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DETERMINANTS OF BUSINESS LOAN DEFAULT IN GHANA

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Abstract

The initiation, funding, servicing and monitoring of loans by financial intermediaries has been done without regard to some critical factors which could have averted the likelihood of default. The study aimed at measuring the extent that owner-specific, borrower-specific, loan and lender-specific characteristics could determine the probability of loan default. The study used logistic regression for 224 business customers of a bank in Ghana from its nation-wide branches. The study found that owner's extra income (ownership characteristics), multiple borrowing, diversion of loan purpose (borrower characteristics), loan price, loan purpose, loan age, repayment plan (loan characteristics) and underfunding (lender characteristics) significantly determined the probability of business loan default. The overall model predicted up to 78.5% of variations in the likelihood of default. The hierarchy of strong determinants given by their odd ratios were loan purpose (47.9 times), underfunding (19.2 times), diversion of loan purpose (11.7 times) multiple borrowing (9.4 times) and owner's extra income (8.2 times). The study can conclude that financial intermediaries should be wary of the credit granting process taking cognisance of ownership, borrower, loan and lender characteristics especially the significant predictors. Combining quantitative and qualitative variables as determinants of default could be considered in future.

Key words: *borrower-specific characteristics, default, financial intermediaries, lender characteristics, loan characteristics, ownership characteristics.*

JEL Classification: *G32, G21*

Introduction

Economic units will always engage in activities to satisfy their consumption of economic resources. Most of such activities are realized through the financial system. The financial system is the interaction of the activities of financial markets and institutions (Casu, Girardone and Molyneux, 2006). The financial system is made up of an interaction of market participants whose activities serve the needs of the other. Surplus units (lenders) and deficit units (borrowers) interplay through the exchange of contracts and transactions to satisfy and smoothen consumption after both parties have been duly rewarded either for the use of resources or for postponing consumption to a future date. The financial services sector especially banks have been lauded for their immense contribution to the growth and development of the economy. They do so

mainly by extending credit to economic units (individuals, households, firms and governments). Apart from the traditional credit granting role of banks, they accept deposits, offer money transmission functions, offer business advisory services, help in implementing central bank monetary policies (Mishkin, 2006), acts as money-changers performing underwriting and brokerage functions (Madura, 2008). Banks have been seen to have superior informational economies which enable them to overcome the problem of information asymmetry which be-devils financial intermediation. In order to safeguard investments and ensure confidence in the financial system, central banks and international bodies recommend prudent measures in the conduct of business. The recent financial crisis has heightened the call for financial market discipline the greatest of which include loan default. The problem of loan default is prevalent in the US (Ghosh, 2015), Europe (Jiménez, Lopez, and Saurina, 2013) and other advanced economies (Fukuda, Kasuya, and Akashi, 2009) because the occurrence is a major contagion to the unsuspecting economic units who might have nothing to do directly with it.

A critical look at most bank balance sheets suggest that loans single-handedly support the greatest proportion of the bank's uses of funds (assets). At the macro level, loans and advances constitute 31.3% of total bank assets in Ghana (Bank of Ghana Annual Report, 2014). In emerging economies where banking activities don't seem to be very much deepened and diversified, banking activities and products mainly centre on loans and advances. This situation places heavy reliance on loans for bank revenues and expectations from shareholders. It is also seen that business clients have very large loan portfolios as compared to individual clients. Thus banks have greater incentives to make funding opportunities available to business clients and some banks have departmentalized a section that concentrates on dealing with business customers. These dynamics leave the banks with no option than to be extra cautious in the origination, funding, servicing and monitoring of business clients during the loan granting exercise.

In economies where the private sector is vibrant, there is the tendency for the creation of jobs and possible increase in GDP. This has been the success story behind most developed nations and governments in emerging economies are leaving no stone unturned to develop a vibrant private sector to support their economies. The successes of private businesses have thrived on meeting their financing needs of which the greatest proportion comes from banks (Dixon, Ritchie, and Siwale, 2007). More often than not, bank loans go bad, the cause of which is attributable to a mix of bank-specific factors, borrower characteristics and other macro-economic factors (Louzis, Vouldis and Metaxas, 2012). Such factors go a long way to increase the likelihood of loans default. When financial institutions take cognisance of these factors, cases of default which is attributable to such factors can be eliminated completely. Most research on default have focused on individual type of customers but it is about time business clients are also given the attention they deserve since they contribute so much to grow the economy.

The menace of loan default has attracted the intervention of international organizations and institutions through the Basel Committee on Banking Supervision (Basel I, II, III). The committee requires that, banks should have risk management committees, standardized procedures and acceptable ways of granting credit. The reliance of these risk-based approaches do not provide a panacea to loan default but some level of due diligence on the part of financial institutions and not being oblivious of research empirical factors that provide incentive for default. Borrower characteristics

has been found to have significant effect in determining the probability of default (Knapp and Seaks, 1992). The study by Knapp and Seaks was about individual personal loans. Jimenez and Saurina (2003) found that collateralized loans have higher probability of default. The same was found for close bank-borrower relationship by the authors. According to them, a close bank-borrower relationship increases the willingness to take more risks. The initiation, funding, servicing and monitoring of credit creates opportunistic tendencies of the parties involved (borrower and lender). There is usually an incentive for ex-post moral hazard issues that endangers the theory of financial intermediation (Andrieş, 2009). The studies by various authors who used non-performing loans as proxy for default in Europe concentrated on macro level factors very interesting results (Khieu, Mullineaux, and Yi, 2012; Makri et al., 2014; Messai and Jouni, 2013). The need for similar studies in emerging economies is very paramount. In cases where studies have done in developing economies, the concentration has been on individual or household clients (Awunyo-Vitor, 2012). The current study aligns with studying emerging economies but approaches it from business client's perspective. This is because the development of the private sector has incentive to boost economies through the creation of jobs and improvement in living standards of the people (Ghana Banking Survey, 2013).

With about sixteen branches operating nation-wide, the bank used for the study has operated as a universal bank for over eight years. The bank varied diversified products for its individual, business and corporate clients in and outside Ghana. The bank has a core mission to expand business development through financial intermediation in the best way possible to impact lives in emerging economies through customer-centric and shareholder value maximization. The rest of the section is organized into background, methods, analysis and results and conclusions.

Background

This section of the write-up covers a description of the Ghana banking industry, theoretical framework for the study, factors that have the probability of causing loan default.

Banking industry in Ghana

The regulator of banking business in Ghana (Bank of Ghana) introduced the universal banking concept in September 2003 and banks have since diversified their portfolios and activities to make them financial super markets. The banking industry in Ghana consists of 27 universal banks dominated by foreign ownership. The breakdown of banks and their market shares for the past three years can be found in Table No.1.

Table No.1 Bank ownership source and market share distribution

Banks	2012		2013		2014	
	Number	Market share(%)	Number	Market share(%)	Number	Market share(%)
Foreign:	14	55	14	58.2	14	53.9
Europe	3	20.1	3	18.1	3	15.7
Pan Africa	10	34.5	10	39.7	10	37.8
Others	1	0.4	1	0.4	1	0.4
Domestic:	12	45	12	41.8	13	46.1

State-owned	4	22.8	3	18.5	4	19
Private	8	22.2	9	23.3	9	27.2
Total	26	100	26	100	27	100

Source: Bank of Ghana Annual Report 2014

The ownership structure exposes the banking industry to shocks from parent countries and international financial system especially with regards to counterparty relationships. The industry has close relation with allied support systems like credit reference bureaus and collateral registry which help minimize potential loan defaults (Bank of Ghana Annual Report, 2014). Credit in the form of loans and advances has been progressive in the past years with the year 2014 recording a 40% increase from the previous year. Figures from the Bank of Ghana Annual Report (2014) indicate that total credit to the private sector increased from 28.6% in 2013 to 42.3% in 2014.

Theoretical framework

Loan default, credit risk, non-performing loans are expressions with same connotation described as among the biggest source of bank worries (Al-Tamimi and Al-Mazrooei, 2007; Haq, 2010); Mamiza Haq, Faff, Seth and Mohanty, 2014). Default is the likelihood that a borrower misses payment or does not meet the conditions of an agreement or indenture (Sobehart, Keenan and Stein, 2001). Loan default has been reported in many economies including advanced (Fukuda et al., 2009); (Jiménez et al., 2013); (Saurina and Jimenez, 2006) and the consequences have been unpleasant. Excessive cases of loan default impair the reputation of the bank (Haq et al., 2014). Research on loan default has been approached by different authors from several perspectives. Among the theories used include the financial accelerator theory used by Bernanke and Gertler (1995) and Kiyothaki and Moore (1997). Life-cycle consumption theories used by Lawrence (1995) as theoretical framework have been applicable to individual consumer type of loans. The theoretical support for the study is derived from the theory of financial intermediation and agency theory. According to Casu et al. (2006), the theory of financial intermediation answers the question of ‘why do banks exist?’ Twentieth century researchers on the theory of financial intermediation have chastised the theory’s basis for explaining the invaluable role of financial intermediaries in reducing the cost of transactions and information asymmetry (Andrieş, 2009; Claus and Grimes, 2003; Scholtens and van Wensveen, 2003). They argue that the advent of technology, deregulation and deepening financial markets reduce intermediation costs thus making financial intermediaries useless. Scholtens and van Wensveen contend that financial intermediaries do not create value as being touted and thus the theory fails to provide satisfactory reasons for the existence of financial intermediaries. The problem of loan default has exacerbated (Haq et al., 2014) and lenders have not been unquestionably efficient even with the advent of sophisticated technology, heavily deregulated financial environment and the existence of efficient financial markets. According to Casu et al. (2006), banks exist for five main reasons thus describing their core functions for which they are seen to have superior advantage as compared to direct finance where there are no intermediaries. These functions are: delegated monitoring, liquidity transformation, information production, consumption smoothing and commitment mechanisms. The dynamics of market activities, participants and sophisticated demand for finance calls for some dynamism in the traditional view of the theory of financial intermediation (Andries, 2009). Indeed transaction costs and

information asymmetry have been minimized through financial intermediaries (Claus and Grimes, 2003), but the issue of who monitors the intermediary creates an incentive to take a second look at the traditional theory (Claus and Grimes, 2003). When the financial intermediary exploits its informational economies, the tendency for the agency problem is eminent in favour of the lender (Andrieş, 2009). Such incentives could motivate reckless credit granting processes (Haq, 2010), which could lead to swelling non-performing loans which endangers confidence in the financial system (Jiménez et al., 2013). The current study aligns with the theory of financial intermediation, but takes cognisance of the agency theory and possible exploitation of information asymmetry (Bolton and Freixas, 2000). To this end, lender and loan-specific factors have been explored so that a more holistic approach is given to address the issue of default which is a menace and believed to be the cause of major global financial crises (Cornett, McNutt, Strahan, and Tehranian, 2011; Ivashina and Scharfstein, 2010).

Factors leading to loan default

The issue of loan default should not be mistaken for a deliberate act. There might be genuine reasons beyond the control of the borrower which might lead to default. Brehanu and Fufa (2008) classified them as voluntary and involuntary causes of loan default. However, the interest of this study is to delve into those factors which are avoidable and traceable to the borrower or lender. Lending institutions will normally have to assess their capability to grant credit to their clients (Bastos, 2010). This is done by giving due consideration to the credit-worthiness of clients, availability of funds for onward transmission, adequacy of borrower collateral and existing regulations regarding the granting of loans by internal and external regulators (Barry, Mann, Mihov and Rodriguez, 2008). The probability of loan default is caused by many factors which could be clustered together as borrower characteristics, lender characteristics and loan characteristics (Abid, Ouertani, and Zouari-Ghorbel, 2014; Glennon and Nigro, 2005; Ghosh, 2015). We include another type of classification based on ownership characteristics, since this study is about business clients.

Ownership characteristics: Coravos (2010) reported that the kind of business ownership or ownership structure could bring about default. Usually, sole proprietors are more susceptible to higher default as compared to ownership types with more members. The kind of collateral an owner has, has the probability of causing default (Jimenez and Saurina, 2003). The writers reported positive relation between the owner's collateral and the likelihood of loan default. In cases where the owner has other source of income or any extra income, the possibility of default might be positive (Brehanu and Fufa, 2008). When the borrower has extra income apart from the business source, the tendency for reckless financial management is possible and default might occur. We therefore hypothesize from the above deliberations that:

H₁: Ownership characteristics can determine possible loan default

Borrower characteristics: The location or distance between borrower and lending institution was used as determinant of demand for collateral (Jiménez, Salas and Saurina, 2009), but we try to test it for probability of default. Usually, when the borrower is located very close to the lender, monitoring is easier and might reduce the

likelihood of default. The age of the borrower was also determined by Mokhtar, Nartea, and Gan (2012) as possible cause of default. When the business has been in existence for long, they have enough experience to ensure sound financial management practices which could avert possible default. At times, over reliance on experience leads to financial indiscipline which could result in default. In the work of Mokhtar et al. they found strong positive correlation between multiple borrowing (which they referred to as extra loan) and the probability of default. The same result was found by Jimenez and Saurina (2003). Multiple borrowing increases the stress on the resources of the business which can result in default. The size of the business can determine default. Usually, small businesses default more frequently than large ones (Brehanu and Fufa, 2008). It was reported by Jimenez and Saurina (2003) that the kind of relationship a borrower has with the lender has the tendency to trigger default. They found a positive relation between borrower-lender relationship and probability of default. Borrowers with good relation have disincentive to default especially when the default is borrower-caused. This leads to our second hypothesis that:

H₂: Borrower characteristics can predict the probability of business loan default.

Loan characteristics: There are several loan-specific factors that can lead to possible default (Foster and Zurada, 2013); (Khieu et al., 2012). The length of time to maturity of the loan described by some authors as loan age, or loan term has the probability of causing loan default. Loans that have longer period to maturity have higher probability of default (Roslan and Abd Karim, 2009). Even though their study was with individual clients within the microfinance industry, their finding is applicable to this current study. Mokhtar, Nartea and Gan (2012) found that the loan schedule could bring about default. Depending upon the frequency with which money flows into the business, servicing of loans should match the timing of the flow of money. It is most advisable for business loans to be serviced in periods less than one month intervals. The purpose of the loan could result in default. When the purpose is mostly different from expanding the business or adding up to direct production or provision of services, default looks very unavoidable (Herrington and Wood, 2003). The price of loan (interest rate) determines the probability of loan default (Salas and Saurina, 2002). The writers found from the Spanish banking industry that interest margin determined delinquency. We therefore hypothesize that:

H₃: Loan characteristics can determine the probability of business loan default

Lender characteristics: Certain factors that are traceable to the lending institution can bring about default (Abid et al., 2014; Louzis et al., 2012). Faulkender and Petersen (2006) reported that the timing of loan approvals play critical role in the repayment capabilities of borrowers. When loan processing takes unnecessarily long time, borrowers might miss opportunities which might be time-bound and may lead to a diversion of the loan purpose. Herrington and Wood (2003) reported that shortages in the amount applied for by the borrower could bring about default. When financial institutions approve an amount lesser than what the applicant sought for, the purpose for which the loan was intended becomes difficult to accomplish and borrowers might divert the usage of the loan which can result in failure and possible default. The probability of loan default increases when borrowers divert the purpose for which the

loan was sought (Claessend, Krahnem, and Lang, 2005). It is therefore the duty of the bank to ensure that there is evidence of the loan purpose before it is approved. The interest charged which is the known as the price of the loan can increase default probability. Exorbitant interest rates put heavy demands on the borrowing thus making servicing of the loan very difficult. Coravos (2010) reported that high interest rates increase the probability of loan default. In this study, interest is mentioned as loan price. The deliberations above leads to the hypothesis that:

H₄: Lender characteristics can lead to business loan default.

Methods

Various authors have used different approaches to address the issue of default by approaching the study from either qualitative or quantitative approaches, studying individual clients or business clients, use of secondary or primary data. This study uses primary source of data studying business clients in a quantitative research design. The researchers used a survey design which allowed for careful design and scrutiny of the research instrument as has been emphasized by Robson (2011). Although the study has the attribute of a case study design where one universal bank was studied, the nationwide coverage of the branches allow for variability and possible generalization of the findings. The myriad of research designs employed in this study is to enable the objectives of the study be realized. Among the objectives of the study include determining ownership-specific factors, borrower factors, loan and lender factors that have the tendency to trigger business loan default. These objectives were addressed through the test of four hypotheses which are stated below:

H₁: Ownership characteristics lead to business loan default

H₂: Borrower characteristics lead to business loan default

H₃: Loan-specific factors lead to business loan default

H₄: Lender characteristics lead to business loan default.

The sample covers eleven branches spread across four regions of Ghana. The sampling techniques were both probabilistic and non-probabilistic strategies. The non-random sampling technique was the quota sampling technique where branches with higher number of business clients were given larger participation to reduce possible biases. After determining the number of business clients in a particular branch, random sampling technique was employed to give each business client equal chance of being selected for the study. Systematic random sampling technique was used where a random number was chosen (between 1-10) depending upon the quota given to each branch and the '*nth*' random number chosen was selected from the loan files till the quota was exhausted. Out of three hundred (300) questionnaires distributed to various business clients of the bank, two hundred and fifty (250) were returned but two hundred and twenty four (224) were fully answered. The fully answered questionnaires were used for the analysis thus representing a response rate of about 75%. We use a binary logistic regression to determine the factors that signal the probability of business loans default. The data was coded into SPSS version 20 and the results analyzed. Most of the predictor variables that had more than two response alternatives in the questionnaire were re-coded in their categorical binary forms to satisfy the conditions for a binary

logistic regression. The summarized list of variables, their expected signs or directions of influence and their associated authors has been presented in Table No.1.

Table No. 1 Variables and expected signs

Variable	Expected sign	Author
Owner-specific characteristics		
Ownership type (Business structure)	+/-	Coravos (2010)
Owner's collateral	+	Jimenez and Saurina (2003)
Extra source of income	+	Brehanu and Fufa (2008)
Borrower-characteristics		
Business age	+	Coravos (2010)
Business size	+/-	Brehanu and Fufa (2008)
Relationship with lender	+	Jimenez and Saurina (2003)
Multiple borrowing	+	Jimenez and Saurina (2003)
Business location	+/-	Jiménez, Salas and Saurina, (2009).
Diversion of loan purpose	+	Claessend, Krahen, and Lang, 2005
Loan characteristics		
Purpose of loan	+/-	Herrington and Wood (2003)
Age of loan (term)	+	Roslan and Abd Karim (2009)
Repayment plan/schedule	+/-	Mokhtar, Nartea and Gan (2012)
Loan price	+	Coravos (2010)
Lender characteristics		
Underfunding	+	Herrington and Wood (2003)
Delays in loan processing	+	Faulkender and Petersen (2006)

Source: Compiled by authors based on research in November 2015

Model specification

The logistic probability function is expressed as

$$(1) P(Y = 1) = \frac{1}{1+e^{-z_i}}$$

Taking the natural logarithm

$$(2) Z_i = \ln\left(\frac{p}{1-p}\right) = \beta_0 + \beta_1 X_1 + \dots + \beta_n X_n$$

Using a generalized logistic regression model to include the error term, the logit model for our study is expressed as

$$(3) \ln\left(\frac{p}{1-p}\right) = \alpha_0 + \beta_1 X_1 + \Phi_2 X_2 + \psi_3 X_3 + \lambda_4 X_4 + \varepsilon$$

where \ln = the logarithm of the likelihood of the event

\hat{p} = a binomial proportion

X = explanatory variables

$\alpha, \beta, \phi, \psi, \lambda$ = parameters of the logistic model for constant, ownership characteristics, borrower characteristics, loan characteristics and lender characteristics respectively

We introduce our variables into the general model for a logistic regression as:

$$(4) P(\text{default}) = \alpha_0 + \beta_1 \text{OwnXtics} + \phi_1 \text{BorrwXtics} + \psi_1 \text{LoanXtics} + \lambda_1 \text{LendXtics} + \varepsilon$$

Where; default = 1 if a borrower misses a payment contrary to the loan agreement

OwnXtics = Ownership characteristics listed in Table No.1

BorrwXtics = Borrower characteristics

LoanXtics = Loan characteristics

lendXtics = Lender characteristics (found in Table No.1)

ε = Error term

Expanding the equation to include all the variables to be estimated;

$$(5) P(\text{default}) = \alpha_0 + \beta_1 \text{OwnTyp} + \beta_2 \text{OwnCollat} + \beta_3 \text{OwnExtInc} + \phi_1 \text{BusAge} + \phi_2 \text{BusSize} + \phi_3 \text{RelaWitLend} + \phi_4 \text{MultBorrow} + \phi_5 \text{BusLoc} + \phi_6 \text{DiverofPurp} + \psi_1 \text{LoanPurp} + \psi_2 \text{LoanAge} + \psi_3 \text{RepayPlan} + \psi_4 \text{LoanPrice} + \lambda_1 \text{Underfund} + \lambda_2 \text{DelaysinProc} + \varepsilon$$

The explanations to the variables can be found in Table No.1

Goodness of fit tests

The Omnibus and Hosmer-Lemeshow tests were run to test the ‘goodness of fit’ of the model. The H-L test provides a Chi-Square test of whether or not the model is ‘adequate fit’ to the data. The null hypothesis is that the model is a ‘good enough’ fit for the data and it is always appropriate that a significance value that rejects this null hypothesis be obtained for a good fit. The test of the predictive power of the set of individual coefficients of the model also known as the ‘goodness of fit test’ is shown by the Omnibus test. A highly significant value is most preferred. It can be seen that the model is highly significant at 95% confidence interval given significance value of 0.000 (meaning $p < 0.0005$). The Chi-square value is 186.1 with 15 degrees of freedom. This means the model is able to distinguish between respondents who defaulted from those who did not experience default of any kind. A further ‘goodness of fit’ test is the Hosmer and Lemeshow test which prescribes that a significance value less than 0.05 is an indication of poor fit. The Chi-square value for the Hosmer-Lemeshow test is 12.192 with 8 degrees of freedom and a significance value of 0.143. The significance value is far above 0.05 therefore indicating support for our model.

Table No.2 Goodness of fit tests

Goodness of fit Tests of Model Coefficients			
Omnibus test	Chi-square	df	Sig.
Step	186.102	15	.000
Block	186.102	15	.000
Model	186.102	15	.000
Hosmer-Lemeshow test	12.192	8	.143

Source: Field survey, 2013

The model is able to accurately predict the correct category which in this case is the probability that a borrower defaults in loan repayment. The result indicates that the model is able to predict by 94.7% accurately that a borrower might default in one way or the other in the repayment. This prediction accuracy shows the sensitivity of the model. The non-defaulters are predicted by 83.8% (Appendix 2) accuracy and this indicates the specificity of the model. The overall accuracy prediction is 91.1% which is

very good for a study of this kind. There were weak correlation coefficients (less than or equal to 0.5) in a correlation matrix which indicates the absence of multicollinearity. None of the predictors had correlation coefficients more than 0.5.

Results and discussions

There were 224 business customers studied out of which 67% indicated default of a kind. The binary coding of the variables for the purpose of the logistic regression can be found in Appendix 1. The model summary provides more reliable information usefulness of the general model. The Cox & Snell R Square and the Nagelkerke R Square (Appendix 2) reports on the amount of variation of the outcome variable (default) explained by the model ($0 < p < 1$). These values do not represent the true R square but the pseudo R square statistics since logistic regression does not measure linearity per se. The result indicates that, between 56.4% to 78.5% of variations in the probability of a business client defaulting in loan repayment is explained by the set of ownership, borrower-specific, loan-specific and lender specific variables. Out of the fifteen predictor variables included in the model, nine of them were significant predictors at 95% confidence interval. The significant variables fell under each of the categories of predictors.

Owner's extra income (beta coefficient=2.102; sig=0.006) was the only ownership characteristic that showed significant positive relation with the probability of default. The odds ratio shown under B(EXP) column reports that owner's extra income could determine the probability of default by more than 8 times. The result is not different from that of Brehanu and Fufa (2008) who reported a non-directional relation between the two variables.

There were three borrower characteristics that show significant positive relationships with the probability of default. The size of the business (Wald test=6.833; B=2.023) which were coded as small or large had significance value of 0.009 and odds ratio 7.558 meaning it could predict default as many as over 7 times. Brehanu and Fufa (2008) reported that usually small businesses are potential defaulters than large size businesses. The same is confirmed in this study because about 52% of the businesses involved were small scale types and it is not surprising they show significantly positive relation with default probability. The study again reports that multiple borrowing (Wald test=9.517; S.E=0.726; B=2.241; sig=0.002) show significant positive relation with default probability predicting default probability by about 9times. When customers have loans with other institutions, there is too much pressure and demand on the resources of the business and defaulting becomes an option for such a borrower. Jimenez and Saurina (2003) found same result in their study. Diversion of loan purpose (Wald test=5.568; B=2.461; sig=0.018) showed positive significant relation with default probability and could predict the outcome variable by about 12times. The result is consistent with Claessend, Krahn and Lang (2005). When loans meant for business expansion are used for other purposes, it is more likely that the motivation to repay promptly will be jeopardized.

All the four loan characteristics variables showed strong significance with default probability. The purpose of loan (Wald test=19.188; sig=0.000; B=3.870) which were coded as for expansion (67.4%) and other purposes (32.6%) significantly determined the probability of loan default with as many 48times prediction determined from the odds ratio (47.944). Herrington and Wood (2003) reported that loan purpose

can significantly determine the probability of default. We confirm a significant positive relationship from our study. Interestingly, all the other loan characteristic variables reported significant negative relation with probability of default but very low and weak odds ratios less than 1. The result on cost of fund or loan price ($B = -2.297$; $\text{sig} = 0.005$) is inconsistent with the works (Salas & Saurina, 2002) and Coravos (2010) who rather found a positive relation with default probability. The odds ratio is very low and weak (0.101). The result on correlation coefficient is not surprising, because about 69% of the respondents indicated lower cost of loan, which is contrary to a perceived high interest rate. The respondents indicated that loan age ($B = -2.001$; $\text{sig} = 0.015$) was of short term (72%) nature meaning it was one year or less. Usually, long term loans are prone to default more than short term ones and since there were more short-term loan respondents, reporting negative marginal effect is not surprising. Again, we find a contrary report by Roslan and Abd Karim (2009) who rather found a positive relation. The repayment plan for business loans should be quite short and regular. We find significant negative relation between loan repayment plan ($B = -5.090$; $\text{sig} = 0.001$) and the probability of loan default. Mokhtar, Nartea and Gan (2012) predicted a non-directional relation, but we report a negative relation. Most respondents were paying their loans monthly, a situation which is uncommon with most small scale short term business loans.

The only significant lender characteristic was underfunding ($B = 2.953$; $\text{sig} = 0.000$; Wald test = 17.183). Usually, during loan assessment, the lender can recommend the approval of loan amount in shortage of the applied sum. This was found to have significant positive marginal effect thereby increasing the probability of default in a direct manner. The odds ratio reports 19 times ability to predict default probability. We find consistency with the work of Herrington and Wood (2003).

Conclusions

The study used a logistic regression to predict the determinants of business loan default. Fifteen variables categorized under ownership, borrower, loan and lender characteristics were involved out of which nine determinants were found to be significant. The nine variables fell under all the four broad classifications thus sustaining the alternate hypotheses that ownership, borrower, loan and lender characteristics predicted the probability of loan default. Most bank business customers operate the sole proprietorship ownership structure and the businesses are of small scale nature located not very near to the banks. This calls for effective and constant monitoring in order to minimize loan default thereby making sense of the theory of financial intermediation. Such customers apply for short term loans for the purpose of expanding their businesses. This calls for the design of loan products tailored to meet such needs of business clients. Ownership characteristics, borrower characteristics, loan characteristics and lender characteristics have significant marginal effects on determining the probability of business clients defaulting in the loans applied for. The individual determinants are owner's extra income (ownership characteristics), size of business, multiple borrowing, diversion of purpose (borrower characteristics), purpose of loan, age of loan, repayment plan, loan price (loan characteristics) and underfunding (lender characteristics). The significant determinants of the probability of business loan default when arranged in hierarchy of their predictive strength is as follows: loan

purpose, underfunding, diversion of loan purpose, multiple borrowing, owner's extra income, size of business, loan age, loan price and loan repayment plan.

The limitations we can report is the fact that the data was collected two years ago (2013) which could make some of the responses not as current as it would have been in 2015. Again, there was no robust test of multicollinearity but the use correlation coefficients in a correlation matrix. However, this does not cast any doubt about the originality and reliability of the results. The study has implications for financial intermediaries to be very mindful of ownership, borrower, loan and lender characteristics that determine loan default. It is not enough for credit institutions to use credit rating quantitative models alone in financial intermediation. A holistic approach to minimize the loan default is a myriad of approaches including the determinants identified (especially significant ones) and even macro economic factors which could be captured as error term. Bank customers will find this research useful, because being aware of factors that relate to borrowers and observing them profile them as good clients whose loan applications cannot be turned down. This will help make the private sector, seen to be the engine of growth of emerging economies, function fully to contribute to the growth of GDP.

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Bibliography

1. Abid, L., Ouertani, M. N. and Zouari-Ghorbel, S. (2014). Macroeconomic and Bank-specific Determinants of Household's Non-performing Loans in Tunisia: A Dynamic Panel Data. *Procedia Economics and Finance*, 13, 58–68. [http://doi.org/10.1016/S2212-5671\(14\)00430-4](http://doi.org/10.1016/S2212-5671(14)00430-4)
2. Al-Tamimi, H. H. A. and Al-Mazrooei, M. F. (2007). Banks' risk management: a comparison study of UAE national and foreign banks. *The Journal of Risk Finance*, 8(4), 394–409. <http://doi.org/10.1108/15265940710777333>
3. Andrieş, A. M. (2009). Theories regarding financial intermediation and financial intermediaries—a survey. *The USV Annals of Economics and Public Administration*, 9(2), 254–261.
4. Awunyo-Vitor, D. (2012). Determinants of loan repayment default among farmers in Ghana. Retrieved from <http://ir.knust.edu.gh/xmlui/handle/123456789/6107>
5. Bank of Ghana Annual Report (2014). www.bog.gov.gh, accessed on 10-11-2015
6. Barry, C., Mann, S., Mihov, V. and Rodríguez, M. (2008). Corporate debt issuance and the historical level of interest rates. *Financial Management* 37,413–430
7. Bastos, J. A. (2010). Forecasting bank loans loss-given-default. *Journal of Banking & Finance*, 34(10), 2510–2517. <http://doi.org/10.1016/j.jbankfin.2010.04.011>

8. Bernanke, B. S. and Gertler, M. (1995). Inside the Black Box: the channel of Monetary Policy Transmission. *Journal of Economic Perspectives* , 9 (4), 27-48.
9. Bolton, P. and Freixas, X. (2001). Corporate finance and the monetary transmission mechanism, CEPR. Discussion Paper Series 2892, Londres, Centre for Economic Policy Research.
10. Brehanu, A. and Fufa, B. (2008). Repayment rate of loans from semi-formal financial institutions among small-scale farmers in Ethiopia: Two-limit Tobit analysis. *The Journal of Socio-Economics*, 37, 2221-2230.
11. Casu, B., Girardone, C. and Molyneux, P. (2006), *Introduction to Banking*, Harlow: FT Prentice Hall, Pearson Education Ltd.
12. Claessens, S., Krahnen, J. and Lang, W. (2005). The Basel II Reform and Retail Credit Markets. *Journal of Financial Services Research* , 28, 5-13.
13. Claus, I., and Grimes, A. (2003). *Asymmetric information, financial intermediation and the monetary transmission mechanism: A critical review*. New Zealand Treasury. Retrieved on 13-11-2014 from http://www.researchgate.net/profile/Arthur_Grimes/publication/5204025_Asymmetric_Information_Financial_Intermediation_and_the_Monetary_Transmission_Mechanism_A_Critical_Review/links/0046352284cb9e4d2e000000.pdf
14. Coravos, A. R. (2010). *Measuring the Likelihood of Small Business Loan Default* (Doctoral dissertation, Duke University).
15. Cornett, M. M., McNutt, J. J., Strahan, P. E., and Tehranian, H. (2011). Liquidity risk management and credit supply in the financial crisis. *Journal of Financial Economics*, 101(2), 297–312. <http://doi.org/10.1016/j.jfineco.2011.03.001>
16. Dixon, R., Ritchie, J., and Siwale, J. (2007). Loan officers and loan ‘delinquency’ in Microfinance: A Zambian case. In *Accounting forum* (Vol. 31, No. 1, pp. 47-71). Elsevier.
17. Faulkender, M. and Petersen, M. (2006). Does the source of capital affect capital structure? *Review of Financial Studies* , 19, 45-79.
18. Foster, B. P. and Zurada, J. (2013). Loan defaults and hazard models for bankruptcy prediction. *Managerial Auditing Journal*, 28(6), 516–541. <http://doi.org/10.1108/02686901311329900>
19. Freixas, X. and Rochet, J.C. (2008) “*Microeconomics of banking*”, 2nd ed. The MIT Press.
20. Fukuda, S., Kasuya, M. and Akashi, K. (2009). Impaired bank health and default risk. *Pacific-Basin Finance Journal*, 17(2), 145–162. <http://doi.org/10.1016/j.pacfin.2008.06.002>
21. Ghana Banking Survey, (2013) Harnessing the SME potential, PricewaterhouseCoopers and Ghana Association of Bankers, 2013. available on <http://www.pwc.com/gh/en/publications/ghana-banking-survey-2013.html>, accessed 10-11-2014
22. Ghosh, A. (2015). Banking-industry specific and regional economic determinants of non-performing loans: Evidence from US states. *Journal of Financial Stability*, 20, 93–104. <http://doi.org/10.1016/j.jfs.2015.08.004>
23. Glennon, D., and Nigro, P. (2005). Measuring the default risk of small business loans: A survival analysis approach. *Journal of Money, Credit and Banking*, 923-947.

24. Haq, M. (2010). Factors determining bank risks: A European perspective (p. 52). Presented at the 2010 AFAANZ Conference, Christchurch, New Zealand: AFAANZ. Retrieved from http://espace.library.uq.edu.au/view/UQ:227937/UQ227937_fulltext.pdf
25. Haq, M., Faff, R., Seth, R. and Mohanty, S. (2014). Disciplinary tools and bank risk exposure. *Pacific-Basin Finance Journal*, 26, 37–64. <http://doi.org/10.1016/j.pacfin.2013.10.005>
26. Herrington, M. and Wood, E. (2003). *GLobal Entrepreneurship Monitor, South African Report*. Retrieved Nov 4, 2015, from <http://www.gbs.nct.ac.za/gbswebb/userfiles/gemsouthafrica.2000pdf>.
27. Ivashina, V. and Scharfstein, D. (2010). Bank lending during the financial crisis of 2008. *Journal of Financial Economics*, 97(3), 319–338. <http://doi.org/10.1016/j.jfineco.2009.12.001>
28. Jiménez, G., Lopez, J. A. and Saurina, J. (2013). How does competition affect bank risk-taking? *Journal of Financial Stability*, 9(2), 185–195. <http://doi.org/10.1016/j.jfs.2013.02.004>
29. Jiménez, G., Salas, V. and Saurina, J. (2009). Organizational distance and use of collateral for business loans. *Journal of Banking & Finance*, 33(2), 234–243
30. Jimenez, G. and Saurina, J. (2003). Collateral, type of lender and relationship bank as determinants of credit risk. *Journal of Banking and Finance* 27, 1–21
31. Khieu, H. D., Mullineaux, D. J. and Yi, H.-C. (2012). The determinants of bank loan recovery rates. *Journal of Banking & Finance*, 36(4), 923–933. <http://doi.org/10.1016/j.jbankfin.2011.10.005>
32. Kiyotaki, N. and Moore, J. (1997), Credit cycles, *Journal of Political Economy*, 105, 211-48
33. Knapp, L. G. and Seaks, T. G. (1992). An Analysis of the Probability of Default on Federally Guranteed Student Loans. *The Review of Economics and Statistics*, 74(3), 404. <http://doi.org/10.2307/2109484>
34. Lawrence, R. Z. (1995). US wage trends in the 1980s: The role of international factors. *Economic Policy Review*, 1(1).
35. Louzis, D. P., Vouldis, A. T. and Metaxas, V. L. (2012). Macroeconomic and bank-specific determinants of non-performing loans in Greece: A comparative study of mortgage, business and consumer loan portfolios. *Journal of Banking & Finance*, 36(4), 1012–1027. <http://doi.org/10.1016/j.jbankfin.2011.10.012>
36. Madura, J. (2008). *Financial institutions and markets*. Cengage Learning EMEA.
37. Makri, V., Tsagkanos, A. and Bellas, A., (2014). Determinants of non-performing loans: the case of Eurozone. *Panoeconomicus* 2, 193–206.
38. Messai, A. S. and Jouini, F. (2013). Micro and macro determinants of non-performing loans. *International Journal of Economics and Financial Issues*, 3(4), 852-860.
39. Mishkin, F. (2006). *The Economics of Money, Banking and Financial Markets*, 8th ed, Pearson Education Inc. Boston, USA: 219-279.
40. Mokhtar, S. H., Nartea, G. and Gan, C. (2012). Determinants of microcredit loans repayment problem among microfinance borrowers in Malaysia. *International Journal of Business and Social Research*, 2(7), 33-45.
41. Robson, C. (2011). *Real world research*. 2nd ed, Blackwell publishing, UK.

42. Roslan, A. H. and Abd Karim, M. Z. (2009). Determinants of microcredit repayment in Malaysia: The case of Agrobank. *Humanity & Social Sciences Journal*, 4(1), 45-52.
43. Salas, V. and Saurina, J. (2002). Credit risk in two institutional regimes: Spanish commercial and savings banks. *Journal of Financial Services Research*, 22(3), 203–224.
44. Saurina, J. and Jimenez, G. (2006). Credit Cycles, Credit Risk, and Prudential Regulation. Retrieved 9 April 2015, from http://mpa.ub.uni-muenchen.de/718/1/MPRA_paper_718.pdf
45. Scholtens, B. and van Wensveen, D. (2003). The theory of financial intermediation an essay on what it does (not) explain. SUERF – The European Money and Finance Forum Vienna 2003
46. Sobehart, J.; Keenan, S. and Stein, R. (2001). Benchmarking quantitative default risk models: A validation methodology. *Algo Research Quarterly (Algorithmics)*, 4 (1/2): 57–72.

APPENDICES

Appendix 1. Categorical Variables Coding			
		Frequency	Parameter coding (1)
Ownership Structure	Other forms of ownership	71	.000
	Sole Proprietor	153	1.000
Size of business	Large	108	.000
	Small	116	1.000
Location of business from bank	Near	71	.000
	Far	153	1.000
Relationship with bank	Long	122	.000
	Short	102	1.000
Diversion of loan purpose	No	173	.000
	Yes	51	1.000
Cost of funds	Low	154	.000
	High	70	1.000
Loan Age	Short term	161	.000
	Long term	63	1.000
Loan repayment plan	Short	30	.000
	Long	194	1.000
Multiple borrowing	No	135	.000
	Yes	89	1.000
Delays in loan processing	No	69	.000
	Yes	155	1.000
Extra Source of Income apart from business	Yes	67	.000
	No	157	1.000
Underfunding	No	98	.000
	Yes	126	1.000

Collateral Provided	Yes	186	.000
	No	38	1.000
Purpose of loan	Expansion	151	.000
	Other purposes	73	1.000
Duration in Business	Not New in Business	135	.000
	New in Business	89	1.000

Source: Field survey, 2013

Appendix 2. Variables in the Equation								
	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
Ownership characteristics								
Business ownership	-1.168	.829	1.982	1	.159	.311	.061	1.581
Owner's collateral	-.085	.838	.010	1	.919	.918	.178	4.746
Owner's extra income *	2.105	.771	7.451	1	.006	8.204	1.810	37.180
Borrower characteristics								
Age of Business	.604	.650	.864	1	.353	1.829	.512	6.536
Size of Business *	2.023	.774	6.833	1	.009	7.558	1.659	34.439
Business Location	.240	.627	.147	1	.702	1.272	.372	4.349
Bank relationship	.113	.660	.029	1	.864	1.120	.307	4.083
Multiple borrowing *	2.241	.726	9.517	1	.002	9.404	2.264	39.053
Diversion of Purpose *	2.461	1.043	5.568	1	.018	11.715	1.517	90.446
Loan characteristics								
Purpose *	3.870	.883	19.188	1	.000	47.944	8.486	270.867
Loan Price *	-2.297	.821	7.829	1	.005	.101	.020	.503
Loan Age *	-2.001	.819	5.963	1	.015	.135	.027	.674
Repayment Plan *	-5.090	1.251	16.567	1	.000	.006	.001	.071
Lender characteristics								
Underfunding *	2.953	.712	17.183	1	.000	19.170	4.744	77.458
Delays in Processing	-.016	.823	.000	1	.985	.984	.196	4.940
Constant	.782	1.491	.275	1	.600	2.185		
<i>-2 Log likelihood</i>								98.123
<i>Cox & Snell R Square</i>								0.564
<i>Nagelkerke R Square</i>								0.785
<i>Overall % prediction</i>								91.1%
<i>Total observations</i>								224
*significant variables in the model								

Source: Field survey, 2013