Commercial Bank Diversification and Financial Performance: The Moderating Role of Risk

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Abstract

Commercial banks in Kenya have posted good financial performance as indicated by ROA and ROE. This coincides with a period of enormous diversification occasioned by global financial sector liberalization, allowing banks to venture into a range of businesses while maintaining the traditional intermediation business. Theory and empirical evidence is equivocal on the financial performance impact of diversification. Often, theory provides an isolated analysis of the diversification – performance relationship which limits their generalizations especially in the face of systemic financial risks and crisis. Using an *ex post facto* explanatory design we investigate whether bank diversification affects financial performance and whether this effect is moderated by solvency and credit risk based on panel data from 34 commercial banks in Kenya over nine firm years. The authors find that income and asset diversification negatively and significantly affect commercial bank ROA while geographical diversification significantly – positively affect both ROA and ROE. We also find a significant positive moderation effect of credit risk on relationship between income diversification and ROA but a significant negative effect on relationship between asset diversification and geographical diversification with both ROA and ROE. On solvency risk, we find a significant positive moderation effect on relationship between geographical diversification and ROE.

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1   Introduction

Commercial banks are profit making institutions whose ultimate goal is profit making (Harker and Zenios, 2000; Ongore and Kusa, 2013). As such all activities performed and strategies designed by commercial banks are meant to attain this grand objective. Traditionally, banks have been able to achieve this objective seemingly with ease. However, the deregulation and liberalization in the banking sector witnessed in a number of countries in the last two decades has increased competition in the sector by allowing non-banking players to join the industry. An example in case is the Second Banking Directive of 1989 which allowed European commercial banks to pursue functional diversification across activities such as commercial banking, investment banking, insurance and other financial services (Baele *et al.,* 2006) and the 1999 Gramm-Leach-Bliley Act which allowed American commercial banks to expand into non-interest banking activities (Ebrahim and Hasan, 2008; Elyasiani and Wang, 2012). This deregulation and liberalization has eroded the boundary between banking and non-banking financial institutions resulting in enormous competitive pressure on the traditional intermediation profits of banks. Further, traditional banking business has been undercut by fundamental economic forces and its profitability has diminished forcing banks to turn to new non-traditional activities (Edwards and Mishkin, 1995).

Commercial banks have responded to the competition pressure by raising their involvement in non-traditional intermediation services such as investment banking and banc-assurance and venturing in areas that were once viewed as risky (Gamra and Plihon, 2011). In addition, banks have considerably grown their networks by opening new branches in areas that were earlier considered unprofitable (CBK Bank Supervision Annual Report, 2012). Indeed Edwards and Mishkin (1995) argue that banks have two alternatives to survive this pressure: first, expanding traditional lending activities into new riskier areas and, secondly, pursuing new off-balance sheet activities that are more profitable. All these strategies and action revolve around diversification whether in operations, activities, products or assets since according to Gort (1962) and Berry (1975) diversification can be viewed in terms of the number of products, services or markets or as put by Markowitz (1952) and Hoskisson and Hitt (1990) as the methods and means that enable an organization to achieve growth and reduce overall risk. However, as according to Olo (2009), the grand strategy involving diversification represents a distinctive departure from a firm's existing base of operations to a separate business line

either through expansion or acquisition or an increase (Penrose, 1959) by a firm in the number of lines whether such lines are related or not. However, bank diversification can be understood better by disaggregating the various elements that constitute the operations, assets and liabilities of commercial banks.

Theory points to a number of motives for corporate diversification including; the synergistic motive, the financial motive advanced in portfolio theory, the market power motive, the resource motive, the agency motive occasioned by managerial discretion and the cost efficiency motive (Montgomery, 1994; Olo, 2009; Yuliani *et al*., 2013). Whereas the synergistic, resource based, financial, market power and cost efficiency motives predict better firm performance as a result of either economies of scope, cost efficiency or resource sharing, the agency motive can be linked to value destruction occasioned by managerial entrenchment, empire building and managerial self efficacy especially for firms with free cash flows (Montgomery, 1994). However, empirical evidence is equivocal as to the effects of diversification on performance. Whereas proponents of bank diversification (Lin, 2010; Gambacorta *et al.*, 2014; Tabarrok, 1998; Christiansen and Pace, 1994; Obinne *et al.*, 2012; Palich *et al*., 2000) argue that diversification enhance bank performance through managerial efficiency, economies of scale, cost efficiency, higher productivity and cross selling, opponents of the practice (Stiroh, 2002; Turkmen and Yigit, 2012; Behr *et al.*, 2007; Baele etal., 2006; Kahloul and Hallara, 2010; Kiweu, 2012; Berger *et al.*, 2010) cite cost increase, managerial incentive problems and inefficiencies, diseconomies of scale and risk as the biggest problems of diversification in banking. This divergence is exacerbated by the presence of risk which characterise bank operations. Indeed research has shown that bank diversification results in risk which may not be offset totally by the benefits of diversification (Baele *et al*., 2006; Stiroh, 2002; Lin 2010; Bludell-Wignall *et al*., 2009). This divergence raises the following two questions that this paper will address;

i.   What is the effect of bank diversification on their financial performance
ii. Does risk moderate the relationship between bank diversification and financial performance

To answer these questions the paper will investigate the effects of income diversification, asset diversification and geographical diversification on the financial performance of commercial banks in Kenya and the potential moderating effect that credit and solvency risk would have on this relationship. Credit and solvency risk were chosen because they are the most critical risks that face banks (Dima and Orzea, 2012; Bessis 2002).

1.1   Banking industry in Kenya
Banking industry in Kenya is fairly stable and developed with 43 commercial banks, one mortgage finance company, 8 deposit taking microfinance institutions,

7 representative offices of foreign banks, 108 foreign exchange bureaus and 2 credit reference bureaus as at March 2013 (Central Bank of Kenya Supervision Reports, 2013). The industry has grown tremendously following the 1995 financial liberalization when exchange controls were lifted. Banks have since come together under the Kenya Bankers Association (KBA) which serves as an industry lobby for the banking sector interests. Over the last few years, the sector has grown remarkably in terms of assets, deposit base, profitability, networks and product offerings (Central Bank of Kenya Supervision Report, 2013) underpinned mainly by an industry wide branch network expansion both locally and regionally. In the last ten years to 2012, the sector assets grew from 456.7 billion shillings to 2.35 trillion shillings while deposits grew from 360.6 billion shillings to 1.76 trillion shillings over the same period. The number of accounts increased from 1.9 million bank accounts in 2002 to 17.6 million accounts in 2012 (Ndung'u, 2013). This growth continued through 2013 to 2014 with cumulative un-audited pre-tax profits increasing by 18.4 percent in the first quarter of 2014 compared to a similar period in 2013 (CBK, 2014). According to the Central Bank of Kenya Supervision Report (2013), the sector is expected to sustain its growth momentum on the backdrop of a stable macro-economic environment and domestic and regional expansion by banks.

The sector is fairly diversified with the banks having a country wide branch network and presence in the East African region (Kodongo and Natto, 2014). A review of the Central Bank of Kenya Bank Supervision Annual Report (2012) revealed that the industry is fairly diversified on all the fronts with the number of subsidiary branches in the region increasing from 223 in December 2011 to 282 in December 2012. The proportion of non-interest income to the total sector income stood at 29 percent and 22 percent in 2011 and 2012 respectively. In addition banks had branches in all the 47 counties in the country with the branch network increasing from 1161 in 2011 to 1272 in December 2012. This shows that commercial banks in Kenya had diversified not only their income sources but also their assets and operations both geographically and internationally. In terms of risk, the banking industry in Kenya is fairly stable and resilient to shocks (Beck *et al.*, 2010). The sector survived the recent global financial crisis that resulted in bank insolvencies in several western countries relatively unscathed. The sector's asset quality has also been improving (Beck *et al.*, 2010) from the dip occasioned by a mix of high interest rates and subdued economic activities associated with the political uncertainty around the 2013 general elections (Joint Annual Report by Financial Sector Regulators, 2014). The banking sector liquidity by the end of December 2013 exceeded the statutory minimum requirement for all the banks and the regulator has been implementing new capital requirements aimed at enhancing the risk profile of the sector (Joint Annual Report by Financial Sector Regulators, 2014).

2 Theoretical perspectives on diversification

Firms, including banks, often pursue diversification for variant motives including; the synergistic motive, the financial motive advanced in portfolio theory, the market power motive, the resource motive, the agency motive occasioned by managerial discretion, and the cost efficiency motive (Montgomery, 1994; Olo, 2009; Yuliani *et al*., 2013). Three theoretical perspectives that are particularly useful in explaining why firms pursue diversification are the Market power theory, the Agency theory and the Resource based view theory (Montgomery, 1994; Mulwa *et al*., 2015). According to Mulwa *et al*., (2015) the market power theory and the resource based view theory are prescriptive and explain the motives of firm diversification based on profit maximization while Agency theory is managerial and emphasizes managerial choices and self interest as a basis for diversification.

2.1 Market Power theory

As discussed in our earlier paper, the argument for market power builds from Porter (1980) opinion of positioning the company in its environment using a set of strategies that distinguishes a firm's position among the competitors. Diversification is one of the strategies to overcome competition (Barney, 1991; 2002) and enables a firm to build market power granting it access to conglomerate powers. Firms are able to gain competitive power in the market by entering other markets through diversification. This is not because of their particular position in that market but because of their positions in their individual markets (Gribbin, 1976). It is this power in the domicile market that propels the firm to enter new markets through predatory strategies supported by its position, resources and strength in its current market. Firms have three ways by which they can to yield market power through diversification: cross subsidization by using profits from one market to support predatory pricing in another; mutual forbearance of rigorous competition among competitors; and reciprocal buying among units of a multi-business firm which forecloses small competition (Montgomery, 1994; Palich *et al*., 2000). By this approach, firms are able to overcome competition thereby earning profits above the average market profits.   As such, market power theory hypothesis a positive relationship between diversification and firm performance.

2.2 Agency theory

Agency theory hypothesizes that separation between the owners and managers of company creates divergence of interests which ultimately increase the agency cost. According to Jensen and Meckling (1976), these costs refer to the aggregate of: the agent incentive costs and monitoring costs incurred by the principals in limiting the divergence of interests; bonding costs incurred to deter the principals from taking interest diverging actions; and the welfare reduction or residual loss incurred by the principal as a result of the divergence between the agents decisions

and welfare maximizing decisions expected by the principals. The theory posits that managers would often deploy corporate assets for their own selfish interests rather than the interest of the stock holders which problems are usually exacerbated by risk preference differentials between the agents and the principals (Jensen, 1986). Often, shareholders are more concerned about non-diversifiable risk while managers are more interested in the diversifiable risk which conflicts are more pronounced in companies with substantial free cash flows. This is so because the managers will chose to invest the excess cash flows to optimize profits and not to increase cash payments to shareholders and diversification is usually a convenient vehicle for this managerial behaviour (Jensen and Meckling, 1976). Managers with free cash flows are likely to undertake value destroying or low benefit diversification to grow the size of their business territories, for managerial entrenchment or for reducing total firm risk which benefits their personal positions (Jensen, 1986). The consequences of these decisions anchor on agency costs because they can be viewed as managerial perquisites intended to decrease the risk associated with managerial human capital (Montgomery, 1994). Agency theory emphasizes the benefits accruing to managers at the expense of the stock holders as a result of the manager's decisions. Accordingly the view explains why managers pursue diversification and predicts a negative impact of diversification on firm performance (Mulwa *et al.*, 2015).

2.3 Resource Based View theory

The Resource Based View (RBV) theory is an action strategy to position a business unit as a foundation for a multi-business firm and emphasizes the firm's ability to exploit the potential synergies between resources to produce higher performance (Wernerfelt 1984; Barney 1991; Teece *et al*., 1997; Montgomery, 1994). RBV approach enlists the circumstances under which a firm's resources lead to high returns over longer periods of time using Porter's five competitive forces. It explains the resource-benefits accruing to a firm by envisaging the existence of resource position barriers where by the holders of a resource are able to maintain a sustainable competitive advantage in relation to other holders and third persons since possession of a resource by one party affects the costs and / or revenues of later acquirers adversely. In such a case the holder can be said to enjoy the protection of a resource position barrier or a first mover advantage (Lieberman and Montgomery, 1988). Just like entry barriers envisaged in Porter's model, resource position barriers do indicate a potential for high returns since one competitor has an advantage over others occasioned by efficiency in the use of resources (Montgomery, 1994; Prahalad and Hamel, 1990). As such, diversification based on RBV focuses on resource allocation and sharing competencies across different business lines to enhance performance by either cost reduction or by playing competitors out of the market as the absolute volume per period increases (Porter, 1980). This exploitation of potential synergies expected

from sharing functions, resources and competencies lead to generation of sustainable competitive advantages and thus profitability occasioned by cost reduction. Therefore, the RBV predicts a positive impact of diversification on a firm's financial performance.

3   Data and Methodology

Theory of bank diversification identifies several approaches to diversification both domestic and cross-border and including income, assets, credit, geographical and international diversification (Lin, 2010; Obinne *et al*., 2012; Gambacorta *et al*., 2014; Chriatiansen and Pace, 1994; Goetze *et al*., 2013). We concentrate on the three common domestic avenues of diversification as identified by Mulwa *et al.*, (2015) namely income diversification, asset diversification and geographical diversification. For income and geographical diversification we construct Herfindhal-Hirschman index (HHI) following Stiroh and Rumble (2006), Doumpos *et al*., (2013) and Elsas *et al*., (2006). The HHI captures variations in the various components of income and asset diversification computed as the sum squared shares of the individual components to total income or assets subtracted from unity to get a value that increases with the degree of diversification. Geographical diversification is measured as the natural logarithm of the number of branches operated by a commercial bank. The natural logarithm is taken to adjust for the arbitral nature of the number measure. We measure financial performance using two accounting measures namely: Returns on assets (ROA) and Returns on equity (ROE) which are ratios of operating income to total assets and total equity respectively (Ongore and Kusa, 2013; Turkmen and Yigit, 2012; Al-Smadi, 2011; Saksonova and Solvjova, 2011) . Generally, accounting methods primarily based on the use of financial ratios have been employed for assessing bank performance in diversification studies (Li and Qiann, 2005; Ncube, 2009; Pan and Tsai, 2012). Credit risk and solvency risk being the most critical risks in banking operations (Dima and Orzea, 2012; Bessis, 2002) were taken to moderate the relationship between diversification and financial performance. Credit risk was measured following Gwon (2011) and Saksonova and Solovjova (2011) as the ratio of gross non-performing loans (NPL) to total value of the loan portfolio while solvency risk was measured as the inverse of the z-score approach used in Beck *et al*., (2010), Djine (2011) and Stiroh and Rumble (2006). Dreawing from literature, we control for the effects of bank size as measured by the natural logarithm of total assets (Kahloul and Hillara, 2010; Pan and Tsai, 2012; and Elsas *et al*., 2006) and bank growth rate measured as the average variation in turnover or operating income on the reporting period. Appendix 1 shows the measures operationalizing the variables.

To achieve the objectives of this study, we approximate additive regression

models. In model 1, the control variables ($C_{j_{i,t}}$) corresponding to size and growth are regressed against financial performance ($Y_{i,t}$) to remove the effects. In model 2 the various diversification measures ($X_{p_{i,t}}$) are added to the models to test the direct relationships between diversification and financial performance as shown below

$$Y_{i,t} = \beta_0 + \beta_j \sum_{j=1}^{2} C_{j_{i,t}} + \varepsilon_{i,t} \tag{1}$$

$$Y_{i,t} = \beta_0 + \beta_j \sum_{j=1}^{2} C_{j_{i,t}} + \beta_p \sum_{p=1}^{3} X_{p_{i,t}} + \varepsilon_{i,t} \tag{2}$$

To understand the moderating role of risk on the relationship between bank diversification and financial performance, we approximate the following additive moderated regression models. As recommended by as recommended by Baron and Kenny (1986) and Whisman and McClelland (2005), products of diversification measures and the various moderators $\left(Z_{q_{i,t}}, X_{p_{i,t}} \right)$ are included in the regression models along with the potential moderators and independent variables to test for moderation effect. As such, model 3 was used to test for the moderation effect of credit risk while model 4 will be used for solvency risk.

$$Y_{i,t} = \beta_0 + \beta_j \sum_{j=1}^{2} C_{j_{i,t}} + \beta_p \sum_{p=1}^{3} X_{p_{i,t}} + \beta_q Z_{q_{i,t}} + \beta_k \sum_{k=1}^{3} \left(Z_{q_{i,t}} X_{p_{i,t}} \right)_{k_{i,t}} + \varepsilon_{i,t} \tag{3}$$

Where Y_{it} is the Financial performance of firm *i* at time *t*, $C_{j_{it}}$ are the control variables (size and growth rate), $X_{p_{it}}$ are the diversification indicators corresponding to income, asset and geographical diversification and $Z_{q_{it}}$ are bank risks (credit and solvency risk). $Z_{q_{it}} X_{p_{it}}$ is a product of risk variables and diversification variables included in the model to test the moderation effects. β_0 is the intercept coefficient, β_j, β_p and β_k are the slope coefficients and ε_{it} is the random error term.

Secondary panel data was obtained for all the variables from the Central Bank of Kenya[i] Bank Supervision reports for nine firm years from 2005 to 2013. Data was collected for all banks in Kenya. However, banks with incomplete information were dropped leaving us with 34 banks that had remained operational for the study period giving a total of 306 firm observations. Table 1 present summary statistics

of the data while table 2 present correlations among variables.

Table 1:   Descriptive statistics of variables

Variable	Obs.	Mean	Std. Deviation	Min.	Max.
ROA	306	3.10	2.02	-6.18	10.39
ROE	306	22.11	15.89	-41.81	159.46
Income diversification	306	0.42	0.08	0.10	0.50
Asset diversification	306	0.46	0.04	0.30	0.50
Geographical diversification	306	2.34	1.19	0.00	5.22
Credit risk	306	0.14	0.35	0.00	3.67
Solvency risk	306	0.07	0.05	0.01	0.43
Bank size	306	23.49	1.35	20.87	26.50
Growth rate	306	0.20	0.34	-0.50	3.79

Source: Research data (2015)

3.1 Statistical quality tests

The use of regression analysis requires that at least the following assumptions are met: normality of random errors, linearity in parameters and independence of error terms (Williams *et al*., 2013). Additionally, we used panel data which requires testing for multi-collinearity and stationarity (Gujarati, 2004) before the data can be subjected to regression analysis. Violations of these assumptions would lead to untrustworthy inferences being made about the parameter coefficients due to biased estimates being made of standard errors and significance levels. Jarque-Bera (JB) test of residual normality was used for normality of random errors. The significance values of the JB statistics were greater than the critical value of 0.05 for all models used in the study thus the random errors were not different from normally distributed (Tanweer, 2011). Parameter linearity assumption was tested by plotting residuals against predicted values of response variable (Osborne and Elaine, 2002) and the response variables were found to be linear in regression parameters for all models. The Durbin-Watson statistic (D) was used to test for serial correlations among errors giving values closer to two for all models which shows that error terms were independent across observations (Lind *et al*., 2015). To test for multi-collinearity, variance inflation factors (VIF) and tolerance were calculated for predictor variables giving VIF values less than 10 and tolerance statistics were greater than 0.10 implying absence of multi-collinearity (Field, 2009). The Augmented-Dickey-Fuller unit root test was done for stationarity and all the variables except bank size, income diversification and ROA were stationary. To correct for non-stationarity in these variables, the first difference of the variables [d(var)] was used in the regression models as recommended by Dickey and Fuller (1979; 1981).

Table 2: correlation coefficients

Variable	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
1. Size	1.000								
2. Growth Rate	.045	1.000							
3. Credit Risk	-.268**	-.024	1.000						
4. Solvency Risk	-.174**	-.072	.014	1.000					
5. Income Diversification	.135*	-.096	-.032	-.061	1.000				
6. Assets Diversification	.032	.071	-.136*	-.242**	.129*	1.000			
7. Geographical Diversification	.781**	.071	-.183**	.000	.273**	-.072	1.000		
8. ROA	.538**	.313**	-.264**	-.397**	-.088	.121*	.284**	1.000	
9. ROE	.528**	.145*	-.215**	-.144*	-.051	.122*	.316**	.631**	1.000

**Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05 level (2-tailed)

Source: Research data (2015)

4   Results

Both fixed effects and random effects regressions were initially estimated with the Hausman test (Baum, 2001) indicating that random effects were a more appropriate approach. All the estimations presented in the paper (table 3) are henceforth random effects regressions. All the models had statistically significant regression relationships as shown by the F-statistics which were significant in all models (Blackwell III, 2005; Hoe, 2008; Greene, 2008). We first estimate equation (1) regressing the control variables size and growth rate on financial performance ROA and ROE.

The results showed that bank size had a significant negative effect on ROA (β = -0.072, p-value = 0.000) though it did not significantly affect ROE, which results remained consistent even when other variables were introduced in the other models. These results imply that small-sized banks enjoy higher returns on assets. This was contrary to the findings by Mercieca *et al*., (2007), Bashir (1999) and Dermiguc-Kunt and Huizinga (2012) that large commercial banks outperformed smaller ones. This could be attributed to the relationship banking efficiency of small banks. Growth rate on the other hand had a significant positive effect on bank financial performance (ROA: β = 0.077, p-value = 0.000 and ROE: β = 0.039, p-value = 0.000) which confirm the findings by Montgomery (1985) among 128 *Fortune 500* firms that Growth rate was positively and significantly related to firm performance as indicated by profitability levels.

4.1 Effects of diversification on bank financial performance
In equation 2 we estimate the direct effects of diversification on financial performance. Income diversification negatively affected commercial bank financial performance which effect was significant for ROA though insignificant for ROE. These results concur with the findings by Stiroh (2002) that income diversification reduced the risk adjusted profits while at the same time increasing the risk of American banks. Kiweu (2012) also found that income diversification was not beneficial to the performance of Kenyan banks since the benefits of non-interest income could not totally offset the increase in risk occasioned by diversification to fee based income. Therefore as argued by Kiweu (2012) and Stiroh (2002) the cost implications and risks (Baele *et al*., 2006) associated with income diversification override the performance benefits of diversification. The results on ROE also confirm the findings by Mercieca *et al*., (2007) in Europe that earnings diversification had no impact on banks profitability. Similar findings were also reported by Montgomery (1985) among 128 *Fortune 500* firms that diversification did not significantly affect firm performance. These results concur with the agency view that managers with free cash flows would pursue diversification that does not enhance performance for personal reasons (Jensen, 1986).

Asset diversification had a significant negative effect on ROA and a negative though insignificant effect on ROE. These results confirm the findings by Berger *et al*., (2010) in china that asset diversification led to a reduction in bank profitability and an increase in banking costs. Goetz *et al*., (2013) also reported that asset diversification significantly reduced bank valuation and loan quality in American banks. Similar results were also reported by Elyasiani and Wang (2012) that asset diversification was associated with lower banking efficiency and the degree of change in diversification overtime was not associated with factor productivity. As suggested by Berger *et al*., (2010) and Turkmen and Yigit (2012), this could be attributed to higher banking costs occasioned by diversification and which lead to a diversification discount on bank performance or offset any expected benefits of diversification.

Geographical diversification had a significant positive effect on financial performance which confirms the findings by Obinne *et al*., (2012) in Nigeria that diversification impacted significantly on performance of banks which was occasioned by management economies of scale, more efficient resource allocation or higher productivity of a diversified bank. The RBV theory predicts this diversification premium by envisioning resource position barriers which has a potential for high returns occasioned by efficiency in the use of resources (Montgomery, 1994; Barney, 1991). The Market Power theory also predicts a diversification premium occasioned by cross subsidization, mutual forbearance of rigorous competition and reciprocal buying and selling among the units of a multi-business firm (Montgomery, 1994; Palich *et al*., 2000).

4.2 Moderating effect of risk on the relationship between diversification and financial performance

To test for moderation effect of credit risk, we estimate equation 3. Credit risk positively and significantly moderated the relationship between income diversification and ROA. This confirms the findings by Doumpos *et al*., (2013) that income diversification would be more beneficial for banks since it could mitigate the adverse effect of financial crisis (risk) on bank financial strength. Though the moderation effect of credit risk on the relationship between income diversification and ROE was positive, it was insignificant. However, credit risk had a significant negative moderation effect on the relationship between asset diversification and geographical diversification with both ROA and ROE. This confirms the findings by Acharya *et al.,* (2006) in Italy that banks with a high credit risk experienced decreased bank performance through diversification. The findings by Gambacorta *et al*., (2014) that diversification benefits for global large banks were less sizable but significant when volatility adjusted returns were used to measure profitability attests to the negative moderation effect of risk. On its own, credit risk had a significantly positive effect on ROE and a positive though insignificant effect on ROA. This implies that commercial bank financial

performance increased as banks took more credit risk. This is consistent with the argument by Edwards and Mishkin (1995) that banks can maintain the profitability of their traditional lending activities by expanding into new riskier areas of lending, which in effect is adding or aggregating credit risk as suggested by Allen (2013).

In equation 4, we tested the moderation effect of solvency risk on the relationship between bank diversification and financial performance. Solvency risk had a positive and significant moderation effect on the relationship between geographical diversification and ROE which implies that as suggested by Doumpos *et al.*, (2013) banks expand their geographical are able to mitigate the negative effects of solvency risk by increasing their geographical outreach. Solvency risk had a negative but insignificant moderation effect on the relationship between income diversification and geographical diversification with ROA and that between income diversification with ROE. It also had a positive but insignificant effect on the relationship between assets diversification with both ROA and ROE. This is consistent with the arguments in PreQuest LLC (2011) that despite consistent diversification, Kenyan banks were not affected by the recent global financial crisis which resulted to bank insolvencies in several western countries. However, on its own solvency risk had a negative but insignificant effect on financial performance which support the argument by Djine (2011) and Blundel-Wignall *et al.*, (2009) that bank insolvency is often a result of decisions of regulatory authorities relating to larger market conditions and therefore banks may not necessarily work about insolvency.

Table 3: Regression model estimations

Variable	Depedent variable: $d(ROA_{it})$				Depedent variable: ROE_{it}			
	[1]	[2]	[3]	[4]	[1]	[2]	[3]	[4]
Constant	0.001	0.051*	0.020	0.069	1.805***	1.790***	1.725***	1.902***
	(0.005)	(0.026)	(0.033)	(0.044)	(0.013)	(0.050)	(0.064)	(0.080)
$d[Size_{i,t}]$	-0.072***	-0.061***	-0.081***	-0.062***	-0.016	-0.004	-0.031	0.008
	(0.018)	(0.019)	(0.019)	(0.019)	(0.026)	(0.026)	(0.028)	(0.026)
Growth rate$_{i,t}$	0.077***	0.070***	0.083***	0.070***	0.039***	-0.038***	0.051***	0.034***
	(10.659)	(0.008)	(0.009)	(0.008)	(0.009)	(0.010)	(0.012)	(0.010)
$d[Income\ diversification_{i,t}\ (ID_{i,t})]$		-0086**	-0.111**	-0.080*		-0.035	-0.025	0.014
		(0.041)	(0.044)	(0.048)		(0.050)	(0.057)	(0.067)
Asset diversification$_{i,t}$ $(AD_{i,t})$		-0.123**	-0.049	-0.162*		-0.098	0.067	-0.212
		(0.054)	(0.069)	(0.088)		(0.100)	(0.132)	(0.151)
Geographical diversification$_{i,t}$ $(GD_{i,t})$		0.002	0.004*	0.004		0.024***	0.026***	0.000
		(0.002)	(0.002)	(0.005)		(0.006)	(0.006)	(0.009)
Credit Risk$_{i,t}$ $(CR_{i,t})$			0.113				0.394**	
			(0.130)				(0.190)	
Solvency Risk$_{i,t}$ $(SR_{i,t})$				-0.056				-1.342
				(0.558)				(0.988)
$CR_{i,t}*ID_{i,t}$			0.483***				0.282	
			(0.186)				(0.274)	
$CR_{i,t}*AD_{i,t}$			-0.686**				-1.124**	
			(0.292)				(0.450)	
$CR_{i,t}*GD_{i,t}$			-0.035***				-0.058***	
			(0.011)				(0.017)	
$SR_{i,t}*ID_{i,t}$				-0.138				-1.321
				(0.501)				(0.967)
$SR_{i,t}*AD_{i,t}$				0.249				1.599
				(0.986)				(1.586)
$SR_{i,t}*GD_{i,t}$				-0.019				0.472***
				(0.074)				(0.143)
R^2 overall	0.297	0.321	0.356	0.326	0.066	0.132	0.178	0.175
F-statistic	56.804 (0.000)	25.147	16.083	14.088	9.540	8.090	6.311	6.162
Prob.(F-statistic)		0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Notes: Significant at: *10, **5 and ***1 percent levels; results shown are from random effects regression; standard errors in parenthesis
Source: Research data (2015)

5 Conclusions

Does diversification affect the financial performance of commercial banks? Our paper finds a negative significant relationship between income diversification and asset diversification with bank returns on assets. These results concur with the agency view that managers with free cash flows would pursue diversification that does not enhance performance for personal reasons (Jensen, 1986). We attribute this to higher banking costs occasioned by diversification which lead to a diversification discount on bank performance or offset any expected benefits of diversification. We also find a positive and significant relationship between geographical diversification with both returns on assets and returns on equity. This concurs with the prescription of both the RBV theory and Market power theory that diversification is beneficial to firm performance through efficiency in the use of resources (Montgomery, 1994; Barney, 1991), cross subsidization, mutual forbearance of rigorous competition and reciprocal buying and selling among the units of a multi-business firm (Montgomery, 1994; Palich *et al*., 2000). However, income and asset diversification did not significantly affect bank returns on equity.

On whether this relationship is moderated by credit risk and solvency risk, we find that credit risk positively and significantly moderated the relationship between income diversification and bank returns on assets but significantly negatively moderated the relationship between asset diversification and geographical diversification with both returns on assets and returns on equity. However, the moderation effect of credit risk on the relationship between income diversification and return on equity was positive but insignificant. We also find that solvency risk positively and significantly moderated the relationship between geographical diversification and return on equity. However, the moderation effect of solvency risk on the relationship between income diversification, asset diversification and geographical diversification with returns on assets and that between income diversification and asset diversification with returns on equity were insignificant.

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References

[1]   Acharya V., Hasan I., and Saunders A., (2006), Should Banks be Diversified? Evidence from Individual Bank Loan Portfolios, *Journal of Business*, Vol. 79 (3), Pp. 1355-1412

[2]   Allen S., (2013). Financial Risk Management; *A Practitioner's Guide to Managing market and Credit Risk,* 2nd Ed., Wiley Finance, USA: John Wiley & Sons

[3]   Al-Smadi M.O., (2011), The Impact of E-Banking on the Performance of Jordanian Banks, *Journal of Internet banking and Commerce*, Vol. 16(2), Pp. 1-10

[4]   Baele L., De Jonghe O., and Vennet R.V., (2007), Does the Stock Market Value Bank Diversification?, *Journal of Banking and Finance*, Vol. 31, Pp. 1999-2023

[5]   Barney, J. (1991). Firm Resources and Sustained Competitive Advantage, *Journal of Management,* Vol. 17(1), Pp. 99-120

[6]   Barney, J. (2002). Gaining and Sustaining Competitive Advantage. Second Edition, Prentice Hall

[7]   Baron R.M., and Kenny D.A., (1986), The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations, *Journal of Personality and Social Psychology*, Vol. 51(6), Pp. 1173-1182

[8]   Bashir M.A., (1999), Risk and Profitability Measures in Islamic Banks: The Case of Two Sudanese Banks, *Islamic Economic Studies*, Vol. 6(2), Pp.1-24

[9]   Baum F.C., (2001). Residual diagnostics for cross section time series regression models, *The STATA Journal*, Vol. 1(1), Pp. 101-104

[9]   Beck T., Cull R., Fuchs M., Getenga J., Gatere P., Randa J., and Trandafir M., (2010). Banking Sector Stability, Efficiency, and Outreach in Kenya. Policy Research Working Paper 5442, The World Bank development research group, October

[10] Beck T., Demirguc-Kunt A., and Merrouche O., (2010), Islamic vs. Conventional Banking: Business Model, Efficiency and Stability, Policy research working paper 5446, The World Bank development research group, October

[11] Behr A., Kamp A., Memel C., and Pfingsten A., (2007), Diversification and the banks risk-return characteristics – Evidence from loan portfolios of German banks, Discussion paper, Series 2, Banking and Financial studies No. 05/2007, Deutsche Bundesbank, Frankfurt am main

[12] Berger A.N., Hassan I., and Zhou M., (2010), Effects of Focus vs. Diversification on Bank Performance: Evidence from Chinese banks, BOFIT discussion papers 4/2010, Bank of Finland: Institute of Economies in Transition

[13] Berry C. H. (1975). Corporate Growth and Diversification. *Princeton:*

Princeton University Press

[14] Bessis J., (2002), Risk Management in Banking, 2nd Ed., England: John Wiley & Sons Ltd.

[15] Blackwell III, J.L., (2005). Estimation and testing of fixed-effect panel-data systems. *The STATA journal*, Vol. 5(2), Pp. 202-207

[16] Bludell-Wignall A., Wehinger G., and Slovik P., (2009), The Elephant in the Room: The Need to Deal with What Banks Do, *OECD Journal: Financial market trends*, Vol. 2009/2

[17] Central bank of Kenya Bank Supervision Reports, (2013), Developments in the Kenyan Banking Sector for the Quarter ended 31st Banking Sector Performance, Retrieved from http://www.centralbank.go.ke/images/docs/Bank%20Supervision%20Report s/Quarterly%20Performance%20Reports/Banking-Sector-Report-Q1.pdf on 11th October 2013

[18] Christiansen W.A., and Pace D.R., (1994), Relaxing the Glass-Steagall Act: Do Diversification Benefits Exist?, *Journal of Financial and Strategic Decisions*, Vol. 7(3), pp. 55-62, Fall

[19] Demirguc-Kunt A. and Huizinga H., (2012), Do we need big banks? Evidence on performance, strategy and market discipline, Bank for International Settlements (BIS) Seminar paper, 2012: January, [Retrieved from: http://www.bis.org/bcbs/events/bhbibe/demirguc.pdf (September, 2013)]

[20] Dickey, D.A., and Fuller, W.A., (1979). Distribution of the estimators for autoregressive time series with a unit root, *Journal of the American Statistical Association,* Vol. 74, Pp. 427-431

[21] Dickey, D.A., and Fuller, W.A., (1981). Likelihood ratio statistics for autoregressive time series with a unit root, *Econometrica: Journal of the Econometric Society*, Vol. 49, Pp. 1057-1072

[22] Dima A.M., and Orzea, I., (2012). Risk Assessment and Management. USA, Wyoming: Academy Publish

[23] Djine L. T., (2011), Assessing the Risk of Bank Failure in Cameroon: A z-Scoring Approach, *International Research Journal of Finance and Economics*, EuroJournals Publishing, Inc., Issue 77

[24] Doumpos M., Gaganis C., and Pasiouras F., (2013), "Bank Diversification and Overall Financial Strength: International Evidence around the Crisis", Financial Engineering Laboratory: Technical University of Crete, Working paper No. 3, November

[25] Ebrahim A., and Hasan I., (2008), The Value Relevance of Product Diversification in Commercial Banks, *Review of Accounting and Finance*, Vol. 7(1), Pp. 24-37, Emerald Group Publishing Limited

[26] Edwards R.F and Mishkin F.S., (1995), The Decline of Traditional Banking: Implications for Financial Stability and Regulatory Policy, *FRBNY Economic Policy Review*, 1995: July

[27] Elsas R., Hackethal A., Holzhauser M., (2006), The Anatomy of Bank

Diversification, *Journal of Banking and Finance*, Vol. 34 Pp. 1274-1287

[28] Elyasiani E., and Wang Y., (2012), Bank holding company diversification and production efficiency, *Applied Financial Economics*, Routledge: Taylor and Francis Group, Vol. 22(17), pp. 1409-1428, April

[29] Field A., (2009). Discovering statistics using SPSS for windows, (3rd ed.). London: SAGE Publications

[30] Gambacorta L., Scatigna M., and Yang J., (2014), Diversification and bank profitability: a nonlinear approach, *Applied Economics Letters*, Routledge: Taylor and Francis Group, Vol. 21(6), PP. 438-441, February

[31] Gamra S.B., and Plihon D., (2011), Revenue diversification in emerging banks; Implications for financial performance

[32] Goetz M.R., Laeven L., and Levine R., (2013), Identifying the Valuation Effects and Agency Costs of Corporate Diversification: Evidence from the Geographic Diversification of U.S. Banks, *The Review of Financial Studies*, Vol. 26(7), Society for Financial Studies

[33] Gort M. (1962), Diversification and Integration in American Industry, *Princeton: Princeton University Press,* Issue 77

[34] Greene H.W., (2008). Econometric analysis, (6th ed.). Upper saddle river, NJ: Prentice hall

[35] Gribbin, J.D., (1976). The Conglomerate Merger, *Applied Economics*, Vol. 8, Pp. 19-35

[36] Gujarati, D.N., (2004). Basic econometrics, (4th ed.). McGraw Hill Companies

[37] Gwon, E. J. (2011),The Effect of Diversification of the Commercial Banking, Asia-Pacific Economic and Business History Conference, California – Berkeley, USA

[38] Harker P.T. and Zenios S.A., (2000), Performance of Financial Institutions: Efficiency, Innovation and Regulation, Press Syndicate of the University of Cambridge, New York

[39] Hoe, S.L., (2008). Issues and procedures in adopting structural equation modelling technique, *Journal of applied quantitative methods*, Vol. 3(1)

[40] Hoskisson R. E., and Hitt M. A. (1990). Antecedents and Performance Outcomes of Diversification: A review and Critique of Theoretical Perspectives, *Journal of management*, Vol. 16, Pp. 461-509

[40] Jensen, C. M. (1986). Agency Costs of Free Cash Flow, Corporate Finance and Takeovers. *American Economic Review,* Vol. 76(2), Pp. 323-329

[41] Jensen, C. M. and Meckling, H. W. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*, Vol. 3, Pp. 305-360

[42] Joint Annual Report by Financial Sector Regulators, (2012), Kenya's Financial Sector Stability Report 2011, December 2011 Issue no. 3, 2012: June

[43] Joint Annual Report by Financial Sector Regulators, (2014), Kenya's

Financial Sector Stability Report 2013, December 2013 Issue no. 5

[44] Kahloul I. and Hallara S., (2010), The Impact of Diversification on Firm Performance and Risk: An Empirical Evidence, *International Research Journal of Finance and Economics*, Euro Journals Publishing, Inc., Issue 35

[45] Kiweu J.M., (2012), Income Diversification in the Banking Sector and Earnings Volatility: Evidence from Kenyan Commercial Banks*, KBA centre for Research on Financial Markets and Policy, Working paper series, No. 2

[46] Kodongo O., and Natto D., (2014), The Drivers of Cross-border Banking Expansion: Evidence from East Africa, KBA centre for Research on Financial Markets and Policy, Working paper series, No. 8

[47] Li, L. and Qian G., (2005). Dimensions of International Diversification: The Joint Effects of Firm Performance. *Journal of Global marketing*, vol. 13(3), Pp. 7-35

[48] Lieberman B.M., and Montgomery D.B., (1988), First-Mover Advantages, *Strategic Management Journal*, Vol. 9, Issue Special Issue: Strategy content research, summer: 1988

[49] Lin S.L., (2010), Bank international diversification on home bias, profitability and risk: Evidence from emerging and industrial countries, *Africa Journal of Business Management*, Vol. 4(17), pp. 3817-3836

[50] Lind D.A. Marchal W.G., and Wathen S.A. (2015). Statistical Techniques in Business & Economics, 16th Ed., New York: McGraw-Hill Education

[51] Markowitz H., (1952), Portfolio Selection, *Journal of Finance*, American Finance Association, Vol. 7(1), pp. 77-91, 1952: March

[52] Mercieca S., Schaeck K., and Wolfe, S. (2007). Small European Banks: Benefits from Diversification? *Journal of Banking and Finance*, Vol. 31 (7), Pp. 1975-1998

[53] Montgomery, C. A. (1994). Corporate Diversification. *Journal of Economic Perspectives*, Volume 8(3), Pp. 163-178

[54] Mulwa J.M., Tarus D.K. and Kosgei D. (2015). Commercial Bank Diversification: A theoretical Survey. *International Journal of Research in Management & Business Studies*, Vol. 2(1), 45-49

[55] Ncube M., (2009), Efficiency of the Banking Sector in South Africa, *African Economic Conference 2009:* Fostering Development in an Era of Financial and Economic Crises, Addis Ababa

[56] Ndung'u N., (2013). "The Importance of the Banking Sector in the Kenyan Economy", *Remarks by Prof. Njuguna Ndung'u , Governor of the Central Bank of Kenya, at the Bank of India – Kenya branch, Diamond Jubilee Celebrations, 12 April 2013*, Bank for International Settlement, Available on: http://www.bis.org/review/r130425f.pdf?frames=0, Accessed: 12th May 2014

[57] Obinne U.G., Uchenna A.W., Nonye U.J., and Okelue U.D., (2012), Impact of Corporate Diversification on the Market Value of Firms: A study of Deposit Money Banks Nigerian, *European Journal of Business and Management*, Vol. 4(8)

[58] Olo O. (2009). Corporate Diversification and Firm Performance. *Manager:*

Current Economic Crisis, Vol. 9, Pp. 39-51

[59] Ongore V.O.,   and Kusa G.B., (2013), Determinants of Financial Performance of Commercial Banks in Kenya, *International Journal of Economics and Financial Issues*, Vol. 3(1), pp.237-252

[60] Osborne J. W., and Elaine W., (2002), Four assumptions of multiple regression that researchers should always test, *Practical Assessment, Research & Evaluation*, Vol. 8(2)

[61] Palich, L.E., Cardinal, L.B and Miller, C.C. (2000). Curvilinearity in the Diversification-Performance Linkage: An Examination of Over Three Decades of Research. *Strategic Management Journal,* Vol. 21, Pp. 155-174

[62] Pan, W. and Tsai W., (2012). Internationalization, regional Diversification and Firm Performance: The Moderating Effects of Administrative Intensity. *International Journal of Business and Social Science*, Vol. 3 (18), Pp. 274-282

[63] Penrose, E. G., (1959). The Theory of the Growth of the Firm. New York: Wiley

[64] Porter, M. E. (1980). Competitive Strategy Techniques for Analyzing Industries and Competitors. The Free Press: New York

[65] Prahalad, C.K and Hamel, G. (1990). The Core Competences of the Corporation. *Harvard Business Review*, Vol. 68(3), Pp. 79-91

[66] PreQuest LLC., (2011), The Outlook of Kenyan Banking Sector, Oxford Analytica Limited, United Kingdom, 2011: September 16

[67] Saksonova S. and Solovjova I., (2011), Analysis of the quality and profitability of assets in the banking system and the impact of macroeconomic factors on its stability – case of Latvia, International Conference on Applied Economics – ICOAE 2011 [Retrieved from: http://kastoria.teikoz.gr/icoae2/wordpress/wp-content/uploads/2011/10/058.pdf (September 2013)]

[68] Stiroh J. K. and Rumble A., (2006), The dark side of diversification: The case of US financial holding companies, *Journal of Banking and Finance*, Volume 3

[69] Stiroh, J.K. (2002), Diversification in banking; Is noninterest income the answer?, Federal Reserve Bank of New York Staff Report 154: 1-26

[70] Tabarrok A., (1998), The Separation of Commercial and Investment Banking: The Morgans vs. The Rockefellors, *The Quarterly Journal of Australian Economics*, Vol. 1(1), pp. 1-18

[71] Tanweeer U.I. (2011). Normality Testing – A direction. *International Journal of Business and Social Science*, Vol. 2(3), Pp. 115-118

[72] Teece, D. J., Pisano, G and Shuen, A. (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal,* Vol. 18(7), 509-533

[73] Turkmen, S.Y. and Yigit, I., (2012). Diversification in Banking and its effect on Bank Performance: Evidence from Turkey. *American International Journal of Contemporary Research*, Vol. 2(12), Pp. 110-119

[73] Wernerfelt, B. (1984). A Resource Based View of the Firm. *Strategic Management Journal*, Vol. 5, Pp. 171-180

[74] Whisman M. A., and McClelland G. H. (2005). Designing, Testing, and Interpreting Interactions and Moderator Effects in Family Research. *Journal of Family Psychology*, Vol. 19(1), Pp. 111-120

[75] Williams M.N., Gomez C.A. and Kurkiewicz D., (2013), Assumptions of multiple regression: Correcting two misconceptions. *Practical Assessment, Research & Evaluation*, Vol. 18 (11)

[76] Yuliani, Hadiwidjojo D., Sudarma M., and Solimun. (2013). Diversification Linkage Model and Firm Performance: A Literature Review, *International Journal of Business and Behavioral Sciences*, Vol. 3 (1), Pp. 36-42

Appendix 1: Measurement of variables

Variable	Indicator	Description	Measure
Financial Performance	ROA	Return on assets or measure of bank economic efficiency	ROA = Operating results/Total Assets
	ROE	Return on equity investment of shareholders	ROE = Net Income/Total Equity
Diversification	Income diversification	Income diversity between interest and non-interest income	Herfindahl-Hirschman index (HHI) $Div_{income} = 1 - (SH_{NII}^2 + SH_{NONII}^2)$ where NII is net interest income and NONII is non interest income
	Asset diversification	Assets distribution into lending and non-lending assets	HHI: DIV_{assets} = 1 - [[Net Loans/Total Earning Assets]^2 + [Other Earning Assets/Total Earning Assets]^2]
	Geographical diversification	Diversification of bank operations across the Kenya	DIV_{geo} = ln (number of branches)
Risk	Credit risk	Quality of bank loan portfolio	$RISK_{credit}$ = Non Performing Loans/Total loans
	Solvency risk	Standard deviations that a bank's ROA must drop below its expected value for equity to be depleted	$RISK_{solvery} = \dfrac{1}{z}$ where: $Z = \dfrac{(ROA + CAR)}{\sigma ROA}$ and $CAR = \dfrac{Equity}{Assets}$
Control variables	Size	Asset base	Natural logarithm of total assets (*ln*.TA)
	Growth rate	Rate of growth of bank turnover or income from time to time	$Growth = \dfrac{Income_n - Income_{n-1}}{Income_{n-1}}$

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[i] Central Bank of Kenya (CBK) is the banking industry regulator in Kenya