EFFECT OF BANKING SECTORIAL FACTORS ON FINANCIAL STABILITY OF COMMERCIAL BANKS IN KENYA

BY

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A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN FINANCE

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DECLARATION

Student's Declaration

I declare that this research project is my original work and that it has not been presented in any other University or institution for academic credits.

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Supervisor's Approval

This research project has been submitted for examination with my approval as the University Supervisor.

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ACKNOWLEGEMENT

I acknowledge the assistance I have got from my friends, colleagues, family members and lecturers. Their encouragements and support, both financial and moral inspired me to reach this far. My sincere gratitude also goes to my supervisor DR. David Oima. I also appreciate the good comments I got from DR. Robert K Mule.

DEDICATION

I dedicate this project to Sheryl, Ryan and Imani.

ABSTRACT

In recent years, the stability of commercial banks in a number of countries across the globe has not been that robust with those in Portugal recording cumulative decline of about 26.6% in assets since 2010. In the Sub-Saharan Africa (SSA) region, and Ghana in particular, commercial banks have continued to record higher figures for non-performing loans (NPLs), ranging from as high as 13%. Locally, the ratio of NPLs to gross loans for commercial banks in Kenya has continued to be on an upward trend, rising to 9.5 % in March 2017 from 6.8 % in March 2016. This is has also been the case for the listed commercial banks at the Nairobi Securities Exchange (NSE). This might be attributed to a number of factors including the banking sectorial factors. However, existing empirical studies including those based on data from commercial banks in Kenya are mixed at best on their findings on the effects of these factors on bank stability. This is despite them being critical in the formulation of effective policies essential to bank stability. Hence, the purpose of this study was to assess the effect of banking sectorial factors on financial stability of commercial banks in Kenya. The specific objectives were to; establish the effect of bank size on financial stability of commercial banks listed at the NSE, determine the effect of bank concentration on financial stability of commercial banks listed at the NSE and evaluate the effect of nation-wide branching on financial stability of commercial banks listed at the NSE. The study was anchored on the too big to fail hypothesis and adopted a correlation research design. Secondary balanced panel data sourced from the annual reports of all the 10 commercial banks listed at the NSE was used. The study spanned over a 5 year period as from 2013 to 2017, yielding 50 data points. Multiple regression was done to achieve the study objectives. In the regression analysis, the coefficient of bank size was found to be -7.132958 with a p-value=0.0391 meaning that bank size has a significant negative effect on the stability of commercial banks listed at the NSE. The coefficient of bank concentration was found to be -0.022892 with a p-value=0.4637 meaning that market concentration has a negative but insignificant effect on the stability of commercial banks listed at the NSE. Nation-wide branching was found to have a coefficient of 6.016090 with a p-value=0.4659 meaning that nation-wide branching has a positive but insignificant effect on the stability of the listed commercial banks at the NSE. Further, loan portfolio/risk was found to have a coefficient of 3.453852 with a p-value=0.6934 meaning that it has a positive but insignificant effect on the stability of commercial banks listed at the NSE. The conclusions of the study are that bank size has a significant negative effect on financial stability of commercial banks listed at the NSE; bank concentration has a negative but insignificant effect on the stability of commercial banks listed at the NSE; nation-wide branching and loan portfolio/risk have a positive but insignificant effects on financial stability of commercial banks listed at the NSE. The study therefore recommends that effective policies on bank size should be formulated by the Central Bank of Kenya (CBK) to ensure sustained stability of the commercial banks listed at the NSE and the country's banking sector at large.

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LIST OF ABBREVIATIONS

CBK	Central Bank of Kenya
CAR	Capital Ratio
DEA	Data Envelopment Analysis
EAC	East Africa Community
ECB	European Central Bank
EPS	Earnings per Share
EU	European Union
GDP	Gross Domestic Product
GMM	Generalized Method of Moment
IASs	International Accounting Standards
IFRSs	International Financial Reporting Standards
IMF	International Monetary Fund
Ltd	Limited
MICs	Middle Income Countries
NIM	Net Interest Margin
NPLs	Non-Performing Loans
NSE	Nairobi Securities Exchange
OLS	Ordinary Least Square
ROA	Return on Assets
ROE	Return on Equity
SCP	Structure Conduct Performance
SDROA	Standard Deviation of ROA
SRISK	Systemic Risk
SSA	Sub-Saharan Africa
UK	United Kingdom
US	United States
UAE	United Arabs Emirates

OPERATIONAL DEFINITION OF TERMS

Bank Concentration: This refers to either the concentration ratio, the Herfindahl-Hirschman Index (HHI) of total assets, the HHI of deposits or the HHI of loans.

Banking Sectorial Factors: This was conceptualized in terms of Bank Size, Bank Concentration and Nation-wide Branching.

Bank size: This refers to the natural log of a bank's total assets at time t.

Financial Stability: This refers to a condition in which commercial banks are capable of absorbing shocks and the unravelling of financial imbalances. It was measured by the banks' Z-scores.

Loan Portfolio/Risk: This refers to the ratio of loans to bank assets

Nation-wide Branching: This refers to either bank branching, number of bank branches or the log of a bank's total number of branches.

Panel data: This refer to data containing observations with both a group (cross-section) and time (within-group) identifiers.

The Z-score: This refers to the ratio of a bank's return on assets plus its capital ratio divided by the standard deviation of the return on assets over the study period

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CHAPTER ONE
INTRODUCTION

This chapter presents the background of the study, statement of the problem, objectives of the study, research hypothesis, significance of the study, scope of the study and the conceptual framework.

Background of the study

Financial stability refers to a condition in which commercial banks are capable of absorbing shocks and the unravelling of financial imbalances (ECB, 2007). It stems from the theories of financial intermediation in which commercial banks are regarded as the main channels of allocating funds from savers to investors (Ongore & Kusa, 2013). This is in addition to managing financial risks and exposures. Hence, and to continue providing these services without any interruptions, commercial banks need to be stable at all times (Onuonga, 2014). Further, and according to Sufian (2011), the profitability, soundness and stability of commercial banks is critical to the well-being of a country's general economy at large due to their significant role in capital accumulation, firms' growth and economic advancement.

In view of the above, it is a common practice for banks across the globe to hold some amount of capital with their central banks to guarantee their stability and soundness. Nonetheless, most of them both in the developed and developing economies have continued to experience a number of shocks with those in Portugal recording cumulative decline of about 26.6% in assets since 2010 (BancodePortugal, 2017). In the Sub-Saharan Africa (SSA) region, and Ghana in particular, commercial banks have continued to record higher figures for non-performing loans (NPLs), ranging from as high as 13% (Mecagni, Marchettini, & Maino, 2015). Locally, several banks in Kenya have faced liquidity challenges coupled with corporate governance issues resulting in two banks being placed under receivership in 2015; and a third bank in the first half of 2016, the first time in over a decade (CBK, 2016a). The ratio of gross NPLs to gross loans for the country's banking subsector has also been on an upward trend, rising to 9.5 % in March 2017 from 6.8 % in March 2016. This might be attributed to a number of factors including the banking sectorial factors.

In light of the aforementioned, several theoretical arguments exist on banking sectorial factors and bank stability. The too big to fail hypothesis as postulated by Mishkin (1999) argues that

banks that are larger in size, complex and with greater market concentration are always systematically important to a country's economy and thus not always allowed to fail. Hence, such banks are always guaranteed of government support just in case they become bankrupt. With this in mind, the managers of these banks usually engage them in risky activities making them less stable. On the other hand, the charter value hypothesis as modelled by Marcus (1984) argues that larger and complex banks with greater market concentration tend to have higher charter values. This in turn increases their opportunity cost of becoming bankrupt thus deterring them from taking risky activities. Therefore, such banks are always sound and stable.

On the same note, several empirical studies exist on the effect of banking sectorial factors on bank stability. Nonetheless, most of their findings are mixed at best. In their study on 14 Asia Pacific countries, Fu, Lin, and Molyneux (2014) found a negative effect between bank size and bank stability. On the other hand, Berger, Klapper, and Turk-Ariss (2009) reported a positive effect between bank size and stability using data from 23 industrialised countries. Further, others such as Turk-Ariss (2010) and Hope, Gwatidzo, and Ntuli (2013) found an insignificant effect between bank size and the Z-scores of commercial banks from a panel of countries including Kenya. Locally, Onuonga (2014) established a positive effect between bank size and the return on assets (ROA) of the top six commercial banks. However, its findings might not be conclusive enough as it relied upon ROA to measure bank performance despite it being limited in considering the different financial aspects of the commercial banks unlike other more advanced measures like the banks' Z-scores used in other studies.

In addition, existing empirical studies are inconclusive on the effect of bank concentration on stability with Fu et al. (2014) reporting a negative effect while Berger et al. (2009) recording a positive effect in their studies on 14 Asian Pacific countries and 23 industrialised countries respectively. In the SSA region, Ajide and Ajileye (2015) found a significant negative effect between bank concentration and the profitability of the Nigerian banking sector. Further, others such as Hope et al. (2013) found a positive effect between bank concentration and stability using data of commercial banks from a panel of countries including Kenya. Locally, Olweny and Shipho (2011) focused specifically on commercial banks in Kenya and found an insignificant effect of bank concentration on bank performance. Nonetheless, its recommendations might not be that useful in the formulation of effective policies on bank stability. This is due to its reliance on ROA as a measure of bank performance despite being

limited in considering the different financial aspects of the commercial banks unlike other more advanced measures like the banks' Z-scores.

Further, studies on nation-wide branching as a complexity variable and financial stability are mixed in their findings. Carlson and Mitchener (2005) found a positive and significant effect between bank branching and financial stability of commercial banks in the United States (US). In the United Arabs Emirates (UAE), Hussein and Al-Tamimi (2010) reported a positive relationship between the number of bank branches and financial performance of Islamic banks while for conventional banks, they found the relationship to be negative and insignificant. In the SSA region, Ajide and Ajileye (2015) in a study on the Nigerian banking industry found that the wider the branch networks, the higher the profitability. Locally and to the best of the researcher's knowledge, there is scarcity of information on any study done on the effect of nation-wide branching on financial stability of commercial banks in Kenya.

It is against the aforementioned that this research study was done on the effect of banking sectorial factors on financial stability. The study was undertaken in the context of the listed commercial banks in Kenya. The banking sectorial factors were conceptualized in terms of bank size, bank concentration and nation-wide branching. On the other hand, the banks' z-scores were used as a measure of their financial stability. Further, the ratio of loans to bank assets was used to control for the banks' loan portfolio and the risks associated with their lending activities. The target population was all the 10 listed commercial banks at the Nairobi Securities Exchange (NSE). These banks have an overall market share control of above 68% of the country's banking sector (CBK, 2016b). Moreover, their financial performance have been mixed in recent years with their gross loans and advances growing by 9.3% to Ksh. 1.9 trillion in the first quarter of 2017 down from Ksh. 1.7 trillion over the same period of time in 2016. On the other hand, they recorded a negative earnings per share (EPS) growth of 13.8% in 2017. Hence, the listed commercial banks provided a good case study in understanding the relationship between the study variables.

1.2 Statement of the Problem

In recent years, the financial stability of commercial banks in a number of countries across the globe has not been that robust with those in Portugal recording cumulative decline of about 26.6% in assets since 2010. In the Sub-Saharan Africa (SSA) region, and Ghana in particular,

commercial banks have continued to record higher figures for non-performing loans (NPLs), ranging from as high as 13%. Locally, the ratio of NPLs to gross loans for commercial banks in Kenya has continued to be on an upward trend, rising to 9.5 % in March 2017 from 6.8 % in March 2016. This is has also been the case for the listed commercial banks at the Nairobi Securities Exchange. This might be attributed to a number of factors including the banking sectorial factors. However, existing empirical studies including those based on data from commercial banks in Kenya are mixed at best on their findings on the effects of these factors on bank stability. This is despite them being critical in the formulation of effective policies essential to the stability of the commercial banks. It was on this basis that this research study was undertaken to fill this gap through an assessment of the effect of banking sectorial factors on financial stability of commercial banks in Kenya.

1.3 Objectives of the study

The study intended to assess the effect of banking sectorial factors on financial stability of commercial banks in Kenya. Specifically, the study sought to:

1. Establish the effect of bank size on financial stability of commercial banks listed at the Nairobi Securities Exchange.
2. Determine the effect of bank concentration on financial stability of commercial banks listed at the Nairobi Securities Exchange.
3. Evaluate the effect of nation-wide branching on financial stability of commercial banks listed at the Nairobi Securities Exchange.

1.4 Research Hypothesis

The specific objectives were addressed by the following null hypotheses:

$H_{01:}$ Bank size has no significant effect on financial stability of commercial banks listed at the Nairobi Securities Exchange.

$H_{02:}$ Bank concentration has no significant effect on financial stability of commercial banks listed at the Nairobi Securities Exchange.

$H_{03:}$ Nation-wide branching has no significant effect on financial stability of commercial banks listed at the Nairobi Securities Exchange.

1.5 Scope of the Study

The study related to the financial markets and institutions and limited to the effect of banking sectorial factors on financial stability of commercial banks in Kenya. The target population was all the 10 listed commercial banks at the Nairobi Securities Exchange (NSE). These banks

dominate the country's banking sector with an overall market share control of over 68% (CBK, 2016b). Moreover, their performance have been mixed in recent years with their gross loans and advances growing by 9.3% to Ksh. 1.9 trillion in the first quarter of 2017 down from Ksh. 1.7 trillion over the same period in 2016. On the other hand, they had a negative earnings per share (EPS) growth of 13.8% in 2017. Hence, their analysis was not only critical for their own survival but also important for the well-being of the country's general economy at large. The research study spanned over a period of 5 years as from 2013 to 2017. This period was characterised as a time of significant developments in the country's banking sector including the capping of the interest rates, placement of three commercial banks into receivership by the CBK and the massive shifts in the size, structure and complexity of the commercial banks due to the adoption of mobile banking and the like in the provision of banking services.

1.6 Significance of the Study

This study was necessary as its findings might help the bank executives and the regulator in formulating effective policies on commercial bank stability. Other researchers interested in this area of study or related disciplines might also use the findings of this study as a point of reference for further research. In addition, it will help in bridging the literature gap on the effect of banking sectorial factors on financial stability of commercial banks due to inconclusive results on the same by previous empirical studies.

1.7 Conceptual Framework

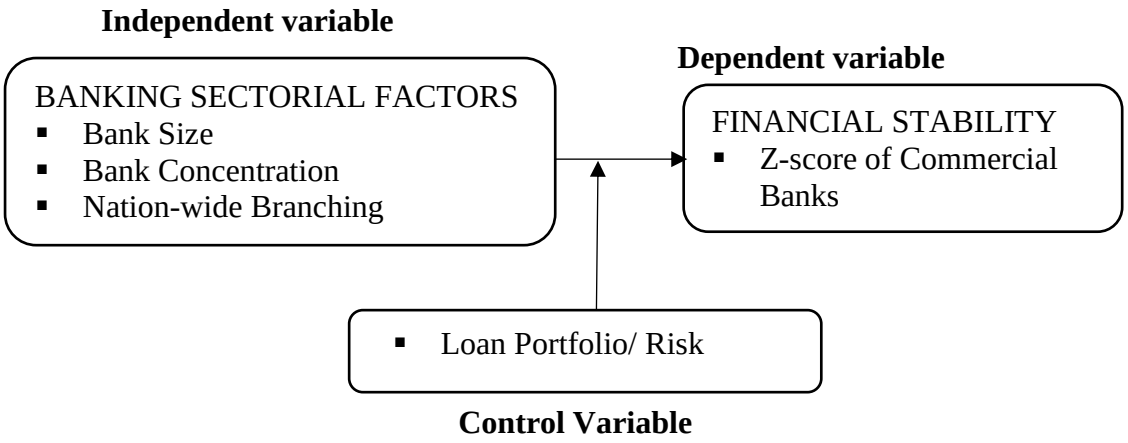


Figure 1.1: Banking Sectorial Factors and Financial Stability Relationship
Source: (Mishkin, 1999)

The study adopted the conceptual framework as illustrated in Figure 1.1 above in order to understand the relationship between the study variables. The banking sectorial factors were the independent variables, conceptualized in terms of bank size, bank concentration and nation-wide branching. On the other hand, the commercial banks' financial stability conceptualized in terms of their Z-scores was the dependent variable. The study postulated a significant effect between the banking sectorial factors and financial stability of the sampled commercial banks in line with the too big to fail hypothesis, controlling for the banks' loan portfolio and the risks associated with the banks' lending activities.

CHAPTER TWO
LITERATURE REVIEW

This chapter focuses on the theoretical foundations on which the study is built on and the comparative empirical literature which helps to explain the study gaps.

2.1 Theoretical Framework

2.1.1 Theory of the Study

This study was anchored on the too big to fail hypothesis as formulated by Mishkin (1999). Under this hypothesis, it is argued that banks that are larger in size, complex and with greater concentration are always systematically important to a country's economy and thus not always allowed to fail. Hence, such banks are always guaranteed of government support just in case they become bankrupt. With this in mind, the managers of these banks usually engage them in risky activities making them less stable. On the other hand, the charter value hypothesis as modelled by Marcus (1984) argues that larger and complex banks with greater concentration tend to have higher charter values. This in turn increases their opportunity cost of becoming bankrupt thus deterring them from taking risky activities. Therefore, such banks are always sound and stable. In spite of this counter argument, the too big to fail hypothesis still provides a good framework of exploring on the various factors that might lead to financial instability in a country's banking sector and hence its use in the study. Accordingly, it was posited that bank size, bank concentration and nation-wide branching have a significant effect on the instability of commercial banks in Kenya.

2.1.2 The Concept of Financial Stability and its Measures

ECB (2007) defines financial stability as a condition in which commercial banks are capable of absorbing shocks and the unravelling of financial imbalances. On the same note, the bank's return on assets (ROA), return on equity (ROE), asset quality, capital to assets, liquid assets to total assets, non-performing loans (NPLs) to total gross loans among others can be used as a proxy of financial stability of commercial banks (IMF, 2006). More recently, a number of researchers including Turk-Ariss (2010), Hope et al. (2013), Fu et al. (2014) and Berger et al. (2009) have used the bank's Z-score as a measures of bank stability. This is due to its robustness in considering the different financial aspects of the commercial banks including their earning volatilities and capital strengths. It is on this basis that the study used the bank's Z-score as a construct of financial stability. It was computed as follows;

$\mathbf{Z\text{-}score}=\frac{\mathbf{ROA_{it}+CAR_{it}}}{\mathbf{SDROA_i}}$; where ROA_{it} is the return on assets and CAR_{it} the ratio of total equity over total assets of bank i in year t. $SDROA_i$ is each bank's standard deviation of the ROA over the whole sample period.

2.1.3 The Concept of Banking Sectorial Factors

Banking sectorial factors refer to those bank specific factors that are within the control of bank managers and the industry wide factors beyond their control (Olweny & Shipho, 2011). In this study, they were conceptualized in terms of bank size, market concentration and nation-wide branching. Further, bank size was proxied by the natural logarithm of a bank's total assets in line with the works of Turk-Ariss (2010), Fu et al. (2014), Berger et al. (2009), Hope et al. (2013) and Onuonga (2014) while bank concentration was measured using the Herfindahl-Hirschman Index of total assets as used in Hope et al. (2013). On the other hand, the log of a bank's total number of branches was used as an indicator of nation-wide branching.

2.2 Empirical Literature

2.2.1 Bank Size and Stability of Commercial Banks

Fu et al. (2014) using information from commercial banks in 14 Asia Pacific economies from 2003 to 2010, investigated the influence of bank competition, concentration, regulation and national institutions on individual bank fragility as measured by the probability of bankruptcy and the bank's Z-score. The results suggested among other things that bank level market power as proxied by the Lerner index is positive and significantly related to bank stability. In addition, greater concentration was found to foster financial fragility. In relation to the control variables, the results showed that tougher entry restrictions may benefit bank stability, whereas stronger deposit insurance schemes were associated with greater bank fragility. On the other hand, bank size measured by the natural log of bank assets was found to have a significant negative effect with the financial stability of the sampled commercial banks.

Berger et al. (2009) using a sample of 8235 banks from 23 industrial countries over 1999–2005 investigated bank competition on stability. The independent variables in the study included the Herfindahl-Hirschman Index (HHI) of deposits and loans. In addition, the study included a number of control variables such as bank size and the ratio of loans to bank assets among other variables. On the other hand, the banks' Z-scores among other variables were used as a measure of bank stability. Amongst its findings, bank size, the HHI of loans and HHI of deposits were

found to be positive and significant with the sampled banks' Z-scores. Nonetheless, the ratio of loans to bank assets was found to be negative and significant with the banks' Z-scores.

Turk-Ariss (2010) examined how different degrees of market power across 60 developing economies including Kenya affect cost and profit efficiency levels and overall bank stability. The results showed that an increase in the degree of market power as proxied by the Lerner index leads to greater stability as measured by the banks' Z-scores and enhanced profit efficiency, despite significant cost efficiency losses. The findings lend empirical justification that increased competition may undermine bank stability. On the other hand, bank size which was used as a control variable was found to have a positive but insignificant effect with the banks' z-scores. However, the ratio of loans to the sampled banks assets was found to be positive and significant with the banks' z-scores.

Hope et al. (2013) explored on the relationship between bank competition and financial sector stability using 2005–2010 data for ten African countries including Kenya. The study utilised a Generalized Method of Moments approach to regress stability indices – Z-score, non-performing loans ratio and return on banks assets – on bank competition indices – Lerner-Index, Herfindahl-Hirschman Index total assets and Herfindahl-Hirschman Index total deposits and other control variables including bank size. The findings showed a robust positive relationship between HHI of assets and commercial banks financial stability. This unequivocally suggests that there is a trade-off between bank competition and financial sector stability in the sampled countries, as per the competition-fragility view. On the contrary, the study found an insignificant negative effect between bank size and the banks' Z-scores. The effect of the ratio of loans to bank assets was positive but insignificant.

Onuonga (2014) did an internal factor analysis on the profitability of the top six commercial banks in Kenya over the period 2008-2013. The generalized least square method was used to estimate the impact of bank assets, capital, loans, deposits and asset quality on banks profitability. The paper used return on assets (ROA) as a measure of profitability. The findings revealed that bank assets, capital strength, ownership, operations expenses and diversification do significantly influence profitability of the top six commercial banks. It was suggested among other things that the Kenyan Government should set policies that encourage commercial banks to raise their assets and capital base as this will enhance the performance of the sector.

In summary, several empirical studies exist on the effect of bank size on financial stability of commercial banks across the globe. Nonetheless, most of their findings are mixed at best. In their study on 14 Asia Pacific countries, Fu et al. (2014) found a negative effect between bank size and bank stability. On the other hand, Berger et al. (2009) reported a positive and significant effect between bank size and stability using data from 23 industrialised countries. Further, others such as Turk-Ariss (2010) and Hope et al. (2013) found an insignificant effect between bank size and the Z-scores of commercial banks from a panel of countries including Kenya. Locally, Onuonga (2014) established a positive effect between bank size and the return on assets (ROA) of the top six commercial banks. However, its findings might not be conclusive enough as it relied upon ROA to measure bank performance despite being limited in considering the different financial aspects of the commercial banks unlike other more advanced measures like the banks' Z-scores used in other studies.

2.2.2 Bank Concentration and Stability of Commercial Banks

Fu et al. (2014) using information from commercial banks in 14 Asia Pacific economies from 2003 to 2010, investigated the influence of bank competition, concentration, regulation and national institutions on individual bank fragility as measured by the probability of bankruptcy and the bank's Z-score. The results suggested among other things that bank level market power as proxied by the Lerner index is positive and significantly related to bank stability. In addition, greater concentration was found to foster financial fragility. In relation to the control variables, the results showed that tougher entry restrictions may benefit bank stability, whereas stronger deposit insurance schemes were associated with greater bank fragility. On the other hand, bank size measured by the natural log of bank assets was found to have a significant negative effect with the financial stability of the sampled commercial banks.

Berger et al. (2009) using a sample of 8235 banks from 23 industrial countries over 1999–2005 investigated the impact of bank competition on stability. The independent variables in the study included the HHI Index of deposits and loans. In addition, the study included a number of control variables such as bank size and the ratio of loans to bank assets among other variables. On the other hand, the banks' Z-scores among other variables were used as a measure of bank stability. Amongst its findings, bank size, the HHI of loans and HHI of deposits were found to be positive and significant with the sampled banks' Z-scores. Nonetheless, the ratio of loans to bank assets was found to be negative and significant with the banks' Z-scores.

Ajide and Ajileye (2015) examined the effect of market concentration on bank profitability in Nigerian banking industry using time series data from 1991 -2012. Error correction mechanism (ECM) was employed, after conducting Co-integration test; to analyze the data sourced from Central bank of Nigeria and Annual report and Accounts of banks. The study used the Return on Capital Employed (ROCE) as a proxy for Bank profitability, which is the dependent variable. Texas ratio (TR), Number of bank branches (NOB), Earnings Power Ratio (EPR), and Concentration Ratio (CRL), served as the independent variables. The overall results rejected the market power hypothesis which states that market concentration increases bank profitability. However, the coefficient of NOB variable was positive with ROCE meaning the wider the network of banks, the higher their profit levels.

Hope et al. (2013) explored on the relationship between bank competition and financial sector stability using 2005–2010 data for ten African countries including Kenya. The study utilised a Generalized Method of Moments approach to regress stability indices – Z-score, non-performing loans ratio and return on banks assets – on bank competition indices – Lerner-Index, Herfindahl-Hirschman Index total assets and Herfindahl-Hirschman Index total deposits and other control variables including bank size. The findings showed a robust positive relationship between market power and financial stability. This unequivocally suggests that there is a trade-off between bank competition and financial sector stability in the sampled countries, as per the competition-fragility view. On the contrary, the study found an insignificant effect between bank size and the banks' Z-scores.

Olweny and Shipho (2011) examined the effects of banking sectoral factors including capital adequacy, asset quality, liquidity, operational cost efficiency and income diversification on the profitability of commercial banks in Kenya. The study used a panel data of 38 banks from 2002 to 2008. The analysis showed that capital adequacy, asset quality, liquidity, operational cost efficiency and income diversification had a statistically significant impact on the banks return on assets (ROA). However, none of the market factors including market concentration power as measured by the Herfindahl-Hirschman (HH) index of the annual deposits of all the commercial banks in the market had a significant impact with commercial banks' profits.

In review of the above, a number of empirical studies exist on the effect of bank concentration on financial stability. Nonetheless, most of their findings are inconclusive with Fu et al. (2014) reporting a negative effect of bank concentration on financial stability while Berger et al.

(2009) recording a positive effect in their studies on 14 Asian Pacific countries and 23 industrialised countries respectively. In the SSA region, Ajide and Ajileye (2015) found a significant negative effect between bank concentration and the profitability of the Nigerian banks. Further, others such as Hope et al. (2013) found a positive effect between bank concentration and financial stability using data of commercial banks from a panel of countries including Kenya. Locally, Olweny and Shipho (2011) focused specifically on commercial banks in Kenya and found an insignificant effect of bank concentration on commercial bank's performance. Nonetheless, its recommendations might not be that useful in the formulation of effective policies on bank stability. This is due to its reliance on ROA as a measure of bank performance despite being limited in considering the different financial aspects of the commercial banks unlike other more advanced measures like the banks' Z-scores.

2.2.3 Nation-wide Branching and Stability of Commercial Banks

Carlson and Mitchener (2005) examined the role that branching played in improving the financial stability of banking systems during the 1920s and 1930s using data on US national banks. The study found that diversification was not the primary channel through which branch banking made state banking systems more resistant to shocks. Instead, the expansion of state-wide branch banking induced greater competition in states where branching was permitted and improved the financial stability of the banks by removing weak and inefficient banks.

Hussein and Al-Tamimi (2010) examined the performance of UAE's Islamic and conventional banks for the period of 1996-2008. Return on assets (ROA) and return on equity (ROE) was used as a measure of bank financial performance. Several variables including the number of bank branches were considered. Among the major findings of the study was that the number of bank branches had an insignificant negative impact with both ROA and ROE of the conventional banks, whereas for Islamic banks, it was shown that number of bank branches have a significant impact with bank performance.

Ajide and Ajileye (2015) examined the effect of market concentration on bank profitability in Nigerian banking industry using time series data from 1991 -2012. Error correction mechanism (ECM) was employed, after conducting Co-integration test; to analyze the data sourced from Central bank of Nigeria and Annual report and Accounts of banks. The study used the Return on Capital Employed (ROCE) as a proxy for Bank profitability, which is the dependent variable. Texas ratio (TR), Number of bank branches (NOB), Earnings Power Ratio (EPR),

and Concentration Ratio (CRL), served as the independent variables. The overall results rejected the market power hypothesis which states that market concentration increases bank profitability. However, the coefficient of NOB variable was positive with ROCE meaning the wider the network of banks, the higher their profit levels.

From the aforementioned, empirical findings on nation-wide branching and financial stability are ambiguous. Carlson and Mitchener (2005) found a positive and significant effect between bank branching and financial stability of commercial banks in the United States (US). In the United Arabs Emirates (UAE), Hussein and Al-Tamimi (2010) reported a positive relationship between the number of bank branches and financial performance of Islamic banks while for conventional banks, they found the relationship to be negative and insignificant. In the SSA region, Ajide and Ajileye (2015) in their study on the Nigerian banking industry found that the wider the branch networks, the higher the profitability. Locally and to the best of the researcher's knowledge, there is scarcity of information on any study done on the effect of nation-wide branching on financial stability of commercial banks in Kenya.

CHAPTER THREE
RESEARCH METHODOLOGY

This chapter presents the research design, data, data collection methods and analysis techniques that was applied in the research.

3.1 Research Design

This study adopted a correlation research design. This was appropriate in establishing the association amongst the study variables. This was in line with the recommendations of Kothari (2004) who notes that correlation research designs are appropriate in such studies which are concerned with the frequency with which something occurs or its association with something else.

3.2 Study Area

The study was conducted in Kenya. Kenya, with Nairobi as the capital city, is a country in in Africa and a founding member of the East Africa Community (EAC). It spans more than 580,367 square kilometres. Its territory lies on the equator and overlies the East African Rift extending roughly from Lake Victoria to Lake Turkana and further south-east to the Indian Ocean. It is bordered by Tanzania to the south and south west, Uganda to the west, south Sudan to the north-west, and Ethiopia to the north and Somalia to the north-east.

3.3 Target Population

The study targeted all the 10 commercial banks listed at the Nairobi Securities Exchange in Kenya. These included the Kenya Commercial Bank, Equity Bank Ltd-Kenya, Co-operative Bank of Kenya, Barclays Bank of Kenya Ltd, Standard Chartered Bank Ltd-Kenya, Diamond Trust Bank Ltd-Kenya, I & M Bank Kenya Ltd, Stanbic Bank Kenya Ltd, NIC Bank Kenya Ltd and National Bank of Kenya.

3.4 Data Collection

The study used secondary balanced panel data. The data was quantitative in nature, and sourced from the financial statements of the listed commercial banks and the Central Bank of Kenya annual supervision reports. This was done through the data collection sheets as attached in Appendix II. The panel data set covered a period of 5 years as from 2013 to 2017. This period is characterised as a time of significant developments in the country's banking sector (CBK, 2016a). Moreover, and over the same period of time, the capping of the interest rates had been effected, three commercial banks have been placed into receivership and the country’s GDP had stagnated in growth.

3.4.1 Validity and Reliability of Data

The annual financial statements and supervision reports relied upon are always prepared in line with the generally accepted accounting standards and principles, the International Financial Reporting Standards (IFRSs) and International Accounting Standards (IASs). This is in addition to their compliance with the relevant provisions of the country's Banking Act and other prudential guidelines issued by the regulatory authority, the Central Bank of Kenya (CBK). Thus, the data that was obtained from these reports in line with the specific objectives of the study were valid and reliable. In addition, diagnostic tests such as unit root test, test of normality, autocorrelation, multicollinearity and heteroscedasticity tests were carried out to ensure that the data conformed to the basic assumptions of classical linear regression model.

3.5 Data Analysis and Presentation

To analyze the data, the researcher used descriptive statistics such as the mean and standard deviation. Inferential statistics such as Pearson correlation and multiple regression analysis was used to analyse the relationship between the study variables. The results were then presented in form of tables and graphs.

3.5.1 Model Specification

The researcher modified the panel regression model used by Fu et al. (2014) in their study, before using it as a base line model in the regression analysis as follows:

$\mathbf{Y_{it} = \beta_o + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \beta_4 X_{4it} + \mu_{it}}$; where: $\mathbf{Y_{it}}$ is the dependent variable representing the Z-score of bank i at time t. $\mathbf{\beta_o}$ is the constant term while $\mathbf{\beta_1, \beta_2, \beta_3,}$ and $\mathbf{\beta_4}$ are the beta coefficients. $\mathbf{\mu_{it}}$ is the error term. $\mathbf{X_{1it}}$, $\mathbf{X_{2it}}$ and $\mathbf{X_{3it}}$ are the independent variables representing the size, bank concentration and nation-wide branching of bank i at time respectively. $\mathbf{X_{4it}}$ is the control variable representing the ratio of loans to assets of the sampled commercial bank i at time t.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

This chapter presents the results on descriptive analysis; trend analysis; correlation analysis; regression analysis and diagnostic tests. The chapter also presents the discussion of results in line with the study objectives.

4.1 Descriptive Statistics

Table 4.1 presents the descriptive statistics relating to the study variables. From the table, the stability of the banks listed at the Nairobi Securities Exchange (NSE) as measured by their Z-scores had a mean of 29.21471 during the study period. The figures are below a mean of 62.76 obtained by Turk-Ariss (2010) for commercial banks in Kenya. On the other hand, bank size had a mean of 26.10662 while the mean for bank concentration was 1161.325. Further, the mean for nation-wide branching was found to be 4.2287 while the banks' loan portfolio/risk was found to have an average of 0.608680 during the study period. Moreover, all the variables were found to be normally distributed since all of them had Jarque-Bera probabilities that were higher than the 0.05 level of significance. In addition, all the study variables were found to be positively skewed and hence there distribution have long tails to the right.

Table 4.1: Summary of Statistics

	Z_SCORE	BSZ	BHHI	NWB	LNDNG
Mean	29.21471	26.10662	1161.325	4.228670	0.608680
Median	26.31124	26.15021	1158.444	4.241094	0.613908
Maximum	59.61957	27.04337	1180.749	5.288267	0.832907
Minimum	5.247319	25.25040	1142.385	3.178054	0.404935
Std. Dev.	14.23847	0.438216	14.22688	0.711867	0.095880
Skewness	0.635508	0.047753	0.099776	0.074732	0.231774
Kurtosis	2.758337	2.308410	1.540890	1.476088	3.030136
Jarque-Bera	3.487258	1.015455	4.518383	4.884679	0.449550
Probability	0.174885	0.601862	0.104435	0.086957	0.798696
Sum	1460.736	1305.331	58066.25	211.4335	30.43399
Sum Sq. Dev.	9933.960	9.409629	9917.798	24.83095	0.450453
Observations	50	50	50	50	50

Source: Field Data, 2018

Key: Z-SCORE=Financial Stability of Commercial Banks, BSZ=Bank Size, BHHI=Bank Concentration, NWB=Nation-wide Branching, LNDNG= Loan portfolio/ Risk.

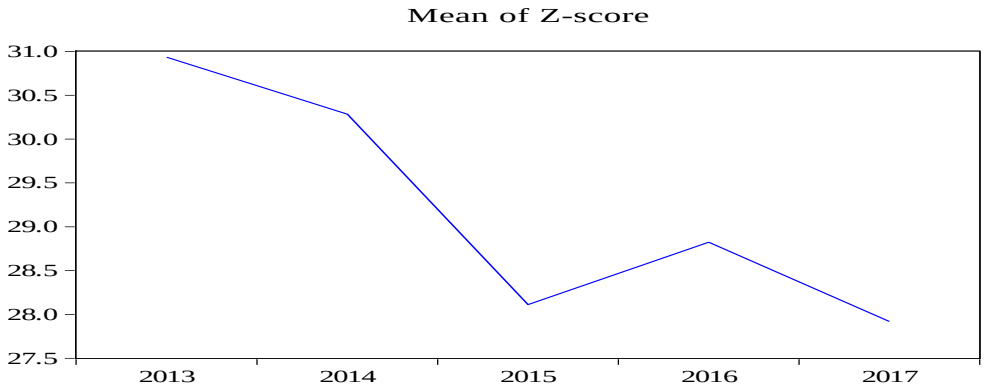
4.2 Trend Analysis on the Study variables

These include trend analysis on financial stability, bank size, market concentration, nation-wide branching and loan portfolio/risk as follows:

4.2.1 Trend Analysis on Financial Stability of the Sampled Banks

Figure 4.2.1 below indicates that the mean Z-score for commercial banks listed at Nairobi Securities Exchange (NSE) had a decreasing trend from 2013 to 2015, increased gradually from 2015 to 2016 before taking a downward trend again. This might be attributed to a number of factors including the banking sectorial factors.

Figure 4.2.1: Trend of Financial Stability- Z-score

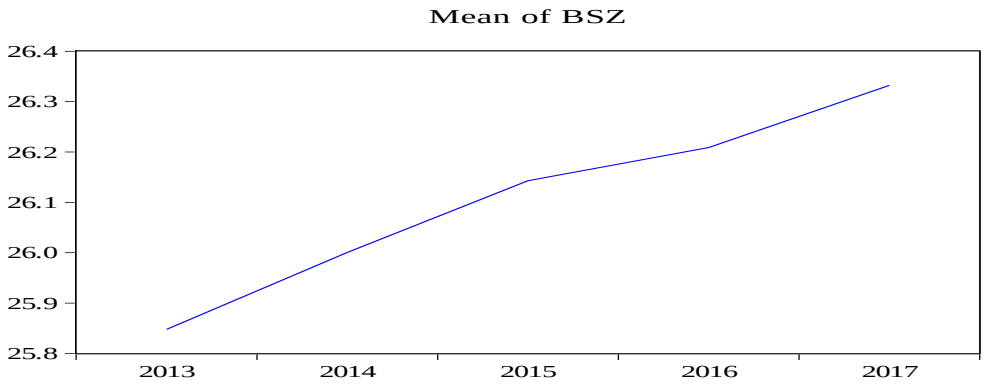


Source: Field Data, 2018

4.2.2 Trend Analysis on Bank Size of the Sampled Banks

Figure 4.2.2 indicates that the average bank size for commercial banks listed at Nairobi Securities Exchange (NSE) has been on an upward trend over the study period. Odunga (2016) attributes this to a number of factors including the increase in customer deposits as a result of the adoption of mobile banking by the commercial banks.

Figure 4.2.2: Trend of Bank Size-BSZ

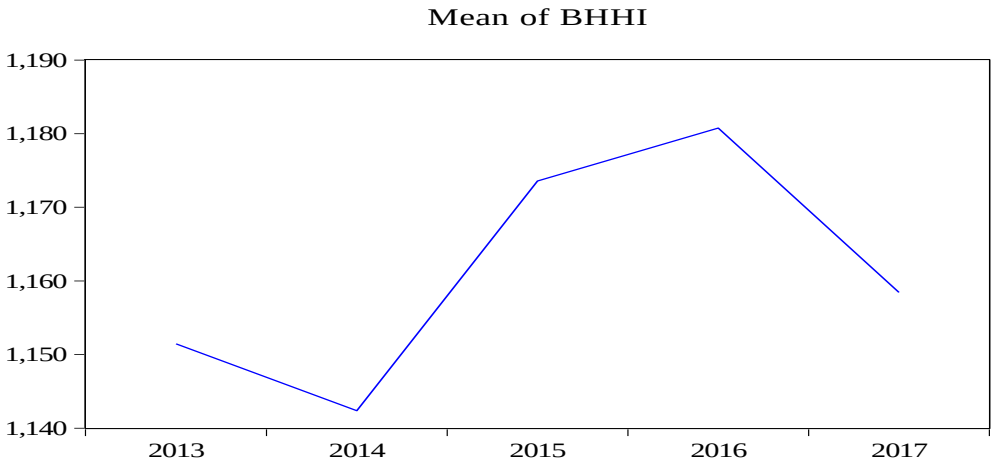


Source: Field Data, 2018

4.2.3 Trend Analysis on Bank Concentration of the Sampled Banks

Figure 4.2.3 shows that bank concentration for commercial banks listed at Nairobi Securities Exchange (NSE) had a decreasing trend from 2013 to 2014, increased gradually from 2014 to 2016 before taking a downward trend again.

Figure 4.2.3: Trend of Bank Concentration-BHHI

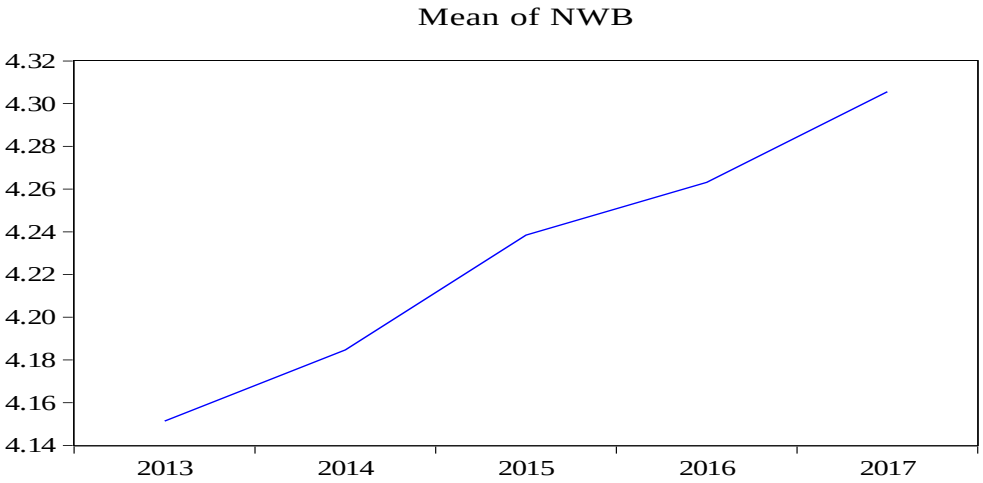


Source: Field Data, 2018

4.2.4 Trend Analysis on Nation-wide Branching of the Sampled Banks

Figure 4.2.4 below indicates that the mean of nation-wide branching for commercial banks listed at Nairobi Securities Exchange (NSE) has been on upward trend over the study period. This is attributed to the increased number of branches opened by the sampled banks over the study period.

Figure 4.2.4: Trend of Nation-wide Branching-NWB



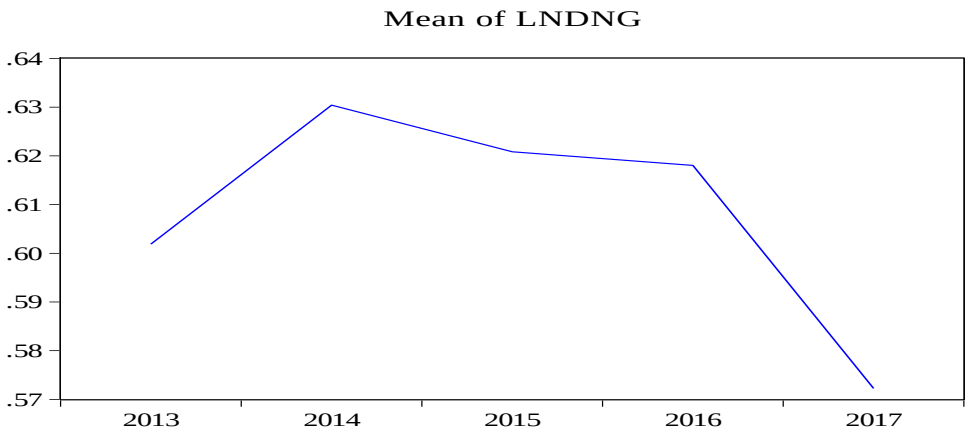
Source: Field Data, 2018

4.2.5 Trend Analysis on Loan Portfolio/Risk of the Sampled Banks

In Figure 4.2.5 below, the average lending by the commercial banks listed at Nairobi Securities Exchange (NSE) had an increasing trend from 2013 to 2014, decreased gradually from 2014 to 2016 before dropping drastically from 2016 to 2017. The drastic fall from 2016 to 2017 might be attributed to the high political climate that was experienced due to the 2017 general elections and the capping of the lending rates.

Res

Figure 4.2.5: Trend of Loan Portfolio/Risk-LNDNG



Source: Field Data, 2018

4.3 Results on Correlation Analysis

Table 4.3 indicates the correlation matrix of the study variables. From the table, it is clear that bank size, nation-wide branching and loan portfolio/risk are positive and moderately correlated with bank stability at the 0.05 level of significance.

Table 4.3: Correlation Matrix

Correlation Probability	Z_SCORE	BSZ	BHHI	NWB	LNDNG
Z_SCORE	1.000000 -----				
BSZ	0.578171 (0.0000)*	1.000000 -----			
BHHI	-0.054984 (0.7045)	0.207462 (0.1483)	1.000000 -----		
NWB	0.485978 (0.0003)*	0.655946 (0.0000)*	0.043601 (0.7637)	1.000000 -----	
LNDNG	0.522314 (0.0001)*	0.045146 (0.7556)	0.013711 (0.9247)	0.073198 (0.6134)	1.000000 -----

*Note: p-values in parentheses; * represent significance at the 0.05 level*

Source: Field Data, 2018

4.4 Regression Results

These include summary statistics of the regression model, regression results on the effect of bank size, bank concentration, nation-wide branching and loan portfolio/ credit risk on financial stability of commercial banks listed at the Nairobi Securities Exchange (NSE). The detailed E-views results are found in Appendix VI.

4.4.1 Summary Statistics of the Regression Model

Table 4.4.1 presents the summary statistics of the regression model. From the statistics, R-Squared is 0.974754. This means the independent variables jointly explain about 97.48% of the variations in the stability of commercial banks listed at the NSE. In addition, the results show that the Adjusted R-Squared is 0.965638, a clear indication that the independent variables collectively, are good explanatory variables of the financial stability of the listed commercial banks at the NSE in Kenya. Moreover, the probability of the F-statistic (0.000000) was less than the 0.05 level of significance. Hence, the null hypothesis of F-statistic (the overall test of significance) that R-Squared is equal to zero was rejected. Further the D.W. statistic was about 2.01 implying that serial correlation was not a problem in the regression analysis.

Table 4.4.1: Summary Statistics of the Regression Model

R-Squared	0.974754
Adjusted R-Squared	0.965638
F-statistic	106.9226
Prob (F-statistic)	0.000000
Durbin-Watson stat	2.010007

Source: Field Data, 2018

4.4.2 Regression Results on the Effect of Bank Size on Financial Stability of Commercial Banks Listed at the Nairobi Securities Exchange

Objective one of the study sought to establish the effect of bank size on financial stability of commercial banks listed at the Nairobi Securities Exchange (NSE). Table 4.4.2 shows that the coefficient of bank size (BSZ) is -7.132958, with a p-value=0.0391. This indicates that a unit increase in bank size leads to a decrease of 7.132958 in the financial stability of the listed commercial banks at NSE holding other factors constant. Moreover, the effect is significant since the p-value is less than the 0.05 level of significance leading to the rejection of the null hypothesis that bank size has no significant effect on financial stability of commercial banks listed at the NSE. Hence, the alternative hypothesis was instead accepted. Similar results were

found by Fu et al. (2014) . However, a negative but insignificant effect was found by Hope et al. (2013) while Turk-Ariss (2010) found a positive and insignificant effect. On the other hand, Berger et al. (2009) found positive and significant effect. Onuonga (2014) also found a positive and significant effect in their study on the top six banks in Kenya.

Table 4.4.2: Regression Results on the Effect of Bank Size on Financial Stability of the Sampled Banks

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Bank Size (BSZ)	-7.132958	3.330727	-2.141562	0.0391*

** represent significance at the 0.05 level.*

Source: Field Data, 2018

4.4.3 Regression Results on the Effect of Bank Concentration on Financial Stability of commercial Banks Listed at the Nairobi Securities Exchange

Objective two of the study sought to determine the effect of bank concentration on financial stability of commercial banks listed at the NSE. Table 4.4.3 above shows that the coefficient of bank concentration (BHHI) is -0.022892 with a p-value= 0.4637. This means that a unit increase in bank concentration leads to a decrease of -0.022892 in the stability of the listed commercial banks at the NSE, other factors being constant. Nonetheless, the effect is insignificant as the p-value is much higher than the 0.05 level of significance. Thus, the null hypothesis that bank concentration has no significant effect on financial stability of commercial banks listed at the NSE was accepted. The study findings also compares with those of Olweny and Shipho (2011). Nonetheless, they contradict the negative and significant effect found by Fu et al. (2014) and Ajide and Ajileye (2015) in their respective studies. It also contradicts the results by Berger et al. (2009) and Hope et al. (2013) who found a significant positive effect.

Table 4.4.3: Regression Results on the Effect of Bank Concentration on Financial Stability of the Sampled Banks

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Bank Concentration (BHHI)	-0.022892	0.030909	-0.740619	0.4637

Source: Field Data, 2018

4.4.4 Regression Results on the Effect of Nation-wide Branching on Financial Stability of Commercial Banks Listed at the Nairobi Securities Exchange

Objective three of the study sought to evaluate the effect of nation-wide branching on financial stability of commercial banks listed at the Nairobi Securities Exchange (NSE). The results in Table 4.4.4 above shows that the coefficient of nation-wide branching (NWB) is 6.016090 with a p-value=0.4659. This means that a unit increase in nation-wide branching leads to an increase of 6.016090 in the financial stability of commercial banks listed at the NSE. However, the effect is insignificant as the p-value was greater than the 0.05 level of significance leading to the acceptance of the null hypothesis that nation-wide branching has no significant effect on the stability of commercial banks listed at the NSE. This corroborates the findings by Hussein and Al-Tamimi (2010) on the effect of number of bank branches on the financial performance of conventional banks in the United Arabs Emirates. However, it differs with the results of Carlson and Mitchener (2005). It also contradicts the findings by Ajide and Ajileye (2015) who established that the number of bank branches has a significant positive effect on the financial performance of commercial banks in Nigeria.

Table 4.4.4: Regression Results on the Effect of Nation-wide Branching on Financial Stability of the Sampled Banks

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Nation-wide Branching (NWB)	6.016090	8.163460	0.736953	0.4659

Source: Field Data, 2018

4.4.5 Regression Results on the Effect of Loan Portfolio/ Risk on Financial Stability of Commercial Banks Listed at the Nairobi Securities Exchange

The study included the ratio of loans to bank assets as a control variable of the banks' loan portfolio and the risks associated with their lending activities. Table 4.4.5 shows that the loan portfolio/ risk (LNDNG) has a positive coefficient of 3.453852 with a p-value=0.6934. This shows that loan portfolio/risk has a positive but insignificant effect on the financial stability of commercial banks listed at the NSE since its p-value is greater than the 0.05 level of significance. This is in tandem with the results of Hope et al. (2013). However, they differ with the significant negative effect reported by Berger et al. (2009) and the positive and significant effect found by Turk-Ariss (2010).

Table 4.4.5: Regression Results on the Effect of Loan Portfolio/Credit Risk on Financial Stability of the Sampled Banks

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Loan Portfolio/ Risk (LNDNG)	3.453852	8.689097	0.397493	0.6934

Source: Field Data, 2018

4.5 Diagnostic Test Results

These include results on a number of tests such as unit root tests, model specification test, test of normality of the residual and multicollinearity test on the independent variables as discussed below. These are then followed by a discussion of the results on heteroskedasticity test.

4.5.1 Results on the Unit Root Tests

Table 4.5.1 shows the results of the unit root tests conducted on the study variables using Levin, Lin, Chu (LLC) common root test. From the results, all the variables of the study were found to be stationary at levels. The detailed E-views results are found in Appendix IV.

Table 4.5.1: Summary of the Levin, Lin, Chu (LLC) Common Root Test Results on the Study Variables

Variable	**Statistic**	**Prob.**
Financial Stability (Z_SCORE)	11.3299	0.0000*
Bank Size (BSZ)	2.15051	0.0158*
Bank Concentration (BHHI)	2.01340	0.0220*
Nation-wide Branching (NWB)	15.1975	0.0000*
Loan Portfolio/Risk (LNDNG)	3.02633	0.0012*

** represent significance at the 0.05 level.*

Source: Field Data, 2018

4.5.2 Result on Model Specification Test

The Hausman Test was used to select the best model, that is, either the fixed effect (F.E) model or the random effect (R.E) model to analyse the panel data under the null hypothesis that the R.E model is preferred to the F.E model. Based on the test results as presented in Table 4.5.2 (see the regression results on the R.E model in Appendix V), the null hypothesis was rejected and hence, the F.E model was used.

Table 4.5.2: Summary Results on Hausman Test

Test cross-section random effects			
Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	14.002414	4	0.0073*

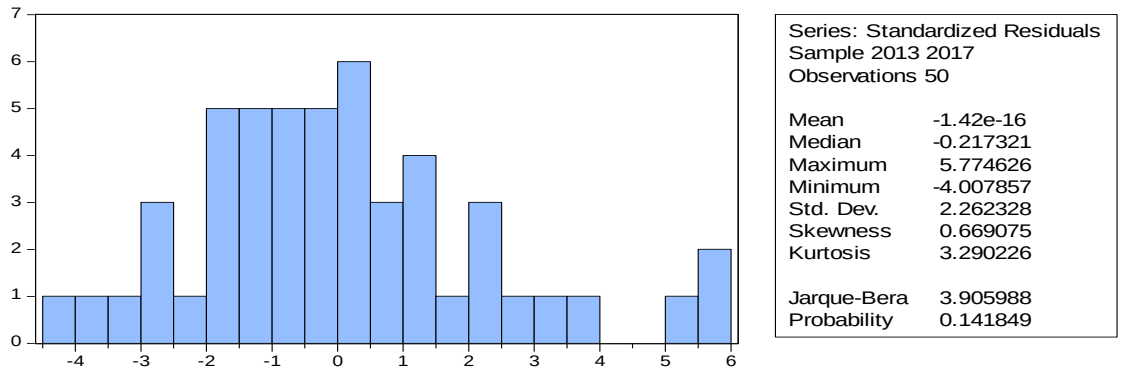
** represent significance at the 0.05 level.*

Source: Field Data, 2018

4.5.3 Results on the Test of Normality of the Residual

Figure 4.5.3 shows that the residuals from the regression were normally distributed with the reported probability that the Jarque-Bera statistic exceeds in absolute terms the observed value being 0.14, higher than the 0.05 level of significance.

Figure 4.5.3: Results on the Test of Normality of the Residual



Source: Field Data, 2018

4.5.4 Results on Multicollinearity Test

The variance inflation factor (VIF) method was used in examining the inter-correlations among the explanatory variables. As indicated in Table 4.5.4, the centred VIF values are much lower than 10 with the highest being 2.909792. Accordingly, Gujarati (1995) asserts that multicollinearity will only be a problem if and only if one of the VIF values is greater than 10 which was not the case with the presented results.

Table 4.5.4: Variance Inflation Factors

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	3913.097	28085.74	NA
BSZ	11.09374	54271.03	2.909792
BHHI	0.000955	9249.230	1.360127
NWB	66.64207	8555.888	2.829896
LNDNG	75.50041	202.0043	1.237229

Key: Z-SCORE=Financial Stability of Commercial Banks, BSZ=Bank Size, BHHI=Bank Concentration, NWB=Nation-wide Branching, LNDNG= Loan portfolio/Risk.

Source: Field Data, 2018

4.5.5 Results on Heteroskedasticity Test

The White's General Heteroscedasticity Test was conducted to determine whether the residuals from the regression analysis have the same variance. The main assumption in this test is that under the null hypothesis that there is no heteroscedasticity, the sample size (n) times the R^2 obtained from the auxiliary regression *asymptotically* follows the chi-square distribution with degree of freedom (df) equal to the number of regressors (excluding the constant term) in the auxiliary regression (Gujarati, 1995). Hence, an auxiliary regression was estimated and R^2 of 0.305866 obtained (see Appendix VII for a detailed E-views results). The chi-square value of 15.2933 was then established, being a product of the R^2 obtained and the sample size. With the df being 14, the critical chi-square value at the 5% level of significance is 23.68. Thus, the null hypothesis of no heteroscedasticity was accepted since the chi-square value (15.293300) was less than the critical chi-square value (23.68) at the 5% level of significance.

CHAPTER FIVE
SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

This chapter presents a summary of the study's findings, conclusions and recommendations.

5.1 Summary of Findings

Objective one of the study sought to establish the effect of bank size on financial stability of commercial banks listed at the Nairobi Securities Exchange, Kenya. The results indicate that bank size has a negative and significant effect on the stability of commercial banks listed at the Nairobi Securities Exchange, Kenya.

Objective two of the study sought to determine the effect of bank concentration on financial stability of commercial banks listed at the Nairobi Securities Exchange, Kenya. The findings show that bank concentration has a negative but insignificant effect on financial stability of commercial banks listed at the Nairobi Securities Exchange, Kenya.

Objective three of the study sought to evaluate the effect of nation-wide branching on financial stability of commercial banks listed at the Nairobi Securities Exchange, Kenya. The results indicate that nation-wide branching has a positive but insignificant effect on the stability of commercial banks listed at the Nairobi Securities Exchange, Kenya.

The study also looked at the effect of loan portfolio/risks on financial stability of commercial banks listed at the Nairobi Securities Exchange, Kenya. The results show that loan portfolio/ risk has a positive but insignificant effect on financial stability of the sampled banks.

5.2 Conclusions on the Study Findings

In view of the study findings, it can be concluded that bank size has a significant negative effect on financial stability of commercial banks listed at the Nairobi Securities Exchange, Kenya. On the other hand, bank concentration can be concluded to have a negative but insignificant effect on financial stability of the listed commercial banks. In addition, both nation-wide branching and loan portfolio/risk can be concluded to have a positive but insignificant effects on financial stability of the listed commercial banks.

5.3 Recommendations of the Study based on the Conclusions

In line with the above conclusions, the Central Bank of Kenya (CBK) should tighten its supervision mechanisms on the activities of the larger commercial banks listed at the Nairobi Securities Exchange). This is to prevent such banks from taking advantage of their sizes to engage in risky activities. In addition, effective policies on the optimal bank size should be formulated by the CBK to ensure the sustained stability of the commercial banks and the country's banking sector at large.

5.4 Limitation of the Research

The outcome of the study may not be applicable to all the commercial banks in Kenya since the study was limited to the listed commercial banks in the Nairobi Securities Exchange and did not incorporate all the commercial banks in the country. The findings of the study may also not be applicable to other financial institutions such as micro finance institutions given the variations in the way both banks and this other financial intermediaries operate. The time period for the study was also limited as the data collected was only for five years. This might not provide robust results as to the long-term relationship between the study variables.

5.5 Suggestions for Further Research

In order to improve on this empirical study, the researcher suggests that further investigations be done on banking sectorial factors and financial stability focusing on the non-listed commercial banks in Kenya as well as other financial institutions such as micro finance institutions. Studies should also be conducted on the topic using a fairly longer time period of 10 years and above so as to help in showing the trends as well as the long-term relationship between the study variables.

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APPENDICES

Appendix I: Letter of Introduction

MASENO UNIVERSITY
SCHOOL OF GRADUATE STUDIES

Office of the Dean

Our Ref: MSC/BE/00116/015

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Date: 23rd May, 2018

TO WHOM IT MAY CONCERN

RE: PROPOSAL APPROVAL FOR OMONDI GODFREY ODUNDO — MSC/BE/00116/015

The above named is registered in the Master of Science in Finance programme in the School of Business and Economics, Maseno University. This is to confirm that his research proposal titled "Effect of Banking Sectorial Factors on Financial Stability of Commercial Banks in Kenya" has been approved for conduct of research subject to obtaining all other permissions/clearances that may be required beforehand.

Prof. J.O. Agure
DEAN, SCHOOL OF GRADUATE STUDIES

Maseno University *ISO 9001:2008 Certified*

Appendix II: A List of the Sampled Commercial Banks

Name of the Bank	Abbreviation
1. Kenya Commercial Bank Ltd	KCB
2. Equity Bank Ltd	EQT
3. Co - operative Bank of Kenya Ltd	COP
4. Barclays Bank of Kenya Ltd	BBL
5. Standard Chartered Bank (K) Ltd	SCB
6. Diamond Trust Bank (K) Ltd	DTB
7. I&M Holdings Ltd	I&M
8. Stanbic Bank (K) Ltd	SBL
9. NIC Group	NIC
10. National Bank of Kenya	NBK

Appendix III: Data Collection Schedule

Bank	Year	PBT-Ksh.M	Bank Assets-Ksh.M	Equity Capital-Ksh.M	Loans Ksh.M	Number of Branches (NOB)
KCB	2013	17746	323312	62391	198370	182
KCB	2014	22362	376969	72165	248824	187
KCB	2015	23445	467741	80886	312080	193
KCB	2016	28482	504778	80990	353900	198
KCB	2017	27472	555,630	88991	387,943	192
EQT	2013	18233	238194	50687	152029	153
EQT	2014	20112	277116	40733	187976	154
EQT	2015	22388	341329	47440	225,037	167
EQT	2016	22778	379749	52341	213806	164
EQT	2017	23,086	406,402	61906	214485	177
COP	2013	10705	228874	35652	137087	138
COP	2014	12515	282689	42351	179486	141
COP	2015	14073	339550	49311	208572	142
COP	2016	18024	349998	60046	232307	142
COP	2017	16502	382830	68227	253862	148
BBL	2013	11921	207010	32371	118362	107
BBL	2014	12294	226043	38111	125423	106
BBL	2015	12074	241153	39716	145379	108
BBL	2016	10440	259498	42095	168510	108
BBL	2017	10006	271682	43559	168,397	121
SCB	2013	13316	220524	36030	129672	39
SCB	2014	14300	222636	40450	122749	37
SCB	2015	8974	234131	40914	115125	38
SCB	2016	12764	250274	43905	122711	42
SCB	2017	9510	285124	44584	126294	36
DTB	2013	5566	114136	18568	75292	50
DTB	2014	6307	141176	25784	94059	51
DTB	2015	7055	190948	29996	125818	59
DTB	2016	8876	244124	36432	136,686	63
DTB	2017	8228	270082	43004	148516	68
I&M	2013	6060	110316	20525	91883	29
I&M	2014	7749	137299	21814	112491	31
I&M	2015	8367	147864	26187	114927	34
I&M	2016	8651	164116	26187	134675	36
I&M	2017	9340	240111	44320	153018	42
SBL	2013	7005	170726	22353	69133	24
SBL	2014	7391	171347	26644	88374	28
SBL	2015	7077	198578	28251	104982	27
SBL	2016	6910	204895	30238	115587	27
SBL	2017	5401	248739	42955	130536	27

NIC	2013	5221	112917	17631	77114	27
NIC	2014	6081	137087	22618	94424	29
NIC	2015	6260	156762	26454	106516	31
NIC	2016	5926	161847	30288	105671	35
NIC	2017	5676	192817	28938	112322	37
NBK	2013	1779	92493	11848	39567	71
NBK	2014	2332	122865	12114	65641	73
NBK	2015	-1684	128295	10914	67804	81
NBK	2016	162	115114	10,996	59339	73
NBK	2017	740	109942	7048	52361	80

- Bank size (BSZ) was calculated as the natural logarithm of a bank's assets in millions of Kenya Shillings (Ksh) per year.
- Return on assets (ROA) = PBT/Bank Assets.

Appendix IV: Unit Root Test

Unit Root Test on Financial Stability-Z-Score

Null Hypothesis: Unit root (common unit root process)
Series: Z_SCORE
Date: 07/27/18 Time: 15:34
Sample: 2013 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Total (balanced) observations: 40
Cross-sections included: 10

Method	Statistic	Prob.**
Levin, Lin & Chu t*	-11.3299	0.0000*

** Probabilities are computed assuming asympotic normality

Intermediate results on Z_SCORE

Cross section	2nd Stage Coefficient	Variance of Reg	HAC of Dep.	Lag	Max Lag	Band-width	Obs
KCB	-0.23472	6.3901	1.3619	0	0	3.0	4
EQT	-0.82195	0.3001	13.309	0	0	0.0	4
COP	-0.71900	16.045	9.2817	0	0	2.0	4
BBL	-0.14175	0.7886	0.8020	0	0	0.0	4
SCB	-1.50784	2.1114	1.2274	0	0	3.0	4
DTB	-0.61398	4.4538	1.3943	0	0	3.0	4
I&M	-1.54906	0.4464	1.5766	0	0	3.0	4
SBL	-1.63928	0.4975	0.9383	0	0	3.0	4
NIC	-2.68131	1.9058	7.3141	0	0	2.0	4
NBK	-0.71405	1.7142	1.0570	0	0	3.0	4
	Coefficient	t-Stat	SE Reg	mu*	sig*		Obs
Pooled	-0.89478	-11.883	1.356	-0.554	0.919		40

** represent significance at the 0.05 level.*

Unit Root Test On Bank Size-BSZ

Null Hypothesis: Unit root (common unit root process)
Series: BSZ
Date: 07/27/18 Time: 15:36
Sample: 2013 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Total (balanced) observations: 40
Cross-sections included: 10

Method	Statistic	Prob.**
Levin, Lin & Chu t*	-2.15051	0.0158*

** Probabilities are computed assuming asympotic normality

Intermediate results on BSZ

Cross section	2nd Stage Coefficient	Variance of Reg	HAC of Dep.	Lag	Max Lag	Band-width	Obs
KCB	-0.21818	0.0015	0.0030	0	0	0.0	4
EQT	-0.22145	0.0011	0.0027	0	0	0.0	4
COP	-0.38000	0.0011	0.0052	0	0	0.0	4
BBL	-0.16113	5.E-05	0.0002	0	0	1.0	4
SCB	0.83083	0.0001	0.0019	0	0	0.0	4
DTB	-0.15781	0.0033	0.0054	0	0	0.0	4
I&M	0.24945	0.0131	0.0122	0	0	1.0	4
SBL	0.32186	0.0055	0.0024	0	0	3.0	4
NIC	-0.22990	0.0029	0.0015	0	0	2.0	4
NBK	-1.09076	0.0034	0.0222	0	0	0.0	4

	Coefficient	t-Stat	SE Reg	mu*	sig*	Obs
Pooled	-0.14425	-2.608	1.805	-0.554	0.919	40

** represent significance at the 0.05 level.*

Unit Root Test on Bank Concentration-BHHI

Null Hypothesis: Unit root (common unit root process)
Series: BHHI
Date: 07/27/18 Time: 15:37
Sample: 2013 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Total (balanced) observations: 40
Cross-sections included: 10

Method	Statistic	Prob.**
Levin, Lin & Chu t*	-2.01340	0.0220*

** Probabilities are computed assuming asympotic normality

Intermediate results on BHHI

Cross section	2nd Stage Coefficient	Variance of Reg	HAC of Dep.	Lag	Max Lag	Band-width	Obs
KCB	-0.86791	213.28	325.72	0	0	1.0	4
EQT	-0.86791	213.28	325.72	0	0	1.0	4
COP	-0.86791	213.28	325.72	0	0	1.0	4
BBL	-0.86791	213.28	325.72	0	0	1.0	4
SCB	-0.86791	213.28	325.72	0	0	1.0	4
DTB	-0.86791	213.28	325.72	0	0	1.0	4
I&M	-0.86791	213.28	325.72	0	0	1.0	4
SBL	-0.86791	213.28	325.72	0	0	1.0	4
NIC	-0.86791	213.28	325.72	0	0	1.0	4
NBK	-0.86791	213.28	325.72	0	0	1.0	4

	Coefficient	t-Stat	SE Reg	mu*	sig*	Obs
Pooled	-0.86791	-5.887	1.000	-0.554	0.919	40

** represent significance at the 0.05 level.*

Unit Root Test on Nation-wide Branching- NWB

Null Hypothesis: Unit root (common unit root process)
Series: NWB
Date: 07/27/18 Time: 15:38
Sample: 2013 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Total (balanced) observations: 40
Cross-sections included: 10

Method	Statistic	Prob.**
Levin, Lin & Chu t*	-15.1975	0.0000*

** Probabilities are computed assuming asympotic normality

Intermediate results on NWB

Cross section	2nd Stage Coefficient	Variance of Reg	HAC of Dep.	Lag	Max Lag	Band-width	Obs
KCB	-0.61984	0.0003	0.0007	0	0	0.0	4
EQT	-0.29404	0.0017	0.0003	0	0	3.0	4
COP	-0.07490	0.0002	0.0001	0	0	2.0	4
BBL	2.49374	0.0020	0.0020	0	0	1.0	4
SCB	-1.73712	0.0022	0.0032	0	0	2.0	4
DTB	-0.01633	0.0020	0.0004	0	0	3.0	4
I&M	0.27684	0.0009	0.0006	0	0	3.0	4
SBL	-1.26172	2.E-05	0.0041	0	0	1.0	4
NIC	-0.02738	0.0006	0.0001	0	0	3.0	4
NBK	-1.36767	0.0021	0.0011	0	0	3.0	4

	Coefficient	t-Stat	SE Reg	mu*	sig*	Obs
Pooled	-1.10215	-14.667	2.347	-0.554	0.919	40

** represent significance at the 0.05 level.*

Unit Root Test on Loan Portfolio/Risk-LNDNG

Null Hypothesis: Unit root (common unit root process)
Series: LNDNG
Date: 07/27/18 Time: 15:39
Sample: 2013 2017
Exogenous variables: Individual effects
Automatic selection of maximum lags
Automatic lag length selection based on SIC: 0
Newey-West automatic bandwidth selection and Bartlett kernel
Total (balanced) observations: 40
Cross-sections included: 10

Method	Statistic	Prob.**
Levin, Lin & Chu t*	-3.02633	0.0012*

** Probabilities are computed assuming asympotic normality

Intermediate results on LNDNG

Cross section	2nd Stage Coefficient	Variance of Reg	HAC of Dep.	Lag	Max Lag	Band-width	Obs
KCB	-0.53247	0.0001	0.0002	0	0	3.0	4
EQT	-0.06869	0.0023	0.0024	0	0	0.0	4
COP	-0.80072	0.0004	0.0001	0	0	3.0	4
BBL	-0.53412	0.0009	0.0010	0	0	1.0	4
SCB	-0.20643	0.0004	9.E-05	0	0	3.0	4
DTB	-0.19929	0.0017	0.0007	0	0	2.0	4
I&M	-2.01842	0.0052	0.0026	0	0	3.0	4
SBL	-0.86370	0.0003	0.0025	0	0	1.0	4
NIC	1.92467	0.0001	0.0008	0	0	0.0	4
NBK	-1.20261	0.0004	0.0031	0	0	0.0	4

	Coefficient	t-Stat	SE Reg	mu*	sig*		Obs
Pooled	-0.57202	-4.423	1.561	-0.554	0.919		40

** represent significance at the 0.05 level.*

Appendix V: Random Effect (R.E) Regression

Dependent Variable: Z_SCORE
Method: Panel EGLS (Cross-section random effects)
Date: 07/27/18 Time: 15:42
Sample: 2013 2017
Periods included: 5
Cross-sections included: 10
Total panel (balanced) observations: 50
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	179.8246	57.82355	3.109886	0.0032
BSZ	-5.840898	2.734009	-2.136386	0.0381
BHHI	-0.040138	0.030330	-1.323402	0.1924
NWB	9.789484	4.070372	2.405059	0.0203
LNDNG	11.65359	8.137185	1.432141	0.1590

Effects Specification		
	S.D.	Rho
Cross-section random	9.121544	0.9227
Idiosyncratic random	2.639383	0.0773

Weighted Statistics			
R-squared	0.200902	Mean dependent var	3.749251
Adjusted R-squared	0.129872	S.D. dependent var	3.156515
S.E. of regression	2.944418	Sum squared resid	390.1319
F-statistic	2.828381	Durbin-Watson stat	1.236735
Prob(F-statistic)	0.035519		

Unweighted Statistics			
R-squared	0.184480	Mean dependent var	29.21471
Sum squared resid	8101.346	Durbin-Watson stat	0.370833

Appendix VI: Regression Results

Dependent Variable: Z_SCORE
Method: Panel Least Squares
Date: 07/27/18 Time: 15:50
Sample: 2013 2017
Periods included: 5
Cross-sections included: 10
Total panel (balanced) observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	214.4746	62.55475	3.428590	0.0015
BSZ	-7.132958	3.330727	-2.141562	0.0391*
BHHI	-0.022892	0.030909	-0.740619	0.4637
NWB	6.016090	8.163460	0.736953	0.4659
LNDNG	3.453852	8.689097	0.397493	0.6934

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.974754	Mean dependent var	29.21471
Adjusted R-squared	0.965638	S.D. dependent var	14.23847
S.E. of regression	2.639383	Akaike info criterion	5.010463
Sum squared resid	250.7883	Schwarz criterion	5.545830
Log likelihood	-111.2616	Hannan-Quinn criter.	5.214334
F-statistic	106.9226	Durbin-Watson stat	2.010007
Prob(F-statistic)	0.000000		

* *represent significance at the 0.05 level.*

Appendix VII: Auxiliary Regression

Dependent Variable: RESID01^2
Method: Panel Least Squares
Date: 07/27/18 Time: 16:08
Sample: 2013 2017
Periods included: 5
Cross-sections included: 10
Total panel (balanced) observations: 50

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7662.624	15731.22	-0.487097	0.6292
BSZ	-12.73113	668.9119	-0.019033	0.9849
BHHI	12.70111	19.05979	0.666383	0.5095
NWB	311.4116	369.5316	0.842720	0.4051
LNDNG	-601.7368	1325.927	-0.453823	0.6528
BSZ^2	-1.013811	13.54711	-0.074836	0.9408
BHHI^2	-0.006276	0.008233	-0.762279	0.4510
NWB^2	7.596233	7.220091	1.052097	0.3000
LNDNG^2	2.744145	115.6013	0.023738	0.9812
BSZ*BHHI	0.084119	0.284381	0.295797	0.7691
BSZ*NWB	-13.23106	15.37015	-0.860828	0.3952
BSZ*LNDNG	35.96964	55.10608	0.652734	0.5182
BHHI*NWB	-0.033153	0.163469	-0.202807	0.8405
BHHI*LNDNG	-0.335030	0.942404	-0.355506	0.7243
NWB*LNDNG	21.80620	34.95734	0.623795	0.5368

R-squared	0.305866	Mean dependent var	5.015766
Adjusted R-squared	0.028213	S.D. dependent var	7.667670
S.E. of regression	7.558732	Akaike info criterion	7.126609
Sum squared resid	1999.705	Schwarz criterion	7.700216
Log likelihood	-163.1652	Hannan-Quinn criter.	7.345042
F-statistic	1.101612	Durbin-Watson stat	1.398090
Prob(F-statistic)	0.389838		