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Does Spatial Proximity to Stock Exchanges enhance access to Funding to Small and Medium Enterprises?

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Abstract

Many researchers believe that in an economy where small and medium enterprises (SMEs) are well-funded, certain socioeconomic hurdles including poverty reduction, inclusive economic growth, equitable income distribution and economic diversification could be achieved. To boost funding to SMEs, countries create Alternative Securities Markets (second tier securities exchanges), called ASeM in Nigeria. The purpose of this study is to evaluate the viability of ASeM as fund provider to SMEs. Prior studies report that stock exchanges are space-sensitive in their service delivery. To provide insight into this spatial-proximity hypothesis, we use Logistic Regression Model and data from Nigeria. Our finding reveals that 1 Kilometer decrease in spatial-proximity to the exchange increases the odd of being listed on the exchange by 0.4628% and reduces the chance of being funded by the exchange by that margin. Informed by the result of our analysis, we recommend a state, provincial or zonal stock exchanges in place of ASeM to bring exchanges closer to SMEs.

Key words: *SMEs; Equity funding; Alternative Securities Market (ASeM); Regional Stock Exchange; Spatial Proximity; Logistic Regression Model.*

JEL classification: *G10; G18; G28; G32; O16; O18; O38*

1. Introduction

Expanding access to finance holds a promise for the growth and development of the small and medium scale enterprises (SMEs) in Nigeria. Even though SMEs hold a key to job creation and overall economic growth, their growth and sustenance in a developing country such as Nigeria is not keeping pace with expectation. Aremu and Adeyemi (2011) found that most SMEs in Nigeria fail before their fifth anniversaries. Besides, in countries at the equivalent level of development with Nigeria, SMEs contribute more to GDP than they do in Nigeria. For example, SMEs contribute 40%, on average, to GDP in Asian countries and 50% to Europe and USA, whereas they contribute only 1% in Nigeria (Oyelaran-Oyeyinka, 2013). The biggest constraint to the development of SMEs in Nigeria, according to researchers (A. Akinola, 2013; A. O. Akinola & Iordoo, 2013; Kauffmann, 2005) is lack of access to finance for expansion and sustainable development.

To solve this problem, many policies have been adopted by the governments of Nigeria. The successes of the policies in boosting access to funding to SMEs have been very limited. For example, in 1985, the Federal Government of Nigeria, through the Securities and Exchange Commission and the Nigeria Stock Exchange (NSE), initiated a market-based solution to the problem by creating alternative securities market (ASeM) (CBN, 2013). The ASeM, created to provide access to funding to SMEs operates as an extension of NSE but with less stringent listing requirements in terms of the costs of listing, financial reporting and the frequencies of reporting. A casual observation indicates that this alternative securities market policy, similar to others before it, does not appear to be increasing access to funding to the SMEs. Here is an indication: out of the documented 73, 000 (approximately) SMEs (2015 figure), ASeM have only been able to list 11 firms since 1985 (NSE, 2017). This implies that it is only the eleven SMEs listed on ASeM that can access funds on the exchange. Despite this remarkable indication of failure of this policy, there is a noticeable shortage of research to examine why and to indicate what policy could solve the problem. However, there are evidence suggesting that firms closer to stock exchanges disproportionately enjoy more access to funding than those farther away from the exchanges (Fafchamps and Schündeln (2013).

The first aim of this research is to test the market proximity hypothesis using data from Nigeria. The tenet of this hypothesis is that firms which are spatially closer to stock exchanges disproportionately enjoy the chances of being listed on the exchange than firms which are spatially farther away from the exchanges. This hypothesis is examined with reference to SMEs and the second-tier securities market in Nigeria. The result of the test is then used to support the argument that the ASeM may not likely solve funding constraints of the SMEs if exchanges are spatial proximity bias in the allocation of its finance. The study seeks to engage various concepts which can explain the risks and opportunities constraining being listed on the securities

markets and gaining access to funding especially by SMEs. Example of such concepts includes the information management, risk management, opportunity cost of capital, lending technologies, agency theories to mention a few. The second aim of this paper is to examine whether the spatial proximity hypothesis still holds in this era where technology and communication have become highly developed. In other words, this question aims to examine the extent to which improved technology and communication alleviate the information and other frictions in the financial markets.

The remainder of the study is organized as follows: The next section reviews literature on spatial proximity and access to funding in the securities markets. Section 3 plays host to the data and methods of analysis and section 4 displays the results of the analysis. Section 5 discusses the results of the analysis while section 6 concludes and suggests policy relevance of the study.

2. Literature Review

2.1. Financial intermediation

In this study, we trace financial intermediation to the work of Joan Robinson (1953). In her report, she argues that when a strong impulse to invest is frustrated by lack of finance, devices are invented; habits and institutions are developed to release it. The invention of devices and development of habits and institutions in the last sentence appear to be speaking to intermediation. Allen and Santomero (2001) describe the concept of intermediation as the creation of markets, designing of products, incentives and the setting up of rules to motivate market agents to meet and exchange. In the circumstance of this study, given a market-based environment, where there is a strong impulse to invest, it is only the presence of intermediaries that are needed, as explained above, for the SMEs to have access to funding. In this case, the intermediaries would design financial products, markets, and positively influence the rules of operations in the market to ensure that parties are motivated to meet and exchange. These intermediaries are the banks, capital markets and other financial organizations. Markets such as the ASeMs, according to Levine (1997), ameliorate information friction, transaction costs and perform other functions of intermediation to ensure that securities issuers get funded. If the market (ASeM) has been established, and SMEs are not funded, then further investigation should be done to uncover what else could hinder access to funding especially to SMEs. This is in part the purpose of this study.

2.2. Information asymmetry: what is it and what part does it play?

Information asymmetry exist where there are two or more parties to a transaction and one party to the transaction knows more about the transaction than the others and could use that knowledge to her advantage at the detriment of the others. In a lender-borrower relationship, the borrower is usually able to have more information

about the transaction than the lenders (the capital market investors). The situation is not better where the borrowers, in this case the SMEs, have no capacity (in terms of accounting) to provide the relevant information to help the investors to better understand the risks and opportunities in the projects which is the subject of the investment. Information asymmetry could also be enforced by the system's inability to regulate the information the SMEs provide to the market. The argument here is that lending and borrowing transactions could be frustrated where there is information asymmetry. Second, the asymmetry of information is more likely to exist in the SME/stock market relationship because of the SMEs information opacity/the accounting capabilities to provide relevant information.

Financial markets solve the information problem by requesting for the feasibility study of the projects or the prospectus prepared by the issuers disclosing the details about the projects or the reasons for the funding for the capital markets. The problem may not all be solved even where these documents are provided because the borrower is capable and could use the fund for another project once the fund is approved. Information asymmetry could also exist where the profile of the borrower is not known and the lender has no way of estimating the rate of borrower's credit default especially where credit rating agency is not available. The situation is intensified where one party, for instance, the lender has no capacity to stop the other party (the borrower) from cheating in the underlying transaction.

The consequences of information asymmetry are adverse selection, moral hazard and the escalation of monitoring costs (Hirshleifer *et al.*, 2016). Adverse selection speaks to a situation where one party has no benefit of information to enable her discriminates between two projects with different risk/returns profiles; in other words, where the investors make their choice blindly. Moral hazard, in this case, will be a situation where the informed party (the borrower) uses her information-advantage to invest in riskier projects (but with higher returns) after taking possession of the fund without the knowledge and permission of the lender. This situation put the investor (the lender) at disadvantage if the project fails and the credit remains unpaid. When this is suspected, the lender could hire an auditor or a professional to monitor the borrower to restrain her from taking advantage of her information and in the process, the lender incurs costs. This cost is referred to as monitoring cost (Cassar *et al.*, 2015). All these could affect SMEs' access to funding because when information asymmetry exists and the value is high, the lender may decide not to participate in the transaction and credit flow will be hindered.

2.3. The concept of transaction costs and its relationship with SMEs' financing

Transaction cost is one of the concepts that hold potential in explaining why SMEs may not access funding using ASeM. The context of this analysis is that the 73,000 SMEs (for instance) are located all over Nigeria and ASeM is in Lagos, the

commercial capital of Nigeria. Table 1 shows the number of SMEs, their locational distribution and driving distances in Kilometer to ASeM in Lagos. In what follows, we examine the connection between the distance of ASeM to the firms' location and SMEs' access to funding? This connection is in terms of the transaction costs.

Where there are no stock exchanges or financial institutions, the individuals with excess savings and desiring to invest will first identify the project; evaluate the project for investment, conduct due diligence on the managers of the project for management capabilities and moral character to ascertain their credibility with regards to keeping to the terms of repayments of the credits. The investor may also have to audit or cause to be audited the report made by the project managers for assurance that the revenue report is true especially when losses was reported. These explain the transaction costs which could potentially frustrate the investment and therefore the access to funding for SMEs. Levine (2005) argues that where the financial system is developed, these costs for the investors are minimized by the involvement of the stock exchange permitting savers to hold financial assets and firms to accessing funding. How then do we explain the case of ASeM in Nigeria, set up in 1985 and only listed 11 companies out of the approximately 73,000 in the country? The poor access to funding by SMEs using the transaction costs argument could be explained in two ways: it is either that the cost is so high that investment in the SMEs financial assets is unviable or ASeM (stock exchange) has no capacity to mitigate the costs and encourage investment in the SMEs stocks as explained by Levine (2005).

The other side of this argument borders on the fixed and variable expenditure in the going public. They include underwriting fees paid to the stocks underwriters, registration fees paid to the exchange and other professional fees. Subsequently, after being admitted to the exchange, companies pay annually the stock exchange fees, audit and distribute their financial statements at their expense. These expenses have no respect for the size of the companies and therefore tend to weigh relatively more on the small companies. This scenario, invariably, makes a case for a relationship between enterprise size and the probability of going public. Different proxies are used in the literature to measure firms' size. Pagano *et al.* (1998) use firm's sales volume while Rajan and Zingales (1996) use firm's total assets. Where these costs (costs of going public) cannot be met from the operations' outcome of the SMEs, the demand for the stock exchange funding will be frustrated and funding of SMEs will be limited.

Table 1: SMEs by states in Nigeria

STATE	Number of SMEs	Driving distance (km) from Lagos
Abia	1,809	584 km
Adamawa*	Nil	
Akwa-Ibom	1,093	669 km
Anambra	1,737	496 km
Bauchi	2,066	1270 km
Bayelsa	426	542 km
Benue	1,168	795 km
Borno*	Nil	
Cross-River	1,294	752 km
Delta	1,444	452 km
Ebonyi	1,210	685 km
Edo	1,979	323 km
Ekiti	1,029	289 km
Enugu	911	560 km
Gombe	1,108	1598 km
Imo	1,394	544 km
Jigawa	1,097	1202 km
Kaduna	2,882	784 km
Kano	8,286	998 km
Katsina	1,355	1226 km
Kebbi	989	869 km
Kogi	846	529 km
Kwara	226	303 km
Lagos	11,663	0.00km
Nasarawa	1,120	932 km
Niger	1,358	739 km
Ogun	1,794	109 km
Ondo	1,999	246 km
Osun	2,272	243 km
Oyo	7,987	134 km
Plateau	2,180	970 km
Rivers	3,022	604 km
Sokoto	841	970 km
Taraba	960	2131 km
Yobe*		
Zamfara	593	1136 km
Federal Capital Territory	2,690	737 km
Total	72,828	

Source: Central Bank of Nigeria, 2014

Note: * Adamawa, Yobe and Borno have no data. Possible reason: Boko Haram struggle in the areas during the time of the survey. Distance sourced from www.travelmath.com, accessed 18/5/17

2.4. *Spatial proximity to exchanges and access to funding by SMEs*

The argument in this section is whether capital market or indeed financial intermediaries are spatial neutral in providing funding access to SMEs. If the financial market is non-neutral spatially, it will be biased in the flow of capital to firms that are located at the periphery of the country away from the location of the exchanges and in regional development of those areas (Klagge & Martin, 2005). In Table 1 above, the total number of SMEs in Nigeria, according to the Central Bank of Nigeria survey of 2013 is 72,828. Out of this number, 84% are in the regions outside Lagos. This number of firms¹, for instance, would suffer credit allocation bias if the exchange that is in Lagos is space non-neutral in the capital allocation. Based on the information asymmetry and transaction costs discussed above, the stock exchange (and banks) would rather allocate fund to firms near it than to the ones farther from it. The implication of this behavior is obvious for economic development: first, capital resources would be misallocated in that a more profitable and efficient firm outside the stock exchange proximity may have no chance of being funded while the one with limited promises and inefficient is funded simply because it is in the vicinity of the exchange; and secondly, the regions with no credit or capital allocation will be slow in development giving rise to rural-urban migration (Klagge & Martin, 2005). The resource misallocation and allocation bias arguments could explain a country's poor national economic performance.

2.5. *The benefit of going public*

A number of researchers for the example Pagano *et al.* (1998) and Rock (1986) argue that the benefits of going public include the liquidity of the company's shares. Such benefits, according to the proponents of the argument, accrues mostly to the sufficiently large companies essentially because the liquidity of a company's share is an increasing function of the trading volume of its shares (Pagano *et al.*, 1998). One therefore, expects a positive relationship between company's size and the probability of being listed on the exchange. If size is proved to be relevant, SMEs are to this extent disadvantaged because SMEs are usually small and in their early stage of development.

2.6. *Other determinants of going public*

In a search for proxies for external finance needs, Rajan and Zingales (1996) found that technology companies and pharmaceuticals are more likely to depend on external funding in the course of their development than those with the conventional technologies. They argue that technology companies possess low fixed and high intangible assets. Such companies therefore would have a limited chance of securing

¹. Firms located outside Lagos – 61,176 or 84% of the total.

bank loans because banks may require collaterals which they may not have. Another attribute of the technology companies, according to Rajan and Zingales (1996), is that they do not usually make and distribute profits in the first few years of their operations. Paying interest on loan during these periods would be challenging (Mayer, 1990). On the pharmaceuticals, Rajan and Zingales (1996) argue that since the operations of these companies involves researching and testing of drugs, such may mean a long wait for cash inflows, forcing them to turn to the market for funds to bridge the periods. These arguments appear to support the hypothesis of a positive relationship between the nature of technology (for example, modern and high technology may depend more on external funding than the conventional ones) and pharmaceutical businesses on one hand and going public on the other. Following this argument, technology and pharmaceutical SMEs should be demanding stock exchange listing much more than the others. In sum, the SMEs which are no high technology or pharmaceutical are not at any advantage of being listed on the exchange.

2.7. Lending technologies and SMEs' access to funding

The argument that spatial proximity to stock exchange correlates with the chance of being funded by the exchange supports another to the effect that capital markets do not function in a pace-neutral way (Klagge & Martin, 2005). If these arguments are true, one expects to see a good percentage of SMEs that are in Lagos (about 11,663) being funded by the ASeM, all other things being equal. The story is not exactly so. To date, ASeM has only 11 listed companies. It appears then that spatial proximity is not likely to be the only variable affecting the chance of being listed on the stock exchange and funded. Research also points to factors such as lending technologies and agency problems as factors affecting SMEs and their chances of being funded by the second tier securities markets (Berger & Udell, 2002). This section examines lending technologies and argues that choice of lending technology could affect the flows of funds to SMEs.

Lending technologies are the methods of extending credits especially to small businesses by financial intermediaries. These methods are classified as transaction-based and/or relationship lending. Transaction-based lending covers lending practices using financial statements of organizations, assets values and credit scoring. It is most suitable where 'hard' rather than 'soft' information is available. The centralized organizational type works better with transaction-based lending because the information upon which to base the lending decisions is easily verifiable and could be communicated from place to place using the modern communication technologies (Berger & Udell, 2002). Transaction-based lending technologies are ill-suited to SMEs. This is because SMEs are generally opaque with regards to information; they have thin asset base and poor credit scores.

Another relevant lending technology for SMEs is relationship lending. It is one of the most powerful methods available to address information asymmetry problems in small and medium scale enterprises finance. Under this technology, financial intermediaries acquire information about the projects, the managers, the organizations over time through direct contact with the firms, its owners, local communities, suppliers, and customers. They use this information to decide on the availability and terms of credit to the SMEs. It should be noted here that our focus is on most of the SMEs with very high growth potential, often in knowledge-intensive, and high technology industries who have no access to bank funding because they have no collateral, credit rating or history. These firms are ill-suited for debt financing but for equity (Carpenter & Petersen, 2002). Berger and Udell (2002) argue that banks have been quite successful in using relationship lending to extend funding to many SMEs. Our follow-up argument is that this technology, as shall be seen later in this article, could also be used in the equity market to provide equity funding to SMEs in the neighborhood where the firms are located. This is because the firms are known where they operate; the owners and managers are also known and can be vouched for in those localities.

Literature observes that relationship lending requires a non-centralized organization type because of the peculiarities of the lending method. Relationship lending uses soft data, such as the information about ones' character, demeanor, the credibility of the owners of firms and the dominant culture of the firms' neighborhood. This information cannot be easily quantified, verified, and communicated through the conventional transmission mechanism (Berger & Udell, 2002). It may therefore not be suitable for a centralized organization with the headquarter-regional office types. Could this explain why ASeM and other alternative markets created to fund SMEs do not appear to be very successful? Can this also explain why the improvement in communication technology does not appear to change the way people invest in the stock exchanges? Can a case be made here for local, regional or alternative exchanges based on the knowledge of how investors invest or how they are bias in their portfolio choices? Some of these questions will be examined in this study and the others in the future ones.

2.8. Agency theory in the SMEs' funding gap

Agency theory attempts to explain, among others, two relationship frictions. First is where the principal and the agent have different but conflicting goals or where it is difficult and expensive for the principal to verify what the agent is doing. The second is where the principal and the agent have different and conflicting risk dispositions which show up in their difficulties to agree on actions which affect their common interest (Eisenhardt, 1989). The argument here is that inability to mediate agency frictions could frustrate fund flows to SMEs.

In this study, agency problems are noticed in two principal spots. One is where equity investor is interested in investing in SMEs despite their information opacity but the goals, risk appetite, and aspirations of the entrepreneur (project initiator) are not transmitted through any conventional reporting instruments to inform and enable the equity investors to take decisions. As it is traditional for investors to be risk averse, she is most likely to stop putting her money where she is not very certain. The access to funding for SMEs would suffer in such a situation where there is information asymmetry between the parties to the investment.

The second spot where agency friction appears in this study is with regards to the relationship lending. Research reports that it is operationally expedient for the loans officer to be the one responsible for the collection of the soft information regarding the projects, the managers, the owners and the business communities (Berger & Udell, 2002). This information, as we have noted in this study, is difficult to observe, store, verify or transmit to other decision makers within the organization. In such context, the authority to take a decision on the loan may be delegated to the loans officers in the offices closer to the site of the projects. Such a management situation may exacerbate agency friction between the loans officer and the bank or the lending organization. This is because there are opportunities and incentives for the loans officer to pursue different goals from those of the organization (Udell, 2008). Where there are challenges in resolving such agency problem, relationship lending technology may not be chosen and if there is no other technology suitable for lending to the SMEs, access to funding to the SMEs will be affected.

In summary, the discussion so far aimed at explaining that although spatial proximity may affect the SMEs' access to funding, the information asymmetries, agency costs, transaction costs, the size of the firm, the nature of technology used and the lending technology choice may be mediating and/or moderating factors.

2.9. Proximity preference theory and development in technology

It will be fitting to answer to some of the anticipated concerns of readers who may think that the improvement in communication, communication technology and electronic trading platforms could have made spatial proximity to exchanges irrelevant and therefore unworthy of policy consideration now. Such question had been the focus of proximity preference theory tested elaborately in the literature starting with the work of French & Poterba (1991). These authors tested what they called home bias in the behavior of the American equity investors and report the following findings: that the investors allocate nearly 94% of their funds to domestic securities even though the USA equity comprises less than 48% of the global equity market; Such behavior indicates home bias for USA stocks; that geographical proximity and information asymmetry play prominent role in the home bias behavior of the investors; and that the home bias behavior exist in other countries of the world as well. Similar

conclusion was also drawn by Rodrik and Subramanian (2009) to the effect that the activity ratio of the cross-listed companies on the London stock exchange is close to zero while those of the local companies is close to 99.5% even when the cross-listed stocks have higher returns.

Others, such as (Sarkissian & Schill, 2003, 2008, 2012, 2016) who contribute to this argument see proximity preference as going beyond spatial geography issues. According to the authors, home bias in portfolio choice covers consideration for culture, economic and industry. Therefore, the improvement in communication and trading technology would do little to solve the problem of spatial proximity hypothesis. These authors conclude that proximity preference is largely explained by permanent decrease in the cost of transactions in the shares of the listed firms. This decrease in transaction costs is occasioned by the effort to understand the firm in terms of its culture, industry and its location (Sarkissian and Schill, 2016). In another contribution, Dwyer and Kotey (2015) report a spatial correlation between the amount of capital raised by British SMEs from AIM (alternative investment market in the London Stock Exchange) and the firms' proximity to London – the site of the stock exchange. Proximity preference in the choice of investment portfolio is also driven by the investors familiarity with the firms (Kang, 1997). Led by this observation, Kang (1997) concludes that if familiarity is important to investors, companies wanting to raise funds from the market will more likely choose to list on more proximate exchanges. In concluding this section, it is safe to say that proximity preference explains investors home bias in portfolio choice, the issuers preference for proximate exchanges and the general resistance of the spatial proximity problems to amend itself to the improvement in technology (Pagano et al., 2001).

Theoretically, the spatial proximity argument appears to have been decided that firms located closer to stock exchanges enjoy better access to funding than those farther located. This is because investors are home bias in their portfolio selection French and Poterba, (1991) and issuers have preference for proximate exchanges when they want to list their securities (Kang, 1997). What may be remaining is empirical testing of the argument.

2.10. Overview of SMEs financing in Nigeria

Financing SMEs in Nigeria has received a mix of the private and public organizations' attentions. The private sector-led effort is driven by the Central Bank of Nigeria who in 1979/1980 financial year ordered commercial banks to set aside 10% of their loans portfolio for SMEs. The commercial banks barely complied with this directive because of the riskiness and non-competitiveness of SME loans and even accepted to pay the stipulated fine for non-compliance (CBN, 2014). In 1990, the directive to set aside 10% was increased to 20% and the directive was made mandatory. The average of the commercial bank loans to SMEs as a percentage of total credit between

2000 and 2005 was 6.02% and between 2006 and 2011 it was 0.41% (CBN, 2014). The 6.02% average loans to SMEs and the subsequent decrease in the number could only be explained by the fact that there is authority in the CBN's directives in the first instance and this authority gradually gave way to a more compelling economic rationality in funding the SMEs. In this case, the uneconomic nature of SME's credit Luper (2012) quickly overruled, bringing the ratio to 0.41% in 2011 from 6.02% in 2005.

Another notable effort by the private sector in solving the problem is that of the Bankers Committee's Scheme of 1999. Under the scheme, commercial banks are to set aside 10% of their profit after tax (PAT) for equity participation in SMEs. In addition, the scheme will provide financial, advisory, technical and managerial support to the SMEs (CBN, 2017). Data on the performance of this Scheme (SMEEIS) is not readily reported, its success, therefore, could not be evaluated.

Apart from the private sector-driven effort to finance SMEs, there is an array of the public-sector schemes in the literature attempting to address this funding gap. The list of such schemes includes but not limited to the Nigerian Industrial Development Bank (NDIB) established in 1962, merged with the Bank of Industry (BOI) and Family Economic Advancement Programme (FEAP) to become Bank of Industry in 2001. In the 1975-1980 Development Plan, a Small-Scale Industries Credit Scheme (SSICS) was created to provide technical and financial support to SMEs. The scheme failed for lack of manpower to supervise and monitor projects funded by it (CBN, 2014). Another institution established for a specific purpose is the Nigerian Bank of Commerce and Industry (NBCI) in 1973. This bank, created in the wake of the 1973 indigenization policy of 1972 was to provide long-term investment financing and equity to SMEs. It also operated as equity shares underwriters and undertook project identification and feasibility studies. The bank was funded through government subvention and penalties paid by commercial banks for not complying with the CBN directives on SME funding. The bank suffered operational challenges and became ineffective and was liquidated as discussed in this study in 2001 (CBN, 2014).

Other public sector-related schemes include the World Bank SME 1 Loans scheme of 1984, World Bank SME 11 Loans scheme commenced operations in 1990, and these loans were taken by the Federal Government to support SMEs after the adoption of the Structural Adjustment Programme (SAP). Others include the National Economic Reconstruction Fund (NERFUND), Refinancing and Rediscounting Facility (RRF). RRF was designed to support banks that would finance SMEs because most banks were prone to financing general trading that was more economical viable in terms of profit and liquidity than financing SMEs. The number of the schemes appears to be unending. There was N200 Billion SME Credits Guarantee Scheme (SMECGS), N200 Billion Manufacturing Restructuring/

Refinancing Facility, N200 Billion Commercial Agricultural Credit Scheme and the Nigerian Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL) of 2011 introduced to address the risk and capacity constraint in agriculture (CBN, 2015). The creation of most of these schemes did not appear to be supported by empirical research and their achievements were not also evaluated empirically. The limited success of these schemes and the generally recognized efficacy of the market-driven policy interventions which incorporate private ownership La Porta et al. (1998) and a solution for agency problems Berger and Udell (2002) are in part the motivation for this current study.

3. Data and Methods

3.1. Variables and data

This study investigates the spatial proximity bias in the services of stock exchanges. It uses as proxy relationship between the spatial proximity of firms to the main stock exchange in Nigeria and their probability of being listed on the stock exchange. The dependent variable is the probability of listing on the stock exchange. This dependent variable is a dichotomous variable taking the value 1 if the firm is listed and 0 if it's not listed. Our sample is made up of 200 firms of which 60% are listed while 40% are not listed. The listed companies are obtained from the website of the Nigerian Stock Exchange (www.nse.gov.ng) while the unlisted ones are obtained from website of the Manufacturing Association of Nigeria (MAN). The sample is purposely drawn based on the firm having the other information needed for the analysis. The independent variables are the absolute driving distance in Kilometers from the exchange and the nature of technology used by the firms and age of the firms in years. The nature and age of the firm are used in line with Rajan and Zingales (1998) who argue that nature of firms and their ages predisposes them to the use of external finance. Technology firms with no large fixed assets, according to the authors, would rather raise capital in the stock exchange than go to the banks because they would have no collaterals. Similarly, firms (such as pharmaceutical companies) engaged in research as part of their operations, would have long gestation periods and would rather go to the stock exchange to raise fund to fill the period of their waiting. So, age and the nature of the firm are expected to influence decisions to be listed on the stock exchange.

We measured distances of the firms from the stock exchanges as follow: the intra-city distances were obtained from www.distancecalculator.globalfeed.com and the intercity distances were obtained from www.travelmath.com. The nature of the technology of the firms and their ages were obtained from the websites of the companies. The data for distance and age are continuous while the one for the nature of technology is a dummy where 1 represents high tech and pharmaceutical and 0 represents the conventional and non-pharmaceuticals.

3.2. Methodology

This study used Logistic regression model specified as

$$f(z) = \frac{1}{1 + e^{-z}} \quad (1)$$

where

$$Z = a_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon \quad (2)$$

where Z , the dependent variable, is a dummy of 1 if firm is listed and 0 when firm is unlisted, X_1 represents the driving distance in Km from the Stock Exchange and is a continuous data; X_2 is a proxy for the nature of technology/pharmaceuticals. X_3 is a dummy of 1 for high tech or pharmaceutical, and 0 for the conventional technology. X_3 is a continuous variable for the age of the firms, a_0 is an intercept and ε is the error term.

In specifying the model, the variables were individually rigorously evaluated using delta-beta-hat approach. Some variables, for example the nature of the firms' operations -retail or wholesales, were deleted because they were adjudged to have added nothing to the efficiency of the model. The model as specified reduces the odd ratio of the variable of interest- spatial proximity- by 4.1% (delta-beta-hat-percent = $.481827 - .462847 / .481827 * 100 = 4.1\%$) ($.481827$ = odds ratio when there is only one variable – distance - in the model and $.462847$ = odds ratio when technology and age are added) making the model in terms of its variables an efficient one.

The model is estimated using the Maximum Likelihood Estimator (MLE). MLE is reputed to be sufficient, consistent and efficient estimator for models with maximum and minimum range of variables (Myung, 2003). It accounts for the potential heteroskedasticity and corrects standard errors for the non-dependent cross-observations on the same spatial proximity (Kleinbaum & Klein, 2002).

4. Interpreting the Results

From Table 2, the coefficient of -0.7704 for logged distance also gives odds ratio of 0.4628 and the marginal effect of -0.0797. Using the odds ratio, it could be explained that 1km decrease in spatial proximity to the stock exchange would increase the relative odds of being listed on the exchange by 0.4628%. Odd ratio is widely used as a measure of association as it approximates how much more likely or unlikely it is for the outcome to be present or absence, in this case being listed or not listed on the exchange (Hosmer Jr, Lemeshow, & Sturdivant, 2013). This result agrees with those of Klagge and Martin (2005) and Allard, Tolman, and Rosen (2003) on similar study. The coefficient for logged distance is negative as expected, indicating the negative relationship between the distance of firm's location to the exchange and the chance of being listed on the exchange. Log age also has a coefficient of 0.8121 and odd

ratio of 2.2527 indicating that the odd of older firms being listed on the exchange is positive. This result agrees with Mayer (1990) on the relationship of age and the possibility of being listed on the exchange. The coefficient of the variable of interest is statistically significant indicating that the model is stables.

Table 2: Summary of regression results

Factor	coefficient	Standard error	p-value	Odds ratio	Marginal effect	Area under curve	LR Chi-square	Classification
cons	1.2192	1.0142	0.1710	3.3846	-	82.29%	30.52	83.44%
Log Dist	-0.7704***	0.2377	0.0010	0.4628	-0.0797			
Log age	0.8122***	0.4730	0.0000	2.2528	0.0840			
Tech.	0.0333	0.7392	0.9640	0.9673	0.0004			

*Notes:*** denotes significance at 1%*

4.1. Model diagnostic

The object here is to demonstrate that our model is parsimonious as explained under model specification above and the estimator is efficient (explained below). In evaluating the efficiency of the Logistic Regression Model as a model estimator, Log likelihood, Likelihood ratio, Chi square, classification and the area under the receiver operating characteristic curve (ROC) which is also known as the Lorenzo curve were used. The log-likelihood of the model is -56.2713 as against the benchmark of -50.00%. This benchmark is used in Harrell (2015). The likelihood ratio Chi square of 30.52 is also reported. This figure is considered high for Logistic regression model according to Mittlbock and Schemper (2002). Another fitting criteria used in this analysis is the area under the ROC which is equivalent to another criterion – classification. This criterion specifies the degree of likelihood correctly classified by the estimator. It measures the discriminating power in terms of classifying outcomes into listed or not listed. Harrell (2015) specifies a benchmark range of 0.7 and 0.8 as an acceptable discrimination and 0.8 and 0.9 as an excellent discrimination in logistic regression. The classification (or goodness of fit) in this analysis is 83.44% making Logistic Regression excellent estimator in the analysis.

5. Discussion of the Results

There are demand and supply frictions that explain the results of our analysis where the reduction in the spatial proximity of firms to the exchange increases the likelihood of not being listed on the exchange. The finding of this study is that stock exchanges (ASeM) is space non-neutral. This behavior of the exchange could be explained using agency problem, choice of lending technology, transaction costs, investors' home bias, issuers' proximate preference, and information asymmetry. Most of the mediating

factors such as the investors' home bias, issuers' proximate preference, and lending technologies are not individually tested in this study for the Nigerian market. They cannot therefore, be claimed to explain the spatial proximity hypothesis in the study even though they have potential to explain the finding (Udell, 2008). Some other factors including agency frictions and transaction costs could only be suspected until they are confirmed. This is because the possibilities of easing these frictions using financial reporting, mandatory disclosure, corporate governance and audit assurance are frustrated by the size and the financial in-capability of the SMEs.

Beyond spatial proximity, several other factors are important in the decision to go public. These factors could constrain or permit SMEs' access to equity funding. These can be seen in the case of Lagos, the site of the nation's premier stock exchange – the NSE; out of 11,663 SMEs located in Lagos, only a handful (11 in number) are listed on the ASeM. What are the other important factors in the decision to go public and what is known about them in relation to firms listed on the stock exchange?

Pagano *et al* (1998) identify several of these factors as potential determinants of listing decisions including the size, using new and high technology and being research intensive. Some other factors are listed as those that are reducing the urge of the firms to go public. They include loss of confidentiality, loss of ownership and control, IPO underpricing and the fixed transaction costs of listing. In this study we assume that companies in the sample have needs for external funding, are willing to get listed and understand the processes and the consequences of being listed on the stock exchange. The insight of all these would be ascertained where a wider sample study is conducted.

6. Conclusion and Recommendation

In this study, we set out to examine the relationship between the firms' spatial proximity to the stock exchange and the probability of getting listed or not being listed on the exchange. The results of our analysis reveal that the relationship appears to exist. Our analysis shows that a 1 kilometer decrease in distance away from the location of the stock exchange increases the odd of being listed by 7.97%. If this finding is true, it means that a firm needs to be around Lagos, the site of the stock exchange to have a chance of being listed and be funded by the market. The implication of this goes beyond the firms; the stock exchange behavior would result in regional economic development bias and the larger implication of rural-urban population drift. It could also affect the national economic performance through inefficient allocation of resources. This conclusion agrees with those of (Dodd & Louca, 2015; French & Poterba, 1991; Ghadhab, 2016; Sarkissian & Schill, 2003).

To understand the complexity of this development, one needs to look at the political map of Nigeria and the number of SMEs scattered around it. Out of 72,828 SMEs

in Nigeria, only 11,663 (5.11%) are located in Lagos; 61,165 others are located around the regions of the country and their proximity to stock exchange ranges from 109km for Ibadan to 2131 km for Taraba in the North Eastern region respectively. To confirm the suspicion, a casual observation shows that no company in many states of Nigeria including Taraba, Bornu, Adamawa, Cross River, Zamfara, Yobe etc is listed on the Nigeria Stock Exchange or the alternative market. Additionally, 99.4 % of those listed are in Lagos and the states neighboring Lagos such as Ogun, Oyo and Edo states.

It is reasonable to note that spatial proximity alone does explain why companies in far-away regions from Lagos are not listed on the Exchange in Lagos. Several studies report have found statistically significant association between spatial proximity to the exchange and access to funding in different countries. For example, Klagge and Martin (2005) report that in the UK, out of the 1970 companies listed on the London Stock Exchange in 2003, 1156 of those companies are located in London and South East England (neighboring community to London). Together these companies (companies in London and the South East England) account for a total market capitalization of 80.1% while the 19.9% is shared among other regions including Scotland, Midlands, Eastern/ North East /York-Humber, South West and Wales. We will not be very surprised to know that the economic development in these regions reflects these spatial distributions of the market listing. What then is the policy implication of our findings?

The policy implication of our findings is that the ASeM (the Alternative Securities Market) does not appear to offer practical solution to the funding to SMEs. Our practical observation supports the empirical findings. ASeM was established in Nigeria since 1985, it has only 11 listed small-scale enterprises out of the approximately 73,000 SMEs according to the Central Bank Survey of 2013. Secondly the existing theories of market development and financial market intermediation do not appear to support the concepts of the alternative markets and performance. This is because the alternative markets as they are currently operated follow the same principles as the main markets and do not consider the peculiarities of SMEs.

Regarding the nature of SMEs, literature sees SMEs as small businesses, owned and run by one person (most of them), with sub-standard management and accounting skills, located widely in the regions of the country away from the metropolitan cities, and opaque with regards to information. To make sense of the non-alignment of the ASeM principles and the SMEs' profile, we have to review the ASeM's listing requirements for SMEs (www.nse.gov.ng)². Most of these requirements involve more

² They include 2 year comprehensive business plan, 2 year audited financials not older than 9 month, and the continuous submission of quarterly, semi-annually and annual audited financial reports prepared using IFRS standards.

pecuniary commitment than most SMEs can bear. Other requirements with financial implications include listing fee of N200, 000 flat, application fee of N100,000 flat, cost of underwriting, expected to be high because the companies are unknown and the hidden IPO underpricing which occurs when shares are newly listed.

There is therefore, a clear need for an alternative to the ASeM. Such alternative must consider not only the profile of the SMEs but the factors that determine market development. These factors according to Chami, Fullenkamp, and Sharma (2010) include the threats and incentives to all the stakeholders in the markets.

An alternative to the current ASeM must be one that is designed to take into consideration all cost-sensitive issues vis a vis the ability of the SMEs, the threats and incentives to parties in the market, the bigger picture which is the development of the national financial market, the regional and national economic development. Such a market should be regionally located, depends less on financial statements but more on relationship lending technology and on a completely de-centralised organizational structure. In addition, it should be well-regulated.

This is not a novel idea. The Capital Trade Point in the Nigerian Securities Law of 1999 was designed to fulfill similar purpose. Unfortunately, that law has not been implemented. Similarly the concept of Regional Stock Exchange, once very active in the UK and Germany, closed in the 1970, is currently being discussed for possible re-implementation for the sole purpose of easing frictions in the access to funding to SMEs (Hommel & Schneider, 2003; Klagge & Martin, 2005). Finally, this study should be seen as a preliminary examination of this issue. Better insight could only be claimed where wider sample, moderating factors and other methods of analysis are employed.

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References

- Akinola, A. (2013). Entrepreneurship in Nigeria-Funding and financing strategies. *European Journal of Accounting Auditing and Finance Research*, 1(4), pp. 115-128.
- Akinola, A. O., & Iordoo, D. A. (2013). Effects of the Nigerian Capital Market on the Micro, Small and Medium Scale Enterprises (MSMEs) in Nigeria. *Research of Journal of Finance and Accounting*, 4(7), pp. 1-14.
- Allard, S. W., Tolman, R. M., & Rosen, D. (2003). Proximity to service providers and service utilization among welfare recipients: The interaction of place and race. *Journal of Policy Analysis and Management*, 22(4), pp. 599-613.
- Allen, F., & Santomero, A. M. (2001). What do financial intermediaries do? *Journal of Banking & Finance*, 25(2), pp. 271-294.
- Berger, A. N., & Udell, G. F. (2002). Small business credit availability and relationship lending: The importance of bank organisational structure. *The Economic Journal*, 112(477), pp. F32-F53.
- Carpenter, R. E., & Petersen, B. C. (2002). Capital market imperfections, high-tech investment, and new equity financing. *The Economic Journal*, 112(477), pp. F54-F72.
- Cassar, G., Ittner, C. D., & Cavalluzzo, K. S. (2015). Alternative information sources and information asymmetry reduction: Evidence from small business debt. *Journal of Accounting and Economics*, 59(2), pp. 242-263.
- Chami, R., Fullenkamp, C., & Sharma, S. (2010). A framework for financial market development. *Journal of Economic Policy Reform*, 13(2), pp. 107-135.
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (1998). Law and finance. *Journal of Political Economy*, 106, pp. 1113-1155.
- Dodd, O., & Louca, C. (2015). International Cross-Listing and Shareholders' Wealth.
- Eisenhardt, K. M. (1989). Agency theory: An assessment and review. *Academy of Management Review*, 14(1), pp. 57-74.
- Fafchamps, M., & Schündeln, M. (2013). Local financial development and firm performance: Evidence from Morocco. *Journal of Development Economics*, 103, pp. 15-28.
- French, K. R., & Poterba, J. M. (1991). Investor diversification and international equity markets. NBER Working Paper No. 3609.
- Ghadhab, I. (2016). The effect of additional foreign market presence on the trading volume of cross-listed/traded stocks. *Journal of Multinational Financial Management*, 34, pp. 18-27.
- Harrell, F. (2015). Regression modeling strategies: with applications to linear models, logistic and ordinal regression, and survival analysis: Springer.

- Hirshleifer, D. A., Huang, C., & Teoh, S. H. (2016). Information Asymmetry, Market Participation, and Asset Prices.
- Hommel, U., & Schneider, H. (2003). Financing the German Mittelstand. *EIB Papers*, 8(2), pp. 53-90.
- Hosmer Jr, D. W., Lemeshow, S., & Sturdivant, R. X. (2013). Applied logistic regression (Vol. 398): John Wiley & Sons.
- Kang, J.-K. (1997). Why is there a home bias? An analysis of foreign portfolio equity ownership in Japan. *Journal of Financial Economics*, 46(1), pp. 3-28.
- Kauffmann, C. (2005). Financing SMEs in Africa, African Development Bank and OECD Development Center, Policy Paper No. 7(2077-2599).
- Klagge, B., & Martin, R. (2005). Decentralized versus centralized financial systems: is there a case for local capital markets? *Journal of Economic Geography*, 5(4), pp. 387-421.
- Kleinbaum, D. G., & Klein, M. (2002). Polytomous logistic regression. Logistic regression: a self-learning text, pp. 267-299.
- Levine, R. (1997). Financial Development and Economic Growth: Views and Agenda. *Journal of Economic Literature*, 35(2), pp. 688-726.
- Levine, R. (2005). Finance and growth: theory and evidence. Handbook of economic growth, 1, pp. 865-934.
- Mayer, C. (1990). Financial systems, corporate finance, and economic development Asymmetric information, corporate finance, and investment (pp. 307-332): University of Chicago Press.
- Mittlbock, M., & Schemper, M. (2002). Explained variation for logistic regression-small sample adjustments, confidence intervals and predictive precision. *Biometrical Journal*, 44(3), pp. 263-272.
- Myung, I. J. (2003). Tutorial on maximum likelihood estimation. *Journal of Mathematical Psychology*, 47(1), pp. 90-100.
- Pagano, M., Panetta, F., & Zingales, L. (1998). Why do companies go public? An empirical analysis. *The Journal of Finance*, 53(1), pp. 27-64.
- Pagano, M., Randl, O., Röell, A. A., & Zechner, J. (2001). What makes stock exchanges succeed? Evidence from cross-listing decisions. *European Economic Review*, 45(4), pp. 770-782.
- Rajan, R. G., & Zingales, L. (1996). Financial dependence and growth. *The American Economic Review* 88 (3), pp. 559 - 586
- Robinson, J. (1953). The production function and the theory of capital. *The Review of Economic Studies*, 21(2), pp. 81-106.
- Rock, K. (1986). Why new issues are underpriced. *Journal of Financial Economics*, 15(1-2), pp. 187-212.

- Rodrik, D., & Subramanian, A. (2009). Why did financial globalization disappoint? IMF staff papers, 56(1), pp. 112-138.
- Sarkissian, S., & Schill, M. J. (2003). The overseas listing decision: New evidence of proximity preference. *The Review of Financial Studies*, 17(3), pp. 769-809.
- Sarkissian, S., & Schill, M. J. (2008). Are there permanent valuation gains to overseas listing? *The Review of Financial Studies*, 22(1), pp. 371-412.
- Sarkissian, S., & Schill, M. J. (2012). The nature of the foreign listing premium: A cross-country examination. *Journal of Banking & Finance*, 36(9), pp. 2494-2511.
- Sarkissian, S., & Schill, M. J. (2016). Cross-listing waves. *Journal of Financial and Quantitative Analysis*, 51(1), pp. 259-306.
- Udell, G. F. (2008). What's in a relationship? The case of commercial lending. *Business Horizons*, 51(2), pp. 93-103.