

The effect of funding strategy on the lending patterns of banks in Ghana

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Abstract

This article examines the effect of funding strategy on the lending patterns of banks in Ghana. We employ a panel dataset of banks from 2005 to 2011, to analyse the impact of funding sources on three sets of lending patterns employed by banks: Primary, secondary and tertiary economic sectors. The result shows that banks in Ghana use internally generated funds to finance loans to the primary and secondary sectors of the economy. In addition, our findings suggest that bank lending to the tertiary sector of the economy is significantly more sensitive to wholesale funding than to deposit and internally generated funds. The overall implication of this finding is that the bank funding structure needs to be considered in addition to the traditional bank-specific indicators when assessing banks' ability to finance economic activities.

Keywords: Africa, developing country, funding sources, Ghana, lending patterns

1 Introduction

Banks and other financial intermediaries perform an important developmental function, especially in Africa, where capital markets are not very developed. Banks help households as well as businesses to take advantage of productive investment opportunities which may not otherwise materialise (Demetriades & Fielding, 2012). Traditionally, banks are funded by customer deposits, which include savings, and demand and time deposits (Ianotta *et al.*, 2007). Banks also make use of wholesale funds, which include short-term borrowings from the central bank, commercial papers, interbank borrowings and repurchase agreements (Huang & Ratnovski, 2009). Studies show that some banks finance their assets with internal capital (Houston *et al.*, 1997; Amidu & Wolfe, 2012). In terms of banking strategy, Amidu (2013) reveals that banks – especially those in emerging economies – use internally generated funds to diversify into non-interest income-generating activities.

According to Kashyap *et al.* (2002), lending involves acquiring costly information about opaque borrowers, and extending credit based on this information. All sectors of the economy are affected by bank lending, since banks serve as a major source of funding for firms, state-owned enterprises and households, especially in developing countries (Ladime *et al.*, 2011). However, commercial banks' contribution to economic growth and development depends greatly on how strategically the banks balance their assets and liabilities, as well as the sources of funds available to them

(De Young & Yom, 2008). For this reason, banks must understand clearly which sectors of the economy are most profitable to lend to, and must identify the sustainable yet inexpensive sources of funds which those sectors rely on. The literature suggests that the availability of bank credit is an important determinant of economic growth and development in developing markets (Chernykh & Theodossiou, 2011). This is especially significant due to the relatively underdeveloped nature of the capital market in developing regions such as Ghana.

This article expands on the intermediation literature by examining the effect of funding sources on the lending patterns of banks in an emerging economy, as funding sources affect both bank credit and risk. Berlin and Mester (1999), who examined the relationship between deposits and relationship lending in the United States, concluded that access to (core) deposits with inelastic rates permits a bank to make contractual agreements with borrowers that would be infeasible if the bank had to pay market interest rates for funds. The authors provide empirical evidence of an explicit link between banks' liability structure and their distinctive lending behaviour. Olokoyo (2011) shows that deposits constitute the most significant determinant of banks' lending behaviour. Since banks' lending directly influences development (Levine, 2004), anything as crucial as funding sources that affect bank lending patterns must be examined and empirically investigated.

This study sets out to examine the effect of funding sources on the lending patterns of banks in Ghana, because its banking sector has seen many significant changes in the past decade. After the financial crisis of the 1980s, government instituted numerous reforms which deregulated the Ghanaian banking sector. Many more banks were set up. Also, the *Universal Banking Act, 2004*, led to the establishment of banks that were not restricted in terms of the kind of loans they granted, compared to previous years where banks were set up as commercial banks, development banks or merchant banks. The deregulation of the banking sector and the influx of banks into Ghana suggest that all banks are 'scurrying' for the same funding, such as deposits and wholesale funds (non-deposit funding sources). The question therefore arises as to whether the particular funding sources banks make use of in any way influence the type, volume and value of loans they grant to customers, given the competitive nature of the banking sector in emerging markets (Amidu, 2013). The paper seeks to address this issue by investigating how funding sources affect bank lending patterns in Ghana.

The motivation for this article is that, while traditional portfolio, intermediation theories and promotion of information asymmetry provide a link between funding strategies and the lending patterns of banks, there is very little empirical evidence on the effect the funding structure has on bank lending. This study, which seeks to explore that gap, is important in Ghana, with its fast-growing banking sector – any such empirical findings would provide strategies to help the banks in their core duty of efficiently allocating funds to the various sectors of the economy and, more importantly, of providing policy guidelines on how bank funding structures influence economic activities.

The remainder of the article is organised as follows: Section 2 describes the Ghanaian banking sector; Section 3 provides a review of extant literature; Section 4 discusses the methodology employed, while Section 5 presents the empirical results and Section 6 offers a conclusion.

2 Overview of the Ghanaian banking sector

According to Annin (2000), banking in Ghana began in the late 19th century with the establishment of the British Bank of West Africa (now Standard Chartered Bank Limited) in 1896, followed by Barclays Bank (1917). During the early years of Ghana's independence, the government intervened extensively in the country's financial markets, in an attempt to control the cost and direction of finance. Public sector banks were set up and administrative controls were imposed on interest rates and the sectorial allocation of bank credits.

The government of Ghana, post-independence in 1957, adopted development priorities that emphasised rapid industrialisation, and the modernisation of agriculture and the national economy. Institutions such as the National Investment Bank (NIB), the Agricultural Development Bank Limited (ADB), the Bank for Housing and Construction, Social Security Bank and Cooperative Bank were established to address imbalances by providing much-needed financial assistance to both the public and the private sectors. Another aim was to accommodate strategic sectors and enterprises. All activities were based on guiding policies in the form of price controls. The Bank of Ghana administratively implemented interest and exchange rate controls along with a variety of other controls which were also imposed on the asset allocations of banks, e.g., sectoral credit directives. However, these policies further highlighted the gaps in the regulatory framework and necessitated a stronger structural and regulatory framework.

Over the last two decades the banking sector in Ghana has grown in terms of the emergence of new banks and credit extension; for instance, from 16 banks in 2000, there are currently 26 banks. Also, private sector credit to gross domestic product (GDP) is currently 23 per cent – twice the value in 2000 (Bank of Ghana, 2010). From 1998–2003, more than 87 per cent of the banks' assets were financed by debt, with deposits constituting more than three quarters of the capital (Amidu, 2007). Over the past decade, the Ghanaian banking sector has seen appreciable growth as a result of reforms instituted by earlier governments, e.g., the Financial Sector Adjustment Programme (FINSAP II and I); Non-Performing Assets Recovery Trust (NPART) and Foreign Exchange Bureau legislation (Amidu, 2006). Two very important banking sector reforms of the past two decades are the *Bank of Ghana Act*, 612 of 2002, enacted to give the central bank greater independence, and the *Banking Act*, 673 of 2004, passed to replace the obsolete *Banking Law* (PNDC Law 225 of 1989). This policy of liberalisation, according to Saka *et al.* (2012), has positively affected domestic banks and reduced the concentration level through the entry of foreign banks.

The structure of the Ghanaian banking sector appears to be evolving away from a heavily skewed oligopolistic trend. For instance, the market share of the top five banks in 2010 was 48.5 per cent, compared to 78.2 per cent in 2000 (Bank of Ghana, 2010). Despite these changes, there is evidence of an uncompetitive structure noticeable from the combined assets and shares of industry deposits and loans of four banks, which averaged about 42 per cent. In comparison with sub-Saharan Africa, Ghana's banking sector performance appears to be lagging behind its economic growth (see Table 3). While economic growth was higher (8%) than the sub-Saharan Africa (SSA) average (5%), banking sector indicators were lower than the SSA average. For instance, the depth and coverage of credit to the private sector has been relatively lower (16%) compared to the SSA average of 56 per cent (IMF Report, 2011). Buchs and Mathisen (2005) found evidence that the non-competitiveness of the Ghanaian banking sector hampers financial intermediation. However, Aboagye *et al.* (2008) found that the concentration of banks has a significant positive impact on interest rate spread.

3 Related literature

3.1 Theoretical overview

Theoretically, Pyle (1971) outlines the main characteristic of a financial intermediation: It issues claims on itself and uses the proceeds to purchase other financial assets. Claus and Grimes (2003) posit that financial intermediaries exist because they can reduce the information and transaction costs arising from information asymmetry between borrowers and lenders. Financial intermediaries thus assist in the efficient functioning of markets, and any factors that affect the amount of credit channelled through financial intermediaries can have significant macroeconomic effects. Two strands of literature that formally explain the existence of financial intermediaries focus on their provision of liquidity and their ability to transform the risk characteristics of assets. Financial intermediaries play an important role because they reduce the cost of channelling funds between relatively uninformed depositors, to uses that are information-intensive and difficult to evaluate. Thus the bank secures funds from surplus spending units and transmits them to deficit spending units (Klein, 1971). The banking sector plays an important role in mobilising deposits and disbursing credit to various sectors of the economy. A sound and efficient banking system is a *sine qua non* for maintaining financial stability (Jaiswal, 2010).

Banks are the most important financial intermediaries in most economies that provide a bundle of different services. As financial intermediaries, banks play a crucial role in the operation of most economies. The efficiency of financial intermediation can also affect economic growth. In addition, banks' insolvencies can result in systemic crisis. Economies with a profitable banking sector are better able to withstand negative shocks and to contribute to the stability of the financial system (Athanasoglou *et al.*, 2005). Funds secured by banks in the form of time

deposits, demand deposits and ownership claims are invested in a wide variety of earning assets, the revenue from which constitutes the main source of the banks' income. These assets differ widely in terms of their expected returns, market and/or default risk characteristics, liquidity, etc. In Diamond and Dybvig (1983), the illiquidity of assets provides the rationale for the existence of banks and highlights their vulnerability to runs. If banks and other intermediaries provide credit to a large number of firms which otherwise would not be able to borrow, the amount of credit channelled through the banking system can have significant macroeconomic effects. This highlights the importance of public policy in designing policies to ensure the soundness of the banking system. Swank (1996) concludes that banks supply services that are generally deemed vital for the proper functioning of modern society.

3.2 Empirical literature on banks' lending patterns

Banks' lending patterns can be analysed according to the length of the lending period, the purpose of the loan, and the sector of the economy which requires the loan. Many factors influence these patterns, as some banks lend to certain sectors and virtually ignore others. Patterns include: Commercial real estate loans (Liu, 2012), residential real estate loans (Liu, 2012), lending to consumers (Cull & Martinez Peria, 2012), corporate loans (Cull & Martinez Peria, 2012); construction firms/real estate loans and other business loans. Cottarelli *et al.* (2003) identify other lending patterns: Lending to the private sector, to individuals and to the state. Joeng (2009) identifies household lending and corporate lending, while Chernykh and Theodossiou (2011) refer to long-term (three to ten years) and short-term lending. Banks also lend to various sectors of the economy: Agriculture (primary), manufacturing (secondary) and services (tertiary) (Dee *et al.*, 2003). Bank loans can also be categorised into commercial, industrial, real estate and consumer loans. Other categories include lending to the private sector or to government, household lending, installment finance, lease finance, mortgage advances and other loans (Akinboade & Makina, 2009). Cottarelli *et al.* (2003) conclude that 'excessive' credit to particular sectors of the economy may result in macroeconomic imbalances and lead to asset price bubbles. Deposits form the traditional source of bank funds (including demand, saving and time deposits) and are considered a cheaper funding source relative to other funding sources (Ianotta *et al.*, 2007). Non-deposit funding sources are funding sources from other banks and other sources (e.g., notes, debentures, short-term bills, large time deposits, brokered negotiable CDs with short remaining maturities, overnight funds purchases, large-denomination certificates of deposits, brokered deposits, repurchase agreements, federal funds, commercial papers and other short-term borrowings whose price and supply fluctuate with credit market conditions) (Berlin & Mester 1999; Feldman & Schmidt, 2001; Ratnovski & Huang 2009; Amidu & Wolfe 2012). They are purchased from other financial institutions and are usually raised on a short-term rollover basis. They constitute short-term funding with relatively higher interest cost compared to deposits from customers.

Internal funding, as distinguished from other bank funding strategies, refers to funds raised internally by the bank, e.g., from a foreign parent bank. Houston *et al.* (1997) identify internally generated funds as a source of funding for firms.

In the light of the above theoretical and empirical discussion, the relationship between the funding strategy and the lending pattern of banks operating in Ghana, is tested. In addition, the strength of the relationship between the funding strategy and the lending pattern of banks is also tested, and may imply negative, neutral or positive linkages. Thus, the hypotheses are

H1. The deposits funding sources of banks in Ghana are used to finance primary economic activities, more so than the secondary and tertiary economic sectors.

H2. The non-deposits and internal funding of banks are employed to finance more of the manufacturing and construction sector (i.e., secondary economic activities).

4 Methodology

4.1 Data sources and variable measurements

The study employs both micro-bank-level data and macro-country-level data. Bank-level data were obtained from the published financial statements of the banks in question, from the Center for Business Banking and Sustainable Development (CBBSD) and from the Bank of Ghana. Data frequency was yearly, covering a sample of 22 banks operating in Ghana over a seven-year period (2005–2011). Macroeconomic data were obtained from the World Bank Development Indicators: GDP growth and inflation. Monetary policy rates were also obtained from the Bank of Ghana.

The dependent variables are the various lending patterns of Ghanaian banks, i.e., according to the sectors of the economy (primary, secondary and tertiary economic sectors); according to ownership (to government and state-owned enterprises, private firms and individuals); according to the length of time (overdrafts and term loans) and the purpose of the loan (real estate, mortgage and commercial loan, for instance). One major pattern concerns the various sectors. Dee *et al.* (2003) identify three sectors within the economy: Primary, secondary and tertiary. This is also motivated by the availability and the reporting format of banks operating in Ghana, which are required by law to prepare their financial reports in accordance with the Company Code, 1963, Act 179, and in conformity with international financial reporting standards. The primary sector comprises agriculture, forestry, fishing and the extractive sectors. This is measured as total loans allocated for primary economic activities relative to total loans. The secondary sector (also known as the industrial sector) comprises manufacturing and construction. This is measured as loans allocated to the secondary economic sector relative to total loans. The tertiary economic sector comprises electricity, gas, water, transportation, storage, communications, commerce, finance and all other services. It is measured as loans allocated to the tertiary sector relative to total loans. In addition, the total of loans allocated to each of these sectors is scaled by total assets to measure total lending.

The independent variables are the various funding sources which banks make use of, namely deposits, non-deposit/wholesale funds and internal capital. Deposits include demand, savings and time deposits, and are considered a relatively cheaper funding source for banks (Janotta *et al.*, 2007). This is measured as the ratio of total deposits to total assets. Non-deposit funding includes interbank borrowings, repurchase agreements, notes, debentures, short-term bills and all other related debts not covered by deposit funding. Non-deposit funds are short-term funding sources with relatively higher interest compared to deposits from customers. This is measured as the ratio of total non-deposit sources to total assets (Huang & Ratnovski, 2009). Internal funding is calculated as the sum of the net profit before extraordinary items and loan loss provisions relative to bank loans at the end of the period (Houston *et al.*, 1997, Amidu & Wolfe, 2012).

We control for other variables which affect the relationship of interest, including bank level variables such as ownership, bank size and bank equity. Ownership is a dummy variable measuring bank ownership, 0 if the bank is state or locally owned, 1 if it is foreign-owned. Cull and Martinez-Peria (2012) found ownership to be significant in explaining lending patterns, but Chernykh and Theodossiou (2011) found that variables other than ownership explain the banks' lending patterns. It is therefore expected that the relationship could either be positive or negative. Bank equity is measured as the ratio of bank equity to total assets and it is used as a measure of the level of capitalisation (Chernykh & Theodossiou, 2011). Chernykh and Theodossiou (2011) argue that better capitalised banks can attract more creditworthy borrowers who will qualify for loans. Alternatively, high levels of capital can reveal risk-averse and conservatively managed banks that may be reluctant to issue risky loans. Therefore, the relationship between bank capital and lending patterns could either be positive or negative. Bank size is measured as the logarithm of total assets (Joeng, 2009; Chernykh & Theodossiou, 2011). Chernykh and Theodossiou (2011) found a positive relationship between bank size and lending patterns, and it is expected to be the case here.

Macroeconomic variables included are inflation, the monetary policy rate and GDP growth (measured as yearly GDP growth rates to represent the economic cycle). Akinboade and Makina (2009) argue that bank lending is procyclical. The real GDP growth rate is the most general and most direct measure of macroeconomic development (Bikker & Hu, 2002). Inflation is measured by the yearly consumer price index (CPI). Cukierman and Hercowitz (1990) presented a model where loan demand is positively related to inflation, but De Gregorio and Sturzenegger (1997) developed a model where firms' demand for bank credit reduces with inflation, because in their model higher inflation is related to lower productivity levels, which, in turn, reduce the demand for labour. Huybens and Smith (1999) show that both outcomes are actually possible, depending on the nature of the steady-state equilibrium in the economy. Monetary policy is measured as the yearly average of the Bank of Ghana policy rate and represents the monetary transmission mechanism. Amidu (2006) notes that an increase in policy rate is expected to negatively affect banks' lending behaviour. To further examine the impact of monetary policy on banks' various

funding sources, due to the important role they play as transmitters of monetary policy (Swank, 1996), the study interacted monetary policy with the various funding sources which Ghanaian banks make use of: Deposits, non-deposit/wholesale funds and internal funding/capital. To do this, each of the funding sources is multiplied by monetary policy. Table 1 presents the summary definition and measurement of variables used in the study.

Table 1: Summary of variable measurements

Variables	Definition and measurements
Dependent variables	
Primary lending	This comprises agriculture, forestry, fishing and the extractive sectors, and is measured as total loans allocated for primary economic activities relative to total loans.
Secondary lending	This is bank lending to the manufacturing and construction sectors. It is measured as loans allocated to the secondary economic sector relative to total loans.
Tertiary lending	This comprises electricity, gas, water, transportation, storage, communications, commerce, finance and all other services. It is measured as loans allocated to the tertiary sector relative to total loans.
Independent variables	
Deposits	This includes demand, savings and time deposits and is considered a relatively cheaper funding source for banks. It is measured as the ratio of total deposits to total assets.
Non-deposit funds	These are short-term funding sources with relatively higher interest compared to deposits from customers. It is measured as the ratio of total non-deposit sources to total assets.
Internal funding	This is calculated as the sum of the net profit before extraordinary items and loan loss provisions relative to bank loans at the end of the period.
Control variables	
Ownership	This is a dummy variable that takes the value 0 if the bank is state or locally owned, and 1 if it is foreign-owned.
Bank equity	This is measured as the ratio of bank equity to total assets and is used as a measure of the level of capitalisation.
Bank size	Bank size is measured as the logarithm of total assets.
Inflation	The yearly CPI is used as measure of inflation.
Monetary policy	Monetary policy is measured as the yearly average of the Bank of Ghana policy rate and represents the monetary transmission mechanism.
GDP growth	This is measured as yearly GDP growth rates and represents the economic cycle.

4.2 Model specification

The main focus of this study is to examine the relationship between the funding sources and lending patterns of banks in Ghana, using a panel data framework. The study therefore makes use of an econometric model with lending patterns as the

dependent variable, and funding sources and other bank-specific and macroeconomic variables as explanatory variables. We specify the model as follows:

$$LP_{i,t} = \beta_1 FS_{i,t} + \beta_2 X_{i,t} + \sum_{j=1}^3 \beta_j M_{i,j} + (FS_{i,t} * MP_t) + \varepsilon_{i,t} \quad (1)$$

Where LP_{it} represents lending patterns, namely: lending to the primary (PRI), secondary (SEC) and tertiary (TERT) economic sectors and total lending (TOTAL) which is measured as total loans to the private sector divided by total assets. FS_{it} represents the various funding sources banks in Ghana make use of, namely deposits, measured as a ratio of deposit to total assets (DEP), wholesale/non deposit funding, measured as a ratio of total non-deposit funds to total assets (WSF) and internal funding which is measured as the sum of net profits before extraordinary items and loan loss provisions relative to bank loans at the end of the period (INTF); X_{it} represents a set of bank specific characteristics that affect lending patterns namely: bank size is measured as log of total assets (BS), bank equity is calculated as total bank equity capital divided by total assets (BE) and bank ownership is a dummy variable, 1 if the bank is foreign and 0 otherwise (OWN); M_t represents macroeconomic variables which affect lending patterns: that is, inflation which is measured as consumer price index (INF), GDP growth (GDPG) and the monetary policy rate (MP) and $\varepsilon_{i,t}$ represents the error term which is made up of μ_i and v_{it} . Here μ_i represents the unobserved time invariant bank specific effect while v_{it} represents the disturbance term. We interact each of the various funding sources with monetary policy (FS*MP) to test for the sensitivity and the response of the various funding sources to changes in the monetary policy. DEP*MP is for the interaction between deposits and monetary policy; WSF*MP is for the interaction between wholesale/non deposit funding and monetary policy and INTF*MP is for the interaction between internal funding/capital and monetary policy. The study employs the Panel Corrected Standard Errors (PCSE) model of the Ordinary Least Squares (OLS) which is robust to heteroscedasticity and first order serial correlation.

5 Empirical results and discussion

5.1 Descriptive statistics

Table 2 provides the descriptive statistics of the key variables used in the study. The average percentage of loans allocated to the primary economic sector is nine per cent, while that of the secondary sector is 24 per cent, with the tertiary sector being the largest at 67 per cent. Total lending accounts for 48 per cent of total assets, implying that loans make up almost half of the total bank assets. On average, deposits account for about 64 per cent of total assets, whereas wholesale funds account for about 12 per cent, possibly indicating the weak and relatively underdeveloped nature of the interbank market in Ghana. Internal capital makes up about eight per cent of funding. For the other bank-specific variables, bank equity has a mean of 13 per cent while the log of total assets, which is a proxy for bank size, has a mean of 8.54 Ghanaian

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Cedis. Ownership has a mean of 45 per cent, meaning that most of the banks in the sample are locally owned. Over the period, GDP growth was at an average of eight per cent; the policy rate had an average of 15 per cent and the average inflation rate was 13 per cent over the period.

Table 2: Descriptive statistics

	PRI	SEC	TERT	TOTAL	DEP	WSF	INTF	BE	BS	GDPG	MP	INF	OWN
Mean	0.09	0.24	0.67	0.48	0.64	0.12	0.08	0.13	8.54	0.08	0.15	0.13	0.45
Median	0.05	0.23	0.69	0.48	0.68	0.11	0.05	0.11	8.60	0.09	0.14	0.11	0.00
SD	0.09	0.16	0.20	0.21	0.16	0.08	0.37	0.10	0.45	0.02	0.02	0.04	0.50
Min	0.00	0.00	0.05	0.02	0.02	0.00	-0.64	0.01	7.33	0.04	0.13	0.09	0.00
Max	0.43	0.87	0.99	0.99	0.98	0.42	4.44	0.92	9.62	0.14	0.18	0.19	1.00
N	136	148	147	148	146	131	146	145	148	154	154	154	154

Note: PRI represents loans allocated to the primary economic sector, SEC stands for loans allocated to the secondary economic sector, TERT represents loans allocated to the tertiary economic sector, TOTAL stands for total loans, DEP stands for deposits, WSF is wholesale/non-deposit funding, INTF represents internal funding, BE stands for bank equity, OWN stands for ownership, BS represents bank size, MP is monetary policy, INF represents inflation, GDPG stands for GDP growth.

Figures 1, 2 and 3 present the trend (2005–2011) of deposits and wholesale funds, internal funding and lending patterns respectively. This section begins with an analysis of the funding sources of banks in Ghana. Our sample shows that banks make use of three main funding sources: Deposits, wholesale funds and internal funding. Almost all banks rely almost exclusively on deposits and direct borrowing for funding (IMF, 2011). Deposits account for about 64 per cent of bank funding sources. They are received from individuals, private institutions, the government and state-owned institutions, and comprise time, savings and demand deposits.

The growth of deposits mobilised by banks in Ghana generally follows an upward trend. Non-deposit funding sources/wholesale funds comprise mainly borrowings from other financial institutions and other borrowings. On average, they account for about 12 per cent of the funding structure. There generally appears to be an upward trend in the growth of wholesale funds employed. However, in 2009 it rose higher than in other years, possibly as the after-effect of an election year, since it declined in subsequent years. Internally generated funds/internal capital account for about eight per cent of Ghanaian banks’ funding sources.

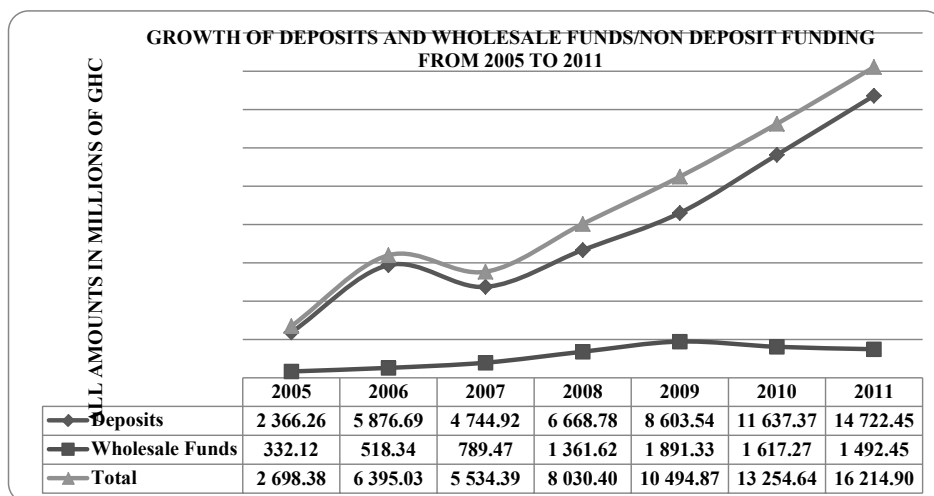


Figure 1: Deposits and wholesale funds raised by banks in Ghana, 2005–2011

Sources: CBBS, BOG and authors’ own computations

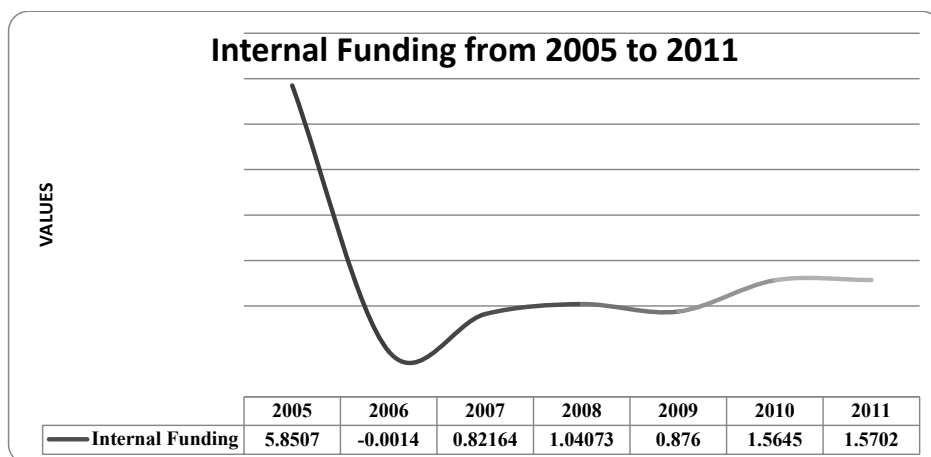


Figure 2: Internal funds raised by banks in Ghana, 2005–2011

Sources: CBBSD, BOG and authors' own computations

Next is an analysis of Ghanaian banks' lending patterns according to sectorial lending practices. The various sectors of the economy aggregate into three main sectors, namely primary (agriculture, fishing, forestry, mining and quarrying); secondary (manufacturing and construction) and tertiary economic activities (electricity, gas, water, transportation, storage, communications, commerce, finance and all other services).

Loans and advances to the secondary sector benefit the manufacturing and construction sectors, and accounts for 24 per cent of total loans awarded by the banks. There is generally an upward trend in the financing advanced to this sector. It is estimated that since the construction sector has the government as one of its largest clients, and government has a low risk of payment default, loans allocated to a sector largely bankrolled by government contracts will have a lower risk rating.

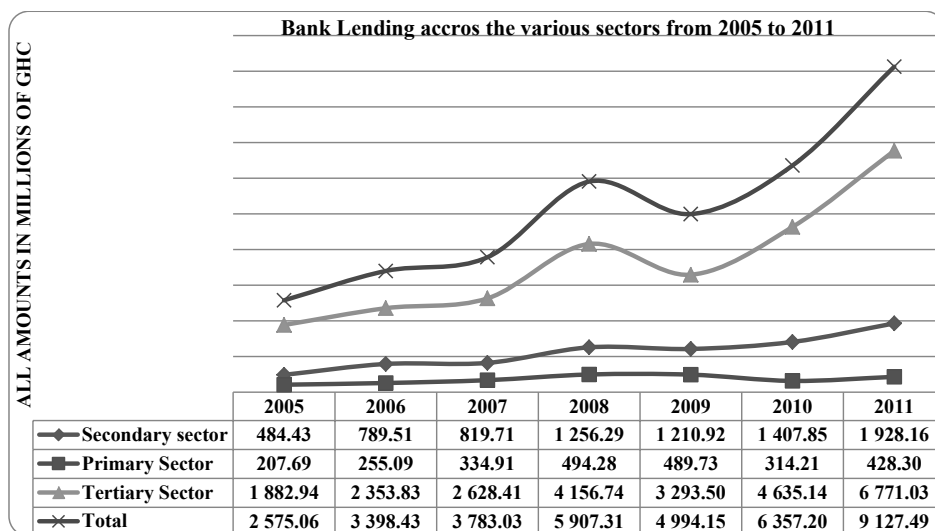


Figure 3: Lending patterns of banks in Ghana, 2005–2011

Sources: CBBSD, BOG and authors' own computations

Loans advanced to the primary economic sector benefit agriculture, forestry, forestry, fishing, mining and quarrying. Such loans account for about nine per cent of total loans advanced. This is generally the least funded sector – a regrettable situation, given that agriculture forms one of the major sectors of the economy and is a must for a country like Ghana, which has not yet achieved self-sufficiency in terms of food production. However, it is suggested that this may be explained by the ‘variable’ nature of the primary sector and the erratic rainfall patterns in the country. Another interesting fact is that it supports the generally held view that Ghanaians depend more on imports, since the tertiary sector receives the most loans. Despite tax concessions, the industry is yet to overcome the peculiar challenges of lending to smallholder farmers with their limited credit history, facing unpredictable weather condition and uncertain market availability. The tertiary sector is further divided into commerce and finance, electricity, gas and water, transport, storage, communication, and all other services. Loans advanced to this sector account for about 68 per cent of the total loans advanced by Ghanaian banks. Commerce and finance continue to be the best supported by banks – about 31 per cent of the total industry loans and advances were granted to this sector, which denotes an increase from 29 per cent in 2003.

The linear independence of the explanatory variables is examined using a correlation matrix (see Table 3). The Pearson product moment coefficient of correlation for pairs of independent variables, measures the degree of linear relationship between two or more variables. The correlation matrix for the variables used in the study indicates that weak relationships exist among the independent variables, thus preventing any potential multicollinearity problems in the regression estimates. We also employ the correlation as a preliminary analysis of the relationship among the selected variables.

Table 3: Correlation matrix

	PRI	SEC	TERT	TOTAL	DEP	WSF	INTF	BE	BS	GDPG	MP	INF	OWN
PRI	1.00												
SEC	0.18**	1.00											
TERT	-0.59***	-0.89***	1.00										
TOTAL	-0.12	0.04	0.02	1.00									
DEP	-0.12	-0.08	0.09	0.06	1.00								
WSF	0.17*	0.26***	-0.27***	-0.01	-0.32***	1.00							
INTF	-0.03	0.03	-0.01	0.00	0.15*	-0.27***	1.00						
BE	-0.03	-0.07	0.06	0.04	-0.05	-0.17*	-0.04	1.00					
BS	0.05	-0.10	0.05	-0.13	0.07	-0.03	-0.08	0.03	1.00				
GDPG	0.15*	-0.09	0.01	-0.09	0.13	-0.04	-0.01	0.05	0.54***	1.00			
MP	0.05	-0.04	0.02	0.13	-0.05	0.23**	0.04	-0.19**	-0.02	-0.07	1.00		
INF	0.06	-0.03	0.01	0.12	-0.08	0.23**	0.05	-0.18**	-0.10	-0.10	0.68***	1.00	
OWN	-0.09	-0.19	0.19**	-0.37***	0.07	-0.25***	-0.03	0.23**	0.11	-0.06	0.00	0.00	1.00

Note: PRI represents loans allocated to the primary economic sector, SEC stands for loans allocated to the secondary economic sector, TERT represents loans allocated to the tertiary economic sector, TOTAL stands for total loans, DEP stands for deposits, WSF is wholesale/non-deposit funding, INTF represents internal funding, BE stands for bank equity, OWN stands for ownership, BS represents bank size, MP is monetary policy, INF represents inflation; GDPG stands for GDP growth. * represents significance at 10% level, ** represents significance at 5% level, *** represents significance at 1% level.

5.2 Regression results

This subsection analyses the relationship between the funding sources and the lending patterns of banks in Ghana, which is examined while controlling for some bank-specific and macroeconomic factors. An adjusted R^2 of 48 per cent is reported for lending to the primary economic sector, while 43 per cent is reported for lending to the secondary economic sector. The adjusted R^2 for lending to the tertiary economic sector is found to be 66 per cent and 57 per cent for total lending, indicating the goodness of fit of the regression results (see Tables 4, 5, 6 and 7, in respect of lending to the primary, secondary and tertiary economic sectors, as well as total lending).

Table 4: Regression table for lending to the primary economic sector

	Coefficient	Std. err.	t	P>t
DEP	0.3270	0.1671	1.96	0.0530
WSF	-0.0797	0.2831	-0.28	0.7790
INTF	0.7872	0.3404	2.31	0.0230
BE	-0.0555	0.0305	-1.82	0.0720
BS	-0.0317	0.0136	-2.34	0.0210
GDPG	3.5606	1.0625	3.35	0.0010
MP	-1.7563	1.0782	-1.63	0.1060
INF	2.2396	0.4398	5.09	0.0000
OWN	0.0166	0.0067	2.49	0.0140
WSF*MP	1.7066	1.9177	0.89	0.3750
DEP*MP	-2.8427	1.1238	-2.53	0.0130
INTF*MP	-6.3266	2.3608	-2.68	0.0090
Constant	0.0440	0.1393	0.32	0.7530
F(12, 109)	10.34			
Prob> F	0.0000			
R ²	0.5324			
Adjusted R ²	0.4809			
Observations	122			
Hausman chi ² (11)	20.21			
Prob> chi ²	0.0000			

Note: DEP stands for deposits, WSF is Wholesale/non deposit funding, INTF represents internal funding, BE stands for bank equity, OWN stands for ownership, BS represents bank size, MP is monetary policy, INF represents inflation; GDPG stands for GDP growth. The standard errors are robust to heteroscedasticity.

The regression results show a positive and significant relationship between lending to the primary economic sector, the tertiary economic sector, total lending and deposits. This implies that the primary economic sector, tertiary economic sector and total lending are mainly funded by deposits. This finding supports Olokoyo's (2011) assertion that deposits are the key determinant of bank lending behaviour in developing economies. For the primary economic sector this is rather surprising, given the decline in its contribution to GDP. This may imply that banks in Ghana are possibly more willing to allocate credit to the primary economic sector, as their deposits increase along with the potential for growth in that sector. For the tertiary economic sector this is not surprising, since it receives more than half of the credit allocated by banks. It is speculated that given the less risky nature of the tertiary economic sector (which is mainly comprised of services), banks are more willing to allocate credit there. Total lending also exhibits a positive relationship with deposits, implying that in general, banks in Ghana allocate credit using their deposits. This is confirmed by the percentage allocation of funding sources, where deposits accounts for 64 per cent of total funding. This corroborates findings showing that more than 87 per cent of banks' assets are financed by debt, and from this, deposits appear to constitute more than three quarters of the banks' capital (Amidu, 2007).

Lending to the tertiary sector shows a negative and significant relationship with wholesale funds. This implies that banks may not fund their loans to the tertiary sector with non-deposits, possibly because banks already lend to this sector using deposits. On the other hand, there is a positive and significant relationship between wholesale funds and lending to the secondary economic sector, which implies that banks in Ghana finance loans to this sector with wholesale funds. It is estimated that this may be so given the relatively small size of the secondary economic sector in Ghana. As such, it may be more prudent to allocate funds to them on an as-needed basis (which may not be regular), thus it may be more prudent to use wholesale funds rather than lock-up deposits. Interestingly, the relationship between wholesale funds and total lending is positive, but not significant. This implies that total lending is not affected by non-deposit funding, which can possibly be explained by the low level of non-deposit funding which banks in Ghana make use of.

Table 5: Regression table for lending to the secondary economic sector

	Coef.	Std. err.	t	P>t
DEP	-0.4139	0.3854	-1.07	0.2850
WSF	2.5061	0.6850	3.66	0.0000
INTF	1.7076	0.8272	2.06	0.0410
BE	-0.1913	0.0746	-2.56	0.0120
BS	0.0293	0.0316	0.93	0.3550
GDPG	-6.2667	2.5133	-2.49	0.0140
MP	3.2128	2.4819	1.29	0.1980
INF	-1.5014	1.0637	-1.41	0.1610
OWN	0.0471	0.0162	2.9	0.0040
WSF*MP	-13.1393	4.6361	-2.83	0.0050
DEP*MP	1.6122	2.5593	0.63	0.5300
INTF*MP	-9.6715	5.7358	-1.69	0.0940
Constant	0.2477	0.3214	0.77	0.4420
F(12, 115)	9.07			
Prob> F	0.0000			
R ²	0.4861			
Adjusted R ²	0.4325			
Observations	128			
Hausman chi ² (11)	19.15			
Prob> chi ²	0.0000			

Note: DEP stands for deposits, WSF is Wholesale/non deposit funding, INTF represents internal funding, BE stands for bank equity, OWN stands for ownership, BS represents bank size, MP is monetary policy, INF represents inflation; GDPG stands for GDP growth. The standard errors are robust to heteroscedasticity.

There is a positive and significant relationship between lending to the primary and secondary economic sectors and internal funding. This suggests that in Ghana, banks finance loans to the primary and secondary sectors using internal funds, possibly because internal funding represents a cheap funding source which banks could use to allocate loans to these risky sectors. The results on internally generated funds concur with the findings of Amidu and Wolfe (2012) that banks – especially those in emerging markets – use internal funds to diversify into non-interest-generating activities. Additionally, total lending shows a positive significant relationship with internal funding.

The results indicate a negative and significant relationship between bank size and lending to the primary economic sector and to total lending. This indicates that larger banks may actually lend less to the primary economic sector, which is quite surprising. However, results from the literature indicate that larger banks may

actually be conservative and as such may not be willing to lend to a risky sector such as the primary economic sector. This may also translate to total lending. On the other hand, there is a positive but not significant relationship between bank size and lending to the secondary and tertiary sectors, indicating that size does not affect sectorial allocation of bank credit in Ghana.

Table 6: Regression table for lending to the tertiary economic sector

	Coef.	Std. err.	t	P>t
DEP	1.6252	0.4172	3.90	0.0000
WSF	-3.5034	0.7436	-4.71	0.0000
INTF	-0.3098	0.8953	-0.35	0.7300
BE	0.0087	0.0808	0.11	0.9150
BS	0.0231	0.0342	0.68	0.5010
GDPG	-13.4369	2.7199	-4.94	0.0000
MP	9.8334	2.6868	3.66	0.0000
INF	-3.7166	1.1528	-3.22	0.0020
OWN	0.1937	0.0176	10.99	0.0000
WSF*MP	27.1288	5.0301	5.39	0.0000
DEP*MP	-11.2239	2.7703	-4.05	0.0000
INTF*MP	-0.8288	6.2088	-0.13	0.8940
Constant	0.5565	0.3478	1.60	0.1120
F(12, 114)	21.66			
Prob> F	0.0000			
R ²	0.6951			
Adjusted R ²	0.6630			
Observations	127			
Hausman chi ² (11)	26.63			
Prob> chi ²	0.0000			

Note: DEP stands for deposits, WSF is Wholesale/non deposit funding, INTF represents internal funding, BE stands for bank equity, OWN stands for ownership, BS represents bank size, MP is monetary policy, INF represents inflation; GDPG stands for GDP growth. The standard errors are robust to heteroscedasticity. * represents significance at 10% level, ** represents significance at 5% level, ***represents significance at 1% level.

For bank equity, the results indicate a negative and significant relationship between lending to the primary and secondary economic sectors. This means that better capitalised banks may not allocate much of their credit to these sectors. The conjecture is that better capitalised banks may be risk averse and conservative in lending to these sectors, which are considered quite risky (Chernykh & Theodissou, 2011). On the other hand, there is a positive but not significant relationship between bank

equity and lending to the tertiary sector. This result suggests that bank capitalisation does not affect the granting of credit to the tertiary economic sector. However, there is a positive and significant relationship between bank equity and total lending, which implies that better capitalised banks allocate more credit generally.

There is a positive and significant relationship between lending to the primary, secondary and tertiary economic sectors and ownership. This indicates that, in general, foreign banks allocate more credit to these sectors. However, there is a negative relationship with total lending, which surprisingly indicates that, overall, local banks lend more.

GDP growth has a positive and significant relationship with lending to the primary economic sector and total lending. This indicates that during an economic booming, more credit is allocated to the primary economic sector and to total lending. This may be an indication of the primary economic sector's contribution to GDP growth. For total lending, it is speculated that during an economic boom, more credit will be allocated in general to keep up with the procyclical nature of bank lending (Akinboade & Makina, 2009). However, the relationship between GDP growth and lending to the secondary and tertiary economic sectors is negative and significant, suggesting that when the economy is booming, the banking sector allocates less credit to those sectors. This is rather surprising, but it is argued that given the unstable macroeconomic conditions in Ghana, bank lending may not always follow accepted norms.

There is a positive but not significant relationship between lending to the secondary sector and monetary policy. This suggests that changes in the policy rate do not affect credit allocation to the secondary economic sector. It is conjectured that this may be the case given the low demand for loans from this sector. Interestingly, monetary policy exhibits a positively significant relationship with lending to the tertiary economic sector and with total lending, which implies that as the monetary policy stance tightens, loans to the tertiary sector increase. It is inferred that demand may be high for loans to that sector, given its fast-growing nature, such that even increases in the policy rate do not lower demand for tertiary sector loans. It is conjectured that this may be the case for total lending, because loans to the tertiary sector account for the bulk of loans granted by banks in Ghana. These results contradict those of Karim *et al.* (2006) who studied the relationship between monetary policy and the sectorial allocation of bank credit, and found a negative relationship between the two.

There is a positive and significant relationship between inflation and lending to the primary economic sector and total lending. This suggests that as inflation rises,

lending to the primary economic sector and total lending generally increase, possibly because as inflation goes up, the cost of the inputs needed for primary activities (such as agriculture and food security) increases. Banks would still have to grant credit to farmers and other professionals (such as fishermen) because, regardless of whether inflation rises, people have to eat. However, inflation exhibits a negative and significant relationship with lending to the tertiary economic sector, indicating that as the prices of goods go up, in general, lending to the tertiary sector generally decreases. This is possibly due to services and other tertiary economic activities not representing core activities, and because people may therefore reduce their demand for such services when inflation is high.

Although deposits have a positive relationship with lending to the primary and tertiary economic sectors and total lending, deposits which interact with monetary policy have a negative and significant relationship with lending to the primary and tertiary economic sectors and total lending. This implies that an increase in monetary policy causes deposits to decline, which leads to a reduction in lending to the primary and tertiary economic sectors and total lending. This is possibly due to the fact that when the policy rate is tightened, depositors may expect banks to raise the interest they pay on deposits. However, when this does not happen, depositors may not be motivated to deposit their money with the banks, which will lead to a decrease in deposits. This would then translate into a reduction in lending to those sectors. However, the interaction between deposits and monetary policy exhibits a positive but not significant relationship with lending to the secondary sector.

Wholesale funding interacted with monetary policy has a positive but not significant relationship with lending to the primary economic sector. There is a negative and significant relationship between wholesale funds and monetary policy interacted with lending to the secondary economic sector. This implies that an increase in the policy rate results in a decrease in the use of wholesale/non-deposit funding. This translates into a decline in lending to the secondary economic sector, which is mainly financed with wholesale funds. The relationship between wholesale funding and monetary policy interacted with and lending to the tertiary economic sector is positive and significant. Internal funding interacted with monetary policy has a negative relationship, which is significant, with lending to the primary and secondary economic sectors and total lending. This suggests that an increase in the policy rate results in a decrease in internal funding and translates into a decline in lending to the abovementioned sectors. This is quite surprising, but our conjecture is that an increase in the policy rate may cause banks to make use of other sources of funding, other than internal funds.

Table 7: Regression table for total lending

	Coeffi- cient	Std. err.	t	P>t
DEP	2.2841	0.4032	5.67	0.0000
WSF	0.1108	0.7166	0.15	0.8770
INTF	5.2182	0.8653	6.03	0.0000
BE	0.3481	0.0781	4.46	0.0000
BS	-0.0991	0.0331	-3.00	0.0030
GDPG	6.5932	2.6291	2.51	0.0140
MP	6.6489	2.5962	2.56	0.0120
INF	2.9510	1.1127	2.65	0.0090
OWN	-0.1485	0.0170	-8.74	0.0000
WSF*MP	-0.2119	4.8496	-0.04	0.9650
DEP*MP	-14.1604	2.6772	-5.29	0.0000
INTF*MP	-33.8678	6.0000	-5.64	0.0000
Constant	-0.7308	0.3362	-2.17	0.0320
F(12, 115)	15.25			
Prob> F	0.0000			
R ²	0.6140			
Adjusted R ²	0.5738			
Observations	128			
Hausman chi ² (11)	41.96			
Prob> chi ²	0.0000			

Note: DEP stands for deposits, WSF is Wholesale/non deposit funding, INTF represents internal funding, BE stands for bank equity, OWN stands for ownership, BS represents bank size, MP is monetary policy, INF represents inflation; GDPG stands for GDP growth. The standard errors are robust to heteroscedasticity.

6 Conclusions and implications

The study examined the effect of funding sources on the lending patterns of banks in Ghana, from 2005 to 2011, using a large and representative sample of 22 banks operating in the country. A single country study such as this provides an opportunity to control for the legal and business environment and to provide robust empirical evidence on the funding sources and lending patterns of banks in a developing economy. The regression results show a positive and significant relationship between lending to the primary and tertiary sectors, total lending and deposits. This implies that the primary sector, tertiary sector and total lending are mainly funded by

deposits, while loans awarded to the manufacturing sector are mainly funded with wholesale funds. In addition, the findings suggest that in Ghana, banks finance loans to the primary and secondary sectors using internal funds.

From a broader perspective, these results confirm findings in the literature that various bank level and macroeconomic variables affect bank lending. Bank funding sources also affect the sectoral lending practices of banks in Ghana, with deposits mainly being used to fund primary and tertiary sector loans, while wholesale funds are used in the case of the secondary economic sector. Additionally, the study concludes that funding to the primary and secondary economic sectors is also financed with internal funds. By interacting the policy rate with each of these funding sources, the study further notes that a tightening of the monetary policy stance results in a decline in deposits, which negatively affects lending to the primary and tertiary economic sectors and total lending. Similarly, an increase in the policy rate translates into a decline in the use of wholesale funds which negatively affects lending to the secondary economic sector. Furthermore, an increase in the policy rate results in a decline in the use of internal funding, which causes banks to make use of other funding sources in lending to the primary and secondary economic sectors. The overall implication of this finding is that banks' funding structures need to be considered in addition to the traditional bank-specific indicators, in assessing their ability to finance economic activities in a developing economy.

Other interesting avenues remain open for further research on the funding strategy and lending pattern of banks in Ghana. The current study does not directly analyse whether there is a bank lending channel operating in Ghana. It will be useful to analyse the extent to which a tightening of the monetary policy stance affects bank lending in Ghana.

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