A search for Theory of Financial Market Failure in Lower Income Countries (LICs) and implication for Financial Exclusion.

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Title: *A search for Theory of Financial Market Failure in Lower Income Countries (LICs) and implication for Financial Exclusion.*[1]

Abstract

We demonstrate in this paper using transdisciplinary approach that the same theory of information asymmetry that explains the raison d'être of financial intermediaries also explains why financial exclusion exists. This paper synthesises some elements of theories of finance and economics in developing a theoretical framework towards the understanding of why financial exclusion exists, and appears to be widespread in lower-income countries (LICs). The paradigm emphasises that financial market frictions that generate information asymmetry, risk and transaction cost associated with lending, contribute significantly to why exclusion occurs. The role fiscal deficit financing that crowds-out the private sector completely plays towards exclusion is also emphasised. The model predicts that excessive fiscal borrowing, market imperfection that allows '*arbitrage value'* to be exploited, and excessive taxation, tend to widen the financial exclusion gap for the private agent. In contrast, growth in income and private investments tend to reduce the exclusion gap, hence, inclusion stimulating. The policy direction is curved towards choices that will minimise the tendencies and prevalence of financial exclusion in economies, especially the developing world.

Key Words: *Financial Exclusion, LICs, Information Asymmetry, arbitrage value, crowding-out effect, QAT*

JEL Classification: G210, E44, G280 D82

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1 Introduction

Financial inclusion which connotes participation and the use of formal financial services promises welfare benefits to households (Allen, Demirguc-Kunt, Klapper, & Pería, 2016). The concept thrives on the recognition that a significant section of society is excluded from participating in the formal financial sector, and seems to have taken centre stage on the global policy agenda in recent times (UNSGSA-Annual_Report, 2016).

Though academic research works on the concept of inclusion are emerging, there is no theoretic proposition that seeks to provide a unified explanation to how financial exclusion occurs in the first place, and why it appears endemic in countries that are both economically and technologically challenged. Existing theoretic frameworks on the *raison d'être* of FIs provide no linkage with why financial exclusion exists. This observed gap implies that there is the tendency of policies formulation that lacks theoretical basis needed to understand why financial exclusion exists and appears to be widespread in developing countries.

Many theories exist in explaining why financial intermediaries exist. From the 'information asymmetry and transaction cost paradigms', 'regulation arguments', to the delegated monitoring (Diamond, 1984), and the recent, 'risk management views'(Scholtens & van Wensveen, 2003), frantic attempts have been made in explaining the *raison d'être* of financial intermediaries (FIs). However, none of these theories has perceived the FI as a firm whose *raison d'être* and primary objective is to maximise profit. Besides none of these theories provides a clear linkage between the *raison d'être* of FIs and why exclusion exists. This gap is filled through a simple model proposition in this paper.

The paper builds a partial equilibrium framework of financial market. The framework is in search of theory of financial market failure and the implication it holds for financial exclusion in LICs (Demirgüç-Kunt & Klapper, 2013). The emphasis is placed on capital structure decision of intermediaries within the constraint of profit-maximization. The model combines ideas from existing theories that attempt to explain why credit constraints exists. In this, theory of information asymmetry, transaction cost, capital structure and neoclassical loanable fund theory serve as the building block. Keynesian savings/consumption model is also incorporated in developing this model. The purpose is to find a plausible unified explanation to an emerging stylised fact of the existence of significant financial exclusion in LICs. This is a first attempt to build such a model relevant to the understanding of: i) how financial exclusion occurs and ii) why it appears endemic in LICs (Atieno, 2001; Demirgüç-Kunt & Klapper, 2012) where the performance of the financial market is imperfect. This is primarily motivated by the general absence of a unified model that explains the underlying phenomenon. The *theory of asymmetric information* is not only crucial to the explanation of why intermediaries exists, it is central to the understanding of why financial exclusion persists, especially in LICs.

> **Proposition I:** *Financial exclusion cannot be explained outside the raison d'être of financial intermediaries.*

1.1 Literature Contextualisation

In keeping with the industrial organisation theory (Freixas & Rochet, 2008), the presence of market friction in the form of transactional technologies always necessitate the existence of an intermediary as a go-between (Allen, 1999; Williamson, 1989). Financial intermediaries (FIs) are specialised agents that trade in financial claims (Freixas & Rochet, 2008) by simultaneously buying claims issued by borrowers and selling claims to savers (Krasa and Villamil, 1992; Moore,1989).

However, FIs are more than being mere traders due to the nature of their financial contracts. If production is the transformation of input into outputs (given technology), then FIs as transformers of financial contracts and securities (Fama, 1980; Gurley, Gurley, & Shaw, 1960; Scholes, Benston, & Smith, 1976) behave like any other producing firms. The motif is to see FIs as profit-motivated firms that seek to maximise returns within constraints of cost imposed by transaction and risks (information asymmetry). In this, the objective of financial intermediary (firm) is not any different from traditional profit-maximization motive that drives any other firm (Freixas & Rochet, 2008).

The proposition confronts existing theories on intermediation that perceive intermediaries as producers of information, delegated monitors in an agency relationship (Diamond, 1984) or risk managers (Scholtens & van Wensveen, 2003). Such suppositions confine the behaviour, and the *raison d'être* of financial intermediaries to the pursuance of interest of others (savers) instead of their own. Three reasons are offered to challenge the position above.

First, depositors are not owners of the intermediary business and as such, they receive interest as any other creditor. For the FIs to be regarded as delegated agents (Diamond, 1984) to monitor borrowers on behalf of savers suggests that the latter is part or proxy owners of the venture for which the amount has been borrowed. Second, unlike capital market where buyers of stocks have the right to know and monitor the performance of the borrowing firm, the indirect financing involving financial intermediation operates differently. Thus, the principles of commercial secrecy, anonymity and confidentiality in lending require that depositors are not aware of who uses their fund. Thirdly, there is no contractual agreements between depositors and borrowers as would be expected under direct financing via the stock market.

This framework emphasises the role of financial market friction that generate information asymmetry, risk and transaction costs associated with business of lending as important factors that explain the existence of financial exclusion.

The risk-based theory (Scholtens & van Wensveen, 2003) argues that FIs assume risk for producing financial products and services. In using their owners' initial equity capital as required by monetary authorities, they assume risk in view of expected returns as they add value. Like any other entrepreneurial venture, meeting needs identified is key to be in business. In view of this, Scholtens and van Wensveen (2003) see FIs as entities that meet the needs of both savers and investors. Because some FIs do not accept public deposits, underscores the point being advanced. That is, *deposit acceptance is a leveraging decision that FIs take as a necessary but not sufficient condition for their existence*. In this case, the authors posit that the

FIs have only one business; *production and supply of financial services and products*. The optimal capital structure decision becomes a matter of choice, just as any other firm.

> **Proposition II:** *The primary business of FIs is to produce (supply) financial services and products towards profit-maximisation.*

2 The Model

2.1 Production Theory of the Firm

Neo-classical theory of production under the assumption of perfect market has been applied to the intermediation process (Scholtens & van Wensveen, 2003). Seen as any other firm, intermediaries produce financial products and sell them with profit maximization as the driving motive (Bhattacharya & Thakor, 1993). Under this assumption, inputs such as capital and labour are employed. Managers of this firm (e.g., banks) maximise profit when they are able to perform the function of qualitative assets transformation (QAT) (Bhattacharya & Thakor, 1993).

Financial intermediaries specialise in QAT when they are able to transform maturity duration, divisibility in terms of unit-size, liquidity and credit risk (Bhattacharya & Thakor, 1993; Greenbaum, Thakor, & Boot, 2015). By transforming short-dated, fluid liabilities using the principle of large numbers, the intermediary's liabilities behave as though they are long-term loans capable of financing long-term assets and lumpy projects (Bhattacharya & Thakor, 1993). The performance of QAT function requires intermediaries to strictly apply the law of large number (Diamond, 1984; Freixas & Rochet, 2008; Krasa & Villamil, 1992). This law simply states that for equal withdrawals that occur at any given time, the intermediaries are able to match it with more deposits than withdrawn (Agyekum, 2011). This allows the intermediaries to borrow short and lend long. For deposit-taking intermediaries, the aggregated deposits mobilised from small savers therefore become *debt-financing* in their capital structure. For the non-deposit taking intermediaries however, the capital structure will only comprise of equity without debt component, unless conventional debt instruments are raised. In view of this, deposit-taking intermediaries thrive on the significant information gap that exists between the suppliers and demanders of credit. By exploiting such information asymmetry between these two market players, FIs are able to transform both maturity terms and liquidity preferences of either side of the market. The above descriptions sum up to the balance sheet portfolio management (Fama, 1983) as the prime focus of intermediary as a producer. Freixas & Rochet, (2008) observe however that, under the Arrow-Debreu complete market paradigm, the FI's balance sheet management tends to have no effect on the real sector agents.

Indeed, what the production theory of the firm has failed to establish is the connection to the capital structure of the intermediary as a firm. This failure has the tendency to push the role of savers in obscurity. Notably, financial intermediaries viewed as producers, may only have to be concerned about buyers (borrowers) of their outputs that guarantees their profitability. View this way, the role of savers/depositors appears less relevant. In the light of this, capital structure paradigm is proposed as an extension.

Following Myers' (1977) argument of 'debt overhang' for example, Allen and Santomero (1997) suggest that FIs have strong preference for internally generated fund (IGF), when friction in the capital market makes external financing costly. However, to avoid under investments, they seek external financing. Factors such as potential bankruptcy, transaction cost and information asymmetry, contribute to the high cost of external financing. The assumptions that guide the development of our model are outlined below.

i.) FIs, established by profit-motivated rational entrepreneurs produce financial services and products.

ii.) Capital is required as an input to complement the labour necessary to supply the outputs (financial services). However, capital in its broader sense and in line with King and Levine (1993), is assumed to comprise of physical, intangible and human capitals. The implication is that output (loan/lending services) of the intermediary firm will not vary with labour but rather the quantity of funds it mobilises as public deposits.

iii.) The entrepreneurs (owners) provide their initial equity capital in the form of a mandatory minimum capital requirement.

iv.) The firm has the option to supply their service solely on the basis of their equity capital or supplement it with debt-financing.

v.) The various debt-financing options ranked in a pecking-order based on the ease, convenience and cost of such capital (debt), include borrowing from; i) the public using deposit claim as instrument, ii) interbank money market, iii) international financial market; iv) and finally from the Central Bank. To keep things simple, the firm's capital structure consists of the *mandatory equity capital requirement* and the *debt component* in the form of public deposits mobilised. The short-term nature of such liabilities as acknowledged by Bhattacharya and Thakor (1993), requires special skills to transform such short maturity durations. The optimal portfolio choice of the firm's capital structure is based on cost considerations underpinned by the risk-returns, as each of these debts options attracts interest.

vi.) They perform the function of qualitative assets transformation (QAT) (*explained later*) and incurs transaction cost of such functions (Bhattacharya & Thakor, 1993).

vii.) The cost of debt is the interest that is paid on deposits, analogous of what the leveraged firm pays for the use of debt in their capital composition.

viii.) The spread between the fees and other interest charged for selling their products (to the deficit units), and the cost of debts (interest on deposit), constitutes their profit (Kwakye, 2012).

Following the viii) above, the following core assumptions are key to understanding the simple model postulated:

a) There exist two different markets for credit, separated by information gap. This gap allows FIs to enter into two separate financial contracts that is mutually exclusive (Krasa and Villamil, 1992; Moore, 1989). This gap referred to as *inter-market information asymmetry* (IMIA), allows FIs to exploit *arbitrage value (av)* equivalent to *interest rate spread*.

b) An intermediary will borrow at rate r_D from sub-market 'A' *(for convenience, called Deposits Market)* and repackages the borrowed amounts for onward lending in the other sub-market 'B' *(Lending Market)* at price r_L, such that $r_L > r_D$. The FI closes the deal in market 'A', takes advantage of IMIA as there is *no cross-sharing of information* between the two sub-financial markets. The difference between r_L and r_D constitutes the *spread* (Kwakye, 2012).

c) The value of the arbitrage advantage is equivalent to the *risk premium* the firm adds to the cost of debt (r_D) it pays to depositors (in Market A). This indeed depends on depth of *the IMIA,* which gives rise to the transaction cost and risks that the firm assumes as a go-between in performing the *QAT* function. QAT function requires that the short-dated deposits from market ***A*** is repackaged and resold in market ***B*** in the form of long-term claims they hold from the *real sector* borrowers.

d) The assumptions (*a-d)*, presuppose that depositors who supply funds in the deposit market *(A)* are completely or partially oblivion of what goes on in market *B'*.

Though asymmetry between FIs and savers is acknowledged (Freixas & Rochet, 2008), existing literature fails to recognise similar relationship between depositors and borrowers. We therefore explore this by emphasising that such information gap existing between depositors and borrowers is necessary not only to avoid bank run but to explain why financial intermediaries exist.

> **Proposition III:** *That FIs make profits and continue to operate so long as they maintain the information gap between their buyers/(borrowers) and suppliers/(depositors).*

In such a case, FIs act as arbitrage taking advantage of information gap between the markets to exploit economic rent (Greenbaum et al., 2015). This notion of market segmentation underpinned by information asymmetry, guarantees profitability of the FIs. The presence of spread (as an *arbitrage value)* suggests that the market will not clear due to the information gap between savers and borrowers that prevents them from meeting directly. This confronts the loanable fund theory which assumes that both lending and deposit rates could equilibrate.

In support of the above observations, Krasa and Villamil (1992) as an instance, acknowledge that intermediaries have "two-sided" contracts acting as borrower and lender simultaneously, to operationalise the two contracts. Moore (1989) also sees banks operating in two different retail markets; i) for bank loan and ii) for bank deposits.

2.2 Profit Maximization as a Rationale for Financial Exclusion

The profitability of the firm stems from the fact that their selling price (lending rate) exceeds the marginal cost of producing these financial services and products. This marginal costs are of two parts: the actual *marginal operational cost* of running the firms and the *marginal opportunity cost* of using depositor's funds (interest on deposits). The potential risk of default posed by the problems of adverse selection and moral hazards compels banks to charge higher lending rate as risk premium. In LICs, non-idiosyncratic risks that come from the macroeconomic level such as *inflation risk*, *exchange rate*, *political risks* and corruption add

to the premium the FIs charge beyond their actual marginal cost. This is carefully modelled using microeconomic theoretical framework of production analysis.

If actual marginal cost from operation is denoted MC_a and the marginal opportunity cost of using depositor's funds is MC_r (deposit rate), then mathematically, intermediaries' aggregate marginal cost of production can be expressed as:

$$MC_{FI} = MC_a + MC_r \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

If we define marginal benefits $\left(MB_{Lr}\right)$ as the lending rate charged on loans, then the intermediaries' spread at the margin (Kwakye, 2012), is equal the difference between the marginal benefit and marginal cost stated as; $s = MB_{Lr} - MC_{FI}$; $\Rightarrow s = MB_{Lr} - MC_a - MC_r$. In a frictionless world of no information and transaction costs, the intermediaries' spread is expected to be zero (thus, MR=MC); *a condition that may suggest irrelevance of intermediation*. In the section following, the authors postulate that the existence of *positive spread* is an indication of market imperfections as a necessary condition for the existence of financial intermediaries. The *widespread financial exclusion in most LICs* generally (Hannig & Jansen, 2010; Demirgüç-Kunt et al., 2015) and among small opaque borrowers is also attributed the significantly higher *spread that market imperfections generates*. This is what the model seeks to establish.

> **Proposition IV:** *the raison d'être of financial intermediation is attributable to market imperfections that guarantee* ***positive spread*** *as an incentive towards profit-maximisation.*

Specialisation and routine nature of the FIs' work (Agyekum, 2011; Fama, 1983) coupled with economies of scale that characterised their operations (Greenbaum et al., 2015) ensure that the MC_a is minimised. This according to Fama (1983) becomes inevitable especially when competition exists. In an extreme assumption of perfect and complete market information in an Arrow-Debreu world, MC_a is expected to be zero. With such an assumption, the spread will depend on the quantum of both the marginal benefit of lending (*lending interest*) and marginal opportunity cost of using savers funds (*deposit rate*). This may connote strong-form of efficiency in the financial market (Greenbaum et al., 2015), as both lending and deposit rates will equilibrate. This classical world will ensure zero spread, which will signal the irrelevancy of financial intermediations (Freixas & Rochet, 2008).

Typically, from Eq. (1), $MB_{Lr} > MC_{FI}$, such that $MB_{Lr} - MC_{FI} > 0$.

$$MB_{LR} - MC_r = s \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

The assumption of frictionless market implies that $MC_a = 0$ in Eq. (1). This implies that for the same value of MC_r, MB_{Lr} must fall to maintain equilibrium. Consistent with the loanable fund complete market model, the lending and deposit rates will equate under the assumption of zero spread (such that $s=0$ in Eq. (2)).

2.2.1 The Model without Market Frictions

Banks as intermediaries are defined as entities whose main concern is to issue deposits and use the proceeds to acquire securities (Fama, 1980, 1983). This view reinforces the balance sheet management function of FIs (Agyekum, 2011; Freixas & Rochet, 2008). Fama (1980) points out two core functions of FIs as; first, maintenance of a system of accounts in which transfers of wealth between surplus units and deficit spenders occur; and the second, being the skill of managing portfolios. Deposits seen as portfolios have returns similar to other assets of similar risks, especially in unregulated perfect market settings. The fees charged for managing such portfolios according to Fama (1980), suggests that there is no opportunity cost. However, financial intermediaries in practice, offer interest to depositors and do incur other transaction cost of replenishing deposits (e.g., publicity cost).

For profit-maximising FI (Bhattacharya & Thakor, 1993), total profit is determined by difference between total revenue and total cost. Total revenue is assumed to be derived from lending transaction (T_L), defined as the volume (quantity) of securities purchased (or monies lent out). Total cost depends on Deposit Transaction (T_D), that is volume (quantity) of deposit mobilised.

Existing literature admit the presence of transaction cost of rendering financial services. For example, Fama (1983) admits there are both transaction cost: (i) of ensuring that 'a depositor' who effects payment via accounting system (e.g., cheque) has adequate funds to cover such transactions; and (ii) when FIs execute exchange of claims in which assets are sold or purchased. If the FIs' lending and deposit rates are given as r_L, and r_D respectively, then a simple expression for total revenue, total cost and total profit for the profit-maximising intermediary, can be obtained as:

$$TC = FC + VC_{(qT)} \quad \text{.....(3)}$$

$$C_{(qT)} = FC + VC_{(qT)} \quad \text{.....(3a)}$$

$$TR_{(qT)} = r_L Q^T \quad \text{.....(4);}$$

where r_L is the lending rate (price charged for rending financial services), and Q^T is quantity of financial (lending) transactions. The total cost function i.e., *Eq. (3a)* can be rewritten as;

$$C_{(qT)} = K + r_D Q^T \quad \text{.....(4b);}$$

where $\mathbf{r_D}$ is the deposit rate and K is fixed cost.

In keeping with Arrow-Debreu world of complete market, the following assumptions further guide the development of the model: i) No transaction cost of mobilising deposit (administrative cost, publicity, etc.); ii) Perfect and costless flow of information to all financial market actors, with no market frictions; and iii) Proxy Law of large numbers applies. Thus, at any given point, the amount of average deposit mobilised exceeds the combined amount of monies withdrawn by savers, and or the amount lent out to borrowers such that $Q_D \geq (Q_L + Q_W)$; where Q_D, Q_L, and Q_W, denote amounts deposited, lent, and withdrawn respectively.

Total Profit function is then specified as;

$$\pi_{(QT)} = TR_{(Q^T)} - TC_{(Q^T)} \quad \textbf{(5)};$$

where π is total profit, TR is total revenue and TC[2] is total cost. The profit function that is maximised *subject to cost constraints* is given as;

$$\pi_{(QT)} = r_L Q^T - (K + r_D Q^T) \quad \textbf{(5a)}$$

Applying first order (FOC) for profit maximisation given as;

$$\frac{d\pi_{(qT)}}{dQ^T} = \frac{d[r_L Q^T - (K + r_D Q^T)]}{dQ^T} = \frac{d(r_L Q^T)}{dQ^T} - \frac{d(K + r_D Q^T)}{dQ^T} = 0$$

$$r_L - r_D = 0 \Rightarrow r_L = r_D \text{ .....(6)}^3$$

The Eq. (6) simply says that in an ideal world of perfect, frictionless financial market[4], *bank's lending rate (marginal benefit) will be exactly equal to its deposit rate (marginal opportunity cost)*. The bank faces no risk and therefore only normal (zero economic) profit is permissible in the long-run, as predicted under the perfect market paradigm (Frank & Parker, 1991, pp 355-360; Kaldor, 1934; Mueller, 1986). This outcome accords well with that obtained by Freixas and Rochet, (2008) under the Arrow-Debreu assumption.

2.2.2 Profit-maximisation under Market Frictions

The utopian world of *Walrasian* equilibrium (Gul & Stacchetti, 1999; Hahn, 1978, 1980; Smale, 1976) that promises utmost efficiency, seems theoretically ideal though practically impossible. Indeed, in the Arrow-Debreu world of efficient financial resource allocation (Allen & Santomero, 1997; Bhattacharya & Thakor, 1993; Scholtens & van Wensveen, 2003), the role of intermediation is needless as savers and borrowers can interact on a market at virtually no cost. Even in the stock market where information is assumed to flow freely across the market spectrum, the existence of brokerage fee and other charges confront the zero-transaction cost assumption.

Below, the assumptions of perfect information and costless transaction are being relaxed. This allows for information entropies that generate transaction costs of rendering financial services. For instance, Allen and Santomero (1997) admit that depositors incur both initial fixed component of participation cost and marginal cost of monitoring the performance of their assets. However, FIs assume such costs in performing the monitoring function on behalf of investors. Moreover, Myers (1977) also admits that a firm's debt policy may mirror the

[2] *(Going forward C will be used in place of TC, for convenience).*

[3] Notice that $\frac{d(r_L Q^T)}{dQ^T}$ is the marginal revenue (MR_{FS}), and $\frac{d(K + r_d Q^T)}{dQ^T}$ is the MC_{FS}, and that the *K (Eq.4.4a)* which is the fixed cost component disappears, applying the constant rule for differentiation.

[4] *with neither information entropy nor transaction cost of rendering financial services*

imperfection. In line of the above, *transaction cost* component is now introduced into the previous model. The resultant variable cost function now specified as;

$$VC_{(qT)} = Q^T(\tau + r_D) \qquad \textbf{(7);}$$

where τ capturing the transaction cost per output. Substituting Eq. (7) into (3a) yields,

$$\pi_{(qT)} = r_L Q^T - [K + Q^T(\tau + r_D)] \qquad \textbf{(8);}$$

satisfying the FOC for maximisation, produces;

$$\pi'_{(Q^T)} = r_L - (\tau + r_D) = 0 \rightarrow \; r_L^* = \tau + r_D \qquad \textbf{(8a)}$$

From Eq. (8a) the marginal cost increases additively by the τ . Eq. (4.8a) suggests that presence of information and transaction cost contributes significantly to the lending rate charged by FIs. *'Ceteris paribus', increase in information asymmetry generates transaction cost per financial service of* τ *, which directly reflects in an increased lending rate.* Because τ represents an incremental cost of rendering financial services beyond deposit rates (r_D) (under the frictionless model), it could be regarded as the *premium* required by intermediaries. Greenbaum et al. (2015) admits *liquidity premium* for transforming maturity duration of assets must be present for FIs to continue to exist. They argue further that when such premium reduces to marginal transaction cost of performing QAT (i.e., r_D), the incentive for FIs to exist disappears. The present paradigm however considers *risk premium* in its entirety other than the liquidity risk premium suggested.

The actual composition of the τ is worth highlighting. Being a proxy risk premium, the composition may include actual administrative and overhead cost, search cost (e.g., publicity), as well as premium to cater for risk such as *default*, *political*, *inflation*, *volatility*, and other *macroeconomic uncertainties*. In the words of Kwakye (2012) "the *lending rate (i.e. cost of credit)* to an individual borrower usually includes considerations regarding specific risks associated with the borrower as well as profitability of the intermediary". Technological deepening may reduce search and administrative costs components of the transaction cost (Scholtens & van Wensveen, 2003), especially for advanced economies where such innovations exist.

The following policy implications can be deduced;

i. A rise in τ due to information opacity that leads to high transaction cost of serving SMEs/households, requires that lending rate (r_L^*) also rises, to maintain the optimality (i.e., to satisfy the maximisation) condition.

ii. Given r_L^*, the intermediaries will demand for collateral (as non-price barrier) whose value at margin must be equivalent to τ .

iii. In advanced economies (e.g. OECDs), inflation, political and default risks tend to be very minimal. This coupled with the reality of technological advancements, potentially reduces transaction cost of rendering financial services (Scholtens & van

Wensveen, 2003). The implication for the 'τ' in Eq.8a, is to predict its closeness to zero in *technologically and economically advanced economies*. Consequently, cost of capital (r_L^*), especially to the SMEs and poor households is expected to be low, hence low incidence of exclusion.

iv. The converse is expected in the LICs where information asymmetry and financial market frictions translate into high political, inflation and default risks. This, exacerbated by the general lack of technological advancements, means that higher value of τ is expected to feed into a higher cost of capital (i.e., r_L^*). Significant financial exclusion is therefore expected.

All these predictions postulated in this framework, have implication for small borrowers in developing economies. Thus, small businesses and household sector who mostly operate with much opacity and obscurity (Berger & Udell, 2006; De la Torre et al., 2010; Vos et al., 2007), will be *financially excluded*, either through price-based (high cost of borrowing) credit-rationing (Stiglitz and Weiss, 1981), or non-price barriers such as collateral requirements.

2.2.3 Reconciling the Present Paradigm with the Conventional Theory of Finance

It is conceivable to reconcile the above proposition *(Eq.8a)* with the standard capital asset pricing theory in traditional finance. Allen and Santomero (1997) advocate for integration between intermediation theories and asset pricing theories.

To start with, let assume that banks will offer their savers interest that is equivalent to the *risk-free rate*. This is consistent with the view that bank deposits are portfolio assets with *minimal risk* (Black, 1970; Fama, 1980; Johnson, 1968). Deposits as a debt-like security tend to have low marginal participatory cost as there may be no need to monitor such assets (Allen & Santomero, 1997). Fama's (1983) assertion that, fees charged by banks in a competitive environment, constitute their marginal cost of rendering transaction and portfolio management services. Allen and Santomero (1997) also observe that the practice of monitoring financial market to determine the kind of adjustments required on a given portfolio on day-to-day basis, gives rise to the existence of significant marginal costs.

If we assume that the probability of FIs defaulting is low due to the possibility of bailout in an event of bankruptcy, then it is plausible to conjecture that the r_D in Eq. 8(a) will be closer to the *risk-free rate* (r_f) offered on government securities. Under such assumption therefore, the cost of capital (lending rate) is simply the $r_L^* = r_f + \tau$ .....**(9):** (where $r_f \cong r_D$ in Eq.8(a) is the *risk-free rate* expected on treasury securities, and τ as the *risk premium* as noted earlier). The Eq. 9 thus, becomes the unweighted average cost of capital. Unweighted because, beta that measures how a change in the market conditions (transaction/information and other components of the risk premium) affects the cost of capital is assumed to be one (1).

Introducing accounting beta (β) into the equation (9), leads to the traditional cost of capital theory in Eq. 10, given below;

$$r_L^* = r_f + \beta\tau \qquad \textbf{(10)}$$

We thus impose restriction on the value of the beta $0 \leq \beta \leq 1$, but would generally assume that it falls between zero (0) and one (1). Can we reasonably expect the beta to be close to zero for advanced economies and close to one for LICs?

2.3 Crowding-Out Effects (COE) and Financial Exclusion: The Missing Component of the Loanable Fund Theory

One important theoretical prediction of the Neo-classical theory of loanable fund is the issue relating to *crowding-out effects*. The theory argues that the financial market will clear and establish an equilibrium interest rate that will be acceptable to both savers and borrowers *(see figure 1)*. Government's intervention therefore leads to distortion in the loanable fund market. Unlike the private sector firms that borrow to invest, the government borrows when it has deficit budget to finance; what is also known as *public sector borrowing requirements (PSBR)*. The reality of PSBR means that government outcompetes and crowds-out the private sector firms on loanable funds market (Kwakye, 2010).

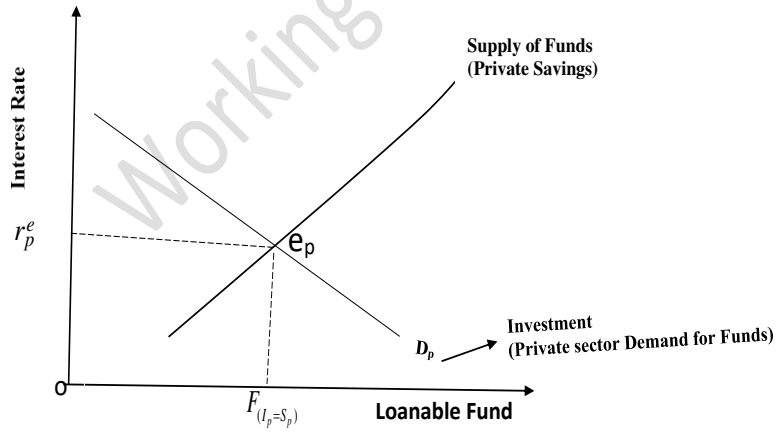

Figure 1: Equilibrium on the Neoclassical Loanable Fund Market

Two problems are identified with the loanable fund paradigm. First the assumption that lending rate will equate the deposit rate at equilibrium, makes no room for the possibility of interest rate spread. Second, the theory fails to acknowledge the residual effect of rise in the interest rate on private consumption.

In contrast, the current model proposition rectifies these two gaps. It is to be noted that as the government offers higher interest on its securities, households are motivated to inter-

temporally allocate their wealth between current and future consumptions (savings). For a given disposable income, the rise in savings in response to the higher interest offering on treasury securities is possible only when current consumption is sacrificed. The total crowding out effect of PSBR is the combined *reduction of domestic private investment* and *domestic households' consumption*. Within the Keynesian paradigm, both effects lead to reduction in the equilibrium gross domestic productivity (GDP), and hence national income.

Note that $\overline{Y}^d = S + C \; ; \Rightarrow \overline{Y}^d = S\uparrow + C\downarrow$ where is the disposable income, S is savings and C is Consumption.

From Figure 2 the gap $\overleftrightarrow{ab}$ (PSBR) represents the *total crowding out effects* which is decomposed into the effect on reduced private investment and rising domestic private savings, which ultimately causes consumption to shrink '*pari-passu',* due to the mirror relationship.

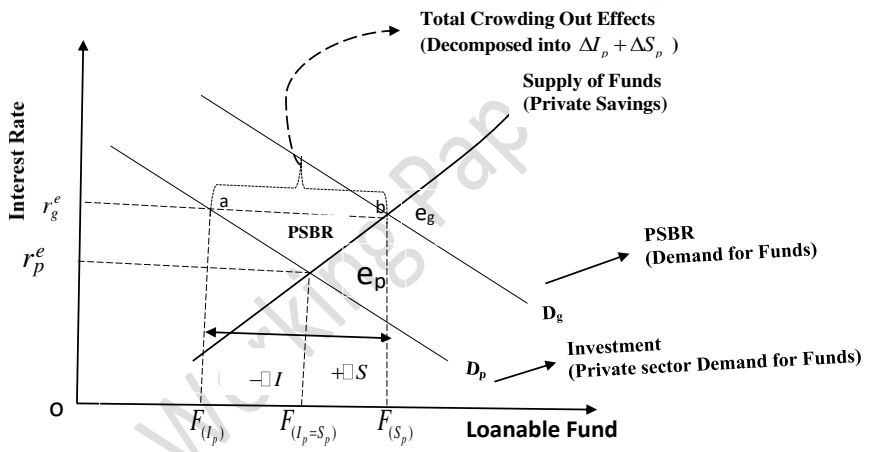

Figure 2: Showing the Complete Crowding-Out Effect of PSBR

The same gap is the difference between quantity of savings (loanable fund) supplied $F_{(Sp)}$ and the domestic private investment, $F_{(Ip)}$. $PSBR = F_{(Sp)} + F_{(Ip)}$

Thus, $\Rightarrow COE = \overrightarrow{F_{(Ip)}F_{(Sp)}}$, which is simply given as: $PSBR = F_{(Sp)} + F_{(Ip)}$ **(11).**

For simplicity, we drop 'F' so that investment and savings stands out in the above Eq. (11) distinctly $PSBR = S_p + I_p$ **……(11a).** Eq. (11/a) defines the *total crowding-out effects*, which is being considered as financial exclusion.

2.4 Formal Treatment of the Complete Crowding-out Effects Model and Implication for Financial Inclusion

The mirror relationship between consumption and savings functions allows the latter to be derived from the former. Savings is unconsumed disposable income. Consumption function from the Keynesian paradigm is given as $C = \alpha_0 + bY^d$ ……(12)[5]; which is not sensitive to interest rate nor PSBR. However, the autonomous consumption a_0 which mirror-transforms into dis-savings (debt or negative savings) ($-a_0$) could suggest that Keynes had in mind the possibility of individuals borrowing to consume at zero disposable income. Because people can borrow to augment their current income to smoothen consumption, it is rational to expect the consumption function to be sensitive to the interest rate. As indicated earlier, PSBR has effect on household's current savings via consumption. In modifying Eq.12 to reflect the impact of both interest rate and PSBR, yields consumption function given as Eq. (13).

$$C = bY^d - ar_p - \gamma PSBR \qquad (13);$$

Deriving the savings function from ***Eq. 13*** using the disposable income-consumption identity below:

$$Y^d = S + C \qquad \Rightarrow S = Y^d - C \qquad (14)$$

$$S = Y^d - (bY^d - ar_p - \gamma PSBR) \rightarrow \quad S = (1-b)Y^d + ar_p + \gamma PSBR \qquad (15)$$

Domestic private investment demand is expressed as a function of interest rate, (i.e., cost of credit) such that $I_p = f(r)$. The actual private investment demand function is given as Eq. 16, below;

$$I_p = I_0 + \varphi r \qquad (16);$$

where φ is interest elasticity of investment demand and I_0 is autonomous component of the demand function.

[5] *Note: Y^d is disposable income, a_0-autonomous consumption and b- Keynesian Marginal Propensity to consume(MPC).*

From Eq. 11, i.e., the *crowding-out effect equation*, we can derive the interest rate, which *reflects the reality of financial exclusion that is likely* to be caused by *PSBR*. Substituting Eq.13 and Eq.14 into Eq. 11(a);

$PSBR = S_p + I_p$ **……(11a).** Eq. (11a) recalled.

$$PSBR = [(1-b)Y^d + \alpha r_p + \gamma PSBR] - (I_0 - \varphi r)$$

$$PSBR = (1-b)Y^d + \alpha r_p + \gamma PSBR - I_0 + \varphi r_p$$

$$(1-\gamma)PSBR + I_0 - (1-b)Y^d = (\alpha + \varphi)r_p$$

$$r_P^* = \frac{(1-\gamma)PSBR + I_0 - (1-b)Y^d}{(\alpha + \varphi)} \qquad (17)$$

Note that interest elasticity of savings/consumptions (α), interest elasticity of investment (φ), marginal propensity to consume (b) and consumptions/savings sensitivity to fiscal borrowing (γ), are all ratios, such that we can accordingly impose the restriction; $0 < \gamma, \alpha, \varphi, b < 1$, (*i.e.,* each falling between zero and one).

Against this therefore, the following policy outcome can be deduced:

1. $\frac{\delta r_p^*}{\delta PSBR} = \frac{(1-\gamma)}{(\alpha + \varphi)} > 0$; i.e., the *complete crowding effect* of fiscal domestic borrowing. This depends on savings/consumption sensitivity to fiscal borrowing (γ), interest sensitivity to both savings (α) and to investment demand (φ). Crowding out effect (COE) due to PSBR widens the *financial exclusion gap*, as it causes rise in the lending interest rate to private sector borrowers.
2. $\frac{\delta r_p^*}{\delta I_0} = \frac{1}{(\alpha + \varphi)} > 0$; An exogenous increase in private sector investment demand will cause a rise in interest rate, if savings remains the same. Though interest rate rises, this does not lead to financial exclusion as the rise is caused and accompanied by investment rise rather than either PSBR or financial market frictions.
3. $\frac{\delta r_L^*}{\delta Y} = -\frac{(1-b)}{(\alpha + \varphi)} < 0; \Rightarrow -\frac{MPS}{(\alpha + \varphi)} < 0$. The model predicts that increase in national output (GDP) will cause an exogenous fall in lending rate as savings rises. For a given marginal propensity to save, rise in income translates into a rise in people's

disposable income and hence savings. Given the same investment demand curve, the cost of credit is expected to fall, in a way that allows more firms to borrow cheaply. This will reduce the *exclusion gap* as inclusion is induced. Thus, policy towards growth in domestic productivity will be an *inclusion engendering*. This again predicts that cost of credit in advanced economies with high income, will be lower than LICs where income and productivity are low *(see, for example, Beck, Demirgiiç-Kunt, and Martinez Peria 2007 and Cull, Demirgiiç-Kunt, and vMorduch 2013).*

In its structural equation forms illustrated on the Figure 1, income behaves exogenously and will cause a shift in the savings supply curve. However, reconciling the reduced forms with the I-S model (which shows an equilibrium in the real sector for a given interest rates and income), GDP then becomes an endogenous variable *(see Eq. 23a).*

Note that the r_p^* in Eq. (17) is the cost of credit that real sector private agents pay for borrowing from the financial system. This is the same as the lending rate r_L^* defined in Eq. (9). If we simply assume that savings/consumption is not responsive to PSBR, such that $(\gamma = 0)$, then Eq. 17 becomes, $r_P^* = \dfrac{PSBR + I_0 - (1-b)Y^d}{(\alpha + \varphi)}$ ……(17a) ; in which case the crowding-out effect will be similar to point (2) above (i.e., $\delta r_p^* / \delta PSBR > 0 = 1/(\alpha + \varphi) > 0$).

2.4.1 Model with Information Asymmetry and Transaction Cost

It has been established earlier that financial market frictions that give rise to information asymmetry and transaction cost do not allow equality between lending rate and deposit rates. The presence of *spread* constituting the *arbitrage value* (τ) serves as an incentive for the continual operation of FIs. Recall from Eq. (10), $r_L^* = \tau + r_D \rightarrow r_D = \tau - r_L^*$ (10a);

Substituting Eq. (10a) into Eq. (15), gives;

$$S = (1-b)Y^d + ar_D + \gamma PSBR \qquad \text{(15) recalled.}$$

$$S = (1-b)Y^d + a(r_L^* - \tau) + \gamma PSBR$$

$$S = (1-b)Y^d + ar_L^* - a\tau + \gamma PSBR \qquad (18)$$

Substituting Eq. (18) and Eq. (16) into Eq. (11a), and solving for r_L^*, produces Eq. (19) below:

$$PSBR = [(1-b)Y^d + \alpha r_L - \alpha\tau + \gamma PSBR] - (I_0 - \varphi r_L)$$
$$PSBR = (1-b)Y^d + \alpha r_L - \alpha\tau + \gamma PSBR - I_0 + \varphi r_L$$

$$(1-\gamma)PSBR + I_0 - (1-b)Y^d + \alpha\tau = (\alpha+\varphi)r_L$$

$$r_L^* = \frac{(1-\gamma)PSBR + I_0 - (1-b)Y^d + \alpha\tau}{(\alpha+\varphi)} \quad (19)$$

From Eq. 19, we can ascertain the impact of market friction and imperfection (τ) on cost of credit to the firm.

4. $\frac{\delta r_L^*}{\delta\tau} = \frac{\alpha}{(\alpha+\varphi)} > 0$; Thus, risk premium and transaction cost that exist due to information asymmetry will cause cost of credit (r_L^*) to the private sector to rise. Consequently, the market will *financially exclude* many firms as it rations credit from those who cannot afford the risk-adjusted interest rate. This seems consistent with *credit rationing* paradigm of Stiglitz and Weiss (1981).

The Neo-classical assumptions of perfect and complete information, no market friction and no fiscal intervention in the credit market can be incorporated in the current model. This leads to optimal allocation of financial resources. The entire household savings will be *channelled* towards the domestic private sector for investment at a rate acceptable to both borrowers and savers. That mimics a strong-form of market efficiency (Greenbaum et al., 2015). Under such circumstances, the QAT role of financial intermediation will be needless (Greenbaum et al., 2015) as equilibrium interest rate drives away arbitrage value (interest rate spread). This prediction is obtainable when with the absence of fiscal deficit $(PSBR = 0)$ and financial market friction ($\tau = 0$), Eq. 19 simply becomes:

$r_L^* = \frac{I_0 - (1-b)Y^d}{(\alpha+\varphi)}$ ……..(20); which can be rearranged back into *savings equal investment model* as done below;

$$\underbrace{r_L^*\alpha + (1-b)Y^d}_{Sp} = \underbrace{I_0 - r_L^*\varphi}_{Ip} \quad (21)$$

Note that unlike the Keynesian model, the Classicalist did not explicitly recognise disposable income as a key determinant of savings. Eq. 21 therefore will be the Neo-classical ideal of perfect market functioning illustrated on Figure 1.

2.4.2 Model with Tax and the implication of Financial Inclusion Policy

Finally, we now examine the model when tax is directly incorporated. It could be seen from the previous equations that the role of tax was implicit through the disposable income (Y^d). As tax is directly incorporated in the model, it allows the effect of fiscal policy on financial inclusion to be determined. The disposable income definitional identity as noted earlier, is income less direct tax; thus; $Y^d=Y-T$. ……..…..(22); Substituting Eq. 22 into Eq. 19, we obtain;

$$r_L^* = \frac{(1-\gamma)PSBR + I_0 - (1-b)Y + (1-b)T_0 + \alpha\tau}{(\alpha+\varphi)} \qquad (23)$$

5. $\frac{\delta r_L^*}{\delta T_0} = \frac{(1-b)}{(\alpha+\varphi)} > 0; \Rightarrow \frac{MPS}{(\alpha+\varphi)} > 0$; Tax imposition causes lending rate to rise as household savings fall in response to a fall in their disposable income. Increase in taxes as an austerity measure therefore *widens the financial exclusion gap*, as some firms will not be able to access credit due to rise in cost of credit.

Table 1: Summary of Policy Predictions of the Model, and Implication for Financial Inclusion

#	**Model Outcome**	**Policy Tool**	**Impact on Financial Inclusion**
1.	$\frac{\delta r_L^*}{\delta PSBR} = \frac{(1-\gamma)}{(\alpha+\varphi)} > 0$	Fiscal borrowing (PSBR) and Crowding Out Effects	*Hampers inclusion* (*see* Kwarkye, 2012)
2.	$\frac{\delta r_L^*}{\delta I_0} = \frac{1}{(\alpha+\varphi)} > 0$	Exogenous Increase in Private Investment	*Neutral Outcome*
3.	$\frac{\delta r_L^*}{\delta \tau} = \frac{\alpha}{(\alpha+\varphi)} > 0$	Financial Market imperfection and Information Asymmetry	*Hindering Inclusion* (see e.g., Stiglitz and Weiss, 1981)

5.	$\frac{\delta r_L^*}{\delta T_0} = \frac{(1-b)}{(\alpha+\varphi)} > 0$	Excessive Taxation	*Inclusion-hampering*
5.	$\frac{\delta r_L^*}{\delta Y} = -\frac{(1-b)}{(\alpha+\varphi)} < 0$	Growth in national income and productivity	*Inclusion Stimulating* (*See* e.g., Allen, et. Al, Pería, 2016)

Note: If we assume that $(1-b)/(\alpha+\varphi) = \theta_3$, $(1-\gamma)/(\alpha+\varphi) = \theta_1$, $1/(\alpha+\varphi) = \theta_2$ and $\alpha/(\alpha+\varphi) = \theta_4$ then the reduced form of Eq. (4.1.9) can simply become

$r_L^* = \theta_0 + \theta_1 PSBR + \theta_2 I_0 + \theta_3 (Y - T_0) + \theta_4 \tau$ .....(23a), which can be estimated as a linear model.

In line with Freixas and Rochet (2008) and Bhattacharya and Thakor (1993), technology can only reduce transaction cost as it addresses the ex-ante form of informational asymmetry (adverse selection), hence reduction in τ . Indirect effect of technology on the interim (moral hazard) or the ex post (costly state verification) information asymmetry can be assumed (Kwakye, 2012; Scholtens & van Wensveen, 2003).

3 Conclusion

Harmonising and drawing synergies from existing economics and finance theories, new paradigm emerges that offers a unified explanation to why financial exclusion seems a natural outcome of structurally malfunctioned financial systems.

The model predicts that information technology, efficient national governance system and much freer economic environment that help minimise the existence of information asymmetry and transaction cost are key towards broader financial inclusion. The proposition holds the key towards policy-formulation that will minimise the tendencies and prevalence of financial exclusion in economies, especially the less developed countries (LDCs). This paradigm holds the key in ensuring that policy prescription towards inclusive financial system by donor agencies, are focused on where impact could be maximised.

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Appendix:

A. Equilibrium Analysis in Sub-Market A; Deposits Market

i. An Inverted Kinked Demand Curve for the FI.

Starting from the assumption that suppliers of fund (Savers/depositing public) have no market power and are price-takers. In such case, we could assume that they face a near perfectly elastic supply curve (S_D). However, the presence of other competitive deposit-mobilisers and strategic savers (e.g., institutional) who have some power to negotiate for a higher deposit rate makes perfectly elastic supply curve unrealistic. *Ceteris paribus*, it is conceivable to assume that saver's behaviour generally mimics price-taking, as decision to save or not is often determined exogenously by other factors other than interest (price) on deposits intermediaries offer. As an instance, Schmidt-Hebbel, Webb, and Corsetti (1992) in their cross-country study on determinant of household saving in developing countries did not find interest rate as a significant determinant. Similarly, Harris, Loundes, and Webster (2002) find very little or no impact of interest rate on household's propensity to save in Australia. Ironically, where influence exists, they tend to be negligible but negative. They argued in line with life cycle hypothesis of Modigliani and Brumberg (1954) that desired to smoothen intertemporal consumption over lifetime, makes wealth and income emerge as positive and robust determinants.

On the demand side, an *inverted kinked demand curve* for the deposit-mobilising financial market is postulated. As can be seen in the diagram below, FIs though have control over their deposit rates, they do not face perfectly inelastic demand curve due to the presence of competitors. The supposition of an *inverted kinked* demand curve has two implications: i) deposit rate will not be influenced by exogenous shift in supply of deposits, at least within the horizontal range; and ii) deposit rate (r_D) will rise when there is a significant shock to supply of funds, or when demand for deposit increases. The deposit rate appears rigid-downwards and flexible-upwards due to the nature of the supply curve. A rise in demand for deposits will occur only when fund suppliers (savers) have been offered a higher deposit rate as an incentive to forgo current consumption. Besides, for deposit-taking rational FI who faces daily liquidity constraints in its treasury management, there is no reason to expect demand for deposit to fall. Demand being rigid downwards, renders the horizontal portion of the S_D curve irrelevant.

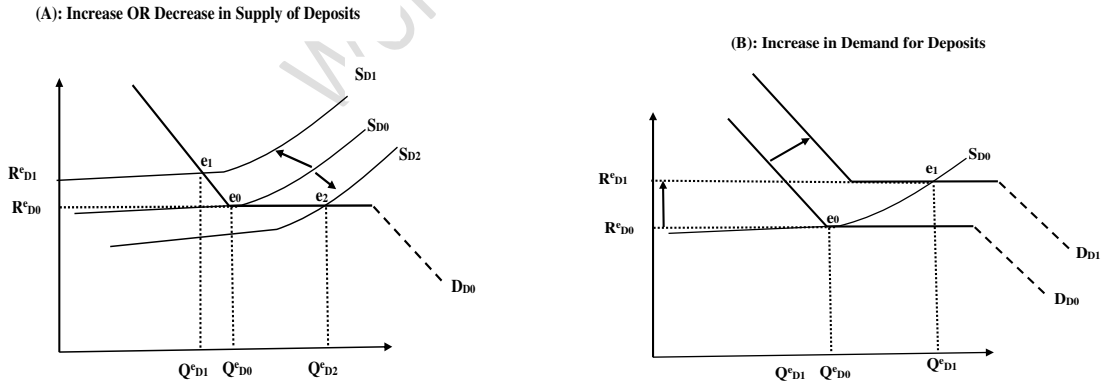

Figure A1: Equilibrium Condition in the Deposits Side of the Intermediation Business

The possibility that deposit rate (r_D) may rise in response to a significant fall in supply of deposits compelling the FIs to offer a higher deposit rate to attract savers arises (See figure 4.4 A). The actual kinked demand curve with the horizontal mid-portion is the recognition that FIs *are generally reluctant in adjusting their deposit rate offerings, 'ceteris paribus'*. Within the horizontal mid-range, the FIs behave as price takers who are willing to mobilise as much deposits (at least within that range) as

possible without reducing the interest rate (r_D). Even with upward-sloping supply curve, depositors' ability to influence the deposit rate is dampened partially by the nature of the FI's demand curve.

This proposition contradicts deposit demand curve postulated by Moore (1989), who assumes that banks face upward-sloping demand for credit because deposit demand is positively related to the deposit rate offered.

It is to be noted that an exogenous increase in demand for deposits caused, for instance, by increased market competition, will cause a rise in the deposit rate (r_D). The nature of the supply curve suggests that fall in demand for deposit will not exert downwards pressure on deposit rate. After all, why would a deposit-taking FIs decrease demand for deposits, in the first place? It is rationally inconceivable! The flat mid-portion of the demand curve as noted earlier, suggests that FIs have *insatiable* demand for deposits. Their demand curve slopes downward at some point to underscore the presence of market competition and their market power.

The broken portion is an admission that FIs though can and may want to offer much lower interest on deposits, doing so may not be in their interest as their competitors may not follow suit. Depending on cross-price elasticity of demand between their services offering and that of other rival intermediaries, substitution may prevent FIs from attempting to reduce the deposit rate below some point. Unlike the traditional kinked demand in an oligopolistic model (Baumol, 1977; Maskin & Tirole, 1988) which assumes a unique-price solution, the current (inverted-kinked) model posited here, brings flexibility to that rigid assumption.

B. Equilibrium Analysis in Sub-Market B; The FI's Lending Market

In contrast to Moore (1989) who admits that banks operate in two retail markets but fails to analyse these market separately, the current paradigm assumes separate sub-markets exist latently for both retail loans and deposits markets.

The model is built on the assumption that real sector private firms are demanders for credits, while the FIs become the suppliers. FIs face perfectly elastic supply curve for credit as they would, in theory, wish to supply borrowers with credit at an established lending rate *(r_L)*.

The real sector firms (borrowers) face the usual downward-sloping demand curve, reflecting the fact that higher lending rate (cost of borrowing) discourages them from borrowing more.

The horizontal supply curve for credit has the following implications:

i. Increase or decrease in demand caused by exogenous pressures will not affect the lending rate *(r_L)*.

ii. Exogenous factor that causes either an increase (excess liquidity) or a decrease (constrained liquidity) in supply of credit affects the lending rate.

This is illustrated in the diagrams below.

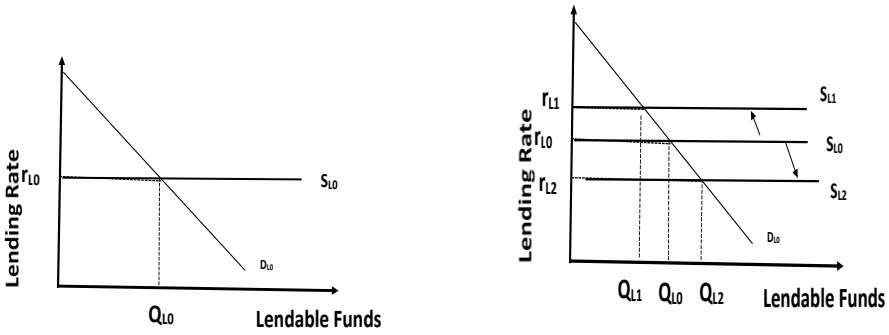

Figure A2 Market Equilibrium for the Lending Sub-financial Market

The conclusion from the above assumptions is that in a perfect and complete market without transaction costs and risk of lending (credit or lending risk), the ***'av'*** will be zero. In such a world, there would not be any role for the intermediaries as surplus spending units and deficit spenders can meet. In such case, both borrowers (real private sector investors) and savers can borrow and save respectively at an equilibrium interest rate that is Arrow-Debreu-Pareto optimal and efficient. This would be similar to the Neo-classical paradigm of loanable fund theory which assumes that supply is able to meet with demand to establish equilibrium interest rate.

In essence, the new paradigm being proposed does not only contradicts the Neo-classical theory of loanable funds, but most importantly brings the practical reality of the *existence of interest rate spread* within the financial sector. The model also predicts that the spread will be relatively higher in developing economies with considerable structural constraints and institutional bottlenecks. As noted earlier, the advanced (e.g. OECD) economies that have overcome such structural constraints, the interest rate spread is expected to be low.

The ultimate prediction is that higher interest rate spread that reflects the underlying risk, information gap and transaction cost are key *contributory price factors that lead to financial exclusion* within an economy. This is in agreement with credit-rationing hypothesis of Stiglitz and Weiss (1981).