INVESTIGATING THE IMPACT OF CAPITAL ADEQUACY RATIO AND CORRUPTION ON BANK RISK-TAKING IN GHANA

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ABSTRACT

This paper examines the impact of capital adequacy and corruption on bank risk-taking behaviour in Ghana over the period 2008-2017. Using the system generalized method of moments (GMM) technique; we establish that increasing bank capital has a significant positive effect on banks' risk-taking. This finding supports the "regulatory hypothesis". In addition, the results show that corruption induces bank risk-taking, thus favoring the "sand the wheels" view in the corruption-development nexus. Based on the findings, we discuss relevant policy implications for regulators and bank managers.

Keywords: Capital Adequacy, Corruption, Bank-Risk Taking, System GMM, Ghana.

INTRODUCTION

In both developing and developed markets, banks continue to play roles in accepting deposits and offering credit to boost investments. In developing economies, the need for the banking to exhibit greater efficiency, effectiveness and stability in order to serve as engine of economic growth assumes important dimension (Boyd et al., 2005; Krozner et al., 2007). The credit crunch that divested many economies has generated a glut of literature on how excessive risk taking in credit financing can lead to global financial crisis (Acharya & Naqvi, 2012). Multitude of factors influences the level of risk vulnerability exhibited by banks. Bank regulation is seen as the dominant factor in defining the risk -taking actions of banks.

The Basel III Accord for instance, has been adopted to check bank risk taking activities following the global financial collapse. Review of existing literature reveals differing propositions on the subject of capital requirements and the degree of impact on bank's risk- taking actions reveal disparate findings prompting the need for further research. While some studies postulate that capital requirements positively impact on risk-taking, others evidence otherwise. The main purpose of this paper is to contribute to widen the scale of studies in this area of study and add to the continuing debate on the capital regulatory and risk-taken relationship in the context of Ghana. The second objective of the study is to examine how corruption influences the risk-taking behavior of banks. Generally, literature on corruption in financial intermediation is limited. Corruption can hinder loans growth the growth in loans by raising the cost of borrowing. In terms of loans, Chen et al (2015) discovered that firms can secure loans through bribes which increases On the other hand, businesses with greater productivity and efficiency can offer higher bribes and are more likely to obtain more loans (Chen et al., 2015).

Hitherto, findings on the financial consequence of corruption as presented by prior studies remain ambiguous. For example, Khwaja & Mian (2005) reveal that organizations well connected to the corridors of political power can access bank loans but are more likely to

default payments. Charumilind et al. (2006) espoused the view that organizations wielding some political influence may access unsecured loans with which expose the lending agency to considerable risks. Weill (2011) stressed that corruption exposes banks to high risks of non- payment of loans and stifles credit growth. Per the researchers' knowledge, there is no empirical study in the context of Ghana which has examined the impact of capital adequacy requirement and corruption on banks' risk-taking behavior. Hence, we present a pioneering attempt in this context and contribute to the limited studies on the determinants of banks' risk-taking behavior, particularly in Africa.

The rest of this paper is structured as follows. Section 2 reviews the relevant literature. Section 3 explains our data and analytical approach. Section 4 discusses the empirical results and finally, Section 5 concludes the study with recommendations

LITERATURE REVIEW

From a theoretical standpoint, there exists some appreciable level of ambiguity in relating bank capital to risk. Capital buffer theory and moral hazard theory posit different conclusions on how banks alter capital and risk relative to minimum capital requirement (Marcus 1984; Milne & Whalley, 2002). The moral hazard theory stipulates that when regulators upwardly review bank capital requirement, the banks respond by increasing their risks threshold. The capital buffer theory in sharp contrast suggests that, banks respond to adjustment in capital requirements based on the strength of their capital buffer. Consequently, banks with immense capital buffer will strive to maintain their capital reserves. Conversely, banks with weak capital buffers will seek to strengthen their capital base in reaction to capital requirement increases form regulators. Another emergent theory that delves into the capital-risk nexus is the "regulatory hypothesis". The regulatory hypothesis postulates that, there is a positive relationship between the level of bank-capital and banks' risk portfolio with banks being motivated to build the capital reserves whilst also investing in risky assets.

Empirical literature on effect of capital requirements on banks appetite for risk taking has posted diverse conclusions. Some studies express the view that, banks invest in more risky ventures when capital requirements are high, thus opining a direct connection between capital requirements and bank risk. Shim (2010) conducted analysis on the effect of capital related directives on insurer's and capital requirements in the United States property insurance market over a period spanning 11 years. Utilizing the three stage least square (3SLS), he established a positive link between bank capital and bank risk. Lee & Hsieh (2013) applied the generalized method of moments (GMM) across 42 Asian countries focusing on bank-level data covering the period 1994 to 2008 and discovered that, the impact of bank capital on risk- taking behaviour of banks is significantly high. The study held the view that higher levels of capital will spark higher profits which will bolster management of banks to take more risks with its attendant higher returns. The outcomes of the study show that the influence of capital on risk differ in several ways across the banks adding that income levels of the sampled countries feeds into the level of influence of capital on risks and profitability of banks.

Karim et al. (2014) studied the relationship between capital adequacy and lending practices of Islamic banks in 14 countries from the Organization of Islamic Conference (OIC) and concluded that there is a direct linkage between capital levels and risk-taking. The study factored the complexities of banking operations and systems in their work and opined that conventional banks tend to invest in risky assets with Islamic banks showing traits in making more risky investments when they record surpluses. Are given the mixed banking system, the study examined this relationship for each type of bank. Rashid & Khalid (2018) undertook a study on the impact of capital-level on risk-taking practices of banks in Pakistan using bank-

level panel data covering the period 2006 to 2015. Combining the dynamic ordinary least square (DOLS) and the two-step system generalized method of moments; the study established a positive and statistically significant effect of capital on banks-risk taking activities. However, studies undertaken by Agoraki et al. (2011), Klomp & Haan (2012), Haq & Heaney (2012), Bouheni et al. (2014), Lee et al. (2015), and Ashraf et al. (2016) found a negative connection between bank capital and risk-taking. Detragiache et al. (2008) and Weill (2011) disclosed that, loan growth is severely hampered by corruption. Park (2012) posited that countries afflicted by severe levels of corruption have record numbers of non-performing. Some corrupt practices include banks offering loans to firms that give bribes which raises the degree of risk in the loans (Chen et al., 2013). In examining the effect of corruption on bank-risk taking behavior in emerging markets, Chen et al. (2015) utilized bank-level data covering more than 1200 banks operating in 35 emerging economies over the period 2000-2012 and found that corruption increases the risk portfolios banks. It emerged from available literature on corruption and its impact on risks performance of banks that, scant studies exist on this subject. The outcome of this study will beef up literature on this subject. Besides, most of the few studies concentrated on emerging economies in Asia to the exclusion of emerging markets in Africa such as Ghana. This work seeks to broaden the geographical spread of this topical issue of capital adequacy and corruption on risk taking activities of banks.

METHODOLOGY

Data and Variables

The study employs bank-level panel data covering 11 banks over the period 2008-2017. We gleaned the data from the financial statements of these banks. The perceived corruption index was taken from the Transparency International reports. Table 1 clearly defines each variable in the study

VARIABLE	DEFINITION
Table 1 **DESCRIPTION OF VARIABLES**	
Bank risk (*risk*)	Bank Z-score (Bank capitalization and returns divided by returns volatility)
Capital Adequacy (*capadeq*)	The ratio of banks' total equity to total assets
Corruption (*corr*)	Corruption index CI = 10 – CPI (Corruption Perception Index)
Bank Size (*bsize*)	The natural log of total assets of banks

Model Specification and Estimation Technique

This study takes a panel approach that involves pooling observations on a cross-section of units over several periods. The panel data model can be generally specified as:

$$Y_{it} = \alpha + \beta'X_{it} + \varepsilon_{it} \qquad (1)$$

Where the cross-sectional dimension is denoted by *i* and *t* is the time dimension. The dependent variable is represented by Y and X takes on the independent factors in the model. Constant is proxied by α and the vector coefficients are connoted by β, where ε is the error term.

To deal with the possible problem of endogeneity, the study applies the dynamic generalized method of moments (GMM) technique by Arellano & Bond (1991) with further modification by Blundell & Bond (1998). Hence, our dynamic model is stated in the form:

$$Y_{it} = \alpha Y_{it-1} + \beta'X_{it} + \varepsilon_{it} \qquad (2)$$

To examine the effect of capital adequacy and corruption on bank-risk taking, while controlling for bank size, equation (2) can be augmented as follows:

$$risk_{it} = \alpha risk_{it-1} + \beta_1 capadeq_{it} + \beta_2 corr_{it} + \beta_3 bsize_{it} + \varepsilon_{it} \qquad (3)$$

Where all the variables are previously defined, except $risk_{t-1}$ which is the lag value of bank risk.

EMPIRICAL RESULTS

Summary Statistics

Table 2 presents the summary statistics of the variables included in our model. This estimates the mean, median, maximum, minimum, and standard deviation values of the variables. From the table, the mean value of bank risk (proxied by z-score) is 5.472 while its minimum and maximum values are 2.026 and 7.077 respectively. On average, the capital adequacy ratio is 0.146 with a standard deviation of 0.041. The mean value of corruption is 5.730 which ranges from a minimum of 5.2 to a maximum of 6.1. This indicates that the corruption level in Ghana is relatively high. Bank size has a mean of 14.283 while its standard deviation value is 0.885. Bank risk shows the highest standard deviation showing more variability.

	risk	**capadeq**	**corr**	**bsize**
Mean	5.472	0.146	5.730	14.283
Median	5.936	0.149	5.800	14.330
Maximum	7.077	0.309	6.100	16.080
Minimum	2.026	0.044	5.200	12.070
Std. Dev.	1.642	0.041	0.339	0.885
Observations	110	110	110	110

TABLE 2
SUMMARY STATISTICS

Correlation and Multicollinearity Analysis

Table 3 illustrates the correlation analysis of the variables. The correlation coefficients between the variables are generally low. As stipulated by Kennedy (2003), a high correlation exists when the correlation coefficient exceeds 0.80. Given the low correlation coefficients for the variables, we presume the absence of multicollinearity in the analysis. To provide further justification of no multicollinearity issue, the study further performed the Variance Inflation Factor (VIF) analysis. For this analysis, there is a possibility of multicollinearity if the VIF value exceeds 10 and the tolerance value goes below 0.10. Table 3 results; however, verifies that there is no multicollinearity as the values of VIF are all below 10 and the tolerances exceed 0.10.

	risk	capadeq	corr	bsize	VIF	Tolerance
risk	1.000					
capadeq	0.298	1.000			1.05	0.950
corr	-0.603	-0.203	1.000		1.28	0.780
bsize	0.602	0.003	-0.424	1.000	1.23	0.813

TABLE 3
CORRELATION AND MULTICOLLINEARITY ANALYSIS

Mean VIF				1.19	

Regression Results

In Table 4, the regression results from the system generalized method of moments (GMM) estimator are presented. The coefficient of $risk_{t-1}$ is positive and significant indicating that bank risk has a self-reinforcing effect. From the diagnostic tests, the Hansen test and its probability value (at 5% level) suggest that the null hypothesis, which states that the over-identification restrictions are valid cannot be rejected, thus signifying that the study instruments in the model are valid. The AR (2) value is insignificant at 5% level, suggesting that there is no serial correlation problem in the model. The Wald test estimate also indicates that the explanatory variables are jointly significant.

Table 4 REGRESSION RESULTS	
Variables	**Two-step System GMM Estimates**
$risk_{t-1}$	0.787***
	(0.000)
capadeq	33.171***
	(0.002)
corr	1.434***
	(0.001)
bsize	-0.255
	(0.359)
Diagnostics	
Wald-test χ^2	178.539
(Pro.> χ^2)	(0.000)
Arellano–Bond AR (2) test	1.829
(*p*-value)	(0.067)
Hansen test	8.042
(*p*-value)	(0.090)

Notes: *** denote significance at 1%. Values in ( ) are *p*–values.

Our analysis established that the estimated coefficient of capital adequacy is positive and statistically significant, indicating a direct association between capital adequacy and bank-risk taking. The finding suggests that highly capitalized banks may invest more in risky assets to gain higher returns. Higher capital level urges banks to invest in assets without thorough scrutiny leading to the construction of risky portfolios. The significant positive impact of capital adequacy on risk is in line with previous empirical works (Altunbas et al., 2007; Jokipii & Milne, 2011; Karim et al., 2014).

Consistent with the findings of Park (2007) and Chen et al. (2013), we find that corruption exerts a positive significant effect on risk-taking, implying that banks' risk-taking increases with more severe corruption. This suggests that in a high perceived corruption environment, as in the case of Ghana, banks tend to advance more credit to unqualified applicants or customers with lower creditworthiness who are likely to default. Thus, increasing their risk-level.

Turning to bank size which serves as a control factor, the results reveal a negative insignificant impact on risk-taking behaviour. This finding conforms with the result of Rashid & Khalid (2018). The negative effect of bank-size on risk-taking indicates that larger banks are prone to less risk compared to smaller banks. We can also argue that due to the high level of expertise and economies of scale enjoyed by larger banks, they are able to form well-diversified portfolios and effectively handle risk compared to smaller banks.

CONCLUSION AND POLICY IMPLICATIONS

This study investigates the effect of bank capital adequacy and corruption on the risk-taking behaviour of banks in Ghana. Employing the system GMM technique, we conclude that increasing bank capital has a significant and positive effect on banks' risk-taking. This implies that when banks maintain more capital than the regulatory requirements, they may tend to invest in risky assets. The finding conforms with the *'regulatory hypothesis'* indicating that higher capital levels and bank risk-taking are positively and significantly correlated. The perceived level of corruption also positively drives the risk-taking behaviour of banks supporting the "grease the wheel" hypothesis of corruption.

Our results present relevant policy implications for regulators and bank managers. In particular, the findings will aid regulatory authorities to put in place stringent measures for enhancing efficiency and banks' asset quality in Ghana. This study may also offer appropriate strategies and guidelines to bank managers in their quest to maintain an optimum capital level and also in forming portfolios that are well-diversified while investing in risky assets. For customers and investors, the findings may help them in selecting suitable banks for borrowing and when making investment decisions. To mitigate corruption, bank managers need to outline corruption control policies to deter officials from engaging in corruption-related activities. For example, whistleblowing policy is pertinent

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