



**ASYMMETRIC INFORMATION, ADVERSE
SELECTION AND MORAL HAZARD IN
THE BANKING INDUSTRY**

by

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ABSTRACT

This paper theoretically reviews asymmetric information and by products, adverse selection and moral hazards in the banking industry and linked them as key structural sources that caused the Asian crisis. These derive from factors of divergent interest, decision makers being insured against some of the consequences of their actions (Deposit Insurance and Lender of last Resort coverage), monitoring and enforcement being imperfect and the other pertinent factors.

This paper reveals that the Asian authorities appeared not to have capitalised on the lessons learnt from the U.S Savings and Loans crises. However the analyses and recommendations presented in this paper should help lead to more informed and focused policy prescriptions as the new International Financial Architecture takes shape.

INTRODUCTION

In the banking Industry, like in other arrangements where incentive structures between contracting parties exist, the incidence of asymmetric information creates various kinds of adverse selection and moral hazard problems. From a microeconomic perspective, these problems which are structural in nature, can lead to widespread market failure within the credit systems of banks and a general loss of depositor confidence in the fractional reserves system. From a macroeconomic perspective, systemic banking crises or runs can disrupt the business cycle through the saving and investment mechanism and result in severe macro economic instability of a country.

Over the last decade the problem of asymmetric information and its by products, adverse selection and moral hazards have been amplified by developments and trends in modern banking. These developments and trends have not altered the traditional deposit taking and loan-issuing role that banks perform in the intermediary process in the financial system. What is altered, is the character of banks' which Mullineux (1991) summed up can now be regarded as 'highly diversified financial conglomerates'.

The paper argues that the problem of information asymmetry, and by products, adverse selection and moral hazard were key structural determinants of the Asian Financial crises. However, this problem and its by products have however received sparse attention

from writers and researchers. There is therefore a need for greater research relating to these critical and problematic issues especially in the wake of the sweeping developments and trends that are reshaping the character of the Modern Banking industry.

These present major challenges in development of the new international financial architecture. In addition, these have severe policy implication to commercial bank risk managers, international bankers, central bank supervisors and regulators as national governments search to foster sound banking industries, financial sector stability and macroeconomic stability.

This paper is divided into four parts. **Part one**, theoretically reviews asymmetric information, adverse selection and moral hazard and relates them to the theory of banking. **Part two**, outlines and analyses factors giving rise of adverse selection and moral hazards problems in the banking industry. **Part three**; regards asymmetric information, adverse selection and moral hazards as key structural sources the Asian financial crisis. These are based on the factors outlined in part two. **Part four**, looks briefly at the lessons learnt and policy implications and recommendations. **The Conclusion** presents a summary of some salient points in the paper.

PART ONE

REVIEW OF THEORETICAL LITERATURE:

(A) The Nexus of Asymmetric Information, Adverse Selection and Moral Hazard.

According to Miskin (1992), asymmetric information arises when one party has insufficient knowledge about the other party involved in a transaction to make accurate decisions. A core concept in models of asymmetric information is that of the principal-agent relationship which, by definition, exists when one party (the agent), takes an action on behalf of another party (the principal). The presence of asymmetric information between the principal and agent means that it is generally not possible to costlessly align both parties' objectives (Borland 1992). This source of the principal-agent problem sometimes gives rise to adverse selection and moral hazard. One way of distinguishing between these concepts is to remember that adverse selection is a problem of asymmetric information before entering into a transaction, whereas moral hazard is a problem of asymmetric information after the transaction has occurred.

The presence of asymmetric information is a root cause of adverse selection and moral hazard problems.

The classic example of adverse selection is the 'lemon problem' which Akerlof (1970) applied to the used-car market. In Akerlof's context, Gresham's law was rephrased as 'Bad cars drive out good'. It works as follows, suppose there are two types of used cars: peach and lemon. A peach, if it is known to be a peach, is worth \$3,000 to a buyer and \$2,500 to a seller. A lemon, on the other hand, is worth \$2,000 to the buyer and \$1,000 to a seller. There are twice as many lemons as peaches. If the buyer both had the ability to look at a car and see whether it was peach or lemon, there would be no problem: Peaches would sell for \$3,000 and lemons for \$2,000. Unfortunately, buyers do not have this ability to tell whether that car is a peach or lemon but sellers know. As a result, the price that the buyer pays must reflect the average quality of the cars in the market, somewhere between the low value and the high value of a good car.

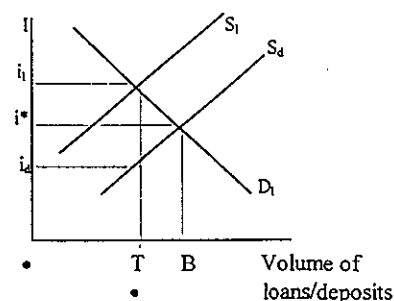
According to Milgrom & Roberts (1992) the moral hazard problem is a form of post contractual opportunism that arises because actions that have efficient consequences are not freely observable and so the person taking them may choose to pursue his or her private interest at the others' expense. With respect to the principal agent relationship, moral hazard arises when the agent and principal have divergent individual interest and objectives and the principal cannot easily determine whether the agent's reports and actions are being taken in pursuit of the principal's goals or constitute self-interested misbehaviour.

(B) Review of Banking Theory

According to Mishkin (1995) banks are financial institutions that accept money deposits and make loans. These include firms such as commercial banks, savings and loans associations, mutual savings banks, and credit unions. The distinguishing feature of bank's existence from other financial firms is that they provide deposits and loan products. Banks play a traditional role in the economy, by acting as intermediaries between depositors and borrowers.

The traditional intermediary function of a bank can be to help explain why banks exist by use of microanalysis. Consider figure 1, a simple model of the credit market as utilised by Heffernan (1996). On the vertical axis is the rate of interest; the volume of deposit/loan is on the horizontal axis. Assume the rate of interest is exogenously given. In this case the bank faces an upward sloping supply of deposits curve (S_d). There is also a supply of loans curve (S_l) showing that the bank will offer more loans as interest rates rise, though the curve may be discontinuous at one point because of adverse selection (as interest rate rise, riskier borrowers apply for loans) and adverse incentives (higher interest rates encourage borrowers to undertake riskier activities). D_l represents the demand for loans, which falls as interest rates increase.

Figure1 Simple model of the banking firm



- $i_l - i_d$: Bank interest differential between the loan rate(i_l) and the deposit rate (i_d) which covers the cost of the banks intermediation
- S_d : Supply of deposits curve
- S_l : Supply of loans curve
- D_l : Demand for loans curve
- OT: Volume of loans supplied by customers
- i^* : Market-clearing interest rate in the absence of intermediation cost

From figure one the element of intermediation cost which according to Mishkin (1995) is important towards explaining why financial intermediaries and indirect finance play such an important role in financial markets. This result from asymmetric information, which banks, specialises because they enjoy informational economies of scope unlike an individual lender.

Given the wave of recent developments in Information technology revolution, financial deregulation and innovation and trends of internationalisation, securitisation, globalisation, and derivitisation have led to the era of modern banking. Banks are increasingly existing as part of highly diversified financial conglomerates that

are active in both informal markets and in organised financial markets partake in a wide range of business activities. These have altered the 'character of banks' which have eroded some of the competitive advantages enjoyed by banks. Among these, is the degree of informational economies of scope, which complicates the information asymmetry problem.

PART TWO

FACTORS GIVING RISE TO ADVERSE SELECTION AND MORAL HAZARDS PROBLEMS IN THE BANKING INDUSTRY?

The above theory underpinning the lemon problem and principal-agent relation provides a useful analytical framework in explaining the structural sources of adverse selection and moral hazard problems experienced in the banking system. These sources derive from key factors which based on Milgrom and Roberts (1992) analysis are inter alia:-

- (1) divergent interest,
- (2) decision-makers being insured against some of the consequences of their actions (Deposit insurance and Lender of last Resort coverage),
- (3) monitoring and

- (4) enforcement being imperfect.

Evidence shows that the factors featured prominently in one of the most spectacular moral hazard problems of recent times, the United States 'savings and loan crises'.

(1) Divergent Interest Factors

In terms of divergent interest, a common kind of adverse selection and moral hazard problem similar to the lemon problems and principal-agent relationship arises when banks process and issue loans to borrowers. This results from the presence of asymmetric information where the loan officer may have insufficient knowledge of prospective borrowers seeking loans to make an accurate decision. As a consequence, potential bad credit risk (lemons) are the ones who most actively seek out loans as opposed to the good credit risk (peach). These include, big risk takers or out right crooks who might be most eager to take out a loan because they know that they unlikely to pay it back.

Lenders always run the risk that the borrower will engage in activities and interest that are undesirable and hence diverse from the lender's point of view making it less likely that the loan will be paid back. Once the borrower has obtained the loan, they may take on big risk (which have possible high returns but also run a greater risk of default) because they know they are playing with someone's money (whose interest is to have safe returns on their investments). Such divergent actions vis a vis adverse selection create moral

hazards arising after the transaction occurs between the loan officer(principal) and borrower(agent) respectively.

In the U.S Saving and Loan Crisis, divergent interest existed between S&Ls and Local borrowers who became less risk averse by turning to riskier investments, including loans on commercial real estate and high-yielding but very risky corporate borrowing called "junk bonds". There was a high incidence of fraud within the industry and defaults by some corporate borrowers on their junk Bonds, which undercut the value of all high-risk debt, and further reducing the S&Ls' assets.

(2) Decision Makers Insured against some Consequences of their Actions,

The very design of the deposit insurance program, together with lax regulation can lead to costly problems of adverse selection and moral hazard in the management of savings and loans [Milgrom and Roberts (1992)].

The portability of deposit insurance schemes can be analysed by examining and comparing the free banking school's case for financial laissez-faire as summarised by Dowd (1996) against the case with government intervention with deposit insurance schemes and government regulation to determine whether the latter increase or decrease moral hazard.

The case for a regime under laissez-faire with no deposit insurance and government regulation as examined by Dowd (1996) suggests that moral hazard would be minimal since depositors would want reassurance that their funds were safe and would soon close their account if they felt there was any significant danger of their bank failing. Indeed evidence support the associated prediction that laissez-faire banks face low probabilities of failure. Further evidence also report failure rates and losses were low for relatively unregulated systems such as those in Canada, Scotland and Switzerland.

The impact of state intervention with respect to deposit insurance and government regulation can be discussed by examining the case of two specific interventions as discussed by Dowd (1996). These are the establishment of a central bank to provide lender of last resort (LLR) support to the financial system, and the establishment of a state-sponsored system of deposit insurance. The establishment of LLR is meant to provide liquidity to banks that cannot otherwise obtain it. Since good banks can always obtain loans to maintain their liquidity, an LLR therefore protects bad banks from the consequences of their own actions. This situation can increase the incidence of moral hazard. It therefore directly encourages the very behaviour - greater risk taking and the maintenance of weaker capital positions that sound banking regimes should avoid. Dowd (1996) states that ironically, the LLR can produce the very instability that proponents of the central banking often claim would arise under free banking. Hence a major cause of banking instability and moral hazard could be mistaken as a cure as, unfortunately, often is.

A system of deposit insurance has comparable effects. As stated in part two, once we introduce deposit insurance, depositors no longer have any incentives to monitor banks management and managers no longer need to worry about maintaining confidence. This imposition increases moral hazards. In addition, a banks rational response is to reduce its capital, since the main point of maintaining capital strength is to maintain depositors' confidence which would no longer apply. Deposit insurance consequently transforms a strong capital position into a competitive liability, reduces institutions financial health. And make banks more likely to fail. It also encourages more bank risk-taking, hence moral hazards.

First Benson and Kaufman (BK) though agreeing with much of the foregoing analysis, disagrees on the central bank LLR function and on government deposit insurance. They argue that LLR creates serious moral hazard problems among other things as with the case of deposit insurance.

Savings and Loan associations (S&Ls) in the U.S saving and loans crisis were insured by a U.S federal government agency. -- until 1990, the Federal Savings and Loan Insurance Corporation (FSLIC) primarily to protect depositors against bank failures by eliminating bank runs. The S&Ls made risky investments in part because the Government insurance scheme made those investments profitable for the owners of the S&Ls. Unfortunately, the FSLIC's reserves were inadequate to cover its promises to protect depositors, and the U.S taxpayers were made to foot the multi-billion dollar bill. In summary, brief deposit insurance and low capital requirements encouraged excessive

risk taking by relieving S&L relieving the S&Ls of the responsibility for poorly performing investment s while allowing them to gain when the investments prospered.

(3) *Monitoring Borrowers*

A bank that lends you money will enquire about your financial condition and about what you intend to do with the loan proceeds. It will run credit checks, demand collateral, and often require regular payments of the interest in the property and part of principal. In general careful scrutiny by depositors is the mechanism by which an unregulated and uninsured bank might be kept from making irresponsible investments or defrauding its investors. However, if deposits are insured and because monitoring can be costly, banks may be less motivated to monitor borrowers.

To the extent insured depositors have so little reason to monitor the bank's activities then outright crooks also find banking an attractive industry for their activities. This is because it is easy for them to get away with fraud, embezzlement and money laundering hence giving rise to moral hazard.

The Deposit Insurance cover of the U.S. Savings and Loans associations relieved the depositors of the usual responsibility of investors to monitor those who held their money. This encouraged both risk taking and fraud and resulted in the incidence of moral hazard.

(4) Enforcement Being Imperfect

Another kind of moral hazard is created by the desire to prevent bank failures (TOO BIG TO FAIL POLICY). As we will see later, this has presented bank regulators with a particular quandary. Because the failures of a very large bank makes it more likely that a major financial disruption will occur, bank regulators are reluctant to allow big banks to fail and cause losses to depositors and major financial disruption. However, the problem with the too big to fail policy is that it increases the moral hazard incentives for big banks. Those inefficient and badly managed big banks will receive government assistance to prevent them from failing and causing major financial disruption in the economy, whereas the small and medium size banks, which may be more efficiently managed, may receive no assistance.

(5) Other Factors

The preceding kind of moral hazard problem in the banking system can be aggravated if the borrower thinks the loan agreement may be altered when the country encounters debt servicing problems or exchange rate changes

PART THREE

ASYMMETRIC INFORMATION, ADVERSE SELECTION AND MORAL HAZARDS AS KEY STRUCTURAL SOURCES THE ASIAN FINANCIAL CRISIS

Although there is broad consensus among academics pointing to the causes of the Asian crises. Few have however attempted to probe deeper into the underlying structural source of this loss of investor confidence that precipitated a reversal in capital flows that triggered the crises. Following from the above theoretical literature, the incidence of asymmetric information and its by products adverse selection and moral hazard can be regarded as underlying key structural sources of the Asian crises.

There is an abundance of evidence hinting to the underlying structural source of the crises. The majority of this evidence points to the quality of information, inadequate public disclosure and lack of transparency in the banking system, poor supervision and the need for good governance. These are all linked to the loss of investor confidence inherited by lax regulation and supervision of the highly diversified financial conglomerates in the banking industry.

Reports suggest that the investment boom and the surge of capital flows that preceded the crisis were based on the region's success. But the pace and pattern of

investment in recent years and the way it was financed, made some countries vulnerable to a loss of investor confidence and a reversal in capital flows. This growing vulnerability was the result of private sector decisions rather than public sector deficits. These private sector activities took place in the context of government policies that did not do enough to discourage excessive risk taking while providing too little regulatory control and insufficient transparency to allow markets to recognise and correct the problems. According to their findings 'the root of the problem was a weak and poorly supervised financial sector against the backdrop of large capital inflows. Equally inadequate corporate governance and lack of transparency masked the poor quality and riskiness of investment.' This lack of transparency made it difficult to distinguish good firms from bad. The erosion of confidence also undermined political stability. Thus, domestic recession, financial and corporate distress, liquidity constraints, and political uncertainty all contributed to a vicious cycle –leading to the dramatic downturn.

In addition other sources identified domestic factors identified lax prudential regulation and financial oversight, which led to a sharp deterioration in the quality of bank's loan portfolios. It was also observed that, among other things, the large capital inflows, including an increasing share of short-term external debt, were intermediated through a weak banking sector and partly invested in the property sector.

The theory of the lemon and principal-agent relation also provide theoretical support for ranking asymmetric information, adverse selection and moral hazard problems experienced in the banking system as key structural sources of the Asian Crisis. Based on

Milgrom and Roberts (1996) analysis these structural sources derive from factors identified earlier, such as :-

- (1) divergent interest,
- (2) decision-makers being insured against some of the consequences of their actions (Deposit insurance and Lender of last Resort coverage),
- (3) monitoring and
- (4) enforcement being imperfect.

It is ironic that these factors which featured prominently in one of the most spectacular moral hazard problems of recent times, the United States 'savings and loan crises' were again prevalent factors leading to moral hazards in the Asian crises.

The fundamental difference relate to my the earlier point that Banks are increasingly existing as part of highly diversified financial conglomerates. They are now active in both informal markets and in organised financial markets partaking in a wide range of business activities. This is reflective in the high volatility inherent in the functioning of financial markets. It reflects not only imperfection in the flow of information but radical changes in its interpretation and sharp revision in expectations as new information arrives, shifts that can be severe because of the uncertainty intrinsic to the intertemporal decisions that underlie financial transactions. This point is well supported in 1999 Report of the Task

Force of the Executive Committee on Economic and Social Affairs Division of the United Nations on the theme "Towards a New Financial Architecture".

In summary, asymmetric information, adverse selection and moral hazards ought to be ranked among the principal sources which led to the Asian Financial Crisis as precipitated from within the highly diversified financial conglomerates now characteristics of the banking industry.

PART FOUR

LESSONS TO BE LEARNT AND POLICY IMPLICATIONS

The Asian crisis reflects, first of all and foremost, the tendency of financial markets to experience sharp boom-bust cycles. It demonstrates that during financial boom, lenders and borrowers underestimate the risk involved in high levels of indebtedness, a fact that only become apparent, with particular severity during ensuing downswings and panic due to a general loss of investor confidence.

Given that the source of market failure attributed to the asymmetry of information represent the root cause of moral hazards Mullineux (1994). In designing a new international financial architecture, structural policies must aim to minimise the

information asymmetry problem and by-products adverse selection and moral hazards. These must be so designed based on necessary and sufficient parameters.

In general whereas necessary conditions for the design of a new and strengthened international financial architecture should be based on the following pillars;

- (1) Internationally accepted best practices, including capital adequacy practices in line with the Basle Accord,
- (2) Internationally accepted accounting and auditing practices to facilitate adequate disclosure and monitoring standards.
- (3) Preventative rather than government regulation such as, the very same deposit insurance, lender of last resort (LLR) in order to discourage excessive risk taking and divergent interest that tend to increase moral hazard.
- (4) Regional surveillance to encourage or pressure countries to pursue sound financial practices and policies.
- (5) Financial sector reform which include better prudential regulation and supervision.
- (6) More effective structures for orderly debt workouts including better Bankruptcy Laws.
- (7) Better sequenced and cautious liberalisation
- (8) A general strengthening of the international financial institutions.

A sufficient condition demands that these policies be more focussed on seeking to correct the factors that lead to moral hazards. These being divergent interest, decision-makers being insured against some of the consequences of their actions (Deposit Insurance and Lender of last Resort coverage), monitoring and enforcement being imperfect and the other pertinent factors.

Indeed preventative rather than protective regulatory policies would be more effective in helping to reduce the incidence of those factors that lead to the moral hazard source.

CONCLUSION

The paper theoretically reviewed asymmetric information and its by-products adverse selection and moral hazards in the banking industry and linked them as key structural sources that caused the Asian crisis. These derive from factors of divergent interest, decision makers being insured against some of the consequences of their actions (Deposit Insurance and Lender of last Resort coverage), monitoring and enforcement being imperfect and the other pertinent ones

By probing deeper into these structural sources, policy makers should hopefully acquire a deeper and better understanding in analysing the causes of the Asian crises.

A better understanding should facilitate more efficient policy responses in terms of structural policies to prevent or minimise the impact of such crises.

In addition, this paper reveals that the Asian authorities appeared not to have capitalised on the lessons learnt from the U.S Savings and Loans crises. As a result banks lost substantial sums of money in East Asia, although their loans were protected. The loss of investor confidence led to bank panic and run as indicated by the large capital flights. This systemic type of banking crises led to macroeconomic instability in this Eastern Continent and Contagion.

The analysis and recommendations presented in this paper should lead to more informed and focused policy prescriptions as the new international Financial Architecture takes shape.

What came out very clearly in this paper is that moral hazard is a very difficult problem to deal with, and whether there is deposit insurance or not with government regulation; moral hazard will still be around to haunt banks as long as information asymmetry exist. The situation is worsened since in the present era of MODERN BANKING where there is increased competition and uncertainty. Banks propensity to take risk will trend upwards, they will always be the tendency for interest to diverge and increase and new kinds of moral hazards will tend to arise in the banking industry.

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APPENDIX 1

ADVERSE SELECTION IN CREDIT MARKETS

FIRMS Each firm has a single project. All projects have the same expected returns. Projects differ in their degree of risk which is measured by parameter θ . Higher values of θ correspond to more risky projects.

Firms cannot choose θ .

THEOREM 2 For a given interest rate r , there is a critical value $\hat{\theta}$ such that a firm borrows from the bank, if and only if $\theta \geq \hat{\theta}(r)$

Proof A (mean preserving) increase in risk raises the expected value of a convex function. Hence if a firm with project $\hat{\theta}$ will borrow from the bank so will a firm with project $\theta \geq \hat{\theta}$. ($\hat{\theta}$ is the minimal value of θ for which the project is profitable for the firm).

THEOREM 3 As the interest rate increases the critical value of θ , below which individuals do not apply for loans increase

Proof The firms profits are $\Pi = E[\max(R - B(r+1), -C)]$ For any given θ , expected profits are lowered by an increase in r . Therefore the break-even θ will be raised.

THEOREM 4 The banks expected return on a loan is a decreasing function of the riskiness of the loan.

Follows directly from concavity of the banks profit function.

MORAL HAZARD IN CREDIT MARKETS

We may introduce moral hazard into the model by assuming that θ is not exogenous, but is chosen by the firm after it has taken out a loan.

THEOREM 6 If at a given interest rate r_0 , a risk-neutral firm is indifferent between two projects, an increase in the interest rate, results in the firm preferring the project with higher probability of bankruptcy.

EXAMPLE Suppose there are two possible projects a and b . Each project is either a success or a failure. Failures yield zero returns.

R_a (resp. R_b) denotes the returns on project a (resp b) if successful.

P_a (resp P_b) denotes the probability of success on project a , (resp. b).

Assume $p^a < p^b$, $R^a > R^b$. Hence a is the more risky project.

$\Pi_a = (R^a - (1 + r)B)p^a$ profit on project a ,

$\Pi_b = (R^b - (1 + r)B)p^b$ profit on project b .

Since the firm is indifferent between the two projects at interest rate r_0 ,

$$(R^a - (1 + r_0)B)p_a = (R^b - (1 + r)B)p^b$$

Define $f(r) = \Pi_a - \Pi_b = R^a p^a - R^b p^b - (1 + r)B(p^a - p^b)$, $\frac{df}{dr} = -B(p^a - p^b) > 0$. Thus

the firm prefers the risky project (a) if and only if $r > r_0$.

