FDI exerts positive effects on the host country's economic growth it is reasonable to expect that this impact will also spillover to the banking sector with a tendency to increase banks profitability. Based on the argument, this study anticipates a positive relationship between FDI and banks profitability.

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Table 1: Variable definition about here
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Variable definitions and expected relationship between banks profitability and the other independent variables are provided in Table 1, while Table 2 provides a number of basic macroeconomic statistics for the countries in the sample showing some significant differences. For example, in 2014 whilst Nigeria experienced a GDP growth rate of 3% it was -20% in Sierra Leone and about 6% in Benin. Similarly, there is wide variation in the level of FDI coming to the countries. For example, whilst Nigeria recorded about $5bn, Gambia only attracted $28m. On the other hand, the countries are similar in their banking development and the level of perception of national corruption. For example, the average CPI measure was 7.5 out of a maximum 10.

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Table 2: Macroeconomic statistics about here

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4. Data and Methodology

4.1 Sample and data collection

The sample is a balanced panel dataset of 123 commercial[2] banks operating in the 15 countries of the ECOWAS over the period of 2002-2016, thus making 1845 observations. Table 3 below presents the number of banks by country. For example, it shows that Ghana has the largest with 22 banks and Guinea-Bissau has the lowest with 2 banks and 123 banks in all.

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Table 3: Banks in the sample by country about here
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The study uses financial data for banks in the ECOWAS region obtained from the Bankscope database, and the macroeconomic and perceptions of corruption data obtained from the World Bank and Transparency International respectively.

4.2 Methodology

This study followed Athanasoglou et al., (2008) and Flamini et al., (2009) in using a dynamic model to empirically investigate the effect of corruption, banks specific and macroeconomic factors on banks profitability. The dynamic econometric model used in the study is of the form:

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[2] This study used only commercial banks to avoid the bias that could be associated with state ownership, and if other banks such as saving investment cooperative and development banks are included.

$$y_{it} = \alpha + \delta y_{i,t-1} + \theta Cpi_{it} + \beta_b X'_{mit} + \beta_m X'_{bit} + v_{it} \qquad\qquad 4$$

$$v_{it} = u_i + \varepsilon_{it} \; ; \; where \; u_i \sim iid \, N(0, \sigma_u^2) \; and \; \varepsilon_{it} \sim iid \, N(0, \sigma_\varepsilon^2)$$

Where y_{it} is the dependent variable i.e. profitability of the ith bank at time t, α is the intercept. $y_{i,t-1}$ is the lagged dependent variable representing profitability of the ith bank in the previous year, this is to recognize the fact that banks profitability could be persistent. δ captures the speed of adjustment of banks profitability to equilibrium. A value of δ between 0 and 1 indicates the persistence of profit, but they will eventually return to their mean value. In a competitive market, the value of δ will be close to zero; a value of δ close to one indicates a less competitive industry. Cpi_{it} is the measure of corruption and θ is its coefficient. X'_{mit} and X'_{bit} are vectors of macroeconomic and bank specific factors respectively, with β_m and β_b as vectors of coefficients, and v_{it} is the disturbance term comprising of u_i which is the unobservable bank specific effects i.e. fixed effect and ε_{it} which is the idiosyncratic error term.

The error terms are independent and identically distributed. The presence of a lagged dependent variable in the model implies that least square estimates and the normal estimations of fixed or random effect panel models produce biased and inconsistent estimates of the parameters (Flannery and Hankins, 2013; Nickell, 1981). This is because of the correlation between the individual effect and the lagged dependent variable. Arellano and Bond (1991) suggest the use of a generalized method of moments (GMM) estimator for dynamic panel models. They argue that the lagged exogenous variables values at level are legitimate instruments for the first differenced lagged dependent variable. However, Blundell and Bond (1998) showed that lagged variables do not provide optimal solutions especially

when a panel contains limited time (T) and large cross-section (N). Instead, they suggest a system estimator that explores more moment conditions on the lagged difference and levels, using the lagged first difference of the exogenous variables as instruments in the levels equation.

Two critical factors in the consistency of the system GMM estimators are the validity of the assumption of no autocorrelation of the error terms, and the validity of the instruments. It is important to note that whilst the presence of first order autocorrelation in the difference residuals does not constitute a problem, the presence of second order autocorrelation implies the violation of the assumption of no autocorrelation and the estimates are not consistent. The study used the Sargan test of over-identifying restriction to confirm the suitability of the instruments. The system GMM estimators also controls for unobservable firm heterogeneity and for the persistence of banks profitability. In additional analysis, the study compared the results of the dynamic model with both fixed and random effects models for robustness check. The next section presents the empirical findings.

5. Empirical findings

Table 4 below presents the descriptive statistics and Table 5 presents the correlation matrix. The mean (median) NIM for the banks in the sample is 6.7(6.9) and a standard deviation of 4; this is slightly different to the average of 7.47 reported by Ahokpossi (2013). A possible explanation for the difference is that his study was on the entire banks in the sub-Saharan Africa compared to this regional analysis. All the countries in the sample have a consistently high corruption perception index score. The average was 7.5 out of a possible 10. The ratios of commercial banks to population showed that majority of the countries have very low level

of financial market participation. The correlation matrix in Table 5 did not indicate any high correlations amongst the variables. The panel unit root test with Levin-Lin-Chu (2002) test shows that the macroeconomic variables are stationary at level (results not tabulated)[3].

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Table 4 and 5 about here

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5.1. Regression results

Table 6 reports the regression results in three columns. The results showed that the model specifications are appropriate. Evidence across all the regressions showed the absence of second order autocorrelations in the residuals (Arellano and Bond, 1991) and the result of the Sargan tests showed no evidence of invalid over-identifying restrictions. The Wald tests are statistically significant and reject the null hypothesis of the joint insignificance of the parameters, indicating a fine goodness of fit. All the regressions are with Windmeijer's (2005) bias-corrected robust standard errors. The study used this robust standard error because of the tendency for standard errors in the system GMM regressions to be downward bias. Model 1 is the regression of the dependent variable (NIM) on its lagged variable and the bank specific variables. In model 2, the study includes all macroeconomic variables and model 3 is the full model that includes the corruption variable.

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Table 6 about here

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[3] This study used Stata command xtunitroot to execute this test with the llc option. Adjusted t statistics for the variables are -11.4504***, -21.7403*** and -5.1188*** for GDP, Inflation and FDI respectively significant at all conventional levels and rejecting the null hypotheses that the panel contained unit root.

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Column 1 in Table 6 reports the result of the first model. The lagged dependent variable, which measures the level of persistence of bank profitability (NIM), is positive and statistically significant in the first three models reported in Table 6. These results show that banks profitability is persistent, and confirm the suitability of the dynamic models used. Furthermore, the coefficient of between 0.21-0.28 and significance for the lagged dependent variable indicate a moderate speed of adjustment of profit to its average level. Model 1 showed a positive but statistically insignificant relationship between capital and banks profitability. The result in model 1 also showed that there is no statistically significant relationship between credit risk and NIM. However, cost management shows negative and statistically significant relationships with banks profitability. Bank size shows significant positive relationship with banks profitability. Liquidity is negative but not statistically significant.

Model 2 in column 2 Table 6 includes the macroeconomic variables. The result is consistent with model 1 except that capital and credit risk have now become marginally significant and cost management is now just marginally significant compare to significance at 5% level in model 1. None of the macroeconomic variables shows statistically significant relationship with NIM. Model 3 includes the corruption measure; CPI. The regression results showed that CPI is positive and statistically significant at 5% level. Capital and credit risk remain positive and marginally significant but cost management is now statistically significant at 5% level maintaining its negative relationship with NIM. Banks size continues to show a statistically significant positive relationship with NIM at 1% level but there is no

statistically significant relationship between liquidity and banks profitability. The macroeconomic variables remain insignificant.

The main result is the full model in column 3, Table 6. The result shows that there is a statistically significant positive relationship between banks profitability and the level of corruption in a country. This result is robust to the inclusion of firm specific and macroeconomic variables and indicates that banks profitability is an increasing function of the level of perception of corruption in a country. Thus, the result suggests that, all things being equal, the higher the perception of the national corruption in a country, the higher the banks' profitability for commercial banks operating in ECOWAS region. The regression results show that a one basis point upward movement in national perception of corruption in these countries is, on average, associated with 2.2 bases points upward movements in net interest margin for the banks in the sample. The result also indicates that in context with high operating risk aggravated by high perception of national corruption, banks seem to respond to this risk by charging higher interest rate for loans to protect themselves from the excessive risks relative to their own funding costs. The result also seems to be indicative of the high cost of financial intermediation in the context, which may affect the depth of the financial market due to high financial exclusion arising from high banking costs.

Furthermore, the main regression results seem to imply that, on average, for commercial banks operating in ECOWAS countries, there is some evidence, albeit marginally, that the higher the capital to asset ratio, the higher the profitability measured as NIM, and that banks credit risk is an increasing function of their profitability. These seem to indicate that well capitalized banks have the potential to generate more profits since they can award more loans

and credits whilst paying less for their funding, as depositors consider them safer especially in a context with high information asymmetry like the ECOWAS region. This result appears consistent with findings from previous studies including Flamini et al., (2009). The marginal positive relationship between credit risk and banks profitability seems consistent with the risk-return analysis whereby banks in the context respond to high banking risk by charging higher interests to protect them from the extra risk exposure arising from loan repayment default or bankruptcy costs. The finding of a positive relationship between credit risk and banks profitability seems consistent with the reported findings from studies such as Ahokpossi (2013) and Flamini et al., (2009).

Moreover, there is a consistent negative relationship between banks profitability and their cost management. Thus poor cost management is associated with lower profitability and vice versa. This finding is generally consistent with the findings from the majority of previous studies (Athanasoglou et al., 2008; Bourke, 1989; Molyneux and Thornton 1992), and shows that efficient cost management is an increasing function of banks profitability. Furthermore, the statistically significant positive relationship between banks size and banks profitability seems to indicate that banks benefit from economies of scale to growth. This suggests that the higher the size of the banks the more profitable they become. This seems reasonable in the African context where there is limited banking competition and large banks enjoy monopolistic competition and therefore can earn abnormal returns since they can charge high interest rate relative to their funding costs as depositors see them as being stable (Flamini et al., 2009). It seems that the additional revenue from expansions and growth in size far outweigh the additional operating costs of expansion.

The finding of a positive relationship between banks size and profitability seems consistent with the SCP theoretical frame. This is in the sense that low banking competition due to high barrier to entry and huge capital requirement couple with poor banking infrastructure could lead to high banking performance for the few large banks in the market. This finding is also consistent with findings from previous studies such as Short (1979), Bourke (1989) and Molyneux and Thornton (1992), Demirguc-Kunt and Huizinga (1999), Pasiouras and Kosmidou (2007) Flamini et al., (2009) who have all reported positive relationship between bank size and profitability. However, it seems to conflict with Berger et al.,'s (1987) claim that profitability does not increase enough to offset the additional costs incurred by banks due to expansion, and Micco et al.,'s (2007; 272) view that "the co-efficient of size is always positive but never statistically significant". This study finds a positive and statistically significant relationship between banks size and their profitability.

Furthermore, none of the macroeconomic variables showed statistically significant relationship with banks profitability. Consistent with Flamini et al., (2009) and Ahokpossi (2013) the study finds positive but insignificant relationship between GDP growth and banks profitability. However, unlike both Flamini et al., (2009) and Ahokpossi (2013), this study did not find any statistically significant relationship between inflation and banks profitability. It is relevant to note that previous studies have reported inconsistent results regarding the impact of macroeconomic factors on net interest margin in banking research in Africa (see Al-Haschimi 2007; Chirwa and Mlachila 2004; Beck and Hesse 2006). These findings suggest the need for additional studies to explore the interactions between macroeconomic variables and banks profitability in the African context.

5.2. Additional analysis

The study undertakes additional analyses to enhance its rigor and robustness. First, it considered the effects of country's legal origin on the determinants of bank profitability. Second, it used fixed and random effect models as alternative estimation techniques to test the persistence of the findings.

5.2.1. Country's legal origin and banks profitability

La porta et al., (1996, 1997) among many other researchers show that country's legal origin and legal system matter for financial market development. The literature suggests that common law countries seem to have more developed financial markets and better protection for investors compared to civil law countries. ECOWAS countries have two distinct legal origins in the English (common law) and French legal system (civil law) following their colonial histories. Although Cape Verde and Guinea-Bissau have Portuguese colonial antecedents, this study merged them to the Francophone African countries because they both have civil law origin. The study used a dummy variable (LEGAL ORIGIN), whereby countries with common law legal system is coded one and zero otherwise. Table 7 presents the regression result of the dynamic model estimation on this. The regression result shows that there is no statistically significant relationship between legal origin and bank profitability although corruption maintained a significant positive relationship with bank profitability. The result indicates that legal origin does not matter in the relationship between corruption and banks profitability for countries in the same economic bloc where there is deliberate move to achieve market convergence.

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Table 7 about here
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5.2.2. Alternative estimation techniques

Some previous studies (Ahokpossi, 2013; Demirguç-Kunt, Huizinga, 1999) used static model in investigating the determinants of banks profitability. This implies that estimations with the usual fixed and random effects model produce consistent and unbiased estimates of the parameters. For robustness, the study used fixed and random effects models. Equation 5 below represents the econometric model used in the estimation. All the parameters and variables remain the same. Table 8 models 5, 6 and 7 present the results of these estimations.

$$y_{it} = \alpha_i + \boldsymbol{\theta} Cpi_{it} + \beta_b X'_{mit} + \beta_m X'_{bit} + v_{it} \qquad\qquad 5$$

As can be observed, the results of these estimations seem generally consistent with the results from the dynamic model. There is a significant positive relationship between NIM and corruption perception. This indicates that the higher the perception of national corruption, the higher the net interest income earned by the banks in the sample relative to their costs of funding. This result is robust to the inclusion of bank specific and macroeconomic variables. Table 8 also shows a significant negative relationship between per capital GDP growth and net interest margin and a significant positive relationship between the natural log of FDI and net interest margin, which suggest that increase in inflow of FDI is associated with increased bank profitability as there is increase in demand for investment funds. These results are

different to the findings in the dynamic models. All the bank specific variables maintained the same sign as in the dynamic model although the levels of significance have changed.

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Table 8 about here

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6. Conclusion

This study examined the effects of corruption on commercial banks profitability in ECOWAS countries for the period 2002-2016. To date, no econometric study has examined the impacts of corruption on banks profitability. Yet, corruption presents significant risks to banking operation and it is capable of increasing banks operating cost. However, corruption could also serve as a basis for banks to charge high fees for their banking services due to increased banking risks associated with corruption, thereby contributing to their profitability. The study examines this issue in a different context to the majority of the extant literature. Banks in Africa have significantly different structure and conduct to those in extant literature and majority of African countries rank high in the Transparency International's corruption perception index.

The study used a dynamic model that allows for profit persistence and that controlled for both bank specific and macroeconomic variables. The study finds that profit is persistent and that there is a significant positive relationship between the level of perception of national corruption and banks profitability. The study also finds that capital base; credit risk, cost management and bank size determine banks profitability. Macroeconomic variables do not explain banks profitability in the dynamic model in this context. These results are robust even when the study used static models. The results seem to show that commercial banks in

ECOWAS recognize corruption risk in their pricing strategy and may provide part of the explanations for the high NIM for banks in this region compare to other parts of the world. This has implication for financial market development. This is because increased banking cost, as represented in a high NIM aggravates financial market exclusion because individual households and businesses may not be able to access bank loans and credit due to high banking cost. Thus, African countries should expedite control of corruption because it can contribute to financial market development through improved individuals and businesses access to loan and credit which can enhanced inclusiveness and hence productivity. High prevalence of corruption increases banks operating costs which is transferred to customers in high lending costs. High lending costs create disincentive for investment with adverse effects on economic growth and development. Therefore, an important step in enhancing inclusiveness and financial market development in Africa is to control the level of national corruption.

The findings in this study is limited to the extent that the measure of corruption used is based on perception rather than actual level of national corruption. Additional research is required in the relationship between corruption and banks profitability. Our study demonstrates that non-economic factors such as corruption impacts economic performance. Therefore, future studies should explore other non-economic factors such as poverty, literacy level and social well-beings on economic performance of banks.

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Table 1: Variable definition, source and expected sign

Variable	Description	Expected sign
	DEPENDENT VARIABLES	
NIM	The difference between interest income and interest expense divided by average asset. (Bankscope)	
	INDEPENDENT VARIABLES	
Corruption Perception Index (CPI)	This represents the perceived level of corruption in a country. Index score obtained from the Transparency International.	**POSITIVE/ NEGATIVE**
	BANK SPECIFIC FACTORS	
Capital strength (CAP)	This is a measure of capital strength, calculated as equity to total assets, higher ratios imply low leverage and thus lower risk. (Bankscope)	**POSITIVE**

Credit risk (CR)	This is the ratio of net loans to deposits and short-term funding, it is used to measure a bank's credit risk, higher ratios imply more risk (Bankscope)	**POSITIVE**
Cost management (CM)	This is the cost to income ratio, it provides information on management's ability to efficiently manage expenses in relation to the revenue the bank generates, higher ratios denote less efficient cost management. (Bankscope)	**NEGATIVE**
Liquidity (LQ)	This is a measure of liquidity, calculated as liquid assets to customer and short-term funding, higher ratios denote higher liquidity. (Bankscope)	**NEGATIVE**
Bank size (LNTA)	The natural log of the value of bank's total assets	**POSITIVE/ NEGATIVE**
	MACRO-ECONOMIC FACTORS	
Gross Domestic Product Growth (GDP %)	The annual percentage change in real gross domestic product. (World Bank)	**POSITIVE**
GDP per capital (LNGDPPC)	This is defined as the GDP divided by the total population. (World Bank)	**POSITIVE**
Foreign Direct Investment (FDI)	This is defined as the natural log of the total value of FDI in a country	**POSITIVE**
Inflation rate (INF)	The annual percentage change in real inflation rate. (World Bank, IMF)	**POSITIVE/ NEGATIVE**

Table 2: Major macroeconomic indicators for the countries in the sample

Country	Population	GDP(US$)	Growth in GDP	FDI (US$)	CPI	Ratio of Bank to population
Benin	10,598,482	9,575,356,735	5.7	377,358,669	6	3.2
Burkina Faso	17,589,198	12,542,221,942	4.4	341,898,203	6	2.2
Cape Verde	513,906	1,871,187,071	2.9	132,441,073	4	33
Cote D'Ivoire	22,157,107	34,253,607,832	8.4	462,038,433	7	4.7
Gambia	1,928,201	903,779,326	4	28,404,021	7	8.9
Ghana	26,786,598	38,616,536,132	3.4	3,363,389,444	5	5.8
Guinea	12,275,527	6,624,068,016	0.4	566,000,000	8	1.7
Guinea Bissau	1,800,513	1,022,371,992	4.4	21,459,644	8	2.5
Liberia	4,396,554	2,013,000,000	7.8	362,967,566	6	3.7
Mali	170,860,220	12,037,229,619	5	198,927,339	7	5.1
Niger	19,113,728	8168695870	4.4	768,985,316	7	1.4
Nigeria	177,475,986	568,508,262,378	3.3	4,655,849,170	7	5.9
Senegal	14,672,557	15,657,551,477	5.00	342,650,072	6	4.6
Sierra Leone	6,315,627	4,837,512,587	-20	690,349,249	7	2.9
Togo	7,115163	4,518,443,477	5.1	292,085,515	7	4.6

Source: Authors' compilation from the World Bank and Transparency International based on 2014 figures.

Table 3: Banks by country

Country	Number of Banks per country	Observation per Country (2002-2016)	Percentage of total observation
Benin	10	150	8.13
Burkina Faso	10	150	8.13
Cape Verde	3	45	2.43
Cote D'Ivoire	13	195	10.56
Gambia	9	135	7.32

Ghana	22	330	17.89
Guinea	5	75	4.07
Guinea Bissau	2	30	1.63
Liberia	5	75	4.07
Mali	7	105	5.69
Niger	5	75	4.07
Nigeria	10	150	8.13
Senegal	10	150	8.13
Sierra Leone	6	90	4.88
Togo	6	90	4.88
Total	**123**	**1845**	**100**

Table 4: Descriptive statistics

	Mean	Median	Std. dev	Skewness	Kurtosis	Jarque-Bera
NIM	6.734	5.597	4.185	1.919	14.81	6169.170***
CAP	11.33	9.590	10.68	0.455	38.01	49053.09***
CR	57.06	59.17	30.00	6.031	101.3	392552.4***
CM	73.12	63.17	57.70	5.790	50.13	94221.94***
LQ	42.27	31.47	53.33	12.02	205.3	1660104***
LNTA	19.23	19.28	1.904	-2.320	40.03	55713.54***
GDP%	5.100	4.832	4.474	2.151	15.57	7056.510***
GDPPC	805.4	634.9	614.7	2.294	9.838	2712.404***
INF	6.159	3.995	6.344	1.231	4.771	367.9863***
LNFDI	19.18	18.98	1.885	-0.097	2.863	2.246093
CPI	7.502	2.900	12.53	2.213	6.642	1313.848***

NIM is the difference between banks interest income and interest expense for a period. CAP is defined as the ratio of capital to total asset of a bank it is a proxy for a bank's capital base. CR is credit risk defined as the ratio of loan to deposit and short term funding of the bank. CM is cost management defined as the ratio of operating cost to banks revenue. LQ is bank's liquidity defined as the ratio of liquid asset to short term funding. LNTA is the natural log of a bank's total assets and it is a proxy for bank size. GDP% is the percentage growth in gross domestic product in a country. GDPPC is the GDP per capital and it is measured as the GDP divided by the total population in a year. INF is the measure of inflation rate in a country and is given as the growth in consumer price index in a country. LNFDI is the natural log of the dollar value of foreign direct investment into a country in a year. CPI is the measure of the perception of national corruption based on the transparency international measured modified consistent with Chen et al. (2015) and to reflect changes in the range of the index.

Table 5: Correlation matrix

	NIM	CAP	CR	CM	LQ	LNTA	GDP%	GDPPC	INF	LNFDI	CPI
NIM	1.000										

CAP	0.280	1.000								
CR	-0.029	0.028	1.000							
CM	-0.135	0.102	0.032	1.000						
LQ	0.064	0.297	-0.222	0.063	1.000					
LNTA	-0.032	-0.185	- 0.049	-0.307	-0.082	1.000				
GDP%	0.148	0.065	-0.174	-0.065	0.037	0.083	1.000			
GDPPC	-0.019	0.106	0.051	-0.011	0.063	0.329	0.106	1.000		
INF	0.359	0.116	-0.228	-0.099	0.270	0.122	0.243	0.137	1.000	
LNFDI	0.178	0.119	-0.109	-0.093	0.068	0.399	0.267	0.555	0.414	1.000
CPI	0.041	0.095	0.052	-0.008	-0.019	0.192	0.086	0.518	0.250	0.208	1.000

NIM is the difference between banks interest income and interest expense for a period. CAP is defined as the ratio of capital to total asset of a bank it is a proxy for a bank's capital base. CR is credit risk defined as the ratio of loan to deposit and short term funding of the bank. CM is cost management defined as the ratio of operating cost to banks revenue. LQ is bank's liquidity defined as the ratio of liquid asset to short term funding. LNTA is the natural log of a bank's total assets and it is a proxy for bank size. GDP% is the percentage growth in gross domestic product in a country. GDPPC is the GDP per capital and it is measured as the GDP divided by the total population in a year. INF is the measure of inflation rate in a country and is given as the growth in consumer price index in a country. LNFDI is the natural log of the dollar value of foreign direct investment into a country in a year. CPI is the measure of the perception of national corruption based on the transparency international measured modified consistent with Chen et al. (2015) and to reflect changes in the range of the index.

Table 6: Regression results for dynamic models

Dependent variable: NIM	Model 1	Model 2	Model 3
NIML1	0.277 (2.67) ***	0.232 (2.54) **	0.214 (2.61) ***
CAP	0.048 (1.45)	0.048 (1.81) *	0.042 (1.78) *
CR	0.009 (1.62)	0.012 (1.87) *	0.011 (1.89) *
CM	-0.007 (-2.11) **	-0.008 (-1.76) *	--0.007 (-2.11) **
LQ	-0.008 (-1.65) *	-0.008 (-1.56)	-0.008 (-1.68) *
LNTA	1.583 (4.80) ***	1.941 (3.47) ***	2.035 (3.69) ***
GDP%		0.018 (0.78)	0.018 (0.91)
LNPCG		0.001 (0.47)	0.000 (0.08)
INF		0.034 (0.82)	0.042 (0.96)
LNFDI		0.162 (0.72)	0.216 (1.10)
CPI			0.022 (1.97) **
Constant	35.09 (5.50) ***	38.38 (4.02) ***	39.06 (4.43) ***
Wald-test			
X^2-statistics	36.80***	63.63***	91.91***
Sargan- test	106(0.389)	100(0.551)	102(0.520)
AR (1)	-2.88(0.003) ***	-2.90(0.004) ***	-2.96(0.003) ***
AR (2)	0.43(0.665)	0.42(0.678)	0.47(0.642)
Observations	1654	1654	1654

NIML1 is the one lagged value of net interest margin measured as the difference between banks interest income and interest expense for a period. CAP is defined as the ratio of capital to total asset of a bank it is a proxy for a bank's capital base. CR is credit risk defined as the ratio of loan to deposit and short term funding of the bank. CM is cost management defined as the ratio of operating cost to banks revenue. LQ is bank's liquidity defined as the ratio of liquid asset to short term funding. LNTA is the natural log of a bank's total assets and it is a proxy for bank size. GDP% is the percentage growth in gross domestic product in a country. GDPPC is the GDP per capital and it is measured as the GDP divided by the total population in a year. INF is the measure of inflation rate in a country and is given as the growth in consumer price index in a country. LNFDI is the natural log of the dollar value of foreign direct investment into a country in a year. CPI is the measure of the perception of national corruption based on the transparency international measured modified consistent with Chen et al. (2015) and to reflect changes in the range of the index.

Table 7: Effects of the legal origin

Dependent variable: NIM	Model 4: Legal origin
NIM L1	0.16(2.01) **
CAP	0.03(1.03)
CR	0.01(2.29) **
CM	-0.06(-2.30) **
LQ	-0.01(-1.65)
LNTA	1.56(4.39) ***
GDP%	0.017(0.78)
LNGDPPC	-0.01(-1.14)
INF	0.03(0.80)
LNFDI	0.07(0.39)
CPI	0.02(2.00) **
LEGAL ORIGIN	5.04(1.55)
Constant	32.21***
Wald Test X^2-statistics	87.74***
Sargan- test	
AR (1)	-2.53(0.01***)
AR (2)	-2.44(0.09)
Observations	1654

NIML1 is the one lagged value of net interest margin measured as the difference between banks interest income and interest expense for a period. CAP is defined as the ratio of capital to total asset of a bank it is a proxy for a bank's capital base. CR is credit risk defined as the ratio of loan to deposit and short term funding of the bank. CM is cost management defined as the ratio of operating cost to banks revenue. LQ is bank's liquidity defined as the ratio of liquid asset to short term funding. LNTA is the natural log of a bank's total assets and it is a proxy for bank size. GDP% is the percentage growth in gross domestic product in a country. GDPPC is the GDP per capital and it is measured as the GDP divided by the total population in a year. INF is the measure of inflation rate in a country and is given as the growth in consumer price index in a country. LNFDI is the natural log of the dollar value of foreign direct investment into a country in a year. CPI is the measure of the perception of national corruption based on the transparency international measured modified consistent with Chen et al. (2015) and to reflect changes in the range of the index. LEGAL ORIGIN is a dummy variable, equal 1 if country is from a common law origin and 0 otherwise.

Table 8: Alternative estimation techniques- fixed and random effects regressions

Dependent variable: NIM	Model 5 Fixed effect	Model 6 Fixed effect with robust standard error	Model 7 Random effect model with robust standard error
CAP	0.05(4.46) ***	0.05(3.13) ***	0.06(3.27) ***
CR	0.01(3.17) ***	0.01(1.78) *	0.01(1.85) *
CM	-0.09(-5.20) ***	-0.01(-3.11) ***	-0.01(-3.52) ***
LQ	-0.07(-3.94) ***	-0.01(-1.53)	-0.01(-1.71) *
LNTA	0.56(3.54) ***	0.33(1.67) *	0.28(1.79) *
GDP%	0.017 (0.76)	0.018 (0.81)	0.017(0.75)
LNPCG	-0.01(-4.02) ***	-0.01(-2.04) **	-0.01(-2.78) ***
INF	0.03(0.20)	0.01(0.25)	0.04(1.44)
LNFDI	0.13(1.31)	0.18(2.36) **	0.17(2.15) **
CPI	0.02(2.55) **	0.04(2.02) **	0.05(2.37) **
Constant	15.39 (5.25) ***	11.25***	12.27***
F-test	13.79***	8.20***	108***
R^2	15%	16%	16%
Observations	1796	1769	1769

NIM is the net interest margin measured as the difference between banks interest income and interest expense for a period. CAP is defined as the ratio of capital to total asset of a bank it is a proxy for a bank's capital base. CR is credit risk defined as the ratio of loan to deposit and short term funding of the bank. CM is cost management defined as the ratio of operating cost to banks revenue. LQ is bank's liquidity defined as the ratio of liquid asset to short term funding. LNTA is the natural log of a bank's total assets and it is a proxy for bank size. GDP% is the percentage growth in gross domestic product in a country. GDPPC is the GDP per capital and it is measured as the GDP divided by the total population in a year. INF is the measure of inflation rate in a country and is given as the growth in consumer price index

in a country. LNFDI is the natural log of the dollar value of foreign direct investment into a country in a year. CPI is the measure of the perception of national corruption based on the transparency international measured modified consistent with Chen et al. (2015) and to reflect changes in the range of the index.