A FUNCTIONAL PERSPECTIVE OF FINANCIAL SYSTEMS AND FINANCIAL INTERMEDIATION

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ABSTRACT

Questions concerning the design of a completely new financial system for a country are no longer simply of academic interest. Increasingly policy makers around the world are embarked on fundamental changes to financial systems of their countries. The central theme of this paper is the focus on financial functions instead of financial institutions as the unit of analysis. The key role of any financial system is to facilitate the allocation and utilisation of economic resources in a changing environment. Alternative approaches to the analysis of financial intermediaries are: first to accept as given the existing institutional structure of financial intermediaries and to perceive the public policy objectives as one of enabling the institutions to survive and prosper in their existing form — an institutional approach; the second is to accept as given the economic functions performed by financial intermediaries and to seek ways of organising the best institutional structure for performing those functions —a functional approach. A functional approach does not necessarily require preserving existing institutions. This paper argues that the second approach is more enduring and is preferred. The theories of financial innovation in the provision of intermediation services are directed towards achieving greater efficiency. The paper further contends that adopting a functional perspective as opposed to a more tightly-defined institutional approach should result in a more flexible, better co-ordinated, and by implication more effective system of supervision. In an international context adopting a functional perspective makes for greater adaptability of differences in institutional structures across countries to a global setting for the financial system. Innovation in financial intermediation is largely driven by inter alia the institutional and regulatory environment. The success of any financial intermediary hinges on its ability to control both the actual and perceived default risk of its liabilities held by customers. As with well established markets increased customer demand for service and increased complexity of products will make this an issue for future focus in Tanzania and Africa in general. Financial intermediary function will be widened to include the management of its counter-party credit risk exposure, in addition to the more familiar working capital requirements. In examining the theories of intermediation and functions of intermediaries the paper provides an adapted econometric model for analyzing the credit standing (rating) of opaque financial institutions. Although the econometric model is incomplete in dealing with the problems of the real-world, it offers a robust approach to evaluating the credit-risk of African intermediaries where the public as in elsewhere are concerned about the safety and soundness of individual financial institutions. The illustrations given in section 4 clearly do not provide a fully specified model of the agency-cost structure faced by financial intermediaries. But perhaps it will serve to focus attention and stimulate further research on these issues of immense importance to intermediaries involved in credit-sensitive activities.

Introduction

Questions concerning the design of a completely new financial system for a country are no longer simply of academic interest. Increasingly policy makers around the world are embarked on fundamental changes to financial systems of their countries. An integral part of the restructuring programme in the former Eastern European countries as indeed in some African countries like Tanzania, from one based on central planning and state (public) ownership of business to one based on free markets and private ownership, is changing the financial system. By the same token countries like Kenya, Nigeria and Uganda to mention but a few are currently embarking on fundamental reforms to privatise large parts of their public sector (financial system). In addition, countries with well-developed private financial markets and institutions like the United Kingdom (UK) are embarked on significant changes to their existing regulatory structures.

The collapse of a domestic bank especially in the developing world [e.g. Meridien Biao, Tanzania Housing Bank, Trade Bank of Kenya and Kenya Finance Bank] can cause disruptions to payments system (settlement failure), with the attendant costs; such as uncleared funds in the process of transmittal, and unsecured overdrafts on a failed bank's clearing account with the central bank or other banks. To offer protection the regulatory authorities require banks that participate in the payments system to have adequate capital and controls [meeting Bank for International Settlements (BIS) standards].

Despite the stated objectives of the new regulatory environment which are to encourage sound financial markets and a level international playing field, in practice these objectives may be far from met. The new regulatory environment poses two main problems. The first is that it fails to recognise the interdependence between the various prudential regulations for financial markets and between bank safety net procedures, in particular [see Inyangete (1996) for a discussion of the interdependence of various prudential regulations]. A second problem arises from a lack of full understanding of the incentives induced by the regulatory environment.

There exists a vast array of theoretical, empirical and public-policy literature on financial systems and financial intermediation. Consequently any attempt at synthesising the subject must of necessity be very selective in abstracting from what is clearly a very complex universe. Instead of attempting to undertake a broad overview, this paper sets out on a synthesis that explores aspects which involve decision making at the level of the entire intermediary with a focus on risk control and the process of capital budgeting. The central theme of this paper is the focus on financial functions instead of financial institutions as the unit of analysis.

Despite the vast literature on the implications for bank credit risk of capital adequacy requirements and deposit insurance schemes, most researchers with some notable exceptions have tended to deal with these issues in different compartments. One such exception is Sharpe (1978) who argued that the deposit guarantor's liability depended on *inter alia* the riskiness of bank assets and the bank's leverage.

The remainder of this paper is organised as follows; Section 2 deals with the role of financial systems; Section 3 explores the theories of intermediation and the functions of financial intermediaries. The functions of bank capital as well as managerial issues for financial intermediaries are examined in section 4. In addition, the paper discusses risk control and credit risk at the individual institution (micro) level and also presents an adapted econometric model for assessing the credit risk of financial intermediaries. The final section provides a summary and concluding remarks.

The Role Of Financial Systems

The central role of any financial system is to facilitate the allocation and utilisation of economic resources in a changing environment. The financial system embraces capital markets as well as the payments system. From an international perspective payments systems operate highly sophisticated and complex networks of institutions and clearing facilities which apply various means of payment [such as paper and electronic] for making transfers. Capital markets in developed economies consists of: equity markets, fixed income securities

markets, and the markets for derivative instruments, such as options, and products like swaps, forwards and futures. Capital markets are increasingly becoming internationalised (globalised) following the liberalisation of international capital flows and it is increasingly important for African countries to take steps to deregulate their financial markets and liberalise their economies.

From a functional perspective the existence of financial institutions, markets and business firms is derived primarily from the functions they perform, and are thus considered endogenous to the system.[1] As a result the institutional form of a financial system is based on its function [for a classification of financial institutions see figure 1]. Drawing from the primary underlying function of resource allocation, the financial system performs the following key roles:

- *Provides a payments system for the exchange of goods and services.* This function is fundamental to the very existence of a financial system as demonstrated in those rare instances when the payments system is hampered or failed, reducing transactions to bilateral barter.[2] The payments system are served by depository financial intermediaries such as banks who offer *inter alia* transfer services, current/deposit accounts and other intermediaries.
- *Provides a mechanism for aggregating funds to embark on large-scale indivisible ventures.* Increasingly, the level of investment needed to set-up and run a business is beyond the resources of individuals especially in the developing world. Although applicable to a lesser degree in Africa the financial system potentially provides an array of mechanisms [e.g. financial intermediaries and stock markets] for individuals to aggregate their wealth into larger sums for meeting the capital requirements of their intended business ventures. In addition, the financial system provides opportunities for individuals to participate in large indivisible investments through for instance their pension funds and investment in securities.
- *Provides a means of transferring economic resources through time and across geographic regions.* A developed and well functioning financial system facilitates the efficient life-cycle allocation of household consumption and the efficient allocation of capital to its most productive use in the business sector. By the same token a well-functioning capital market also promotes the efficient separation of ownership from management of the firm, thereby allowing efficient specialisation in production due to the principle of comparative advantage. Intermediaries performing this function include insurance companies and pension funds who finance corporate investments and pay pensions.
- *Provides a means for managing risk.* A developed and well-functioning financial system enhances the efficient allocation of risk-bearing among firms and individuals. The financial system provides risk-pooling and risk-sharing opportunities for businesses and individuals through private sector and government intermediaries [in the U.K for instance through the national insurance system]. It also enhances efficient life-cycle risk-bearing by individuals, by allowing for the separation of the providers of capital for real investments [such as in staff, plant and machinery] from the providers of risk capital who bear the financial risk of those investments. This separation of real investment and risk bearing enables specialisation in production activities based on the principle of comparative advantage. The most commonly cited example of a financial intermediary offering risk protection are insurance companies, who offer protection against the loss in value of human capital, physical assets and financial assets.
- *Provides price information for co-ordinating decision-making in various sectors of the economy.* The ability of individuals and businesses to trade financial assets is a manifestation of a key function of financial markets. In addition, an important role of the capital market is to

act as a major source of information for co-ordinating decision-making in various sectors of the economy. Security prices play an important role in the consumption/ saving decisions of individuals regarding their portfolio selection and allocation, while also providing signals to business managers regarding their investment and financing decisions. This price 'discovery' function although a feature of all markets in a capitalist economy takes on added significance for financial markets because the information discovery (processing) is an integral part of the pricing of the assets.[3]

- *Reduces the costs of asymmetric information problems.* A well-functioning financial system enhances the resolution of adverse selection and moral hazard problems arising from information asymmetries between the parties to transactions.[4] Information asymmetry problems hinder the efficient separation of ownership and management of businesses, thereby posing the classic principal-agent problem. These problems, generally classified as 'agency problems' can also result in parties [e.g. lenders and borrowers] shying away from mutually beneficial transactions.[5] Financial intermediaries by their activities mitigate against this efficiency losses from information asymmetry.

The most efficient institutional structure necessary for meeting the stated functions of the financial system is not static but changes over time and differs across countries and political spectra, for a number of reasons which include the complexity, level of technology available, cultural and historical backgrounds of countries. It is instructive to note that even when the corporate descriptions are similar, they may perform very different functions. Nigeria provides a classic illustration of instances where financial institutions with very similar corporate identities perform dramatically different roles. The U.K. financial market has been transformed almost beyond recognition since the introduction in 1980 of organised exchange in derivative assets, and the explosion of trading in swaps and futures contracts. There are strong indications that futures contracts and swaps will become more readily available in Tanzania with the advent of a formalised Stock Exchange. South Africa is on the verge of introducing organised derivative markets.

However, the key functions of a financial system are similar in essence across economies and political divides. Given the relative stability of the functions of a financial system compared to the structure of financial institutions within any system, in today's rapidly changing environment, a functional perspective provides a convenient and lasting basis for analysis compared to an institutional perspective. In an international context adopting a functional perspective makes for greater adaptability of differences in institutional structures across countries to a global setting for the financial system.[6]

Theories of Intermediation and Functions of Financial Intermediaries

Financial intermediation is a key activity within all financial systems and refers to the process of converting financial assets from one form into another. Financial intermediaries have as their main role the processing of information, risk management, and the reduction of transaction costs. These goals are achieved through their particular functions, which include origination, servicing, brokerage, market-making, and portfolio management. The management of an intermediary selects from the universe of financial claims and the functions to create a unique intermediary, in a process constrained by law and regulation. As discussed earlier, capital market functions (transformation of assets) is conducted by financial intermediaries such as merchant banks, commercial banks, insurance companies, etc who buy financial assets [such as shares and stocks, bonds, and mortgages] and provided financial assets [such as insurance policies, deposits accounts, bonds and stocks] by committing their own funds. Intermediation activities are performed either through organised financial markets [e.g. stock exchange] or via direct transactions with individuals or

institutions. We have shown that the institutional structure of the financial system refers to the interaction between financial services and the regulatory arrangements governing the provision of such services. Financial innovation refers to the dynamic process for changing the institutional structure.

There exists for the developed economies a vast array of literature covering the theoretical, empirical and policy aspects of financial intermediation. As a consequence this paper sets out to conduct a selective exploration of key aspects of the processes of financial intermediation relevant to the African environment.[7] There are in essence two broad approaches to the analysis of financial intermediation. The first approach is to accept as given the existing institutional structure of financial intermediaries, thereby considering the public policy objective as one of enabling the institutions to survive and prosper in their existing form.[8] Perceived in this manner the private sector managerial objectives for say banks and insurance companies would also be centred around requirements for making these institutions perform their roles more efficiently and profitably. An alternative approach is to accept as given the economic functions performed by financial intermediaries, and to seek to find ways of putting in place the best institutional structures for performing those functions. This functional approach unlike the institutional approach, makes no commitments about preserving the existing regulatory or operational structures. Rather, its structures are founded on two premises: first, that financial functions are more stable than financial institutions who perform those functions [in other words, there is little change in the functions over time and these functions are largely similar across countries]; second, competition leads to an evolution towards more efficient institutional structures. It should be borne in mind that the underlying propositions for both approaches is change, which suggests the need for a dynamic approach to financial intermediation.[9]

Theories of financial intermediation consistent with the functional perspective can be broadly classified to deal with improvements in economic performance due to financial intermediation:

- Satisfying the needs of investors to 'complete the markets' with new instruments that offer a wider range of opportunities for risk management and transfers of resources. This asset and liability transformation rationale is the process of intermediaries converting liabilities with one set of risk, maturity and denomination characteristics into assets that may have entirely different characteristics.
- Transactions cost rationale [lowering transactions costs or increasing liquidity]. A major efficiency concern is the transaction costs, or search costs [brokerage] incurred in bringing market participants together. Financial intermediaries can reduce search costs through brokerage and the creation of their own financial liabilities.
- Information processing and monitoring rationale [reducing agency costs arising either from information asymmetry between market participants or incomplete monitoring of their agents' performance].
- Operator of the payment system rationale. This focuses on the importance of intermediaries in the implementation of monetary policy and the creation of money demanded by governments, households, and businesses. Increasingly the payment system rationale is becoming less of a focus of attention due to innovation, technological advance and the wider powers (domain) of intermediaries.

These theories (hypotheses) make for financial innovation in the provision of intermediation services and are geared towards achieving greater efficiency.

Innovation in financial intermediation is largely driven by *inter alia* the institutional and regulatory environment [See Miller (1992) for the effects of regulation on financial innovation]. We have argued that adopting a functional

perspective as opposed to a more tightly-defined institutional approach should result in a more flexible, better co-ordinated, and by implication more effective system of supervision.[10] For a detailed exposition of the future of financial intermediation and the dynamics of institutional change see Merton (1992).

Functions of Bank Capital [11]

In Africa as elsewhere the public is concerned about the safety and soundness of individual banks.[12] To engender confidence in the safety and soundness of individual banks the public need to be satisfied that there is adequate protection of depositors, protection of borrowers and users of other bank services, protection of shareholders and debt-holders (other than depositors) and employee welfare.

In principle bank capital serves two functions: (i) it represents value of shareholder investment (equity) and (ii) acts as a buffer against possible declines in the value of bank assets. It is with regards to the latter role that the Bank for International Settlements proposed international harmonisation of the definition of capital, minimum capital requirements and a set of risk asset weights.

The past decade or so has seen widespread attempts in the international arena to improve the competitiveness of the financial sector by eliminating restrictions and regulations that have acted as barriers to entry[13]. There is also a parallel trend towards re-regulation aimed at improving the safety of the international financial system. The fragile nature of financial institutions throughout the world is increasingly apparent. Numerous examples include: the inability of developing countries to meet the debt service on bank loans; the failure of small as well as large banks in the USA, Europe, Japan and in some African countries (e.g. about 16 banks in Kenya alone in the recent past) which have depleted deposit insurance funds; increased provisions for non-performing assets (loan losses); and other events which have lead to a lowering of bank credit ratings.

Despite the stated objectives of the new regulatory environment which are to encourage sound financial markets and a level international playing field, in practice these objectives may be far from met. The new regulatory environment poses two main problems. The first is that it fails to recognise the interdependence between the various prudential regulations for financial markets and between bank safety net procedures, in particular [see Inyangete (*op cit*) for a discussion of the interdependence of various prudential regulations]. For example the draft European Union directive (1993) which includes the principle of deposit co-insurance, if implemented will not only increase depositor awareness of the strengths and weaknesses of individual banks [Dale (1993)], but will also increase the probability of bank runs and the contagion effects as depositors seek to protect their positions amidst rumours that may not be true. As a consequence pressure will be brought to bear on the capital positions and liquidity of banks who may be forced to incur losses while selling assets. It appears that the policy proposals in this instance fails to achieve the desired outcome as the criterion for implementation is not the solvency of the financial institution but its inability to meet withdrawals. In other words the prime concern is in the liquidity position of the bank.

A second problem arises from a lack of full understanding of the incentives induced by the regulatory environment. Taken on face value a reading of the financial press tends to give the impression that such problems arise largely from fraud or mismanagement on the part of financial institutions. It can be argued that the incentives induced by the regulatory environment contribute to some of the difficulties currently experienced in the financial sector. For instance, in practice none of these procedures is completely related to risk. However, the BIS risk weights constitute a major attempt at recognising the problem. It is instructive to note that the BIS specifies very broad categories which deal only with credit risk and not investment or interest rate risk, they also fail to distinguish between different risks within categories and they do not distinguish between systematic and diversifiable risk. Consequently banks with highly risky loan portfolios may face the same capital adequacy requirements as very conservative banks with 'low risk' portfolios. There has been a tendency not to have well formalised deposit insurance schemes, perhaps

the policy thinking in that regard is not to induce moral hazard problems with banks not subject to depositor discipline which might encourage them to adopt highly risky portfolios. Although most deposit insurance schemes [such as Tanzania's Depositors Insurance Fund] involve flat premiums independent of the risks associated with a particular bank's portfolio, the American Federal Deposit Insurance Corporation [FDIC] recently introduced a risk-related deposit insurance premium to be paid by banks.

The implications for bank credit risk of capital adequacy requirements and deposit insurance schemes, have tended to be addressed in different compartments by most researchers with some notable exceptions. One such exception is Sharpe (1978) who argued that the deposit guarantor's liability depended on *inter alia* the riskiness of bank assets and the bank's leverage. He further suggested that the liability could be reduced by increasing the capital/asset ratio. Pyle (1986) argued that "in principle, there is a schedule of risk-related premiums and minimum capital'ratios which would compensate for a bank's risk position" (p. 189). This relationship is analogous to put-call parity condition of contingent claims theory where bank equity and deposit guarantee are modelled as call and put options respectively. Keeley and Furlong (1990) used similar relationship and showed that higher minimum bank capital ratios increased the option value of deposit guarantee and hence reduced the incentive for risk taking. Zarruk and Madura (1992) have examined the effects of different capital requirements and deposit guarantee on bank interest margins. Nevertheless the issue of the impact of the interaction between credit risk and deposit guarantee on the value of a bank remains insufficiently addressed.

The section which follows deals with a key managerial issue for financial intermediaries - risk control and credit-risk at the individual institution (micro) level.

A Managerial Issue for Financial Intermediaries - Risk Control

Parties to any transactions regardless of the nature of its business are concerned with the credit-risk of that firm. For financial intermediaries (mainly banks and insurance firms in Africa) this concern assumes greater significance as the efficiency of the central business activities depends critically on ensuring that their customer liabilities are default free. Attention is focused on those intermediaries whose main activities relate to issuing liabilities of a particular kind to customers [typical example being Insurers of property or general insurance], and manage their assets to enable them to meet their obligations.[14]

To illustrate the greater significance of credit-standing for intermediaries compared to other firms, it is essential to formally separate the 'customers' from the 'investors' of the firm [this distinction is not essential for non-financial firms as it is clearly obvious]. Unlike for say the customers of a trading business who buy the firm's product, or its shareholders, lenders or other investors who buy the securities on the one hand, compared to customers of a bank who take out loans or deposit fund and investors who own the bank, in contrast for many intermediaries (e.g. Insurance firms) their customers receive a promise of services which normally involve payments to the customer of specified sums of money, contingent on the realisation of events or effluxion of time. The services so promised are in both economic and accounting sense liabilities of the firm. Given the dual nature (assets and liabilities) of investors holdings in such intermediaries, the distinction between customers and investors is often blurred.[15]

An alternative view argues in favour of indifference by asserting that the customers may be able to eliminate the effect of default risk either by trading in the securities of the life insurance company or by entering into several smaller contracts with different companies (diversification). Although such a case may be valid for frictionless complete-market economies, it is not yet tenable for the African environment given the absence of well organised markets and inadequate supply of securities to facilitate diversification [see Nwankwo (1991)]. However, a key economic role of intermediaries is to provide services to those entities (customers) who cannot trade efficiently nor enter into contracts at minimal transaction costs. The *raison d'etre* for the existence of intermediaries is to reduce

the costs which individuals and firms would have incurred in managing risk and transacting with counter-parties.

On the other hand, holders of liabilities (shares or bonds) issued by an intermediary expect their returns to be influenced by the future prospects of the firm. These investors enable the intermediaries to better serve its customers by assuming the burden of the risk-bearing and resource commitment to customers themselves.[16] The investors expect a rate of return which adequately compensates for their risk taking, which in turn leaves customers in a position to benefit from the shift in risk-bearing. Despite the distinct roles played by investors and customers, it is possible for the same firm or individual to be both an investor (own shares) and a customer (hold a policy) in a particular intermediary.[17]

Generally one might expect customers to possess less information about the firm's business prospects than its investors. In this scenario the higher cost of customers bearing default risk of the firm instead of the investors is not merely due to customers possessing less information than investors. The bulk of the additional cost between customers and investors is essentially due to customers' relative inability to reduce the risk attributable to the firm, because such risk is internalised compared to the investors ability to diversify (eliminate) such risk. Clearly exposure to default risk reduces the efficiency of customer contracts. Hence, business activities that rely on customers holding contractual liabilities are perceived as credit-sensitive (significantly affected by customer perception of credit standing).

Intermediaries with credit sensitive activities can manage their default risk to customers who hold its liabilities by:

- **Hedging**: through 'matching' payouts of its assets holding to those of its contractual liabilities (obligations) and selecting a structure considered to be 'transparent' and facilitating verification of its adherence to the stated matching policy.
- **Insuring**: obtaining guarantees of its customer liabilities from government or reputable third party. In developed economies the provision of such guarantees is a very large credit-sensitive segment of financial intermediation business [e.g. Federal Deposit Insurance Corporation (FDIC) in the USA or to a limited extent Nigeria's Deposit Insurance Corporation (NDIC)].
- **Capital cushions**: through raising capital [often in the form of equity] surplus to requirements and above the levels needed for financial intermediaries.

For an intermediary the costs of safeguarding against default risk are largely agency costs. The impact of such costs on the managerial decisions of intermediaries are explored in a hypothetical context in the section which follows through an adaptation of Merton (1977 & 1992) models.

Capital Budgeting for Financial Intermediaries

{A Credit-Standing Model of Financial Intermediaries}

An intermediary's credit standing has a potentially significant impact on its operating cash flows which can lead to effects analogous to synergy across activities (businesses) within the intermediary even in the absence of such synergies. Credit sensitivities (credit risk) of businesses within an intermediary which is a recognisable feature of African intermediaries can result in the failure of a theoretically superior Capital Budgeting technique as the Net Present Value -NPV ['value-additivity principle'], (for a discussion of the theoretical superiority of the NPV method see Paudyal and Inyangete (1992) even in the absence of any synergistic interactions across those business activities. In addition credit sensitivity across business activities mitigates against efficient separation of the capital budgeting and financing decisions for intermediaries with credit sensitive activities than for non-financial firms.

These effects are analysed with an adaptation of Merton's model using a hypothetical scenario of what can be classified as a non-transparent (opaque) intermediary, a fair classification of African Commercial Banks and Insurance Companies, based on three business activities. Each activity designated, B, C, D, are credit-sensitive, but without any operating

linkages across them. The analysis is simplified by assuming that customers will enter into contracts if they perceive the risk of the intermediary defaulting as being negligible.[18] Hence, conducting business becomes conditional on the customer contracts for each activity having a very strong guarantee against default. In the previous section ways of obtaining such safeguards were described, and we assume for convenience that such guarantee is provided by a [third party] deposit insurance corporation like Nigeria's NDIC.[19]

The analysis requires as a starting point a definition of the characteristics of the three business activities on distinct {stand-alone} basis [as separate legal entities- intermediaries], and in different combinations with each other. It is essential to also establish a bottom-line, valuation of the businesses based on perfect-market and zero agency cost assumptions. The 'Actuarial Value' of the contract guarantees are defined as their fair value, given the absence of agency frictions between the intermediary and the guarantor. With this framework we can obtain the *Gross Present Value* of each business activity or combinations of business activities meeting the customers-contract guarantee requirements, without allowing for the cost of the guarantee; the 'Actuarial Value' of the guarantee; and the 'Actuarial Net Present Value' computed by deducting the actuarial value of the guarantee from the Gross Present Value.

From contingent claims (option-pricing) theory, the actuarial value of a contract guarantee [similar to a put option (right to sell) on the assets of the intermediary] is an increasing function of the volatility ('risk') of the end of period (year) value of the business (combination of businesses).[20] As a consequence any differences in the actuarial guarantee values for the stand-alone cases will reflect differences in volatility across the businesses. Hence, even where the Gross Present Value of each activity is assumed to be the same the actuarial values may (should) differ.[21] In the absence of operating synergies or costs from combining the businesses and with zero agency costs, there should be no gain or loss in value from merging the business (activities).

The earlier perfect-market assumptions can be relaxed by introducing information asymmetry and other agency problems between the intermediary and the guarantor.[22] In these circumstances the guarantor needs to charge a price in excess of the actuarial value of the guarantee and the difference (spread) between the two is the agency cost which is a 'dead-weight' loss.[23] The agency cost can be modelled both as a fixed-percentage (z%) mark-up or it can be allowed to vary with the size of the actuarial guarantee, both should produce the same result.[24] The value of the intermediary's business will be reduced by the higher charge for the guarantee. Hence, the Actual (Adjusted) Net Present Value, becomes the actuarial net present value less agency cost of guarantee. [Numerical illustrations of this hypothetical scenario is given below]

It should be apparent that complexities are created in attempting to allocate either cost or capital to individual businesses of the intermediary due to the combination of credit-sensitive customer businesses and agency costs. As a consequence the intermediary's *marginal* agency cost and Net Present Value for each business activity has to be computed, by obtaining the difference between the intermediary with all its businesses and the intermediary with each respective business excluded. Due to the synergy-like effects of individual-business volatility on agency costs, value-additivity of the individual businesses is not achievable and as such there can be no unique scheme for fully allocating costs. However, if the intermediary chooses to issue equity capital, rather than buying guarantees, to provide customers with contract safeguards, it will still encounter the same allocation problem for capital and agency costs relating to equity.[25]

Suffice to mention that the break-down of value-additivity principle and the consequential arbitrary nature of allocating costs to individual businesses would not cause any ambiguity for optimal capital decisions of the intermediary provided it is made in a centralised manner whereby the cross business effects of risk are internalised.

It is important to bear in mind that the effect of credit-sensitivity does not always result in the conclusion that diversification is the ideal solution. This is so because of the presence of

futures contracts on say the Financial Times Index (FT-SE) which can be used to replace one of the business activities. A put-option on the FT-SE which is traded on the London derivative market can be purchased and used to guarantee any pre-specified value for the portfolio with no (incremental) agency cost to the stand-alone intermediary.[26]

It has been shown for instance by Merton that '*a passive attempt at diversification or retention of a business that does not benefit from either the integrated or opaque structure of intermediary reduces the value of the intermediary*' [This result is consistent with Ross (1989) model of financial innovation and intermediation].

The success of any financial intermediary hinges on its ability to control both the actual and perceived default risk of its liabilities held by customers. As with well established markets increased customer demand for service and increased complexity of products will make this an issue for future focus in Tanzania and Africa in general. Financial intermediary function will be widened to include the management of its counter-party credit risk exposure, in addition to the more familiar working capital requirements. The formal adapted model specified below although constrained in certain respects should serve to point the way forward in modelling the crucial issue of agency cost confronting the bulk of financial intermediaries in Africa embarked on activities sensitive to default-risk [credit-sensitive businesses].

Formal Specification of Credit Risk Model

Underlying assumptions of the model:

The structure of the model developed in this paper is drawn from contingent claims (options) theory. This approach has its origins in the work of Black and Scholes (1973) who noted that the equity of a firm should be modelled as a contingent claim in order to take into account limited liability. They show that in essence a firm's equity is analogous to a call option [right to buy], where the audit at the end of an accounting period is equivalent to the expiry date of the option. For example, if the firm under consideration is a bank and V_T and L_T represent the value of its assets and deposit liabilities respectively at the end of period T, bank equity E_T could be expressed as follows:

$$E_T = \text{Max}\,(V_T - L_T, 0) \qquad (1)$$

If $V_T > L_T$ the bank is solvent, but if $V_T < L_T$ the bank has failed and the value of equity is zero[27]. Due to limited liability provisions, shareholders are not responsible for the short-fall, i.e $L_T - V_T$, the burden is borne by creditors or credit guarantors. Merton (1977) uses this framework for evaluating bank deposit insurance schemes and the role played by the lender of last resort. Merton's framework assumes the bank operates in continuous time. For the model developed in this paper some processes will take place in continuous time (e.g. the asset return generating process) while others will take place at discrete time intervals (e.g. publication of financial statements and audits).

Bank Assets in the model in this paper consists of loans V_T, which mature after two periods. In addition to shareholders equity E_T, bank liabilities consist of guaranteed customer contracts (e.g. insured certificate of deposit) L_T. The bank is audited on the same date that its assets mature. Following the audit the bank will restructure its balance sheet, if solvent {i.e $V_T > L_T$}, or fail if the value of its total assets is less than its liabilities {i.e $V_T < L_T$}.

Table 1 shows simplified balance sheets characterising borrowers and banks at the end of an audit period denoted T. The representation assumes that borrowers are homogenous non-bank firms with limited liability, with a given initial level of capital K_0 and borrowing from bank V_0. All funds are invested in homogeneous asset with value A_T at T. The value of the bank loan upon maturity will be either the face value (if the borrower is solvent) or the value of the firm's asset (if it is insolvent). As the value of the loan is a contingent claim, the value of bank equity at T takes the form of an option E_T written upon another contingent claim with value V_T, at the end of the audit period.

The balance sheet of the bank [Table 1 panel B] can be characterised in a similar manner

to the above. In essence bank depositors write a call option [Option writer sells option] against the bank's loan portfolio and sell it to the bank's shareholders. The terminal condition of this option is expressed as given earlier as follows;
$E_T = \max (V_T - L_T, 0)$

where E_T is the value of bank equity at period T and V_T is equal to the value of bank deposits $L_0 \exp(r T)$. If the "option" is exercised (i.e. $V_T > L_T$) then the depositors receive L_T. If there is no deposit guarantee and the bank failed, depositors receive V_T because shareholders do not exercise their "call option" (i.e. bank has failed). It is instructive to note from Merton (1977) that when the cost of deposit insurance is fully subsidised, this is equivalent to the Central Bank buying a put option, with terminal condition equal to $\max(L_T - V_T, 0)$, and then giving it to depositors.

The Model: A detailed formal model is specified for the hypothetical case described above. Consider a stylised model of an opaque financial intermediary. It is plausible to assume that all businesses are severely credit-sensitive so that they can only be operated if customer contracts are default-free. Let $V_j(t)$ denote the **gross asset value** of business j at time t on a stand-alone basis, given that customer contracts are default-free. It is assumed that, conditional on

$$V_j(t) = V_j \,,\; V_j\,(t + \tau)/V_j(t) \qquad (2)$$

is distributed log-normal with expected value

$$\overline{V}_j(\tau;t) \equiv E_t\{V_j(t + \tau)\} \qquad (3)$$

where τ is time interval (e.g. year) and variance rate per time period for logarithmic changes in asset value,

$$\sigma_j^2 \equiv Var\{\log[V_j\,(t + \tau)/V_j(t)]\}/\tau \,, \qquad (4)$$

$$for\ \tau > 0.$$

Let $L_j(t)$ denote the value at time t of customer contracts which are guaranteed liabilities of the issuing intermediary. It is further assumed that $L_j(T) = L_j$, an amount specified at t = 0 and hence, $L_j(t) = L_j \exp[-r(T - t)]$ where r is the risk-free interest rate (say on Treasury bills) which is constant over time.

The *actuarial guarantee* value for the aggregate of customer contracts is modelled using the loan-guarantee valuation formula [Merton 1977] as;

$$G(V,t;L,T,r,\sigma^2) = \qquad (5)$$
$$Le^{-r(T-t)}\phi(X_2) - V\phi(X_1)$$

where

$$X_1 \equiv \frac{\log(L/V) - (r + \sigma^2/2)(T - t)}{\sigma\sqrt{T - t}} \;;\; X_2 \equiv X_1 + \sigma\sqrt{T - t}\;;$$

and $\Phi(\,)$ is the cumulative normal-distribution density function. In this model, the volatility of the asset value V is measured by the standard deviation of its logarithmic change between t and T as,

$$\sigma\sqrt{\tau - t} \qquad (6)$$

Equation (5) can be used to evaluate the cost to the guarantor of guaranteeing a debt issue with face value of L and maturity of T.

At time T, the (stand-alone) business j as an intermediary must pay its customers L_j. If the assets of the intermediary exceed L_j, then its owners receive the residual value, $V_j(T) - L_j$. Otherwise, they receive nothing and the third-party guarantor makes up the shortfall so that the customers still receive L_j. Thus, at time T, the equity value of the intermediary is given by; $V_j(T) - L_j + \text{Max}[0, L_j - V_j]$. Let I_j denote the amount of tangible investment (other than the cost of the customer-contract guarantee) needed to acquire the assets of business j. The ***gross net present value*** (GPV) of business j on a stand-alone basis at time 0 is defined as;

$$GPV_j \equiv V_j(0) - L_j e^{-rT} + \qquad (7)$$
$$G(V_j(0),0;L_jT,r,\sigma^2j) - I_j$$

where G is the actuarial guarantee value of business j as a stand-alone computed using Equation (5)

In the hypothetical case the guarantee is purchased at time 0. If we assume that the guarantee requires the intermediary to have an initial "cushion" of assets that exceeds the current value of customer liabilities by z (say 5) percent. That is, $V_j(0) = 1.05\ L_j(0)$. The *tangible capital* of the firm, $K_j(0)$, is thus given by $K_j(0) = V_j(0) - L_j(0) = .05\ L_j(0)$. It is further assumed that T = 1 year and r = log(1.05). The various stand-alone properties of businesses B, C, and D for the hypothetical example can thus be computed. To analyse an intermediary that holds more than one business, we must specify some further distributional properties; Let V(t) denote the gross asset value for an intermediary that holds n businesses. Based on earlier assumption, there are no operating synergies from combining the businesses and so.

$$V(t) = \sum_{j=1}^{n} V_j(t) \qquad (8)$$

The aggregate customer-liability value is given by $L(t) = L_j(t). = \Sigma_1^n L_j(t).$ ... (9)

The fraction of the intermediary's asset " portfolio" initially allocated to business j, w_j, is given by $V_j = V_j(0)/V(0)$. To simplify the computation of the customer-contract guarantee value for the entire intermediary, we approximate the gross asset value of the intermediary at time T by

$$V(0) \exp\{\sum_1^n W_j(\log[V_j(T)/V_j(0)])\} \qquad (10)$$

This approximation is tantamount to continuously rebalancing the asset portfolio between t = 0, and t = T to the initial weighting $(w_1 \ldots\ldots w_n)$. This "log-normal approximation" for the portfolio distribution is commonly used for valuing options on a portfolio of stocks such as the *Financial-Times 100 Share Index [FT-SE]*. The quantitative errors induced by this approximation should not distort the basic points illustrated.

With this approximation, the variance rate for the intermediary's asset portfolio is computed as

$$\sigma^2 = \sum_{i=1}^{n} \sum_{j=1}^{n} W_i\ W_j\ \rho_{ij}\ \sigma_i\ \sigma_j \qquad (11)$$

where ρ_{ij} is the correlation between $\log[V_i(T)]$ and $\log[V_j(T)]$. For computational ease the correlations between businesses can be assumed to be the same. That is ρ_{ij} is equal for all i, j, $i \neq j$ [for illustration this is equal to 0.4]. The actual value of the guarantee is computed from equation (5) as

$$G(V(0),0;L(T),T,r,\sigma^2) \qquad (12)$$

The various properties for combinations of business as in the hypothetical case can thus be compiled and used for decisions [see appendix 1].

Hypothetical Illustrations:

The differences in actuarial guarantee values for the stand-alone cases in Table 2 reflect different levels of volatility across the businesses with, D the most volatile and B the least. Hence, although the gross present value of each business is assumed to be the same, the actuarial present value are different.

The impact of having the three businesses as part of one firm depends on the distributional properties of the combined end of year values of the business [see appendix 1 for a full development of the distributional properties]. It is apparent that there is a positive but non-perfect correlation in the year-end values of B, C and D. Since the returns from the businesses are not perfectly correlated with each other, the volatility (risk) of the combined portfolio of businesses is less than the sum of the volatilities of each of the businesses on an individual basis. Consequently the actuarial value for the combined business is less than the sum of the guarantee values for each business taken separately. For the results of the three businesses combined into one firm see (i) of Table 2. This shows that the actuarial value of the guarantee for the combined firm is $1,230,000 compared to $1,800,000 total value of the stand-alone guarantees i.e. approximately 32% less. It is worth indicating that the $570,000 decrease in the actuarial cost of the guarantee does not result in a corresponding gain in actuarial net present value.[28] In the no-synergy

perfect-market case, the loss in gross present value is exactly compensated for by the decrease in the actuarial cost of the guarantee, such that the actuarial net present value of the total remains unchanged at $1,200,000. Thus the total actuarial net present value of holding all three businesses separately is equal to the value of combining the three businesses into one firm.

The same "value-additivity" result applies for all combinations of the businesses. To demonstrate this, consider the intermediary with B, C, and D. If it were to "sell-off" or otherwise eliminate business B, then applying the loan-guarantee valuation model to the (ex-selloff) firm containing C and D, given (in (ii) of Table 2) that the actuarial guarantee value is $1,118,000, the gross present value is $1,718,000, and the actuarial net present value is $600,000. The marginal values for B can thus be determined by subtracting (ii) from (i) in Table 2. Marginal B in Table 2 shows that although the marginal gross present value and actuarial guarantee value for B differ from the corresponding stand-alone values, the actuarial net present value of $600,000 is the same.

From Table 2 similar computations for selling off C and retaining B and D and selling off D and retaining B and C lead to the same results: the marginal net present value of each business is the same as its stand-alone value. In a nutshell, in the absence of any operating synergies or costs from combining these businesses and with no agency, tax or other spread costs, there is no value gain or loss from merging businesses.

With the underlying assumptions of perfect-market, information asymmetry and other agency problems between the intermediary and the third-party guarantor can be introduced.[29] Given these problems, the guarantor must charge a price greater than the actuarial value of the guarantee and the spread between the two is the agency cost which is a "dead-weight" loss. The agency cost is modelled as a fixed-percentage (10%) markup on the actuarial value of the guarantee.

The increased charge for the guarantee reduces the value of the intermediary's business. The actual net present value is defined here as the net present value less the agency cost of the guarantee. In line with the analysis in Table 2, we provide the valuations including agency costs for the three businesses on a singular basis and in various combinations. As agency costs are proportional to actuarial value of the third-party guarantee, combining the three businesses into a single firm will reduce the aggregate costs.[30] From Table 3, the $180,000 in total agency costs for the business on a singular basis decreases to $123,000 if they are combined. The saving of $57,000 in agency costs causes the aggregate net present value to increase to $1,077,000.

The combination of customer-sensitive businesses and agency costs creates complexity in attempts to allocate either costs or capital among the individual businesses of the intermediary. To demonstrate this, consider the intermediary with businesses B, C, and D. To compute the intermediary's **marginal agency** cost and net present value of each business, we take the difference between the intermediary with all three businesses and the intermediary without one of those businesses in turn. Hence, from (ii) in Table 3, the agency cost and net present value for the intermediary with C and D (without B) are $111,800 and $488,200, respectively. Subtracting from (i) in Table 3, the marginal cost of B is ($123,000 - 111,800) = $11,200 and the marginal net present value of B is ($1,077,000 - 488,200) = $588,800. Note that this marginal net present value of B exceeds its stand-alone value by $28,800 (i.e. $588,800 - 560,000). The calculations for C and D produce similar results.

From Table 3, none of the marginal values adds up to the corresponding total for the firm. As shown in Table 4, this creates problems for cost allocations among the individual businesses. For example, the aggregate of marginal agency costs, $92,200, leaves $30,800 of unallocated agency costs for the firm if marginal costs drawn from the combined-firm configuration are used for allocation. Similarly, the aggregate of marginal actual net present values ($588,800 + 368,000 + 151,000) = $1,107,000 exceeds the actual net present value of the whole firm by the $30,800 of unallocated agency costs.[31] Looking at Table 4, if the "stand-alone" agency costs of the business are used instead to allocate marginal costs, then the resulting aggregate overstates actual costs by $57,000. Due to the synergy-like

effects of individual-business volatility on agency costs, value-additivity of the individual businesses fails, and with that failure removes any unique scheme for fully allocating costs. As shown in Table 4, the same failure applies for other sub-divisions of the firm. If by contrast (see section 4.1 for methods of providing customer guarantee) the intermediary uses the issue of equity capital — instead of purchasing guarantees to provide contract assurance to its customers, the same allocation problem occurs for the capital and agency costs associated with the equity.[32]

It should be emphasised that the failure of value-additivity and the resulting arbitrary allocation of costs among individual businesses **does not** cause any ambiguity with respect to optimal capital-budgeting decisions of the intermediary made in a **centralised** manner that "internalises" the cross business effect of risk.

As indicated in footnote 30, the value-maximizing decision for the intermediary in this illustration is to keep the three businesses in the firm. However, this outcome is due to the specific structure of the agency costs. To demonstrate that the credit-sensitivity effect does not always lead to the conclusion that diversification is beneficial, the illustration is changed by replacing business D with business E, which is simply a passive investment in futures contracts on say the UK's Financial-Times 100 Share Stock Exchange Index [FT-SE 100]. For ease of comparisons, it is assumed that the scale of business E and its joint-distribution properties with B and C are the same as for business D which it replaces. From Table 5, (see appendix for analysis supporting it) replacing D with E changes the stand-alone entries in Table 3 in two respects: (i) as with all passive investments, the actuarial net present value of E is zero and (ii) the agency cost of a guarantee for this traded asset alone is zero. The latter follows because as a stand alone, the futures could be placed in a "transparent" intermediary structure such as a mutual fund or unit trust. In addition put options which trade on the FT-SE 100 futures in the financial market can be purchased to guarantee any pre-specified value for the portfolio with no incremental agency cost to the stand-alone intermediary.

If, however, business E is held as an integrated part of an opaque intermediary with businesses B and C, then it will add to the volatility of the year-end aggregate value of the intermediary. This additional volatility from including E causes the actuarial guarantee value of the intermediary to increase. Due to the asset integration and the opaque nature of the intermediary, the proportional agency cost applies to this increment. Hence, as shown in Table 5, the actuarial guarantee value and agency cost for the intermediary with B, C, and E are $1,230,000 and $123,000, respectively, as in the original illustration. However, the actuarial net present value is now ($600,000 + 400,000 + 0) = $1,000,000, and hence the actual net present value of the intermediary is ($1,000,000 - 123,000) = $877,000.

Suppose the intermediary divests itself of E. As a stand-alone selloff, E has an actual net present value of zero. The actuarial net present value of the intermediary remains unchanged at $1,000,000. However, the actuarial guarantee value declines to $740,000 and the corresponding agency costs are $74,000. The actual net present value after the divestiture is ($1,000,000 - 74,000) = $926,000 or an increase of $49,000 in the value of the intermediary, which is exactly the marginal agency cost of retaining business E in this structure. Hence, in the model used here, a passive attempt at diversification or retention of a business that does not benefit from either the integrated or opaque structure of the intermediary reduces the value of the intermediary.[33]

Summary and Conclusions: Financial System Regulation

The current wave of deregulation and liberalisation (in Africa, Eastern Europe and elsewhere) is largely a response to financial crisis, changes in financial systems and problems related to the functioning of financial systems. The success of any financial restructuring is enhanced when due political recognition is given to ensuring that the financial institutions and markets being restructured will remain competitive.

Despite the largely seemingly dual objectives of financial regulation, its impact tends

to go far beyond the specified goal(s) due to inherent inter-relationships between financial regulation. For instance, the use of macroeconomic tools such as credit ceilings, limiting the ability of banks to engage in imprudent and non-permissible credit expansion would in addition to meeting the desired prudential objective, will have structural implications given the constraints placed on competition between financial institutions.

Regulatory steps can be taken to deal with financial restructuring, through interventions by authorised bodies in situations involving solvency crises. The interests of consumers (investors) can be safeguarded by setting up compensation funds and deposit insurance schemes.

Role of Financial System

The central role of any financial system is to facilitate the allocation and utilisation of economic resources in a changing environment. Drawing from the primary underlying function of resource allocation, the financial system performs the following key functions:

(i) it provides a payments system for the exchange of goods and services. The payment system are served by depository financial intermediaries such as banks who offer among other things transfer services, current/deposit accounts and other intermediaries.

(ii) provides a mechanism for aggregating funds to embark on large-scale indivisible venture.

(iii) provides a means of managing risk. A developed and well functioning financial system enhances the efficient allocation of risk-bearing among firms and individuals.

(iv) provides price information for coordinating decision-making in various sectors of the economy.

(v) reduces costs associated with problems of information asymmetry. A well-functioning financial system enhances the resolution of adverse selection and moral hazard problems arising from the asymmetry of information between various parties to transactions.

(vi) provides a means of transferring economic resources through time and across geographical boundaries and regions.

- The most efficient institutional structure necessary for discharging the stated functions of the financial system is not static but changes over time and differs across countries and political spectra. However, the key functions of a financial system are similar in essence across economies and political divides.

- Financial intermediation is a key activity within all financial systems and refers to the process of converting financial assets from one form into another. Financial intermediaries perform the main role of processing information, risk management, and the reduction of transaction costs. Intermediation activities are performed either through organised financial markets or via direct transactions with individuals and institutions. The institutional structure of the financial system refers to the interactions between financial services and the regulatory arrangements governing the provision of such services. Financial innovation refers to the dynamic process of changing the institutional structure.

- Alternative approaches to the analysis of financial intermediaries are: first to accept as given the existing institutional structure of financial intermediaries and to perceive the public policy objectives as one of enabling the institutions to survive and prosper in their existing form — institutional approach; the second is to accept as given the economic functions performed by financial intermediaries and to seek ways of organising the best institutional structure for performing those functions — functional approach. A functional approach does not necessarily require preserving existing institutions. This paper has argued that the second approach is more enduring and is preferred.

- Theories of financial intermediation consistent with the functional perspective

can be broadly classified to deal with improvements in economic performance due to financial intermediation: satisfying the needs of investors to 'complete the markets' with new instruments that offer a wider range of opportunities for risk management and transfer of resources; transaction cost rationale (lowering transaction costs or enhancing liquidity); information processing and monitoring rationale (reducing agency costs arising from say information asymmetry) and operator of payments rationale.

The theories of financial innovation in the provision of intermediation services are directed towards achieving greater efficiency. Innovation in financial intermediation is driven largely by *inter alia* the institutional and regulatory environment.

Managerial Issues for Financial Intermediaries [Controlling Risk and Capital Budgeting]

- In the framework adopted such as in Merton (1992) investors and customers strict (ideal) preference is to enter into contracts whose payoffs are devoid of the financial performance of the intermediary [contracts which are default-free].

- The risk of default on contracts (credit risk) depends crucially on the total as opposed to the systematic risk of the intermediary, given the high transaction costs which prevent customers from diversifying the risk of default through hedging.

- As the total risk of the intermediary increases so does the agency costs associated with guaranteeing the discharge of contract obligations for an opaque intermediary.

- Capital Budgeting decisions are inhibited by the failure of the value additivity principle of theoretically superior techniques like the Net Present Value in a setting of opaque intermediary with multiple credit sensitive businesses.

Regulation and Financial Intermediaries.

- The role of government in improving efficiency of financial intermediaries includes promoting competition, ensuring the integrity of market and social welfare externalities; to prevent financial collapse.

- Intermediation services carry significant exposure to changes in investors/customers preferences especially in the advent of low transactions costs. This factor has potential influences on the institutional structures of intermediaries and their location.

Conclusion:

An important requirement for the success of any financial intermediary is its ability to control both actual and perceived default risk of its customer-held liabilities. Greater customer demand for service and greater complexity of products will intensify the attention given to this issue in the future. The internal finance functions of intermediaries will be expanded to cover not only the increased working capital needs of the firm, but also the management of its counter-party credit exposure. The illustrations given in section 4 clearly does not provide a fully specified model of the agency-cost structure faced by financial intermediaries. But perhaps it will serve to focus attention and stimulate further research on these issues of immense importance to intermediaries involved in credit-sensitive activities.

Postscript Comments:

It has been argued for instance by Inyangete (*op. cit*) that the *raison d'etre* for intervention in the financial (banking) sector is to ensure the stability of financial systems (markets). This does not in itself imply the systematic protection of depositors. In liberalising their markets, if African countries (policy makers) choose to permit foreign banks to operate [e.g. in Tanzania], providing they do not delegate their powers to some supranational or multilateral authority, they would retain full responsibility for domestic market. The justification is that a failure of the financial (banking) system will affect the domestic economy, the deposit insurance scheme or the lender of last resort. Hence supervision of foreign banks should not be entirely delegated to the supervisor of the parent company (bank).

NOTES:

1 This is in contrast to the traditional neo-classical economics view where a functional perspective of the financial system treats the existence of households, their tastes, and wealth as exogenous to the economic system.

2 A number of developing countries at the height of the third-world debt crisis of the 1980s resorted to bilateral barter arrangement to manage acute constraints on the effectiveness of their payments system.

3 Banks and insurance houses are examples of intermediaries whose quoted rates for corporate loans serve as a basis for investment decisions by firms. Stiglitz and Weiss (1981) show that in a world with credit rationing, the size of loans which intermediaries are prepared to provide enhances the information function served by prices.

4 Merton (1992) provides an interesting illustration of this situation by way of an individual who on purchasing insurance cover against fire or theft, is less inclined to take precautions against these risks. This presents the insurer with a moral-hazard problem. Adverse selection deals with the likelihood that those individuals facing greater risks of losses through fire and theft will be more inclined to buy insurance cover. The individual buying the insurance cover possesses relevant information which may not necessarily be available to the insurer. However, it is instructive to note that insurance contracts in the U.K as in countries of the East African Cooperation are contracts of the utmost good faith (*uberrima fides*) and not *caveat emptor*, placing obligation to disclose full information on the insured (customer).

5 Although largely untested it is widely agreed that the costs of information asymmetry are high for developing countries and as a consequence the range of services (instruments) offered are limited. A number of African countries like Tanzania present testable opportunities for this hypothesis.

6 Given the rate of technological developments and the increasing globalisation (integration) of financial markets, a functional approach may well facilitate anticipation of the future direction of financial innovation, regulatory obstacle, changes in financial markets and intermediation. This paper argues as does Merton that a basic tenet of the functional perspective for analyzing the financial system, posits that the fundamental economic force of competition, will tend to cause the real-world dynamic path of changes in institutional structure to evolve towards improvements in the performance of the functions of the financial system.

7 It is argued for instance by Merton (1992) that the relationship between financial institutions are typically both competitive and complementary: this applies both for intermediaries and markets as well as for intermediaries and governments, in addition to participants within an intermediary.

8 Gertler (1988) rejects the widely accepted economist working hypothesis concerning the irrelevance of the structure of financial intermediation. The 'irrelevance' propositions cover the 'finance is a veil' argument

which suggests that the financial structure of corporations is irrelevant for their market value and that investment and financing decisions can be completely separated. It also extends to the 'money is a veil' argument, which implies the associated concept of the long-run neutrality of money, even though it is incompatible with the view that inflation distorts relative prices, fuels speculative behaviour and misallocates resources. This proposition is at variance with observed practice in financial markets, which emphasises the importance of matching the maturities of assets and liabilities, maintaining stable dividend payouts, minimising the cost of capital and avoiding excessive reliance on debt finance.

9 As discussed in part in the previous section a functional perspective is useful for analyzing both micro and macro issues concerning financial regulation and the system. This framework is suitable for a wide range of analyses which include an entire financial system, and public policy choices.

10 The use of a functional perspective is not restricted to analyses at the financial system level. It has been employed in the study of financial activity by for instance Merton and Bodie (1992) and for the study of a financial institution by Merton and Bodie (1993).

11 The main thrust of this section is drawn from Merton (1992)

12 A report by the Central Bank of Nigeria (CBN) in 1992 classifies about one-third (40) of Nigerian banks as 'distressed' with unconfirmed reports of 'defaults' in the inter-bank market as some [mainly merchant] banks were forced to raise their capital ratios to required levels. The Nigerian Deposit Insurance Corporation (NDIC) reports that at the end of 1991, only 16 out of 65 commercial banks and 15 out of 54 merchant banks had raised their capital to the required levels. A new set of six criteria for measuring distress [which include 'sound' management, prudential guidelines, minimum capital, cash and liquidity ratios, and 8% capital adequacy ratio] released in september 1992, are said to be easier to satisfy. {SOURCE: FINANCIAL TIMES, 1 APRIL 1993].

13 The United States offers an important example which involves the narrowing of the distinction between activities of banks and securities firms. Major brokerage houses offer Cash Management Accounts which enable investors to consolidate their securities activities with cheque and credit card transactions. The Glass-Steagall Act which prevented banks from engaging in underwriting and market making activities is slowly being eliminated as banks can now enter into underwriting. The UK's Financial Services Act 1986 allows bank to set up securities businesses but with separate balance sheets. Similarly in Tanzania the Capital Markets and Securities Act permits banks to enter into securities business by setting up a subsidiary firm.

14 It is interesting to point out that a less familiar example (in the African environment) will be an organised derivative exchange, such as London's derivative market, although these are widely classified as financial markets and not intermediaries. However, derivative exchanges serve the fundamental intermediation function of guaranteeing the discharge of contracts traded on these exchanges. Traders {buyers and sellers} have as their respective counter-party, the exchange clearing corporation [e.g. London Clearing House (LCH)], and not the opposite party. Hence the exchange issues liabilities to both groups of customers. Efficiency of the derivative market would be greatly reduced if their customers had to 'diversify' against contract default risk by spreading their otherwise homogeneous transactions across a large number of different exchanges. As a consequence it is

of paramount importance that the clearing corporation of the exchange (e.g. LCH) has impeccable credit-standing with its customers.

15 A distinction can be made by exploring the strict preference of customers who hold such an intermediary's liabilities as the payoffs on their contracts being as unrelated (insensitive) as possible to the fortunes of the intermediary itself. For instance, a life insurance policy is to provide its beneficiaries with the payment of a specified sum in the event of death of the insured. This function would be less effectively discharged if the contract were to also call for payment of the death benefit in the associated event of the insurance firm being solvent at the time of death, even where the insurers offer adjustments for the solvency clause. It would seem that few would accept such terms despite any incentives attached. Merton points out that in the real-world customers would not possess the relevant information to reach a decision and as a result may face potential welfare loss from default.

16 A classic illustration of this shifting of the burden of risk-bearing is provided by investors (names as they are known) in the Llyods of London Insurance underwriting syndicate.

17 It is worth noting that the distinction between an investor-held and a customer-held liability claim is not unique to financial intermediaries. A similar analogy can be made for a holder of a guarantee from a car manufacturer. It is fair to say that given the choice some customers would prefer to accept increased default risk in return for a fair reduction in the cost of the guarantee. Although default risk may be crucial for a financially distressed firm, it may be of little concern to customers of a car manufacturer. On the other hand, given the large size and long duration of many financial contracts like life policy, default is a key concern for customers of financial intermediaries. Hence, to succeed a financial intermediary must charge an appropriate rate to cover its costs and obligations to customers.

18 There may generally, be a less severe trade-off between the expected volume of customer business and the credit standing of the intermediary, either due to differences in customer default-risk preferences or differences in their credit assessment of the firm. In the general case, finding an optimal credit rating becomes part of the capital budgeting decision, and the marginal gain in customer business is equal to the marginal cost of improving the credit standing. The intermediary in the extreme case is faced with a clear choice; either to pay the additional cost of making the customer contract default-free or abandoning the whole business.

19 In this illustration the NDIC as guarantor assumes obligation for any 'shortfall' in value between the contractual obligations of the intermediary and its resources (assets).

20 Using options [Black-Scholes] formulation offers important advantages, in that it requires very weak assumptions and the data inputs are often observable or can be readily estimated. Thus, making the formulation empirically testable, and if found to be suitable can form part of the practical management tools. Such models are commonly used by market participants in organised options exchanges. In addition, as options formulation do not require a history of market prices for the type of security being evaluated, it offers immense opportunities for evaluating non-tradeable instruments such as insurance contracts. See Smith (1976) for a detailed discussion of the properties and boundaries of options price.

21 The impact of combining the three businesses (B,C, and D) into a single firm depends on the distributional properties of the combined end of period (year) values of

the businesses. These distributional properties depend on the correlation between the business returns. As long as the business returns are not perfectly correlated, the volatility of the combined portfolio of business is less than the sum of their individual volatilities on a stand-alone basis in value terms. Hence the actuarial value of the guarantee for combined business is less than the sum of guarantee values for each individual business taken separately. In general, an option on a portfolio of non-perfectly correlated assets has a lower value than a portfolio of options on each of the assets - [See Merton 1992b].

22 Similar information asymmetry problems will exist between customers and intermediary, but this is usurped by our hypothetical case which assumes that the intermediary can only be in business if customer contracts are made default-free, this implicitly transfers all such costs to the relationship between the intermediary and the guarantor.

23 An analogy can be made with a market-maker's bid-ask spread for shares on the London Stock Exchange, where the bid price is the actuarial value and thus the economic value of the guarantee for the intermediary. On the other hand the ask (offer) price is that charged by the third-party guarantor. As with other transaction costs, the spread is a deadweight loss to the intermediary. A similar analogy can be made with reference to the retail segment of Tanzania's foreign exchange market where the intermediaries post their bid-ask quotations for foreign currency.

24 It is instructive to bear in mind that the situation modelled mirrors a typical African [opaque] intermediary which marks its assets and customer liabilities to market, only reports changes in its aggregate value periodically (annually), and discloses very little further information about its position and business activities. As a result the guarantor merely has a rough guide to the volatility of the Net Present Value of the intermediary and little else.

25 In a world without agency costs and tax-burden or other frictional costs associated with issuing equity, the optimal solution for every intermediary with credit-sensitive businesses would be to raise funds by issuing large amounts of equity and investing the proceeds in a passive strategy of buying assets that earn a market rate of return.

26 In the absence of derivative instruments as in Tanzania and the African environment, diversification offers the ideal solution.

27 The value of equity is not negative but zero as equity holders are protected by limited liability provisions.

28 The gross present values in the stand-alone case have embedded in them the ex-post profits in one business are not used to offset losses in another. That is, because they are stand-alone, the guarantor must cover the shortfall on customer contracts in each losing business separately, even though one or more of the other businesses earns profits. This "option-like" feature adds to stand-alone gross present value of each of the businesses. Once they are combined into a single firm, the guarantor can use the 'surplus' of the profitable businesses to offset the shortfall in the losing ones and the value of this option-like feature is lost.

29 In general, there would also be similar problems between the intermediary and its customers. However, in this illustration, to be in business, the intermediary must make customer contracts default-free and hence, all such costs are transferred entirely to the intermediary-guarantor relationship.

30 In addition to the explanation in footnote 28, this reduction in agency cost could for example reflect a reduction in the moral-

hazard incentive to take on excessive risk when a business is guaranteed separately. Alternatively, if performance were assured by equity capital instead of third- party guarantees, then the smaller aggregate amount of equity capital required to cover "n-standard deviation" loss in the combined firm implies a smaller amount of "passive" assets required within the firm to assure customers. These smaller passive-asset footings in turn lower the potential "free-cash-flow" agency costs described by Jensen (1986).

31 Note from Table 3 that the marginal net present value of each business exceeds its stand-alone value implying that the optimal capital-budgeting decision is to retain all three businesses instead of selling-off any one of them to stand alone.

32 In the absence of agency, tax-disadvantage or other frictional costs to issuing equity, the optimal solution for every intermediary with credit-sensitive businesses would be simply to issue huge amounts of equity and invest the proceeds passively in assets earning a market rate of return.

33 This result is consistent with Ross (1989) model of financial intermediation.

TABLE 1

PANEL A

BALANCE SHEET OF NON-BANK FIRMS (THE BORROWERS)

Assets	Liabilities
A_T	$V_T = \min(A_T, V_C)$
	$= V_C + \min(A_T - V_C, 0)$
	$K_T = \text{Max}(A_T - V_T, 0)$

PANEL B

BALANCE SHEET OF THE BANK (THE LENDER)

Assets	Liabilities
$V_T = \min(A_T, V_C)$	L_T
	$E_T = \text{Max}(V_T - L_T, 0)$

Definitions

A_T = the value of borrowing firm's assets
V_C = the promised loan repayment to lending bank
$V_C = V_0 \exp(r\,T)$.

V_T = the actual loan repayment
K_T = the value of firm equity
L_T = the value of bank deposits
E_T = the value of bank equity

TABLE 2

HYPOTHETICAL ILLUSTRATION.
VALUES OF BUSINESS WITHOUT AGENCY COSTS
[Scenario based on perfect-market assumptions]

($ 000s)

BUSINESS	**Gross Present Value**	**Actuarial Guarantee Value**	**Actuarial Net Present Value**
	a	**b**	**[a - b]**
B	1,000	400	600
C	1,000	600	400
D	1,000	800	200
Stand-Alone Total	3,000	1,800	1,200
(i) B+C+D	2,430	1,230	1,200
(ii) C+D	1,718	1,118	600
(i)-(ii) Marginal B	712	112	600
(iii) B+D	1,710	910	800
(I)-(iii) Marginal C	720	320	400
(iv) B+C	1,740	740	1,000
(i)-(iv) Marginal D	690	490	200

Calculations of gross present value and actuarial guarantee value based on the model in section 4.

Source: Computed from Merton 1992

TABLE 3

HYPOTHETICAL ILLUSTRATION
VALUES OF BUSINESS WITH AGENCY COSTS

($ 000s)

Business	Gross Present Value	Actuarial Guarantee Value	Actuarial Net Present Value	Agency Cost of Guarantee	Actual Net Present Value
	a	b	c=(a -b)	d=(b*10%)	e = (c-d)
B	1000	400	600	40	560
C	1000	600	400	60	340
D	1000	800	200	80	120
Stan alone Total	3000	1800	1200	180	1020
(i) B + C + D	2430	1230	1200	123	1077
(ii) C + D	1718	1118	600	111.8	488.2
(i)-(ii) Marg. B	712	112	600	11.2	588.8
(iii) B+D	1710	910	800	91	709
(i)-(iii) Marg.C	720	320	400	32	368
(iv) B+C	1740	740	1000	74	926
(i-(iv) Marg. D	690	490	200	49	151

Generated from Table 2

TABLE 4.

HYPOTHETICAL ILLUSTRATION: COST ALLOCATIONS AMONG BUSINESS AGENCY COSTS

($ 000s)

B + C + D

Allocation by Marginal Cost		**Allocation by Stand-Alone Cost**	
	$		**$**
Marginal B	11.2	Stand-Alone B	40.0
Marginal C	32.0	Stand-Alone C	60.0
Marginal D	49.0	Stand-Alone D	80.0
Total Marginals	92.2	Total Stand-Alone	180.0
Unallocated Cost	30.8	Overallocated Cost	(57.0)
Total Actual Cost	123.0	Total Actual Cost	123.0

Allocation by Marginal Cost for Various Subdivisions of Intermediary

	B + C	**B + D**	**C + D**
Marginal B	14	11.0	-
Marginal C	34	-	31.8
Marginal D	—	51.0	51.8
Total Marginals	48	62.0	83.6
Unallocated Cost	26	29.0	28.2
Total Actual Cost	74	91.0	111.8

Generated from Table 3

TABLE 5.

REVISED HYPOTHETICAL ILLUSTRATION:

BUSINESS VALUES WITH AGENCY COSTS

($ 000s)

	Business	Gross Present Value	Actuarial Guarantee Value	= Actuarial Net Present Value	- Agency Cost of Guarantee	= Actuarial Net Present Value
	B	1000	400	600	40	560
	C	1000	600	400	60	340
	E	800	800	0	0	0
Stand-Alone	Total	2800	1800	1000	100	900
(i)	B+C+E	2430	1230	1000	123	877
(ii)	B+C	1740	740	1000	74	926
(i)-(ii)	Marg. E	490	490	0	49	(49)

Generated from Table 3

Opaque Business D substituted for a transparent business E

APPENDIX 1

PROPERTIES OF BUSINESSES:

STAND ALONE AND IN COMBINATIONS AT TIME 0

($ 000s)

Business	Standard Deviation σ	Asset Value V(0)	Customer Liability L(0)	Tangible Capital K(0)	Tangible Investment I(0)	Guarantee Value G(0)	Gross Net Present Value GNPV
B	.100	20,356	19,386	970	370	400	1000
C	.200	10,670	10,162	508	108	600	1000
D	.400	6,058	5,768	288	88	800	1000
E	.400	6,058	5,768	288	288	800	800
B+C+D	.138	37,084	35,316	1,766	566	1,230	2,430
B+C	.112	31,026	29,548	1,478	478	740	1,740
B+D	.141	26,414	25,156	1.258	458	910	1.710
C+D	.228	16,728	15.930	796	196	1.118	1,718
B+C+E	.138	37,084	35.316	1.766	766	1,230	2,230

$V(O) = 1.05\, I(0)$

$k(0) = V(0) - L(0) = 0.05\, L(0)$

Source: Computed from Merton (1977 & 1992)

FIGURE 1

CLASSIFICATION OF FINANCIAL INSTITUTIONS

Transparent				Translucent				Opaque
Govt. Bond	Stock Market	Futures & Optns	Unit Trusts	Mutual Funds	Pension Funds	Finance Companies	Insurance Companies	Commercial Banks

Classification Scheme by Merton (1992) an extension of Ross (1989)

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