

EXTENT OF CREDIT FINANCING BY COMMERCIAL BANKS TO AGRIBUSINESSES IN KENYA

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Abstract

Financing in the Agribusiness sector has been difficult due to perceived and unmanaged sectoral risk factors although it contributes to employment by up to 53% in a majority of poor and developing countries, 60% in South Saharan Africa; and up to 80% to the Kenyan population. Despite the commercial banks' application of credit risk mitigation mechanisms, there is little empirical evidence on the use of the forward integration credit risk mitigants on the performance of the agribusiness firms. The purpose of this study was to determine the extent to which the commercial banks provide credits to agribusiness firms. Specifically the study sought to ascertain the extent to which the commercial banks grant credit financing to the agribusiness enterprises in Nyanza region and determine the agribusiness borrowers' opinion on commercial banks' application of forward integration credit risk mitigation mechanisms in granting credits to them. This study takes a descriptive research design. The target population comprised 183 agribusiness firms in operation for the period 2003 to 2012. Stratified random sampling was used to select a sample size of 45 agribusiness managers. Both primary and secondary data were used. The study findings reveal that the commercial banks grant an average of 4.98% credit funding to the agribusiness capital level, 12.40% to owner equity and 4.38% share of credit extended to the agribusiness sector. Borrowers' opinion reveal that the commercial banks highly consider the credit volume determinants in extending credits to the agribusinesses at a mean of 2.2372.

Keywords: Agribusiness, Credit Risk Mitigation, Forward Integration, Investment Risk

1. Introduction

Credit risk is the risk that counterparty will fail to meet his payment obligation, resulting in a loss. This risk is a key determinant of extent of lending to various sectors and entities especially the vulnerable group such as agribusinesses. This risk is historically considered the main risk for banks (Gunther, 2010). Hull (2007), in reference to Basel II (2004), states that banks can with approval of supervisors, use their own estimates of default probabilities to determine the amount of capital they are required to keep to service various credit lines. Commercial banks 'credit risk management has been modeled on six key practices; i.e. customer character, capital requirement, collateral management, capacity to repay, cost determination and market condition (Tony, 2009). Credit risk mitigation which refers to the employment of various methods by lenders, banks and other business which offer credit to control loss from default and promote credit demand; is a practice which includes risk based pricing or credit cost adjustment to the credit strength of the borrower; credit tightening, information management through technical assistance, advisory services and literacy, diversification or increasing portfolio- mix of borrowers and purchasing credit insurance. Credit risk mitigation framework therefore provides for both internal protection from default risk and external security for borrowers' facilitation to limit default (Anthony, 2004). It is a significant tool for ensuring borrower- business stable progress, increased borrower capacity to respond to the operational dynamics; that subsequently enhances business output, turnover and growth. Noah (2005), states that while bankers are quite familiar with the hazards of credit risk, and the related tools and techniques needed to assess and manage it in their portfolios, many are less prepared to deal with the myriad of new loan customer challenges that today's dynamic operating environment brings.

Agribusinesses are a main source of employment in a majority of the world's poor and developing countries. In the context of this study, agribusiness is used synonymous with corporate farming; combining the words agriculture and business; thereby involving a range of activities and methods used in modern food production; where the practitioners' ultimate goal or the bottom line is profit. Agribusinesses provide a share of up to 53% employment in developing countries, 60% in Sub Saharan Africa, and up to 80% plus to the Kenyan economy on a direct and indirect proportion. Agribusiness being a vehicle for enhancing agricultural productivity, sustainability and adaptability, through focused investment into small medium and large scale agriculturally based enterprises has been gradually shaping up agricultural practice in Kenya since the post structural adjustment program in Kenya in the 1980s (Gichira, 2010). It is thus an important sector to the national economy. It indirectly contributes approximately 27% GDP

through linkages with the manufacturing, distribution and other service related sectors. The sector also accounts for 60-80% of the national employment mainly in rural areas, 60% of the export earning, and about 45% of the government revenue. It is therefore evident that the sector plays a critical role in addressing the national goals of poverty eradication, increasing rural incomes, creating employment and guaranteeing food security (Republic of Kenya, 2004). By the 1990's the agro-processing sector employed about 10 percent of Kenya's workforce and contributed about 31 percent to GDP. Despite the contribution of the agribusiness subsector to the economy it continues to face two critical challenges to its development. These are lack of capital and access to affordable credit among others (GOK, 2010).

Farmers in developing countries are often exposed to the lack of credit as the greatest barrier to increasing production and the profitability of agricultural enterprises. Maxwell (1997) explains that there is need to support the agribusiness sector through proper screening of the agribusiness systems. He further argues that the major constraints to agribusiness lending by financial institutions are the shortage of commercially viable projects and poor loan and investment "packaging" by the lender, and not the lack or unavailability of funds. Funding of the agribusiness sector had traditionally been done by the government and non-governmental agencies; a process that has significantly diminished, with the adoption of the SAPs thereby necessitating the private sector investment to the industry (Gurushri, 2001). As private sector financial players commercial banks have remained the most sustainably appropriate financiers to the agribusiness sector; serving the supply side of credit as the agribusinesses participate on the credit demand side. Like any other investment, agribusiness requires financing, part of which is done through credit funds from the financial institutions whose eligibility is assessed through the established credit risk management practices which provide a framework for component mitigation practices. In general, private sector investments are motivated by expected returns relative to perceived risk and uncertainty, which in turn are shaped by both external and internal factors. Supportive components specific to the agribusiness sector include appropriate financing, risk management and supply chain coordination, specialized infrastructure and support services in compliance to international food safety and standards (Mhlanga, 2010).

Economic Surveys (2007 -2011) emphasize agribusiness contribution and its need for funding. This is clearly highlighted through the analysis of trends in terms of its contribution to the GDP, its progressive growth and commercial banks' priority rating to the sector in terms of its credit portfolio. Commercial banks' share of credits to the sector between 2000 and 2011 shows a decreasing trend from 6.5% to 2.9%; while its contribution to the

Kenyan GDP increases fluctuates between 1.8 and 6.9. Table 1, showing commercial banks' lending's in proportional percentages to the agribusiness sectors of Kenya and other select countries in sub-Saharan Africa between 2000 and 2011, reveals a fluctuating but aggregately declining trend. Table 2, which provides a summary of the financial contributions of agribusiness to the select countries within the SSA region in absolute financial values to the respective countries, confirms the same trend. Table 3, providing information on agribusiness growth trends in comparison to the GDP movement and the marketed value output, shows a near- to- proportionate effect on the agribusiness sector from 6.57% in 2000 to 2.927% in 2011.

Government of Kenya (2012), on National Agribusiness Strategy, postulates that agribusiness sector has progressively registered an aggregate growth of 34.2% between 1999 and 2011. In terms of proportions, the agribusiness input sub-sector accounts for 7.83%, primary production sub-sector stands at 2.93% while the manufacturing units cater for 4.29%. This growth can effectively and productively be sustained with strategic approaches to technology, financing and marketing. The Strategy for Revitalizing Agriculture (SRA) has also underscored the importance of increasing agricultural productivity in the fight against poverty (Republic of Kenya, 2004); and thus sets up its pillars into three components namely; extension problem, research problem and an economic and financing problem. The Kenya Vision 2030 has also highlighted growth of the agricultural sector as a major challenge (Republic of Kenya, 2007). Guo (2009), states that major agribusiness risk is compounded in the credit risk; which is basically the possibility of loss to financial institutions caused by the defaults of the transaction parties i.e. debtor and creditor. It is a two-way risk, which can be expressed by a function as $C_r = F(A, B, E)$; where C_r represents credit risk; 'A' represents the loan party; 'B' represents the bank; and 'E' represents the environment. It is a traditional type of risk faced by the financial institutions, alongside market risk and operational risk.

Forward integration mitigation mechanisms are therefore measures by the commercial banks to increase access to credits by the various sectors of the economy and to enhance and promote credit productivity (Smith, 2007). According to World Bank report on 'Managing risk in Financing Agriculture' (2009), sound risk assessment and management is a fundamental element of sustainable agricultural finance at the levels of the farm, financial institutions and value chain. Shield (2012), states that disconnect between Africa's agricultural potential and its current state; including macro-level hurdles such as currency risk and market-distorting policies are challenges that require effective attention. In addition, inadequate credit strategically designed to finance inputs and capital investment in agriculture in general and agribusiness in particular.

Consequently banks must therefore design and implement unique credit risk mitigation mechanisms that would not only enhance the access of credit facilities by agribusinesses.

Whereas the mitigants have been applied in a number of countries to realise growth of the sector, the commercial banks in Kenya also apply these programmes within a composite of credit risk management practices to a developing agribusiness sector. Despite the application of these programmes, there has been little empirical information on the effect of these strategies on extent of lending to agribusinesses. This study therefore sought to determine the extent of credit financing by commercial banks to these agribusinesses in Kenya.

2. METHODOLOGY

The study was based on a descriptive research design. The relationships of the variables of the study were set on a conceptual framework which depicts the interrelation between the variables in an environment of other moderating variables. The target population comprised 183 agribusiness firms; divided in to 101 agro-processing and 82 farm- based agribusinesses in operation for the period 2003 to 2012 within the Nyanza region. Stratified random sampling was used to select a minimum sample size of 45 respondent agribusiness managers out of which 43 turned in the responses comprising a 95.5% response rate. Descriptive statistics; percentages correlation and regression have been applied to determine respective outputs.

3. STUDY FINDINGS

The main objective of the study sought to determine the extent to which the commercial banks grant credits to the agribusiness enterprises in Nyanza region. To achieve this objective, the study undertook to ascertain the volume of credits granted to the sampled agribusiness firms in comparison to the firms' capital and equity levels; and portion of credit attributed to entire commercial banks' credit portfolio for the whole country. It subsequently analyses the borrowers' opinion on commercial banks' implementation of loan volume determinants through their descriptive statistics, correlation and regression results. The *first specific objective* was analyzed as follows;

The table below (2.1); shows the comparative analysis of commercial bank lending, agribusiness capital level and agribusiness owners equity

Table 2.1 Aggregate Business capital level and Commercial Banks credit volumes.

Period	Business Capital Level	C.B Credit volume	Owners' Equity Level	C.B Credit to sector's Capital (Nyanza)	C.B share of credit to the sector's (Kenya)	C.B Credit to Equity (Nyanza)	CB loans and advances (USD in Millions)
2003	12,302.21	720.62	6,252.71	5.86%	6.20%	11.53%	361
2004	13,248.68	796.06	5,209.12	6.01%	6.00%	15.28%	389
2005	13,411.49	920.89	5,211.48	6.87%	6.25%	17.67%	456
2006	14,866.33	832.44	5,214.99	5.60%	5.38%	15.96%	465
2007	14,564.64	689.15	5,241.96	4.73%	4.08%	13.15%	437
2008	13,547.25	651.77	5,237.80	4.81%	3.60%	12.44%	382
2009	15,321.72	512.90	7,606.06	3.35%	3.12%	6.74%	367
2010	16,912.12	839.70	7,608.73	4.97%	3.00%	11.04%	325
2011	19,243.13	794.87	7,609.79	4.13%	2.98%	10.45%	288
2012	21,194.28	741.933	7,610.073	3.50%	3.21%	9.75%	294
Total	154,611.85	7,500.34	62,802.71	49.82%	43.82%	124.00%	3,764
Mean	15,461.19	750.03	6,280.27	4.98%	4.38%	12.40%	376.4

Note: Sample 2003-2012; n=430.

Source: Adapted from CBK, 2013

The information from the table 2.1 above reveals that the volume of credit granted to the agribusinesses in Nyanza region ranges between 3.348% to 6.866 % of the agribusiness capital base during the aforesaid period; with the lowest credit allocation experienced during 2009 and the highest in 2005.

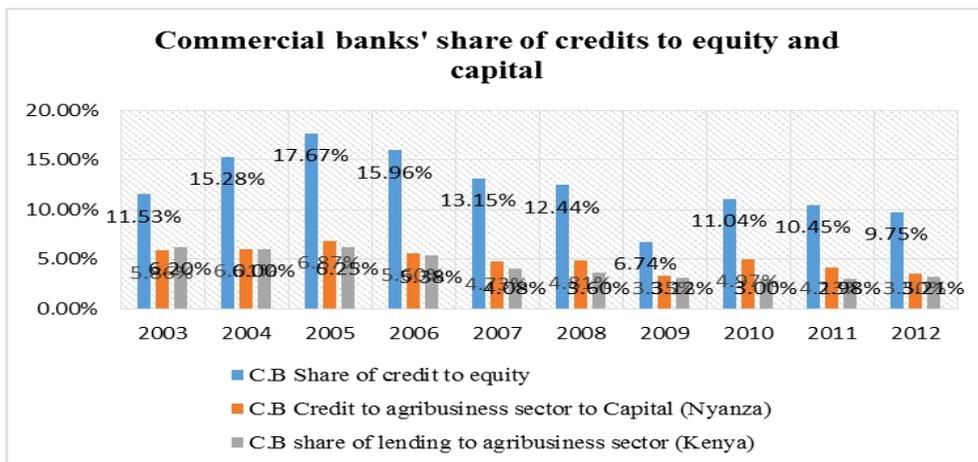


Figure 2.1 Commercial Banks' Share Of Credits To Agribusinesses Equity And Capital- 2003-2012

Source: Research Data 2013

Figure 2.1 above, is an extract from table 2.1, with reference to percentage comparison of credit volume to owner’s equity and capital level of the sampled firms, alongside the proportion of credits allocated to agribusiness enterprises on a national grid. The information reveals extensive gaps between owner equity to credit volumes and share of credits to agribusiness enterprises in the commercial banks’ credit portfolios.

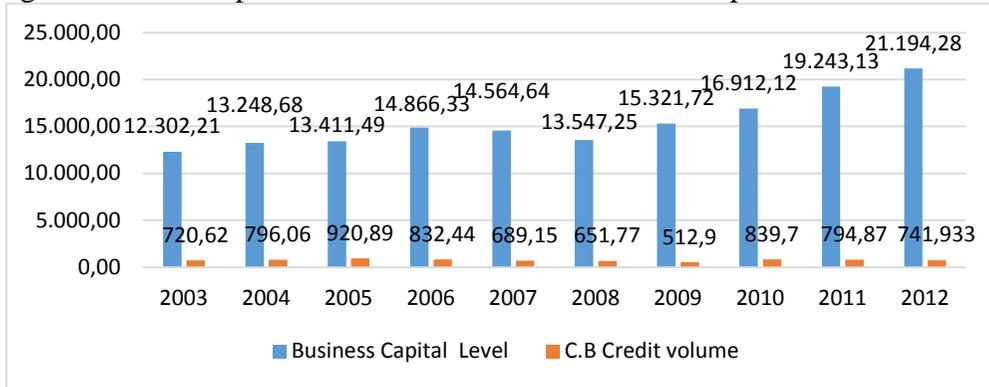


Figure 2.2 Comparisons between Commercial Banks Credit to Capital Volume of Agribusiness Enterprises

Figure 4.2 Comparing commercial banks’ credits to Agribusinesses capital 2003-2012

Figure 2.2 above also extracted from table 2.1, presents a comparison in absolute values commercial banks’ credit volume to the agribusiness enterprises with the enterprises’ business capital levels over the period of study. The information reveals distinct gaps in credits to the firms; and almost constant credit volumes, despite the increasing trends in aggregate business capital levels.

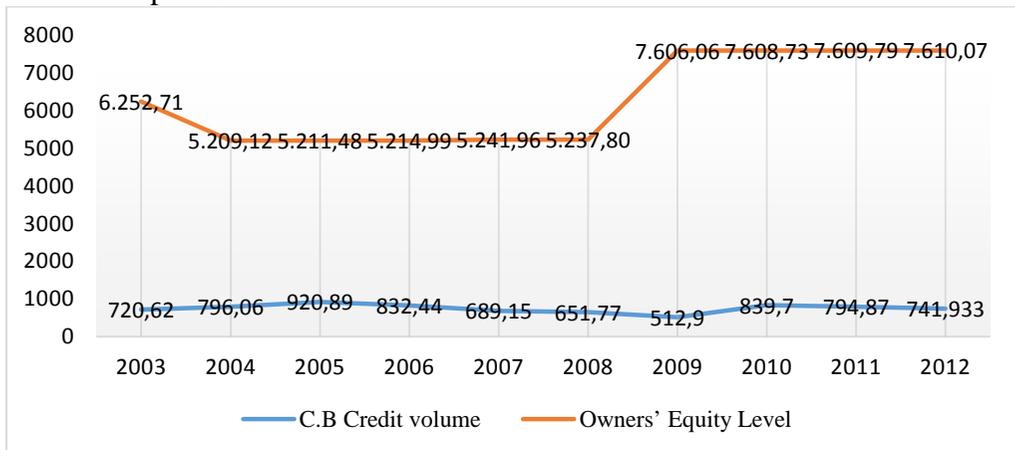
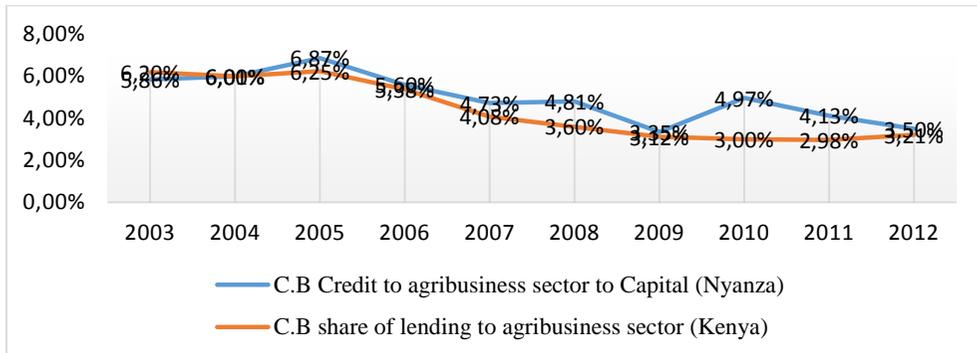


Figure 4.3 Commercial Banks’ Agribusinesses Credits Versus Owner Equity - 2003-2012
Source: Research Data 2013

Figure 2.3 above presents the comparison between commercial banks’ credit volume with the agribusiness enterprises’ owners’ equity levels over the study period. It reveals an ever widening gap between the two variables.



The following table (2.2) presents descriptive statistics showing the borrowers’ opinion on the commercial banks’ application (consideration) of the credit volume determinants, employed by the banks in granting loan status and levels.

Table 2.2: Loan Volume Parameters -Item Statistics

		Mean	Std. Deviation	n
LV 1	Business capital level	1.6977	1.01266	43
LV 2	Business capital leverage	1.4186	.87919	43
LV 3	Capital leverage to credit	2.1395	1.10370	43
LV 4	Business capital sufficiency	3.1860	.82392	43
LV 5	Loan refinancing mechanisms	3.2093	1.22587	43
LV 6	Operation chain potential analysis	1.4186	.81766	43
LV 7	Product market opportunity	2.9302	1.26105	43
LV 8	Farm size and priority analysis	1.3721	.81717	43
LV 9	Past loan repayment experience	1.4651	.76684	43
LV 10	Use of insurance on credit levels	1.8837	.98099	43
LV 11	Borrowers' product diversity	3.3256	1.01702	43
LV 12	Previous product market performance	2.7209	1.11964	43
LV 13	Agribusiness class	2.8837	1.17937	43
LV 14	Loan renegotiation	3.6744	1.49158	43
LV 15	Socio political overtures	1.2326	.52722	43

Source: Research Data, 2013

TABLE 2.3: ANOVA

		Sum of Squares	df	Mean Square	F	Sig
Between People		93.907	42	2.236		
Within People	Between Items	450.335	14	32.167	31.710	.000
	Residual	596.465	588	1.014		
	Total	1046.800	602	1.739		
Total		1140.707	644	1.771		

Grand Mean = 2.2372

Source: Research Data 2013

The descriptive statistical output in the table 2.2 above reveals that the commercial banks significantly consider the socio political overtures at a mean of 1.2326, farm size and priority analysis at a mean of 1.3721, business capital leverage at a mean of 1.4186, operation chain potential analysis at a mean of 4.4186, past loan repayment experience at a mean of 1.4651, business capital level at a mean of 1.6977, use of insurance on credit levels at a mean of 1.8837 and capital leverage to credit at a mean of 2.1395; as the main factors considered by the commercial banks in extending credits to the agribusiness firms in the region. The other factors such as previous product market performance (mean- 2.7209), agribusiness class (mean- 2.8837), product market opportunity (mean- 2.9302), business capital sufficiency (mean- 3.1860), loan refinancing mechanisms (mean- 3.2093), borrowers product diversity (mean- 3.3256), and loan renegotiation (mean- 3.6744); are considered to insignificant magnitude. In general, the grand mean from table 2.3, of 2.2372 imply that the commercial banks highly consider the stated parameters in determining credit volumes extended to the agribusiness firms in Nyanza region.

TABLE 2.4: SHARE OF COMMERCIAL BANKS’ LENDING (LOANS AND ADVANCES) TO THE AGRIBUSINESS SECTOR, 2000- 2011 (percentage of total portfolio)

Country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Kenya	6.57	6.01	6.07	6.20	6.00	6.25	5.38	4.08	3.60	3.12	3.00	2.9	3.23
Botswana	0.61	0.93	0.67	0.76	1.42	1.42	1.13	1.06	0.68	0.69	1.01	1.1	1.17
Ghana	9.65	9.56	9.38	9.45	7.65	6.71	5.38	4.08	3.60	3.12	3.12	3.0	3.15
Malawi	7.55	8.63	3.23	10.4	12.1	9.9	15.3	16.3	14.6	11.1	10.01	9.8	10.03
Uganda	10.75	8.57	11.2	9.69	11.1	10.1	9.13	6.67	5.88	6.46	7.9	9.2	9.68
Tanzania	6.30	9.60	17.1	12.0	13.9	12.4	13.94	11.1	12.4	13.3	14.1	14	14.85
Mozambique	6.39	6.42	6.41	7.65	7.69	7.71	9.53	9.59	8.79	9.57	9.52	9.57	9.65
*Nyanza *				5.86	6.01	6.87	5.60	4.73	4.81	3.35	4.97	4.13	3.51

Source: Adapted from Central Banks, 2013 and research data 2013.

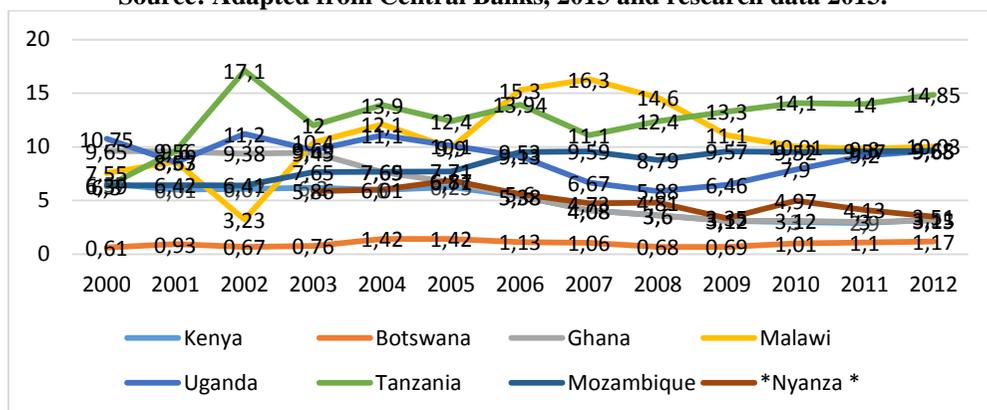


FIGURE 2.5 SHARE OF COMMERCIAL BANKS’ LENDING TO AGRIBUSINESS SECTOR IN SELECTED COUNTRIES

Source: Adapted from Central Banks, 2013

Therefore in reference to the first objective of this study; “the extent to which commercial banks grant credits to the agribusiness enterprises in Nyanza region,” it is evident that agribusiness credit risks are traditionally evaluated with reference to the management capacity of the borrower, the type of activity (i.e. place in the value chain) or type of commodity to be financed and the quality of the collateral offered; the same basis on which FICRMMs constructs of this study have been set on (i.e. credit portfolio diversification, credit insurance, credit information management and technical assistance) by lender institutions.

Nomathemba (2010), on a study of Private sector Agribusiness Investment and Agro industry from selected countries, in Sub- Saharan Africa Kenya being one of them; postulates trends in private sector agribusiness investment; based on commercial bank lending to the agricultural sector as a proxy for domestic private agribusiness investment. The study further revealed that the commercial banks, other than applying collateral management and warehouse receipts, venture in to leasing of machineries and equipment, insurance covers and progressive borrowers’ involvement through information management; majorly in compliance with the parameters of the independent variables of this study. That study however revealed that the commercial banks in Kenya granted credits to the agribusiness sector at an average of 4.43% to the Commercial Banks’ entire credit portfolio; for the ten years’ period (2003- 2012), on a national framework (Table 2.4). Those findings have been proximately confirmed by the results of this study which provides a 4.98% credit extension to the agribusiness firms in Nyanza region for the same period (Table 2.1). Nomathemba further highlighted the dire need for agribusiness funding; which has not been a priority credit line. These findings imply similar need. Despite the fact that agriculture contributes up to 26% to the Kenyan GDP directly and indirectly, the funding as compared to other sectors is fairly low. Whereas the study compares the portion of credit financing to the agribusiness capital levels; while the Commercial Banks’ compares the portion of credit portfolio ratings, there is congruency in the ratings; implying close correlation between portfolio ratings and capititation of the agribusiness firms.

A study by Betty Kibaora and James Nyoro (2007); on ‘Expanding the Agribusiness Finance Frontier’ in a Kenyan perspective; through a comparative analysis of emerging models established that demand for farming credits takes the highest proportion of the farmers’ credit needs yet the outcomes of study do not seem at this stage to move to meet this. This situation accentuates importance of agribusiness credits to the sector. It further reveals that state- run financing models have the lowest financial sustainability; but impressively ranks private investment in agribusiness

sector. It therefore suggests that there is need for repackaging of financial products to expand the credit demand in the agribusiness sector. IBRD (2012); study on Agribusiness indicators in Mozambique, established that interests chargeable on credits extended to the agribusiness sector vary according to the calculated risk of the operations. The study findings show that the commercial banks' lending to the agribusiness sector aggregately ranges from 6.39% to 9.53% for the period 2003 to 2012. This compares unfavourably with credit granted to the agribusinesses in Nyanza region for the aforesaid period; which ranges from 2.98% to 6.25 % (Table 2.1). This further reveals a funding gap ranging from 93.75% to 97.02%; which is met by the agribusiness entrepreneurs from personal sources and interpersonal credits. This trend as experienced for the 10 years period under study shows a stifled capital formation process with a very low gearing ratio; which denies the firms the potential benefit from debt in a capital structure, which comes from the tax benefit of the interest payments in accordance with the Modigliani and Miller's Tradeoff Theory of Leverage (Richard, 2004).

Ewing Marion Carrying out a study on capital structure decisions on new firms (2009). Outside debt (financing through credit cards, credit lines, bank loans, etc.) was the most important type of financing for new firms, followed closely by owner equity. These two sources accounted for about 75 percent of startup capital. Insider debt (from friends, family, and spouses) and outsider equity were much less important sources of startup capital. Owner debt and insider equity were the least important sources for startup capital. Firms with high credit scores (low risk) started businesses with much higher levels of startup capital than firms with low credit scores. Outside equity financing was the most important source of startup capital for high-tech firms with high credit scores.

Essentially, in ascertaining the agribusiness firms' opinion on how the Commercial Banks' consideration of the operational environmental factors rank in qualifying for the agribusiness credit (BCR) capacity and sustainability, the descriptive results of the 43 respondent firms' are given in the table 2.5 below.

Table 2.5 Descriptive Statistics for Objective One

	BCR	CAP	EQU
Mean	17.44264	359.7655	146.0900
Median	1.014000	8.370000	2.457000
Maximum	294.0210	6651.644	1689.510
Minimum	0.125000	0.824375	0.586000
Std. Dev.	47.27803	1007.087	313.0312
Skewness	4.075328	3.764528	2.190018
Kurtosis	20.28530	17.72710	6.695087
Jarque-Bera	6543.433	4901.536	588.3544
Probability	0.000000	0.000000	0.000000
Sum	7500.335	154699.2	62818.70

Sum Sq. Dev.	958905.8	4.35E+08	42037077
Observations	430	430	430

Note: Sample 2003-2012; n=430

Source: Research Data, 2013

The information on the table 2.5 above confirms the observations outcome on table 2.1; which gives an average commercial Banks' credit to business capital rate of 4.982 %; being an outcome of $(17.44264/359.7655 * 100)$.

The *second objective* of the study was to determine the agribusiness borrowers' opinion of commercial banks' application of forward integration credit risk mitigation mechanisms in granting credits to agribusiness firms. This was done through the administration of likert scale question set along each parameter of enquiry.

Table 2.6 Item Statistics for Credit Portfolio Diversification

		Mean	Std. Deviation	n
x_1	Preference for group financing	1.5116	.59250	43
x_2	Preference for vertical chain financing	1.4884	.59250	43
x_3	Sectoral orientation	1.4884	.82728	43
x_4	Preference for horizontal chain financing	3.4651	.95988	43
x_5	Production function levels undertaken by a firm	1.8372	.92402	43
x_6	Review of funding priority orientation	2.8140	1.53151	43
x_7	Portfolio performance	2.3721	.87351	43
x_8	Portfolio credit inherence	1.9070	1.06489	43
x_9	Pre and post deal profitability analysis	3.3256	1.08498	43
x_{10}	Portfolio concentration	3.6977	1.14507	43
x_{11}	Portfolio valuation	2.9070	1.23083	43
x_{12}	Portfolio integration with other risk types	1.3721	.61811	43
x_{13}	Portfolio recasting	3.3023	1.05864	43
x_{14}	Portfolio return to cost measurement	3.8837	.93119	43
x_{15}	Portfolio integration with other risk types	1.7907	1.12458	43

Source: Research Data, 2013

Table 2.7 Anova For X- Credit Portfolio Diversification

		Sum of Squares	df	Mean Square	F	Sig
Between People		76.524	42	1.822		
Within People	Between Items	493.157	14	35.225	37.304	0.000
	Residual	555.243	588	0.944		
	Total	1048.4	602	1.742		
Total		1124.924	644	1.747		

Grand Mean = 2.4775

Source: Research Data, 2013

The results in Table 2.8 below reveal a descriptively fair significance levels of Credit Information Management at a mean of ($y=3.253$). From the parameters analysed the borrowers' opinion reveal that the best contributors to agribusiness performance are credit counseling at a mean of 1.5814, group collateral management techniques at a mean of 1.7209, financial education at a mean of 2.5439 and provision of credit copying skills at a mean of 2.5581. The other parameters remain insignificant.

Table 2.8: Item Statistics For Information Management

		Mean	Std. Deviation	n
y_1	Involvement in basic training	3.8605	.63925	43
y_2	Financial market information sharing	4.1163	.66222	43
y_3	Policy change information sharing	4.2093	.96506	43
y_4	Market index information dissemination	3.9302	1.14216	43
y_5	Borrower performance enhancement briefings	3.2558	1.02569	43
y_6	Fund sufficiency review and ascertainment	3.1163	.87856	43
y_7	Refinancing programme information	3.8372	1.08957	43
y_8	Borrower skill level assessment	3.5349	1.26017	43
y_9	Fund management skills	2.9767	1.16473	43
y_{10}	Knowledge continuity	3.8372	1.13243	43
y_{11}	Insistence on External training	3.7442	1.04865	43
y_{12}	Provision of credit copying skill	2.5581	.98325	43
y_{13}	Group collateral management techniques	1.7209	.70121	43
y_{14}	Financial Education	2.5349	.90892	43
y_{15}	Credit counseling	1.5814	.54478	43

Source: Research Data 2013

Table 2.9:ANOVA for y

		Sum of Squares	df	Mean Square	F	Sig
Between People		109.501	42	2.607		
Within People	Between Items	418.208	14	29.872	36.701	0.000
	Residual	478.592	588	0.814		
	Total	896.8	602	1.490		
Total		1006.301	644	1.563		

Grand Mean = 3.2543

Source: Research Data 2013

Concerning the agribusiness practitioners' view on credit technical assistance the results give an average influence of Credit Technical Assistance to agribusiness performance at a mean of 3.468. Among the analysed parameters farm tool financing yields a mean of 1.4651 and employment of agro-lending score card at a mean of 2.7209. It is evident that in view of the agribusiness borrowers' assessment of the remaining

parameters; they have not implemented in such a way that their impact on the agribusiness performance (see Table 2.10 below).

Table 2.10: Item Statistics for Credit Technical Assistance

		Mean	Std. Deviation	n
u_1	Assistance on firm performance analysis	3.9070	1.23083	43
u_2	Monitoring and evaluation agents	3.5349	1.09868	43
u_3	Assistance on industry operation indices	3.4186	1.13877	43
u_4	Market coordination and strategy	4.0465	.81514	43
u_5	Chain linkage and refinancing guidelines	3.7209	1.24069	43
u_6	Performance potential and opportunity analysis	3.9767	.91257	43
u_7	Value chain segment analysis	3.2558	1.02569	43
u_8	Competitor pricing negotiation skills	3.6977	1.08089	43
u_9	Collateral conversion and appraisal	3.6744	1.20950	43
u_{10}	Collateral tracing	4.3953	.72832	43
u_{11}	Loan use on intended purpose	3.6977	.86009	43
u_{12}	Loan product design and cost negotiation	3.2558	1.02569	43
u_{13}	Employment of agri-lending scorecard	2.7209	1.16139	43
u_{14}	Training on business plan analysis	3.2558	1.13585	43
u_{15}	Farm tool financing	1.4651	.63053	43

Table 2.11: ANOVA for u

		Sum of Squares	df	Mean Square	F	Sig
Between People		144.865	42	3.449		
Within People	Between Items	282.505	14	20.179	22.335	0.000
	Residual	531.228	588	0.903		
	Total	813.733	602	1.352		
Total		958.598	644	1.489		

Grand Mean = 3.4682

Source: Research Data 2013

Concerning the agribusiness practitioners' view on credit insurance the results reveal an average contribution of Credit Insurance to agribusiness performance at a mean of 3.360 (Table 2.12 below). The best contributors here are preference for group insurance with a mean of 2.3023, insurance effect on general default at a mean of 2.6279, comparative risk base analysis at a mean of 3.0233 and preference for single business insurance at a mean of 3.0930.

Table 2.12 Item Statistics for Credit Insurance

		Mean	Std. Deviation	n
w_1	Insurance on credit cost	3.4186	1.15949	43
w_2	Insurance on borrower confidence	3.5116	.59250	43
w_3	Insurance on credit volume	3.9302	1.16282	43
w_4	Insistence on insuring agribusiness	3.4884	.82728	43

w_5	Preference for single business insurance	3.0930	.71760	43
w_6	Preference for group business insurance	2.3023	1.18593	43
w_7	Considering aggregate firm capital	3.4651	1.65254	43
w_8	Appraisal of firm on industry based uncertainties	3.6512	1.04389	43
w_9	Insurance effect on general default	2.6279	1.00055	43
w_{10}	Collateral review over credit time	3.8140	.95757	43
w_{11}	Collateral relationship with the business	3.8140	1.15996	43
w_{12}	Sectoral credit performance	3.5349	.88234	43
w_{13}	Comprehensive risk base analysis	3.0233	1.03483	43

Source: Research Data 2013

Table 2.13 ANOVA for w

		Sum of Squares	df	Mean Square	F	Sig
Between People		65.034	42	1.548		
Within People	Between Items	118.075	12	9.840	9.056	0.000
	Residual	547.617	504	1.087		
	Total	665.692	516	1.290		
Total		730.726	558	1.310		

Grand Mean = 3.3596

Source: Research Data 2013

These observations reveal that the credit consumers' views on the application of the various operational techniques of the four forward integration credit risk mitigation mechanisms tend towards average contribution. This may have two interpretations; i.e. that the borrowers have not been able to critically analyse the credit-demand side factors, or the commercial banks have not employed the credit-demand side factors in a progressively productive manner to the agribusiness borrowers. Observations of the minimum and maximum responses to the examined components; under each Forward Integration Credit Risk Mitigation Mechanism reveals that Credit Portfolio Diversification has (min=1.372 and max=3.884); Credit Information Management (min=1.581 and max=4.209); Credit Insurance (min=2.302 and max=3.390) and Credit Technical Assistance (min=1.465 and max=4.395); making credit portfolio diversification a fairly placed potential mitigants, followed by credit technical assistance, credit information management and credit insurance respectively. This also reflects the agribusiness borrowers understanding of the parametric role of each mitigants as imperfect, thereby requiring the commercial banks or credit systems' managers to enhance credit training or systematic information dissemination to the agribusiness sector and other potential sectors of the economy. Of the four mitigation mechanisms, the agribusiness borrowers' response reflects that 10 out of the 15 parameters examined score at very high and high contribution levels, giving portfolio diversification as the most significant credit risk mitigation mechanism to credit extension.

This is followed by credit information management; of which 5 out of the 15 examined parameters turn in very high and high significance. For technical assistance 4 out of the 15 examined parameters yield very high and high influence to grant of credits. Credit insurance scores low in its contribution to grant of credits, since only 2 out of the 15 examined parameters yield very high and high contribution to credit extension.

Table 2.14 Summary of descriptive statistics for the Forward Integration Credit Risk Mitigation Mechanisms (FICRMM)

IVs	Forward Integration Credit Risk Mitigation Mechanisms	Mean	Min	Max	Max/Min	Variance	No. of Items
x	Credit Portfolio Diversification	2.478	1.372	3.884	2.831	0.819	15
y	Credit Information Management	3.254	1.581	4.209	2.662	0.695	15
w	Credit Insurance	3.360	2.302	3.930	1.707	0.229	13
u	Credit Technical Assistance	3.468	1.465	4.395	3.000	0.469	15

Source: Research Data 2013

From the table 2.14 above, the borrowers; who are Commercial Banks' Credit Consumers' perception (views) on the application of the Forward Integration Credit Risk Mitigation Mechanisms in grant of credits, points to; fair contribution of Credit Portfolio Diversification at a mean of ($x = 2.478$). The credit portfolio diversification parameters as employed by the commercial banks, fairly contributes to the agribusiness performance; the best of which are portfolio integration at a mean of 1.3721, vertical chain financing at a means of 1.4884, sectoral orientation at a mean of 1.4884 and production level undertaken by a firm at a mean of 1.8372. The remaining parameters do not play significant role to the agribusiness performance (Table 2.14 above).

2.15 Ordinary Correlation Analysis of the FICRMMs

Correlation				
Probability	CREDINS	INFOMGT	PORTDIV	TECHASS
CREDINS	1.000000			
INFOMGT	0.687938**	1.000000		
	0.004600	-----		
PORTDIV	-0.216085	-0.156772	1.000000	
	0.039200	0.046900	-----	
TECHASS	0.437629**	0.74196**	0.245533	1.000000
	0.002800	0.001500	0.037700	-----

Note: The p values are in parenthesis. ** Significant at 1% i.e. $\alpha = 0.05$

Source: Research Data, 2013

The table 2.15 above reveals that all the forward integration credit risk mitigation mechanism examined under this study have significant relationships between them at significance levels below the alfa $\alpha = 0.05$.

This implies that the parameters have operational relationships as shown by the respective coefficients in the respective directions. A unit change in credit portfolio diversification by the commercial banks for instance is followed by a -0.216085 change in credit insurance with a p value of 0.039200; implying an inverse relationship; whereas it is followed by a -0.156772 with a p value of 0.046900. In practice however, credit portfolio diversification as a concept is both a cost and specific loss reduction mechanism by the commercial banks (citation). Therefore the negative sign on the credit insurance' coefficient is an indication that increased credit portfolio diversification reduces commitments to credit insurance by 0.216085 and information management by 0.156772. Subsequent analysis of the agribusiness borrowers' opinions on the commercial banks employment of the forward integration credit risk mitigation mechanisms (FICRMMs) in granting credits to the agribusiness enterprises in Nyanza Region, set on a likert scale rank order, established five weight categories on a descending order revealed the following results, together with the representative descriptive statistics outcomes, the following observations can be deduced. In view of the single time data on borrowers opinion analysed and discussed in the preceding section, Forward Integration Credit Risk Mitigation Mechanisms (FICRMMs) do not significantly contribute to the performance of agribusiness enterprises in the Nyanza region. This may arise due to either the borrowers' ignorance which impairs their negotiations with the banks on credit contract fundamentals; or improper implementation of the mitigation mechanisms by the lender banks.

It would be recommended that Forward Integration Credit Risk Mitigation Mechanisms (FICRMMs) be restructured into few critically and knowledgeably implementable operational practices. The agribusiness forms should also be exposed to the facts of these practices so as to enable them to appraise their outcomes on a score- card. Similarly the bank information systems should be made more proactive and comprehensive so as to link them with industrial or sectoral benefits that in effect would decompose the otherwise perceived risk inherence levels of the agribusiness sector. These findings open a critical need to establish agribusiness policy framework that would capably deal with the mitigation issues of information management, market chain appraisal, portfolio productivity; and ascertainment of requisite technical assistance for the agribusiness sector.

Because banking information systems do not seem to lend significant change in the sector's performance, it is important to develop an intermediary system that would help in repackage the supply – side information management parameters with the demand – side parameters to bolster their impacts for both sides. In suggesting issues for further studies, it is recommended that a survey be conducted to determine the rate or level of

agribusiness operators' engagement with the commercial banks in each of the six counties covered in this study. Once established it would enable the commercial banks, financial agencies and financial policy formulators to set up suitable middle- range financing mechanisms for the sector. It may also help them in designing ways of promoting agribusiness productivity. Therefore if the previous studies attest to commercial banks consideration of the owners' investment in the business enterprises in a joint collateralisation mechanism, aimed at enhancing lending to the businesses, then the three preceding scenarios relating credit volumes to either agribusiness capital or equity levels require attention. Furthermore the credit extended to the agribusiness firms in Kenyan registers a declining trend. This situation is a sufficient condition for the subsequent sets of analyses; with a fundamental question as to the contribution of forward integration credit mitigation mechanisms on specific agribusiness performance indicators. It would be therefore imperative that a well structured financing mechanism be established to deal with the financing of agribusiness sector; rather than only leave it to the commercial banks.

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