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THEORIES OF INTERMEDIATION - IMPLICATIONS FOR REGULATION

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Introduction

This paper seeks to stimulate thought and discussion regarding the future of regulation and the evolution of the financial sector. This first part seeks to offer an understanding of why certain types of transaction may occur only in banking markets, while others may arise either via banks or securities markets. The main theoretical section applies to a rather stylised version of traditional retail banking, but this is generalised in Section (2) to cover recent structural developments such as securitisation and wholesale banking.

The theoretical analysis is used in a third section to analyse the nature of banking regulation in the light of the theories of intermediation, and in a fourth to suggest approaches to wider regulatory and structural issues. Particular attention is paid to the role and future viability of banks and the appropriate scope of regulation.

(1) Theories of Intermediation

Outline

Davis and Mayer (1991) distinguished four main theories of intermediation. These are, respectively, theories of economies of scale, information, control and commitment. A fifth theory of banking, relating to liquidity insurance and maturity transformation, is included for completeness, but in our view does not distinguish as sharply between banks and markets.

To begin with brief definitions:

(a) Economies of scale: owing to transactions costs, small investors and borrowers use banks, while wholesale users can access bond markets.

(b) Information: banks have a comparative advantage in screening and monitoring borrowers to avoid problems of adverse selection and moral hazard which arise in debt contracts - market finance is only available to those having a reputation.

(c) Control: banks are better able to influence the behaviour of borrowers while a loan is outstanding and seize assets/restructure in the case of default than markets. This minimises moral hazard. Often dubbed "transactions banking".

(d) Commitment: banks can form long-term relationships with borrowers, which reduces information asymmetry and hence moral hazard.

(e) Liquidity insurance/maturity transformation: banks offer forms of insurance to lenders and borrowers, but in doing so leave themselves open to "runs"; securities markets offer similar facilities via market liquidity, and may also be subject to failure.

All of the theories rely on a degree of market imperfection, such as asymmetric information or economies of scale - in the absence of market imperfections banks' deposit creation and asset management services play no independent role in the economy (Fama (1980)).(1)

In the following sections, the principal approaches are developed in more detail.

(a) Economies of scale

The traditional theory of intermediation relies on the presence of economies of scale, which benefit specialised intermediaries [Gurley and Shaw (1960)]. Banks can pool risk and diversify portfolios more cheaply than individual investors, given fixed costs of acquiring investments. Risk itself is reduced in turn by such diversification, which should entail a lower cost of funds. On the liabilities side, banks can be seen as providing a form of insurance to risk averse depositors against liquidity risk (ie their need for cash in the future), if it is assumed these individuals are "small" and risks cancel over the population.(2) There are also economies of scale in the provision of payments services, although these apply more to the size of the payments system per se

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(1) This is because, given perfect capital markets (that is, markets where individuals can freely borrow against human and non-human wealth) no information costs or transactions costs, banks and other financial intermediaries are just passive holders of portfolios; depositors can offset any actions of banks via private portfolio decisions. This theorem applies even if individuals' access to capital markets is limited, as long as access is costless for banks and competitive conditions prevail, as then banks would then offset each others' portfolio shifts. (There are strong parallels with the well-known Modigliani-Miller theory of corporate finance.)

(2) Insurance is one aspect of the Diamond and Dybvig (1983) model of banking (see Section (e)). The suggestion is that banks can provide a liquidity service even when insurance companies cannot, ie when depositors' need for liquidity is private information.

than to the institutions linking to them. On the assets side, banks can also lend more easily than individuals, owing to their ability to manage investments at lower cost. (As a corollary, any reductions in fixed costs of direct financing will increase markets' comparative advantage).

Empirical work suggests that overall economies of scale to banks are exhausted at a relatively small size (so the theory does not justify giant banks). This does not, however, rule out economies of scale in some sub-categories such as those relating to non-interest income (brand names and branch networks to sell insurance etc). Another counterargument may be that a sizeable local presence is need for a deposit/transactions relationship, while diversification requires a national spread of business and hence a nationwide branch network (note that economies of scale relate to all costs and not merely those relating to risk bearing). But the importance of a local presence may have declined with technical advance.

However, this theory does not distinguish banks from other financial intermediaries such as mutual funds (unit trusts), which may also benefit from economies of scale(3) - and which may themselves be part of the payments mechanism(4) It also does not address the issues of information asymmetry, incomplete contracts and monitoring, which recent theoretical work suggests are central to the nature of debt.

(b) Information asymmetries - screening, monitoring and reputation

A second set of theories confronts these issues directly. As is well known, information asymmetries and the absence of complete debt contracts (which specify borrowers' actions in every eventuality) give rise to a need for lenders to screen the quality of entrepreneurs and firms (ie select their borrowers correctly) and to monitor their

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(3) Note that the economies of scale arise from existing technology rather than any unique feature of banks. [Goodhart (1989)].

(4) Presence of mutual funds in the payments system shows that confidence of customers and third parties in payments intermediaries can be established either via owners' capital (banks) or stable valued assets (mutual funds). This suggests dominance of the payments system is not the distinguishing feature of banks.

performance (to ensure funds are not misused) to avoid adverse selection and moral hazard, respectively.(5) But these are general features of the debt contract. Why should banks have a specific advantage?

First, there are links to scale economies; for example, expertise and fixed technology costs in screening by banks may give rise to economies of scale for depositors financing large scale projects, Chan (1983). There may also be economies of scale in monitoring, making delegation of monitoring to banks desirable, and economies of scope linking screening and monitoring.

As regards sources of these advantages, banks may have informational advantages arising from ongoing credit relationships; there may also be economies of scope arising from access to the borrower's deposit history (Fama (1985)); and from use of transaction services (Lewis (1991)). The intangible nature of this information makes it difficult to transmit to markets or other lenders, hence loans are typically non-marketable; as a corollary, many borrowers from banks are unable to access finance from securities markets. Moreover, even if transfer of such information were possible, given economies of scale it might be uneconomic for small borrowers to generate information themselves and transfer it to the market, rather than have it collected by a bank.

A consequence of non-marketability, which buttresses banks' positions, is that such investments are by definition held on the banks' own books. This will avoid free rider problems typical of securities markets (where an individual investor in marketable securities can costlessly take advantage of information on borrowers produced by other investors, thus reducing the incentive to gather it). Even abstracting from such problems, it also reduces costly duplication of information collection, that should otherwise be reflected in loan pricing. Note the assumption is of a single bank loan; free rider problems similar to securities markets may easily arise for syndicated loans. Also if bondholders traded on private information in the way that banks lend,

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(5) See Leland and Pyle (1977), Diamond (1984). Diamond (1991) cautions that for very low quality borrowers, monitoring does not eliminate incentives to moral hazard. This is because such borrowers have both less to lose by defaulting, and also less to lose by revealing bad news about themselves by being caught indulging in moral hazard. So monitoring in this case only screens out certain borrowers caught taking high risk actions. If the cost of monitoring is sufficiently high, they may be excluded from credit.

they might be accused of insider trading. This is hence another reason why certain types of activity - where private information is crucial - tend to be financed by banks.

An indicator of the importance of banks' roles as monitors is that even when firms can access securities markets, a continuing supply of bank debt may reduce the cost of market funds to the borrower (Fama (1985), James (1987)). This is because markets may regard bank loan renewals as a positive signal given banks' superior information; and this reduces the costs of monitoring for external debt and equity holders. There is thus a positive externality from banks.

The key theoretical work in this area has been produced by Diamond (1984), who shows why it may be efficient for investors to delegate monitoring to banks, given information asymmetries between borrowers and lenders. In Diamond's model, banks offer standard debt contracts to borrowers, which pay a fixed return when default does not occur and impose penalties in the event of default, thus ensuring adequate incentives.

There is of course also a problem of screening and monitoring banks by depositors, given information asymmetry about banks' activities. Diamond suggests that costs of this are reduced by portfolio diversification by banks, which reduces costs to the bank of losses on individual loans, and which also allows standard debt contracts to be offered to depositors(6) . The holding of bank assets in the form of debt ensures "incentive compatibility" between the interests of the bank owner and depositor. This is because, unlike equity, efforts by the intermediary to increase the probability of the highest return, by ensuring borrowers do not default, also increase the probability that depositors claims will be met. Chant (1987) suggests an additional mechanism is bank owners' equity. This gives depositors grounds for confidence in banks, as owners suffer initially from any losses. A further backup is of course regulation, whereby supervisors assume the burden of monitoring banks. Finally, rather than seeking to offset effects of information asymmetry, increased disclosure may buttress depositors' confidence in banks by reducing information asymmetry per se.

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(6) The corollary is that inadequate diversification may leave banks vulnerable to changes of opinion by depositors as to the risk free nature of bank deposits.

Reputations are important in a multiperiod context [Diamond (1989, 1991)]. Reputations of borrowers may be adequate to avoid excessively high risk investments and other moral hazard problems associated with imperfect information. In the absence of reputations, firms may be dependent on bank finance owing to moral hazard and adverse selection.(7) Only when a reputation has been established and has itself become a capital asset, by facilitating future access to cheaper sources of funds, are adverse selection and associated agency problems reduced, and firms can be relied on to select safe rather than risky projects. At that stage firms are able to gain access to the bond or commercial paper markets and avoid costs of bank finance.(8) Rating agencies may have an important role to play in this process, by offering monitoring services for investors in bond markets.

(c) Control

Since it is not possible to write "complete" contracts specifying the actions of the borrower in every eventuality, lenders of long term debt are vulnerable to exploitation by borrowers. This may, for example, take the form of forced refinancing to avoid threats of repudiation (Hellwig (1977)). Where possible, creditors will seek protection from such threats by retaining rights to control assets in the event of default - often called "enforcement". These rights may, for example, allow creditors to engage in liquidations that are costly to debtors (Hart and Moore (1989)). Conversely, borrowers are vulnerable to exploitation by lenders during the period of gestation of the investment project when costs have already been sunk. These offsetting factors suggest that funding of long-term investment needs a balance of control between borrowers and lenders.

A debt contract may provide such a balance, by allowing entrepreneurs to remain in control(9) as long as they are not in default (Aghion and Bolton (1991)). If there is a default, control transfers to lenders (albeit at a cost, eg in terms of low prices for second hand assets, that the lender will hesitate to incur). Control is a general feature of debt contracts, but banks may be better suited to exercise control than bondholders - they may have lower "enforcement costs" - if there are free rider problems to the

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(7) However, Chant (1987) suggests that an underwriter may be able to substitute his reputation for the borrower's in some cases (such as junk bonds).

(8) Particularly the costs of screening and monitoring, and the higher rates that banks may need to charge to offset residual adverse selection and moral hazard.

(9) Note that for public companies, equity markets exert a form of control short of default on debt, namely the takeover sanction.

involvement of the latter in corporate restructurings. (In other words, if one lender takes action to increase his return, all others who may not contribute will benefit equally, thus reducing the incentive to the active lender. (Stiglitz (1985), Bolton (1990)).) Control in non-default states may be reinforced by features of the debt contract such as short maturities, collateral and covenants(10) , which again banks may have a comparative advantage in enforcing. Focus on control in banking is often dubbed "transactions banking", ie where borrowers and lenders seek to maximise returns from each individual transaction.

(d) Commitment

Authors such as Mayer (1988) and Hellwig (1991) suggest that an alternative to control is commitment or "relationship banking". For example, banks may only rescue firms that are in financial difficulties if they anticipate being able to participate in the returns from such rescues. Superior information on the part of banks may tie borrowers to their original lenders, and thereby allow creditors to capture the required benefits. Conversely, firms will only be willing to commit themselves to particular creditors if they believe that their creditors will not exploit their dominant position. Reputations of financial institutions may be adequate to ensure that this condition holds (see also Sharpe (1990)), although they may be buttressed by equity participations of banks, which also reinforce banks' influence over the firm in non-default states. Participants in bond markets may be unable to commit themselves in the way outlined.

It has been suggested that the bank-oriented systems of Germany and Japan may be better suited to commitment than the market-oriented Anglo-Saxon systems and the euromarkets. Competition between financial institutions (and limitations on bank equity holdings) in the latter may make commitment on the part of large borrowers difficult although small and medium sized borrowers tend to rely on banking relationships in all countries (partly because, lacking reputation, they have high switching costs between lenders). Note that commitment is a form of "implicit contract" - the nature of the agreement to provide credit (by the lender) and to remain a customer (by the borrower) cannot be specified formally.

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(10) However, recent experience of bondholders in the US, where losses following takeovers and restructurings have been sizeable, show the weakness of covenants - or their inability to cover all outcomes - in the case of long-term debt.

Furthermore, the theory as outlined only focuses on interactions after the loan is made (ie superior monitoring). But relationships based on implicit contracts may also arise from costs of pre-loan evaluation of firm risk (or more general relationship-specific capital investment), where borrowers and lenders form an implicit contract to share benefits (Wachter and Williamson (1978)).

(e) Liquidity insurance/maturity transformation

Although in our view it is a theory of banking rather than intermediation, which highlights functions served both by banks and securities markets, the "liquidity insurance" approach is included for completeness. This theory is most closely related to Diamond and Dybvig (1983). By pooling risk, banks are able to provide liquidity insurance to risk averse depositors facing private liquidity risks (ie they do not know when they will require liquidity, but prefer higher returns associated with long term investment to hoarding cash). In other words, banks offer the possibility of early redemption of deposits at a fixed rate and hence are "money"; they offer returns superior to hoarding cash, given funds are on-loaned for fixed investment projects, but returns are below those on illiquid direct investment, reflecting the "insurance" provided. This pattern is held to imply that banks provide "optimal risk sharing". Meanwhile, reflecting the preferences of borrowers carrying out the long term investment projects, as well as the importance of private information specific to the relationship between borrower and lender, banks' assets are long-term and illiquid, except for a small liquid proportion to meet normal demand for withdrawals;(11) hence banks engage in maturity transformation.

Securities markets offer liquidity insurance in a different way. A liquid securities market provides optimal risk sharing from a security holder's point of view. The counterpart to the lower yield on bank deposits than direct investment is that yields are lower in highly liquid securities markets. Unlike banks there is no guarantee of a fixed rate at which assets can be liquidated but short-term high-quality debt securities approximate to this. Market liquidity depends on all other holders not seeking to realise their assets at the same time. Meanwhile, so long as markets remain liquid, the issuer of the security benefits from a longer effective maturity than the investor, thus there is again maturity transformation. Money market funds active in short term debt markets are intermediate between banks and markets, offering pooling benefits similar

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(11) A criticism of the paradigm, rectified in Diamond (1984), is that it does not specify the nature of bank assets.

to banks but a greater confidence about asset values than an individual investor (undiversified and with no cash reserves) would in a securities market. Their liabilities may hence be viewed as "near money" and may be used for transaction purposes.

A key aspect of this theory is that, the risk sharing deposit contract given illiquid assets may give an incentive for panic runs on banks by depositors, even if the bank is solvent; this is because of imperfect information of the bank, inability to sell or cash illiquid assets at par, and the "first come first served[12] " process whereby claims are distributed to depositors. Until the bank declares closure it must meet withdrawals on demand. But once the run exhausts liquid assets, it must close on liquidity grounds; and its ability to borrow liquidity in normal circumstances is at most equal to the value of capital. Once the latter is exhausted, the bank is likely to be insolvent, given the need to dispose of illiquid assets at "distress" prices. After closure, depositors join a pool of creditors who may or may not be met in full (implicitly, depositors face variation in the effective seniority of their claim). Therefore, there is an incentive to be first in the queue, and the risk that others may withdraw can cause a panic regardless of the underlying financial position of the bank. Such failures may impinge both on other banks (via contagion) and on borrowers unable to access other sources of funds.

Similarly in securities markets, if doubt arises over the future liquidity of the market, it is rational to sell first before the disequilibrium between buyers and sellers becomes too great, and market failure supervenes (ie yields are driven up sharply, and selling in quantity becomes extremely difficult). Such losses of liquidity, especially in short term debt markets, may have externalities similar to bank failures if illiquidity makes investors unwilling to accept new issues and if there are creditors who do not have a clear alternative source of short term finance (examples include the FRN crisis, the junk bond market and the Swedish CP Market, see Davis (1992)). As argued by Bingham (1991), economic agents generally are increasingly meeting liquidity needs by holding liquid assets saleable in secondary markets. Hence smooth operation of securities markets is itself seen as essential to preservation of overall financial stability.

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(12) Technically, as well as this "sequential service" feature, there is a need for incomplete markets, ie agents are not allowed to trade claims on physical assets after their preferences for consumption have been realised. But banks specialise in lending to sectors where contracts are incomplete, owing to fixed costs, asymmetric and/or private information.

(2) Applications

The versatility of these concepts - applied in the theoretical section above to a rather stylised version of traditional "retail" banking - can be seen in their applicability to two of the recent developments in financial markets, namely securitisation and wholesale banking.

(a) Securitisation

Securitisation may be defined (Cumming (1987)) as "matching up of borrowers and savers wholly or partly by way of the financial markets". It thus covers both direct intermediation via bonds and commercial paper, and repackaging of loans such as mortgages, where financial intermediaries originate loans but securities markets are used to seek investors.

As regards stimuli to this process, first, it is suggested that relationships or "implicit contracts" between banks and borrowers weakened in countries such as the US in the 1980s. On the one hand, volatile interest rates rendered highly unprofitable the options implicit in such facilities as credit lines and lending commitments. On the other hand, the high level of interest rates would often make the costs of reserve requirements and of capital exceed the benefit of holding the loan on the balance sheet, even if the borrower chose to exercise his right to borrow. In addition, increased competition in finance has reduced the market power of banks and the cost of severing ties with them.

As banking relationships ceased to offer continuous access to funds in a manner distinct from securities markets, price differences came to the fore. Here, the economies of scale offered by banks may have weakened, as increased capital requirements and the high level of interest rates raised the minimum spread acceptable to banks, and thus made the fixed costs of securities issuance acceptable to a wider range of borrowers. In particular, banks after the ldc debt crisis faced a higher cost of funds, which reduced their competitiveness. In addition, improved issuance techniques such as shelf registration(13) , as well as competition among underwriters(14) were acting to reduce

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(13) An amendment to rules in US securities markets which allowed blanket registration of bond or equity issues over two years, rather than having to register each issue individually, and which thus increased the flexibility of US domestic securities markets.

these fixed costs. Banks themselves have found it attractive to sell assets in this context, thus economising on capital, as well as reducing duration[15] of assets relative to liabilities, while taking advantage of lower costs of packaging loans. The collateral on such loans (eg mortgage deeds) substitutes for bank capital as a "buffer" from the investors' point of view. The institutionalisation of saving - itself partly a response to changes in relative transactions costs - has increased demand for securities over deposits, and hence reduced relative costs of securities market financing.

In this context, increased liquidity of securities markets and the development of money market mutual funds led to close substitutability of bank and market intermediation in terms of liquidity insurance.

Also by use of packaging (for household loans), guarantees and letters of credit (for corporate loans), and sometimes both packaging and guarantees (securitisation with recourse[16]) banks could use their continuing comparative advantage in monitoring while using up little capital. Such monitoring could also help maintain relationships - at least with banks' securities arms.

Turning to control aspects, the more complete the debt contract, the easier it is to securitise. The new financial instruments noted above have increased the potential for this. However, apart from the use of junk bonds in the US, in most countries - and in the euromarkets - banks' advantage in exerting control has prevented securitisation of high risk transactions such as takeover credits or project credits (Allen (1990)). Moreover, there are clear limits to packaging; it has not been a feature for small business loans. This may be due to features such as the importance of personal confidential information about idiosyncratic borrowers, the fact loans may be unsecured or the security difficult to sell, and all such loans may be vulnerable in a downturn (ie the risk is largely non-diversifiable).

(b) Wholesale banking

Lewis (1991) suggests that certain wholesale banking activities such as syndicated lending and interbank borrowing can also be explained by theories of intermediation. For example, as regards economies of scale, risk pooling of liabilities via interbank markets occurs outside the bank via market transactions, instead of within the bank as

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(14) See Davis (1988).

(15) Duration is the average time to an asset's discounted cash flow. If differs from maturity by distinguishing fixed and floating rate instruments of the same maturity; a floating rate asset has a lower duration.

(16) See Benveniste and Berger (1987).

with traditional deposits. Similarly, a diversified portfolio of loans can be obtained either by a bank itself making many small loans or participating in many large loans made by other banks. Again, in syndicated lending the banks taking participations can be seen as delegating the screening and monitoring of the borrower to the lead bank, which in turn has incentives to perform its function based on its reputation and on the credit risk it absorbs. (Experience suggests, however, that this process may work imperfectly. The lead bank may skimp on screening and monitoring, given the attraction of its fee and small exposure to the overall risk.) Development of secondary markets in loan participations offers banks a form of liquidity insurance in taking on such exposures.

On the other hand, it is less clear that wholesale banking entails relationships, with implicit contracts guaranteeing support to correspondents. Although there has to be a basis of trust in such markets, reaction to stress is often cutting of interbank credit lines. The dispersion of creditors to any one bank may make this a likely outcome. Even in terms of control, groups of banks may find it more difficult to reorganise non-financial firms in difficulty than a single bank (ie they face similar free rider problems to bond market investors). The difficulty of coordination of a large group of banks has been the basis of public intervention in countries such as the UK.

(3) Supervision and the theories of intermediation

In this section the theories are applied directly to the regulatory process, with particular reference to banking supervision. Insights are sought regarding the advantages of current forms of regulation, as opposed to "market solutions to market problems" eg rating agencies or other forms of private monitoring. In each case the analogy is drawn between supervisors and banks as described in the theories in Section 1.

The link between theory of intermediation and supervision can be made quite explicitly, because to the extent that regulators (via deposit insurance/lender of last resort) provide liquidity insurance guarantees to depositors with banks which are akin to debt contracts, and which are generally free or not accurately priced in relation to risk, all of the issues such as monitoring, control and commitment arise for them vis-a-vis banks equally as for banks vis-a-vis borrowers. Banks must be prevented from taking advantage of the (explicit or implicit) guarantees to take excessive risks; the supervisors can be seen as providing forms of protection for the mispriced "safety net" insurance that the authorities provide. Note that the link from regulation to provision of guarantees is likely to be well established in the public mind, and accordingly any depositors who lose money are likely to blame the supervisors, thus putting them

under political as well as economic pressure. Note that market-based institutions such as rating agencies have much more limited responsibility, namely to provide investors with an indication of the probability of their losing money. They are not offering guarantees - the cost of poor ratings is rather a loss of reputation.

Abstracting initially from rating agencies, in terms of the asymmetric information paradigms, the regulators are presumed to provide a better basis for the debt relation between depositors and banks than those the market can provide, (such as portfolio diversification, incentive compatibility of assets and liabilities, equity held voluntarily by banks, and public disclosure). The authorities have the advantage of ability to coerce banks into disclosing information, access to private information and ability to compare such information across banks not available to depositors. There are fewer free rider problems than for individual investors; the information available to the authorities is confidential and neither available to other investors nor reflected in market prices.

Supervisors may use private information both for screening (fit and proper tests for bank owners) and monitoring (prudential supervision). The need for such close monitoring may be less when banks gain reputations, but only if there is a definable cost to bankruptcy. As noted by Keeley (1990), such costs may have declined along with the value of bank franchises since deregulation. Similarly to markets offering cheaper funds to borrowers monitored by banks, uninsured wholesale investors may take confidence from supervisory monitoring in making deposits. Rating agencies reportedly also take the quality of supervisory oversight into account. This is a double edged sword, as it may lead to relaxation of potentially useful market discipline.

Rating agencies can obtain at least some of the information available to prudential supervisors and not the market. Their sanction of a downgrade offers a strong incentive for institutions to provide such information, in the same way as the authorities can coerce. Agencies are not vulnerable to losses arising from free riding since they are not remunerated from profits on securities holdings, but fees from borrowers. They will only rate a subset of banks, however, ie those in a position to issue bonds. Low quality institutions may seek to avoid rating. Hence rating agencies can at most be a partial substitute for supervisors, in this context.

The authorities may also benefit from economies of scale in accumulation and analysis of such data. A broader form of economy of scale arises from need and ability of supervisors to advise the lender of last resort regarding risk of contagion, which makes

centralisation of such information essential. Rating agencies may also benefit from the former type of economy of scale, but only need concern themselves with the latter to the extent individual banks they rate are seen as vulnerable to contagion.

There may be different ways of approaching the responsibilities of monitoring, which are in turn influenced by the nature and evolution of financial structure. On the one hand, regulators may rely on "control", with strict reliance on rules in order to maintain financial stability. The regulators may take over or close banks that are in difficulties, and may intervene at an early stage if regulations are breached. The various ways of achieving control of those to whom guarantees are provided were summarised by Merton and Bodie (1992) as some combination of adequate monitoring (including marking assets to market, and willingness to seize assets when net worth falls below a certain level), control over the asset distribution and risk based insurance premia. Issues relating to monitoring and ability to seize assets were noted above. Marking bank loans to market faces difficulties given their nature, though some judgements of this nature are essential to the supervisory process, and the development of secondary markets for loans make the process more precise. Limits on net worth correspond to the familiar capital-adequacy regulations. Similarly to banking covenants, the authorities generally impose restrictions on banks' asset portfolios such as limits on concentration of risk and liquidity ratios (in some countries). Strict adherence to risk based capital adequacy or risk based deposit insurance premia provide approaches to the third category of control mechanism, namely risk based insurance premia.

However, while such control mechanisms will always be necessary to some degree, it is important to add that the authorities may also apply a form of "commitment" to their relationships with banks. Close sharing of information and ability to influence management enable the authorities to nurse failing banks back to health (or merge them) when strict application of the control approach would suggest closure. They may apply forebearance to institutions that fail portfolio tests as strictly defined. This may in turn be more efficient in terms of avoiding failure and systemic risk, although as shown by the US thrifts, it may also leave the authorities vulnerable to moral hazard if their countervailing influence over troubled institutions is inadequate.

Commitment of the authorities may be bolstered by a cooperative relationship between them and the major institutions in the national market. It means the latter may act as a club, helping themselves to maintain standards (in the interests of their own reputations) by exerting pressure on deviants and also providing a ready source of funds to take over or otherwise finance institutions in difficulties. In such a situation

supervisors may be able to rely only on informal rules and suasion. This situation may be more difficult to maintain when the market becomes more competitive and internationally integrated. This in turn may lead to a switch in the direction of the control mechanisms as a means of disciplining financial institutions. The Basle accords can be seen as examples of this at an international level.

The analysis of control versus commitment provides further insight into the comparative advantages of the authorities over "market discipline", and the determinants of comparative advantage. Again the analogy is drawn between the authorities and banks and market discipline with securities markets. Whereas it is clear that the markets and rating agencies are unable to have the type of commitment relationship to firms in difficulties that the authorities can, it is less clear that they could not impose control (eg rating agencies monitoring capital adequacy). Note that, since unlike rating agencies they may not convey information to market, the authorities do not have the option of affecting profitability and possibly influencing behaviour via a rating downgrade. (Threat of a downgrade can also ensure provision of information to the agency.) The difficulty with a market based system would arise when due to a shock, a bank did breach the portfolio limits and thus encountered a sharp rating downgrade. The consequence might be an immediate run, to which the lender of last resort might need to respond. The authorities might prefer to intervene at an earlier stage (eg by using trigger ratios) in order to prevent the situation arising in the first place.

To summarise, the theories of intermediation have been shown to apply directly to supervisors as against markets and rating agencies. The comparative advantage of supervisors seems greatest when "commitment" to institutions is possible. It is less clear that they have such a strong comparative advantage in overcoming information asymmetry (although in practice agencies will only rate a subset of banks) while even for inducing control, the rating agencies have a weapon at their disposal (downgrading) not available to the supervisors.

(4) Wider implications for regulation

In this final section some wider issues relating to financial structure and regulation are addressed, focussing again largely on the lender/borrower relationship. In this context, it is important to note that the theory outlined in Section 1 is all developed in terms of a financial system without regulation. Drawing implications for regulation is hence largely a question either of assessing where the state of affairs described can be improved, or one where the theory is shown to be incorrect or incomplete, particularly given ongoing structural developments such as securitisation and wholesale banking, as described in Section 2.

The broad themes which emerge include the following.

- The future viability of traditional (deposit/loan) banks, and whether they play an essential role in the financial system.

- Whether, particularly in the light of recent banking difficulties, regulation should focus more on systems (monitoring, screening) and structural developments (such as securitisation) in addition to capital adequacy and balance sheets.

- Or alternatively whether, as in Section 3, a greater reliance on market forces with less regulation would be viable (market solutions to "market failures").

- The role of regulation if securities markets were to dominate the financial system.

- Issues of competition policy which arise in the financial sector, and may conflict with regulatory objectives.

- The contrasting features of Anglo Saxon and Continental financial systems.

(i) Economies of scale

- If economies of scale are exhausted at a relatively small size, then in terms of competition policy giant banks are not justified (ie there is no tradeoff of efficiency against monopoly risks). However, large institutions could be more stable, suggesting a three-dimensional tradeoff. This issue links to moral hazard and "too big to fail" problems, to the extent the large institutions which fall into this category are not economically superior to smaller banks.

- Given the key role of transactions costs, any technical change that reduces them may make traditional banking less viable. Is there a point at which they become inviable - when small companies are the only borrowers, and even they are charged so much, they fail to develop or seek alternative finance? How should regulators react? Seek to change the parameters, or accept reality? Should they at least focus closely on such technological developments?

- Payments systems may benefit from sizeable economies of scale, but costs of linking to them may be low, and not necessarily limited to banks (money market mutual funds). This suggests competition policy should focus on free entry and not restrict it to banks. Prudential regulation needs to take into account likelihood of failure of participants - but again, is this related to size?

(ii) Asymmetric information and monitoring

- If screening and monitoring are central to profitable lending, should regulators put more focus on their efficiency?

- What are the costs of monitoring that prevent banks from maintaining adequate control of risk? Is the problem the banks' weak bargaining position vis-a-vis borrowers - and if so, how should regulators react?

- How essential are the links relating to private information from deposit and payments services to effective monitoring of the same client? ("economies of scope" as in banks compared with rating agencies) Is monitoring markedly less efficient in their absence? Should allowance be made for this?

- What does the "Milken"/junk bond episode tell us about monitoring? Would the type of "inside" information he was prosecuted for using be normally available to banks? Does such information give an unfair competitive advantage to banks over other providers of finance?

- Monitoring may not be useful without an appropriate sanction (which links to "control"); does the legal framework provide it? Is the threat to cut off future credit sufficient, if borrowers can switch to other banks?

- If markets rely on banks for signals about creditworthiness, this may provide a rationale for policy action to maintain a viable banking sector. But can banks be remunerated for such services; if eg the bulk of a large firm's business is marketed? Will the monitoring often not be performed? Or will the bank need to prove additional services ("securitisation with recourse") for its monitoring to be remunerated? Are rating agencies unable to fulfil this function?

- If borrowers all had reputations, monitoring (as opposed to economies of scale) would not be so essential, weakening the functions of banks. Would this be a cause for concern? How stable are reputations - and will banks be strong enough to support the "next generation" of firms as they gain reputation? Should rating agencies be encouraged so as to overcome this problem?

- Should loans to firms with and without reputation/market access be treated differently by regulators? How could reputation be measured?

- Theory suggests there are a variety of mechanisms besides regulation to give depositors confidence in banks, notably (i) the incentive compatibility of the debt contract per se (ii) bank owners' equity (held voluntarily) (iii) disclosure (iv) portfolio diversification by the bank. Would they be sufficient in the absence of regulation?

- Could screening and monitoring problems be usefully reduced by pooling data? (eg in Centrales des Risques).

(iii) Control

- Are banks really superior to markets at restructuring balance sheets of borrowers in default? To the extent restructuring is hampered when there is a syndicate of lending banks, does this mean syndicated loans warrant special supervisory treatment?

- Conversely, does bond issue give the debtor the whip hand over investors (because they lack ability to "control"), only restrained by reputation (as in the case of "event risk" in the US)? Are retail bond market investors sufficiently protected? How reliable are rating agencies? Does institutionalisation change the picture (in that institutional investors have superior information, and ability to form coalitions against recalcitrant bond issuers)?

- How effective is "control" in terms of ability of lenders to repossess assets - does it take so long that the assets' prices will have fallen sharply? How often are they marked to market and what action is open to lenders if they depreciate? Does bankruptcy law (eg Chapter 11 in the US) tilt the balance against the lender? Do lenders perceive this, and hence it is factored into loan pricing, or do they have to make losses before the lesson is learnt?

- Is there a danger of conflicts of interest between senior and junior creditors, that may lead to unnecessary liquidations of borrowers? Is banks comparative advantage in restructuring compromised if they are senior creditors, since they have incentives to liquidate?

- The adequacy of the supplementary control mechanisms could be questioned. Are covenants an effective means of control? How easy is it to detect breaches? Do covenants make lenders relax their monitoring? Similarly, does reliance on collateral lead to a false sense of security especially given recent losses following default plus volatile resale prices of collateral assets? Finally the debt crisis showed short maturities to be ineffective means of control, given the weakness of the applicable sanctions.

- The takeover sanction is a key control mechanism for poor management of non-financial firms - does it apply to a sufficient extent in the financial sector?

(iv) Commitment

- Does the distinction between control and commitment lead to a real difference in risk, which should be reflected in regulation (eg between bank loans in the UK and Germany)? Or are any differences more than offset by differences in portfolio structure (bank equity holdings, gearing of creditors etc) in countries where "commitment" holds?

- Is commitment sustainable in an open, competitive financial market? How easily will German banking fit into a post-1992 environment?

- Is commitment compatible with syndicated lending? Does it justify giant banks in countries such as Germany?

- Should countries with "Anglo Saxon" financial systems seek to move towards greater commitment (bank representation on boards, bank equity holdings etc) if it makes corporate rescues more likely and improves small firms' access to finance?

- Is banks' reputation a reliable protection for small borrowers against exploitation in relationship banking?

(v) Liquidity insurance/maturity transformation

- The risk of bank runs and panics provides much of the basis of provision of the safety net and associated banking regulation. But (i) is the risk of such runs really so great for large diversified institutions? and even if it is, (ii) are there not similarities in securities markets, that are themselves increasingly the basis for transactions balances? How should regulation adapt - more emphasis on robustness of market structures, and on the dangers of failure of market makers? (Bingham (1991)).

- If securities markets are unstable sources of funds, should any decline of traditional banking be a cause for concern? Do we not need both?

(vi) General points

- Can regulation itself distort some of the parameters in the choice of intermediation vs the market? (For example, the "preferred creditor" legislation in the US and similar provisions in the UK that deter banks taking a role in firms' management, and thus inhibits commitment?)

- Experience suggests that banks, particularly in the presence of excess capacity, may make systematic errors in their intermediation (risk assessment, liquid assets, expectations regarding the cycle etc), which is part of the rationale for regulation. How does this affect interpretation of theory - does it necessitate an extra safety margin, and hence tight regulation? Or is it induced by the safety net/too big to fail problem?

- Are banks less likely to disappear than to change their nature - either into investment banks or financial supermarkets - in both cases shifting from interest to non-interest income? What difference would this make to the paradigms (would banks retain some of their distinctive comparative advantages, eg in control and commitment?)

- What need would there be for regulation if traditional banks did disappear from the scene - or will their functions eg providing payments services require continuing regulation similar to current practice?

Conclusions

It is suggested that the theories of intermediation which have been developed in recent years can offer insights far beyond the rather stylised type of retail banking with which they were initially associated. In particular, it is suggested that recent developments in finance can usefully be examined through the theories, that banking supervision can itself be seen in direct analogy to banks' role in the intermediation process, and that the theories raise a variety of broader issues in financial regulation and the evolution of financial systems. Given the ongoing development of regulatory structures at both national and transnational (notably pan-EC) levels, and current financial difficulties related to overleveraging as well as the continuing rapid change in financial structure, it is suggested that the theories and their implications warrant further attention by regulators.

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