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DEPOSIT INSURANCE SYSTEMS AND BANK RISK

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ABSTRACT

The link from deposit insurance to bank risk taking has been widely analysed, but has been the subject of relatively little empirical work. This work contributes to the existing literature by exploring microeconomic aspects of the deposit insurance–bank risk relationship. It employs four of the five IMF core financial soundness indicators, using data from financial statements for 914 banks in 64 countries. It also disaggregates deposit insurance by individual design features. Results, generated using GMM, suggest that deposit insurance mainly affects bank risk through its relationship with profitability and asset quality. An optimal deposit insurance system might have features such as voluntary membership, no cover for foreign currency deposits, no coinsurance, be unfunded, and administered by a private sector manager with the insurance cost borne fully by the private sector.

INTRODUCTION

Since the US introduced deposit insurance in the 1930s, some form of deposit insurance has been widely adopted by both advanced and developing countries to aid the stability of their banking systems. There is also a political benefit to the adoption of the insurance scheme, in that it protects small depositors and improves opportunities for smaller banks to compete with larger institutions for deposits. Underlying the attraction of deposit insurance is the fact that although some bank failures are good for market discipline, systemic failures may fuel banking crises. Haldane et al (2001) show that these can entail cross-country spillovers and huge economic costs. According to Barrell et al (2004), the high cost of financial instability is the main reason for concern in terms of financial turbulence.

The goal of achieving and maintaining the health and soundness of financial institutions and markets has become a top priority for policymakers, and deposit insurance has been a part of the "safety net" in most countries (Demirguc Kunt et al 2004). However, deposit insurance has also been subject to criticism. Even though it has been credited with solving the inherent "runs problem" of deposit banking, it has also been accused of introducing a costly side effect – moral hazard, which could in itself lead to failures as a result of riskier banking practices. It is this dilemma that has caused deposit insurance to come under public scrutiny and has given rise to widespread discussions of deposit insurance reform (Demirguc Kunt et al 2006).

This paper seeks to contribute to such discussions via an empirical investigation of the link from deposit insurance to bank risk using Financial Soundness Indicators. In doing so, we seek to give plausible answers to such questions as whether deposit insurance indeed leads to increased risk taking by banks, thereby causing moral hazard, how individual design features of deposit insurance impact the risk taking appetite of banks and accordingly what the best choices may be for policymakers.

This paper is structured as follows. Section 1 is a theoretical framework. This section outlines the basic theory, highlighting the major concepts and reasoning on deposit insurance. Section 2 provides an overview of the existing analytical literature in this area. Section 3 introduces the data and variables, while Section 4 outlines the econometric methods. Section 5 provides results and an interpretation, while Section 6 concludes.

1 THEORETICAL FRAMEWORK

The characteristics of demand deposits give rise to important incentives for both the depositor and the bank management. Demand deposits have infinitesimal maturity and are also governed by the sequential service constraint (SSC) where the bank pays its depositors on a "first come first served basis" as highlighted in Greenbaum and Thakor (2007). This creates the incentive for the depositors to monitor the bank so as to be the first in the withdrawal queue in case of risk of failure. These characteristics are intended to give incentives for managers to act in depositors' interests. However, the non-tradability and debt-like nature of demand deposits as well as asymmetric information also creates a risk of runs when depositors fear that solvency is compromised. The classic "sunspots" theory of bank runs by Diamond and Dybvig (1983), suggests that such runs are random. It assumes that individuals are risk averse and uses a two-period world. When individuals invest, they can choose to liquidate their investment and consume in the present period with little or no payoff from investment if they perceive that they will "die". Or they can leave their investments running and reap a greater payoff at maturity if they perceive that they will "live". This choice is especially made possible by the penalty-free infinitesimal maturity characteristic of their deposit contracts.

The banks seek to structure their assets in such a way that a certain amount of the bank's projects are liquidated to pay off the "diers" who will break their contracts at the end of the first period, or they simply hold liquid assets to meet this requirement. This is based on the assumption that the livers will all wait till maturity –the end of the second period. But if a supposed "liver" feels strongly that other "livers" will panic and break their contracts as well, they will go on to withdraw. Logically, all other "livers" will follow suit, meaning that the bank will have to prematurely liquidate their assets to pay them off, forcing the bank to sell their assets at "fire-sale" prices and becoming insolvent.

Chari and Jagannathan (1988) suggest that runs are a consequence of adverse information and not random events. Similar to the sunspots theory, there is a two- period world consisting of "diers" and "livers" but the "livers" are in two categories: those informed of the end period value of the banks assets and the uninformed ones. If the informed livers perceive at the first period that the second period value of the banks assets is favorable, they will wait for their contracts to mature. However if they perceive otherwise then it will only be rational for then to terminate their contracts and consume now instead. Uninformed "livers" are left to infer outcomes from the length of the withdrawal queue. Bearing in mind that the queue comprises of both "diers' and informed "livers", they assume then that the longer the queue the greater the number of informed "livers" who wish to withdraw their funds and as such the outlook of the bank is not favorable. They quickly join the queue, causing a bank run. Furthermore, the adverse information discovered by depositors' monitoring is sometimes noisy, causing bank runs to occur when they should not. This in turn leads the banks to liquidate profitable projects. This overdisciplining of the banks is ex post socially wasteful.

A bank panic basically results when there is an element of systemic risk likely to affect all banks. This is usually caused by failure of a major bank hastening the failure of other banks (contagion effect) arising in turn from direct counterparty risk exposures or concerns over balance sheet similarities under information asymmetry. This situation may occur in an economic recession as stated in Gorton (2002) or an unstable political situation. Empirical researchers like Bordo (1986), Calorimis and Gorton (1991), Calorimis (1993) among many others have established that panics are preceded by a change in the risk perceptions of depositors reflected in the deposit/currency ratios of countries.

Bank runs and panics can be short circuited by a safety net for depositors, such as deposit insurance. It is a system usually run by the Finance Ministry, guaranteeing the nominal value of deposit claims on insured banks. The lender of last resort facility is an alternative form of the safety net and is operated by central banks, using their ability to produce “high powered money” to lend at their discretion to illiquid but solvent institutions. Referring the safety net concept to the models above, if the “liver” was guaranteed repayment of his deposits and his additional payoff from investing till the end of the second period, he would not be forced to terminate his contract prematurely, irrespective of whatever actions are taken by other “livers”. If this is applicable to all “livers” in the bank, then there will no bank run. Equally, if the uninformed “liver” in the adverse information theory was in any way assured of his due repayment at the end of the second period, he would wait until then and would not care about the length of the withdrawal queue and the number of informed “livers” in it. Similarly, the informed “livers” will also not be disturbed about the future value of the banks assets. With this assurance in place, there will be no occurrence of a bank run.

That the introduction of deposit insurance significantly changed depositor behavior is empirically reflected in the period between 1935 - 1972 after deposit insurance was introduced, when there were many instances of failed corporate liabilities in the US, none of which gave rise to a banking panic, see Greenbaum and Thakor (2007). This obviously was as a result of the guarantee provided by deposit insurance to the depositors. Demirgüç-Kunt et al (2005) note that even though deposit insurance can be either implicit or explicit, virtually all countries around the world that have adopted deposit insurance implement an explicit scheme. But there also arise adverse incentives for the bank, which can be conceptualized using an option framework.

If v is the asset value of a bank and D represents its debts, a bank can buy an equity put option to insure against bankruptcy, so as to MAX (0;V-D), when D > V and V-D = -K. The maximum gain for a bank from owning a put option equals the exercise price (D) of the option if the stock price (V) falls to zero, which in turn implies that the firms asset value has fallen below its liabilities. The firm then exercises the put and gains the negative difference between its asset value and its liabilities (-K). In this context, deposit insurance can be viewed as a put option for a bank to insure against runs. It is the right to sell the value of the end-of-period assets of a bank for the amount the banks owes as debt. Normally, a bank maximizes its payoff when the end of period value of its assets is greater than its debt. In this situation, its payoff is the difference between the value of its assets and its debts. This difference is shareholders’ wealth. If however, the value of its debts exceeds the value of its assets, the bank becomes distressed and then the deposit insurer takes over the bank’s assets, ensures that it pays out the total value of the debts to the creditors and incurs a loss of the difference between the value of the banks total debt and its end of period total value. This loss to the deposit insurer is the maximized gain to the bank from exercising the put option.

The presence of deposit insurance therefore gives the bank the option of exercising the put if the value of the debt becomes greater than the value of its assets at the end of the period. This implies that even though the bank has more debt than it can pay, by exercising the put option, the deposit insurer carries on the extra debt and the bank is insured against a run. However, if at the end of the period the value of the bank's assets turns out greater than the debt it owes its depositors, it leaves the option unexercised and neither gains nor loses.

Like any form of insurance, a bank insures its deposits by paying premiums to the institution formed and assigned the sole duties of writing put options for the banks. In the US prior to 1933, private arrangements like the Commercial Bank Clearing Houses were present and carried out some of the duties of a central bank and they helped diminish the possibilities of bank panics by issuing Clearing House Loan Certificates to member banks who needed extra cash to meet up to their deposit withdrawals. However private arrangements cannot totally eliminate runs and panics because the amount of assistance offered is limited by the capital of the organization and as such, depositors cannot always be sure that their banks will be bailed out when they are in need. This factor retains the incentive for depositors to monitor their banks, the very incentive that breed runs and panics. To truly give depositors the degree of assurance they expect to stop unnecessary monitoring of banks requires a system of deposit insurance that is managed by a very credible body such as the US government.

A possible agency problem arises from the incentive that a put–owning bank might have to increase the value of the options. Here lies the key of the accusations on deposit insurance of accentuating moral hazard by banks through increased risk –taking activity, as follows: If the bank has the incentive to max (0; V-D), when D>V and D-V= K. If B represents the deposit insurer's losses, and we assume that B = -K, then D-V= B. If so, as the value of the banks share price tends to zero, at which point the bank maximizes it's deposit insurance put option, the higher the value of B and the more losses accrued by the deposit insurer. Hence, while the banks maximize their payoffs from increasing the negative difference between their asset value and their liabilities by increasing their risks, they also increase the loss incurred by the deposit insurer. There is also an incentive for banks to reduce their capital and increase asset volatility. The deposit insurer has to offset this loss from the excess of the premiums paid by the bank in distress. If the troubled bank (or the totality of banks) have not paid the right amount of premiums in the past, the deposit insurance agency will have to pay depositors from the government's pocket – taxpayers' monies. The basic problem is that usually the price of deposit insurance is invariant to risk, whereas risk-taking incentives could be partly or wholly neutralized by risk related insurance premia. Deposit insurance agencies must ensure that premiums are properly priced and risk-sensitive if it is to achieve the goals for which it is instituted. They must also find a way to punish high-risk banks and compensate low–risk ones. This gives a rationale for bank regulation and supervision, in the sense that the multi-faceted problems that can arise from information asymmetry, externalities and the exploitation of market power, justify the need for the regulation of the banking system, a need that is increased by the mispriced safety net as argued by Mishkin (2000). Banks can only be regulated by actually monitoring them and overseeing by whom and how they are operated. This is where the bank supervision comes to play. Supervision helps to detect and deter high-risk banks and save the deposit insurance system from the inherent incentive problem (Crockett 2001). Regulation and supervision are major counterparts to the safety net in achieving global financial stability. The internationalization of financial markets gave birth to the need for a standardized agreement for bank regulation, such as the successive Basel capital accords.

Besides such microprudential regulation, there has also been a growing recognition of the need for macroprudential indicators of the stability of the system as a whole. Lindgren et al (1998), define a sound banking system as one in which most of the banks that account for the majority of the system's assets and liabilities are solvent and are likely to remain so. Financial Soundness Indicators, are categorized using the CAMEL framework as ratios that act as measures of bank risks that help determine the soundness of the financial system. They are referred to by Evans et al (2000) as the indicators of the health and stability of financial systems. Slack (2003) shows the five major categories and their corresponding bank ratios and also claims that these ratios are widely used by bank supervisors to evaluate individual banking institutions.

The Financial Soundness Indicators are grouped into two categories mainly to avoid having a one – size-fits- all approach but rather to introduce flexibility in the choice of indicators used to check country-specific vulnerabilities. Carson et al (2001) show the categories as first, the "core set "of indicators which are mainly for the purpose of periodic monitoring, focus on the five main aspects of vulnerability on institutions in the banking sector. Then there is the "Encouraged set" which includes more indicators for deposit taking institutions and other institutions and market participants that are of direct relevance in assessing financial stability. See the table below for the full list. Developments in such indicators provide a measure of whether the risk-taking incentives of deposit insurance are operative.

2 RECENT ANALYTICAL WORK ON DEPOSIT INSURANCE AND BANK SOUNDNESS

Most theoretical work done in the area of deposit insurance tends to confirm that deposit insurance is responsible for the increased risk taking activity in banks arising via moral hazard, where FSF (2001) defines moral hazard as the incentive for additional risk taking that is often present in insurance contracts and arises from the fact that parties to the contract are protected against loss. Garcia (2001) also mentions that moral hazard occurs when protection causes the beneficiaries of insurance (in the case of deposit insurance, this means depositors, bank owners, managers and supervisors, and even politicians) to be careless in their approach to bank soundness.

Demirgüç-Kunt and Detriagiache (2000) point out that according to economic theory, while deposit insurance may increase bank stability by reducing self-fulfilling or information-driven depositor runs, it may also decrease bank stability by encouraging risk-taking on the part of banks. They also reason that the absence of an explicit deposit insurance system creates some degree of uncertainty amongst depositors as to how quickly their losses will be covered in case of a mishap and hence may create an incentive for depositors to monitor banks, hence reducing moral hazard but also recognize the objection that small depositors may not be effective bank monitors.

Wheelock and Kumbhakar (1995) note that deposit insurance subsidizes risk taking, therefore creating moral hazard in that banks with insured deposits will find it optimal to assume more risks than they would otherwise. Grossman (1992) goes a step further to acknowledge that it is by charging a flat rate premium that deposit insurance creates a moral hazard problem, since banks do not bear the costs of engaging in risky behavior on their cost of funds, they are therefore encouraged to take more risks than they ordinarily would. He adds that since governments often provide 100 percent depositor protection, especially to large banks where a loss could have industry wide repercussions – “the too big to fail” issue - deposit insurance becomes a sure guarantee in the strict sense of the word and so generates problems not usually found with private insurance where there is usually risk sharing (suchnrning to as excesses).

The issue of regulatory or political capture is an agency problem arising from conflicts of interests amongst deposit insurance scheme owners who obviously want cheaper schemes and scheme managers who are more interested in prolonging their personal careers or safeguarding their relationships with existing political regimes as highlighted by Beck (2002)

In a different perspective, Park (1997) derives a model based on differential calculus to study the risk taking behaviour of banks under regulation. His model is unique because it explicitly incorporates regulation, whereby regulators sort risky banks based on capital ratios and asset portfolios. Park finds that with the multidimensional approach to bank regulation, it is difficult to predict the effect of a change in regulation on the bank risk variables, for instance, tighter capital standards can cause some banks to lower their capital ratio and compensate for such action by lowering their portfolio of risky assets or as most banks find optimal, maintain capital ratios higher than what regulators require, but greatly increase their portfolio of risky assets.

Jeitschko and Jeung (2004) buttress the point above by suggesting that when a bank is driven by managerial incentives, its risk may increase as its capitalization increases, since its choice of assets set is ordered by a high risk –high return criterion. They arrive at this suggestion while investigating the relationship between bank capitalization and risk taking behaviour. They generate a similar empirical model and carry out a similar theoretical analysis as Park (1997) above but incorporate the incentives of three agents - the deposit insurer, the shareholder and the bank manager and different levels of preferred asset risk.

Boyd and Rolnick (1998) suggest that the costs of containing moral hazard will have to be shared by the insured and that surely, bank owners must carry a much greater share of the risk of loss as well as depositors, but to a lesser degree. Most countries that have explicit deposit insurance today; exclude inter-bank deposits from protection and other countries even limit coverage to accounts of households and not-for-profit organizations. This however has the power to defeat the whole purpose of deposit insurance in the first place, especially as the performance of an explicit system may seem adequate in "normal times" but fail woefully during crisis periods when partially insured depositors rapidly withdraw deposits, precipitating bank runs. Then the authorities often have to provide blanket guarantees which covers all depositors.

Turning to empirical work, in a seminal paper, Demirgüç-Kunt and Detriagiache (2000) carry out an empirical investigation on the effects of deposit insurance on bank stability, by estimating its contribution to the probability of a systemic banking crises occurring, using a multivariate logit model on a panel of 61 countries between the periods of 1980 and 1997. They find that the presence of an explicit deposit insurance alongside other macro variables like low GDP growth, declining terms of trade, the real interest rate and inflation significantly increased the chances of having systemic banking problems. They further indicate that an explicit deposit insurance scheme could also cause an increase in the "clean up costs" of a potential crisis adding that since they find an inverse correlation relationship between the length of crisis episodes with the costs associated with it, then it may be that quick clean up rescue operations require huge budgets and as such cost more.

Laeven (2001a) shows that the opportunity cost value of deposit insurance service has a predictive power in forecasting bank distress and as such is a proxy for bank risks, especially for banks with a concentrated ownership structure, high credit growth and for small banks as well.

In his study of the relationship between bank risk taking activity and their governance structure, Laeven (2002a), argued that a relatively high cost of deposit insurance indicates that a bank takes excessive risks. Using market capitalization and dividend yield data for 144 exchange listed banks in fourteen emerging market countries for the period between 1991 – 1998, he derived an extension of the Merton (1977) deposit insurance algebraic model with "cost of deposit insurance" as a proxy for bank risk. He obtained results suggesting that banks with more concentrated ownership take on greater risks than their counterparts with a dispersed ownership structure and that his bank risk proxy had some power in predicting bank distress.

In contributing to the moral hazard debate, Gueyie and Lai (2001) study the conditions for risk shifting from the five biggest chartered banks in Canada to the Canadian flat rate deposit insurance system based on seven measures of bank risk and utilizing both market and accounting data from 1956 to 1982. They propose two main risk avenues – increasing bank asset risk and decreasing market and book value capital ratio. The bank asset risk is measured by variables such as (a) the standard deviation of equity returns, to capture a banks total risk, (b) the market return for the bank for market risk (c) the unexpected yield on the interest rate index to indicate for interest rate risk. The ratio of the product of the number of shares outstanding and the stock price to total assets is used to capture the market/book value ratio, while the book value of equity to total asset measures the book value capital ratio. They carried out both statistical mean difference tests as well as cross – sectional time series analyses and found that the implicit volatility of bank assets have indeed increased, with capital ratios also decreasing. However they do not find sufficient manifestations for risk shifting from banks to the deposit insurance agency (moral hazard) since their results show that banks maintain their overall risk posture at constant levels by offsetting increases in asset risk by decreases in leverage.

In a sequel paper to Gropp and Vesala (2001), using the same methodology, but with a more homogeneous sample of 73 European union Bank level data, Gropp and Vesala (2004) study the effect of the presence of explicit deposit insurance on charter values (to capture bank risk taking), choosing to use the Tobin's Q value as a proxy for bank charter values , and show that the establishment of explicit deposit insurance in the European Union, significantly reduces the degree of risk taking by banks.
Gropp and Vesala (2001) study the effects of explicit deposit insurance on bank behaviour and the 'too-big-to-fail problem for 128 European banks, between 1991 and 1998. They carry out OLS regression analyses, using both cross sectional and time series data for the presence of explicit deposit insurance from the Demirguc-Kunt at al (2005) deposit insurance database and bank specific book and market data from the Bankscope and Datastream databases. They find that deposit insurance may reduce moral hazard if non-deposit creditors are left out. This is because by so doing, it permits monitoring by the uninsured subordinated debt holders. They also find that a limited safety net reduces risk taking by small banks with lesser charter values and that the risk practices of the too-big-to-fail banks remained unchanged in the presence of deposit insurance. However, it may be impossible to attribute increased bank riskiness to banking regulation alone, since bank principals can act in many different ways, in response to an existing or new regulatory environment.

The design of a deposit insurance scheme has also recently proven to be an important factor in the state of health of the financial system, as shown by Demirgüç-Kunt and Huizinga (1999) who investigate empirically, linkages between deposit insurance and market discipline as indicated by the growth rate of deposits and interest expenses. Using a cross-country balanced panel of 52 countries between 1990 and 1997, they execute pooled OLS estimations. They find that apart from an explicit deposit insurance system, other design features of a deposit insurance system directly influence the level of market discipline exerted on the banks by their depositors respectively. They conclude that higher coverage and government funding of the deposit insurance system reduce market discipline by lowering bank interest expenses while increasing deposit rates, and that joint management of the deposit insurance scheme may improve market discipline by having the opposite effect on bank deposit and interest expenses.

Beck (2002), in his detailed non- empirical exposition of the unique 'private club' structure of the German deposit insurance system finds that a deposit insurance system that is designed to be funded and managed by the banks themselves without any form of governmental support or contribution except in the extreme case of systemic baking sector collapse can be very effective as in the case of Germany. Kane (2000) contends that contrary to the "one- size- fits –all" premise, individual country safety nets should be designed to take into account the large differences that exist across countries in the degree of transparency the banks afford their depositors.

According to Demirgüç-Kunt and Detragiache (2000), the higher the level of institutional quality in a country, the lesser the level of moral hazard and the more effective their deposit insurance system. Even in the case of Germany, Beck (2002), where a completely privately funded and managed scheme has seemed to work so well, it has also been judged to be so successful as a result of a higher than average level of institutional quality. The same goes for the rest of the European Union where Gropp and Vesela (2004) identify a stronger institutional structure as being a party to the success of explicit deposit insurance in comparison to emerging market countries.

The implication is that ideally, explicit deposit insurance should only be instituted in countries with a relatively strong institutional environment. Laeven (2002b) uses daily stock market capitalisation, ownership structure and annualised yields data from the DataStream and Bloomberg database for 144 exchange –listed banks across 14 developed and developing countries to compare the opportunity cost value of explicit deposit insurance in countries that practice it with countries that have implicit deposit insurance systems in place. He develops a theoretical model which is a combination of the Merton (1977) put option model for deposit insurance and the Black Scholes option pricing model. His results identify that an explicit deposit insurance system raises the opportunity cost value of deposit insurance, but that presence of a sound legal system and proper enforcement of rules reduces the adverse effects of explicit deposit insurance on the opportunity cost value of deposit insurance services. Kane (2000) mentions that political accountability is needed to ensure that the public's duty to value the risk taking ability of banks as well as resolving financial difficulty promptly, evolves efficiently and effectively.

Explicit deposit insurance is not however confined to advanced countries. Using a dataset of more than 170 countries worldwide which have adopted a deposit insurance system up to 2003, Demirgüç-Kunt et al (2004) employ the multivariate logit estimation method to study the spread of explicit deposit insurance systems around the world and the determinants of the design features of a deposit insurance package. They find that even after controlling for macro economic shocks, severity of crises and individual country characteristics, the desire to copy the “developed country style” of regulation influences greatly the decision of a country to adopt a very generous deposit insurance scheme. This explains the widespread growth of explicit deposit insurance in recent years, especially amongst developing countries. They explain that this desire is largely attributed to external pressure, especially immediately after those countries have experienced banking instability. They are also concerned that such ‘crisis pressure” is likely to result in deposit insurance design features that poorly control moral hazard.

Some particular institutional variables have been found to be directly linked to some of the individual design characteristics of deposit insurance. Kane (2004) shows that the extent of deposit insurance coverage tends to be higher in countries where poorly capitalized banks dominate the scene, and also higher in countries where the depositors are poorly educated. This is in support of the “Private Interest” theory that riskier banks always pressure politicians for self-enriching regulations like allowing an extensive level of coverage as shown by Kroszner and Stratmann, (1998).

Regarding the optimal design of deposit insurance, it is important to distinguish the two main purposes of deposit insurance (Blair et al 2006). First there exists deposit insurance for systemic risk protection by removing the incentive for the development of costly bank runs that interfere with their financial intermediation duty and second, deposit insurance for consumer protection acts by providing a minimum level of guarantee to depositors against the consequences associated with the failure of a bank. Striking the proper balance for a deposit insurance package that fulfills both requirements and at the same time eliminating or at best reducing to the barest minimum, the adverse incentive effects on financial stability from the actions of both the insured banks and insured depositors is the problem at hand.

In the recent past, it has been widely suggested that components of the financial systems of nations need reform. Deposit insurance is surely one such component. For countries considering the establishment or reform of a deposit insurance system, there exists no real consensus on which way to go about it, however, it is obvious that deposit insurance alone cannot increase financial system stability. Without a sound system of banking supervision that includes strong capital standards as well as mechanisms for enlisting help from the market in imposing discipline on participants, deposit insurance and other elements of the financial safety net (i.e. lender of last resort) will be ineffective and may increase the costs and pain of resolving a financial crisis, especially if the system is liberalized.

In most countries, interest rate controls, branching and interstate banking restrictions have been lifted and the barriers between commercial and investment banking are fast eroding. Banks are consolidating in record numbers. The size and complexity of the largest banks are growing. The problem is that the loss of one of these banks (too big to fail), will pose a great systemic risk. Yet too much depositor protection can cause such banks to take too much risk. `

Cull (1998) explains that in all insurance pools, individual risk premiums are paid into a fund from which all losses are met, and a residual claimant loses money when losses exceed premiums, meaning a claimant that underprices risk, tends to go bankrupt. However, with the deposit insurance schemes of most countries, the residual claimant is a government agency with very different incentives, and if the premium paid by member banks cannot cover current fund expenditures, the taxpayer makes up the shortfall. Facing little or no threat of insolvency, there is little incentive for administrative agencies to price risk correctly. This situation leads to instability.

According to Folkerts-Landau et al (1998), "While the dangers of precipitating a general loss of confidence has frequently made it difficult to close large banks without fully compensating large depositors, it is almost always possible to make owners and large creditors bear a substantial part of the financial burden of losses". One example is the UK, where the system till October 2007 increased depositors risk exposure, by low deposit insurance limits, coinsurance for insured depositors, and restriction of insurance coverage to particular class of depositors. This should induce depositors to increase their monitoring of banks and by means of their deposits and withdrawal activity to discipline and restrain risky banks. However, Northern Rock's bankruptcy showed its limitations and the UK has now moved to a higher level of 100% cover for retail depositors.

Some parties to the reform debate have suggested that banks be constrained to holding only safe assets – the "narrow bank approach as highlighted in Ely (1991). Others maintain that a closer monitoring and pricing of bank risk should do the trick. Some others consider that banks in distress should be shut down before even their net worth falls to zero – the US "prompt corrective action". However, Boyd and Rolnick (1998) warn that all of these recommendations may be infeasible and unnecessarily expensive to carry out.

According to Garcia (2001), in order to avoid moral hazard, the deposit insurance system must be transparent, thus enabling bank customers to protect their interests. This means clearly specifying, what qualifies as an insured deposit and allowing the supervisors access to accurate and timely information on individual banks to institute prompt remedial actions and speedy intervention when necessary. They may also disseminate unclassified information to the public. She finds that excluding larger depositors and unsecured creditors from coverage, thereby exposing them to loss, will increase their participation in bank monitoring and as such increase the degree of market discipline. She advises on relatively low amount of coverage, in the region of two times GDP per capita for a start, which should not be indexed to inflation.

Even with the above guidelines, limited deposit insurance cannot maintain systemic stability in the face of shocks. As noted, in a systemic crisis, a full deposit guarantee can be essential. Typically, a full guarantee covers all bank debts. However Garcia (2001) agrees with other economists that protecting shareholders and subordinated debt holders is inappropriate, unless they carry no blame for the situation. She notes that in the context of a crisis, IMF staff advice is not to reintroduce a limited deposit insurance scheme until the banking system is fully restructured to acceptable standards of financial soundness.

Gropp and Vesela (2004) propose "constructive ambiguity" as a measure to contain moral hazard in countries with weaker institutional quality. Probably, an amendment to the present Basel II will help. The development of a worldwide credit default swap market, which will help to create diversification in the specialist origination of bank loans, thereby reducing risk concentration and financial fragility is the answer. But with every powerful derivative instrument, comes the possibility of widespread abuse and risk as emerged from credit default swaps in 2007-8. Goodhart (1995) advises that perhaps what is needed most is greater transparency.

This paper contributes to this small array of existing literature by aiming to discover the relationship between deposit insurance and its design features and bank risks based on balance sheet ratios that consist of the IMF FSI framework for bank soundness as proxies.

3 DATA AND VARIABLES

The data for deposit insurance and its characteristics used in this paper were collected from the Demirguc-Kunt et al (2005) World Bank deposit insurance database (see Obasi (2009) for details). A sample of 64 countries was employed as set out in Appendix Table A.2. The macroeconomic indicators were obtained from the World Bank development indicators database. For the measures of bank risks (financial soundness indicators) and the bank specific variables, data from balance sheet statements of banks as posted in the Bankscope database was used.

The selection criteria used for bank choice in each country was along similar lines that used by Cavallo and Majnoni (2002) but was slightly modified to ensure that we capture an adequate picture of each country's banking system and to accommodate the dynamics of the data available. First, every country's central bank was excluded from the sample. We then chose the 20 largest banks in terms of asset size in each country for countries with more than 50 banks, the 10 largest banks for countries with up to 50 banks, the 5 largest banks for countries with less than 20 banks and all the banks for countries with 5 banks or less in total, giving rise to total of 914 banks.

We however made use of the unconsolidated statements of the banks as marked in the Bankscope database, to ensure uniformity and also include as much countries in the sample as possible. It is known that the accounting practices of most countries across the world favors the reporting of unconsolidated financial statements. We are aware that this raises the double counting issue with subsidiaries but this is the trade off for an inclusion of a lot more banks and countries in the sample to ensure a truly bank based and cross-country investigation. We placed no restrictions on the inclusion of other kinds of bank-type financial institutions (other than the central bank) as long as they met the aforementioned requirements. With respect to data inconsistency in the Bankscope database, we eliminated all banks with less than 4 years data of the 8-year sample. This study covers the period between 1995 and 2003 - the limit of availability of data in the Bankscope database. Data are summarized in the Appendix (Table A1.1).

The dependent variables are bank balance sheet or profit and loss based ratios, which are proxies stipulated by the IMF as part of the "core" set financial soundness indicators (FSI's), see Table 1 above. They were chosen because of their ability to reflect different measures of bank risks. Four of the five categories of FSI's are represented in this work, namely Capital adequacy, Asset quality, Earnings and profitability and Liquidity (see Table 1). The fifth, which is sensitivity to market risk, is not employed as a result of the absence of any representative data. Poor disclosure levels prevent the use of information on banks foreign currency positions, duration of assets and liabilities as well as liabilities (tier 2 capital) as is required to obtain the ratio that indicates sensitivity to market risk. Although a limited amount of these data were found, it was so scanty that attempts to include them in any way in the regressions meant that we would have lost significant degrees of freedom, which resulted in a bias.

The FSI variables are:

LOANAST:	The ratio of total loans to total assets
ROAA:	The ratio of the return on average assets
LEVRATIO:	The leverage Ratio. (Total on-balance sheet assets to own funds*)
LIQUID:	The ratio of liquid assets to total assets

First, the ratio of loans to assets is a predictor of the quality of a bank's assets and highlights the proportion of a banks total balance sheet asset that is issued out as loans (loans no matter how safe or highly rated, still carry a significant proportion of risk). Davis and Zhu (2005) suggest that loans carry a higher level of risk in comparison to other assets that may be in a banks' asset portfolio such as government bonds etc. A clearer indicator could have been impaired loans or problem loan to gross loans ratio. However obtaining data for those variables across a range of countries proved very difficult. Second, the rate of return on average assets is a good indicator of the earnings and profitability of banks. It captures the risks associated with high leverage. Third, the leverage ratio, the ratio of on – balance sheet assets to own funds is an indicator of capital adequacy and availability, which determines the robustness of banks to sudden shocks to their balance sheets. Fourth, the ratio of liquid assets to total

*Equity was used as a proxy for own funds because of unavailable data on total liabilities.

assets is the indicator of liquidity and can indicate excessive maturity mismatches by bank management and as such the ability of banks to withstand shocks. It can also reflect the degree of customer confidence in the long-term survival of a bank. An adverse trend in the leverage, return on average assets and liquidity ratios is a pointer to potential banking stress as a result of increased risk. An increase in the loan to asset ratio is an early warning signal of risk to the soundness of a bank. These ratios were calculated for all the banks chosen in each country and for all the years in the study. We now turn to the independent (control) variables.

Macroeconomic variables

As in Demirgüç-Kunt and Detragiache (2001), macroeconomic variables were included to control for the general state of the economy. This minimizes omitted variables bias. The lags of some of these variables were included at some point in the work to take into consideration the time delay in realizing their impact on the economy. **STAGDEV**, the Real GDP per Capita, captures the stage of general development of a country **STAGFINDEV**, the Ratio of domestic credit to the private sector to GDP, an indicator of the level of financial development of a country. **GDPGROWTH**, the rate of growth of Real GDP. **INFLGROWTH** represents the rate of change of the GDP deflator and **REALINTRATE**, the real short term interest rate.

Bank-Specific variables

As in Davis and Zhu (2005), some bank specific variables were also included, some of which were entered in lags to account for the simultaneity bias resulting mainly from the year-end nature of balance sheets, from which information on them have been obtained. They are **INTMGNTA**, the banks net interest margin which is the ratio of a bank's Net interest revenue to total assets. It is an indicator of the banks price of loans. **LOANGRTH** is the real rate of growth of bank loans, a proxy for the credit risk of bank assets.

Deposit Insurance variables

Most earlier studies on deposit insurance cited above have constructed the dummy for the presence of deposit insurance as taking the value of 1 when there is explicit insurance and 0 for implicit or vice versa. We contend that the kind of insurance; whether implicit or explicit is a design feature and should not be used to capture the presence of deposit insurance at all. But equally because virtually all the countries in a deposit insurance system had all already adopted or changed from an implicit to an explicit deposit insurance system**.** Including a special variable for explicit or implicit deposit insurance design would have resulted in a near perfect collinearity. Accordingly our deposit insurance variables are as follows:

DI: A dummy variable taking the value of 1 when there is a deposit insurance system in place in that year, in a particular country and 0 when there is none. This deposit insurance system presence variable is the major variable of interest in this study.

COVER: A dummy variable taking the value of 1 when there is a high level of coverage in that year, in a particular country and 0 when there low coverage. The IMF recommended best practice for the extent of coverage is two times a country's GDP (Garcia 2001). I have therefore classified countries with higher coverage amount /GDP ratios than 2 as having high coverage and 2 or less as having low coverage.

MEMBER: A dummy variable taking the value of 1 when there is compulsory membership of a deposit insurance system in place in that year, in a particular country and 0 when there is voluntary membership.

FORCURR: A dummy variable taking the value of 1 when foreign currency deposits are insured in that year, in a particular country and 0 when they are not

INTERBA: A dummy variable taking the value of 1 when interbank deposits are insured in place in that year, in a particular country and 0 when they are not.

COINSURE: A dummy variable taking the value of 1 when there is a coinsurance practice (loss to both depositors and the deposit insurance fund) in place in that year, in a particular country and 0 when there is none.

FUND: A dummy variable taking the value of 1 when there is a funded deposit insurance system in place in that year, in a particular country and 0 when there is an unfunded one in place. . Demirguc-Kunt and Sobaci (2000) explain a funded system as one in which the member institutions make periodic contributions to an established fund, whereas an unfunded one has no permanently maintained funds in place.

SOURCE: A dummy variable taking the value of 1 when the source of the funds come jointly from the public and private sector in that year, in a particular country and 0 the source is from solely the private sector.

CENTADMIN: A dummy variable taking the value of 1 when the deposit insurance system is centrally administered by the public sector in that year, in a particular country and 0 when it is not.

JOINTADMIN: A dummy variable taking the value of 1 when the deposit insurance system is administered jointly by both the public and private sector in that year, in a particular country and 0 when it is not

PRIVADMIN: A dummy variable taking the value of 1 when there is a deposit insurance system is administered by the private sector in that year, in a particular country and 0 when it is not. This variable was found to be homogenous across the sample and so was not included in the regressions.

4 ECONOMETRIC SPECIFICATION

The major aim of this work is to find the effects of the presence of a deposit insurance system on the three measures of bank risks stipulated above. The econometric analysis follows closely the work of Davis and Zhu (2005). The fixed effects static model is stated below:

$$\mathbf{Y_{it} = f\,(MACRO_{t},\ BANK_{it},\ DIV_{t},) + E_{it}.} \qquad (1)$$

Where:

Y_{it} represents each of the dependent variables (the bank risk ratios).

Macro is a vector of the macroeconomic variables stated above.

Bank is a vector of all the bank specific variables

and

DIV in this case stands for a vector of the Deposit Insurance presence variable and the variables representing the Deposit insurance design features.

For robustness, a dynamic model, which includes the lag of the dependent variable as a regressor , is proposed as shown below:

$$\mathbf{Y_{it} = f\,(Y_{it-1},\ MACRO_{t},\ BANK_{it},\ DIV_{t},) + E_{it}.} \qquad (2)$$

This estimation work seeks to detect whether the presence of a deposit insurance system in a country, as captured by the **DI** variable, affects the risk taking activity of banks, through its effects on the different measures of bank risk. Second we then investigate in detail how this happens, by analyzing the effects of all the design features (**COVER, MEMBER, FORCURR, INTERBA, COINSURE, FUND, SOURCE, CENTADMIN, JOINTADMIN**) that make up a deposit insurance system on the different bank risk variables, with a view to ascertaining if each of the design features influences a bank's risk appetite. From this we also deduce whether the different design features of deposit insurance have effects on the bank risk variables that are independently and different from the overall effect of the total deposit insurance package.

For the initial static model, we started by running a static panel data pooled OLS least squares regression for the base model with the deposit insurance system presence variable **DI** included. However, to ensure robustness to heteroscedasticity and possible endogeniety bias, we opt for a fixed effects model, which transforms the data in first differences, thereby removing the individual bank correlated effects with other regressors in the model. While re-estimating the differenced model, the transformed standard error term was also adjusted for possible bank specific serial correlation. Further, a Hausman specification test was also carried out between the estimates from the fixed effects model and those of the pooled OLS regression. A significant p-value is obtained in favour of the fixed effects model producing more efficient estimates.

To assess the impact of the deposit insurance design features, we ran further regressions dropping the **DI** variables, but adding each of the design feature variables one at a time for subsequent regressions. This helps to eliminate the effects of collinearity amongst variables in a model (which is common with difference transformations of dummy variables). We are also able to ascertain the individual effects of each of the design features. Considering that there could be the possibility of the presence of the "end of year balance sheet bias" in the regression estimates as highlighted by Davis and Zhu (2005) as well as the chance that the bank risk variables could be explained by their lags, including the first lags of the dependent variable could further improve our model specification. We then propose the dynamic model shown above.

We then repeated the same procedure above, using the robust Generalised Method of Moments (GMM) estimator. GMM estimators control for endogeniety on two levels. First, they are able to remove the inherent bank specific heterogeneity component of the error term. Second, they control for the possible correlation between the lagged dependent variable and the error term, thereby generating far more robust estimates of the coefficients. GMM estimators also control for reverse causality among variables in the same model. Above all, it controls for any omitted variable bias in the models as shown by Kim and Frees (2006), which means that the GMM estimates are robust to the effects of any other explanatory variables not included in the model. This feature makes our method of running separate regressions with each of the design feature variables robust even though we are unable to include the other design features simultaneously in the model as controls.

There are many variations of the GMM estimators, however we choose the GMM Style estimator proposed by Arellano and Bond (1991), because it allows for the use of further lags of the dependent variable to construct a matrix of the maximum number of instruments without loss of generality (loosing data from early periods in the panel). The GMM style instruments include a combination of the second lag of the dependent variables as well as the first differences of the non- lagged regressors. The instruments we used are listed in Table A3 in the appendix. For each regression with a deposit insurance/design feature variable, we drop the corresponding differenced instrument from the regression.

The estimations are carried out with the same procedure of deposit insurance variables as with the static model analysis. Correct GMM diagnostics include obtaining a p-value as close to 1 as possible for the Sargan test of overriding restrictions, which means that the instruments are valid. An insignificant p-value for the test for 2^{nd} order autocorrelation is also required indicating that the estimates are free from autocorrelation. A significant Wald Chi^2 test statistic shows that it was correct to reject the null hypothesis that either of the joint variables or dummy variables are equal to zero. In summary significant Wald tests make the case for the fact that the model is not misspecified.

We also experiment with a different variation of the GMM estimator called the IVGMM estimator where all regressors are differenced and the lagged difference of the dependent variable is instrumented with the second and third lag of the dependent variable. This estimation produces results that are similar to those obtained from the GMM Style regressions. However we choose the former results since the IVGMM estimator is known to be biased in small samples due to loss data as highlighted by Girma (2008).

We included time dummies in all estimations to account for the effect of common shocks on the variables. We also included country dummies to account for the different country dynamics in the panel and had individual bank dummies as well to control for the effect of the individual bank practices in the panel, irrespective of whether they belonged to the same country or not. Unfortunately, as a result of the transformations of the models needed to ensure that the results are more robust, it is impossible to estimate these models for the OECD and EME subgroups. Differencing and lagging of the deposit insurance binary variables makes them homogenous across the subgroup samples, leading to collinearity among panels.

The results from the static model and those from the dynamic models are very similar and buttress our case for robust estimates. However, we choose the GMM regressions for the dynamic model as the most robust and the second - step results are reported in Tables 1.2 through 1.11 below. We tabulate the full results for the baseline model, but subsequently tabulate only the results for the different design features, especially as the effects of the other control variables remain the same across all the regressions even when we change the design feature variables. We see no reason to repeat the effects of the control variables each time.

5 RESULTS AND INTERPRETATION

Results for both the dynamic GMM model estimations are tabulated in Tables 1.2 through 1.11, and the static estimates in Table 1.12. The columns record the estimates of all the regressions run for each of the four dependent variables, with each coefficient and p-value in the corresponding row of regressors. A summary is in Table 1.13. As noted, correct GMM diagnostics include obtaining a p-value as close to 1 as possible for the Sargan test of overriding restrictions, which means that the instruments are valid. This tends to be obtained for all regressions except the loan/asset ratio. An insignificant p-value for the test for 2nd order autocorrelation is also required indicating that the estimates are free from autocorrelation, also generally obtained. A significant Wald Chi^2 test statistic shows that it was correct to reject the null hypothesis that either of the joint variables or dummy variables are equal to zero. In summary significant Wald tests make the case for the fact that the model is not misspecified. This is universally obtained.

With reasonable diagnostics, we now consider the results. We reiterate that the main aim of this paper is to examine the effects that the presence of a deposit insurance system as presently designed around the world has on the financial health of banks as indicated by the Financial Soundness Indicators. This makes DI our main variable of focus in this paper, alongside all the other individual features of a deposit insurance system.

From the Baseline regression, as shown in Table 1.2, the present design of deposit insurance package as depicted by the DI variable does not explain the level of a bank's liquid asset in relation to its total asset portfolio. The same goes for the capital adequacy ratio, probably because banks are stipulated to keep a certain percentage of capital as reserves according to the Basel Accord . The loan/asset ratio is almost significant and positive at 10%, while the return on average assets ratio has a significant and negative relationship with the presence of deposit insurance. The implication is that the presence of a deposit insurance system generally affects banks risk mainly through its negative effect on bank profitability. This implies that it may create an incentive for bank personnel to fail to maximise profits or slack (be overly conservative) in investing in more profitable ventures to boost bank profitability or to be reckless in the issuance of loans, resulting in a high proportion of bad loans which in turn hurt bank profitability. The latter point is buttressed by the slight positive relationship between deposit insurance system presence and the loan to asset ratio we find. . The combination of a possible positive effect on the proportion of loans to assets banks issue and a negative effect on bank profits signals that the presence of deposit insurance may have a positive effect on the proportion of non-performing loans on the bank's books. Unfortunately, we are not able to pursue this premise further due to unavailability of data on bank bad loans. However, we stress that the effects of the DI Presence variable is only general and is dependent on the mix of design features currently in place. Its effects are subject to change with the shuffling of the different design features it comprises of. It is therefore important to delve deeper to ascertain the real effects of the design features that may be masked by the DI presence variable.

Turning to the features of deposit insurance, referring to Tables 1.3-1.11, we find that all of the individual features of deposit insurance have their specific effects on the FSI variables. The individual effects of the different design features may differ from the effect of the overall package. It is the interaction of the effects of the individual design features that form the overall effect of deposit insurance. This is important in the issue of the optimal deposit insurance design. Understanding the different effects of the individual design features on financial soundness indicators can help us design the optimal package for overall bank soundness.

In line with the baseline regressions, none of the deposit insurance design features matter for the liquidity ratio and the leverage ratio. It is therefore safe to say that deposit insurance has no effect on the level of capital a bank holds relative to its assets (at least non risk weighted assets) and on how liquid a banks asset portfolio is. Most of the design features are also important for bank profitability. Although the general DI Presence variable was not statistically significant for bank asset quality as shown above, we find evience that the general DI variable had masked the true relationship between deposit insurance and bank asset quality since we find statistically significant relationships between the loan to asset ratio and some deposit insurance design features highlighted below.

The extent of deposit coverage by the deposit insurance system as well as covering inter-bank deposits does not affect any of the FSI's. This outcome is shared by Boyd and Rolnick (1998) who piont out that covering interbank deposits or increasing coverage levels can both be good or bad, since they can cause moral hazard on one hand and fail the good purpose of deposit insurance on the other hand if they are not fully covered when partially covered depositors rush to withdraw deposits, precipitating a bank run as was highlighted by the Northern Rock bank run in the United Kingdom in 2008. They may be ex-post measures, which only come into play after a crisis has occurred and so do not necessarily shape the behaviour of banks in good times.

Like Beck (2002), we find that compulsory membership is bad for asset quality as it increases the amount of loans issued by banks relative to their assets and also bad for bank profitability since it reduces the return on average assets ratio. A voluntary membership requirement for banks into a deposit insurance system may help to differentiate good banks from bad ones and also serve as a signal to depositors and other market participants that a bank that decides to signs up is serious about safeguarding depositors' funds and as such is prudent thereby aiding market monitoring and discipline. However , this is in contrast to best practices as shown in Garcia (1999).

The coverage of foreign currency deposits increases the loan to asset ratio as well as reducing the return on average assets ratio. Clearly, some deposits in foreign currency are usually left for long periods with banks, enabling them to issue more long term loans relative to their assets as well as exposing them to exchange rate risks and possible loan maturity mismatch issues which could hurt profitability. Others may be "hot money" that exposes banks to the temptation to excessively expand balance sheets.

The practice of coinsurance of deposits of deposits also has a negative effect on the profitability of banks as well as a negative effect on the asset quality. The intuition here may be that the cost of insuring deposits in borne in part by the depositors and in part by the banks themselves. This reduced responsibility creates a greater incentive and financial capability for the banks to increase the amount of risky loans issued which in turn dampens profits. Moreover small depositors (who constitute the greater part of total bank depositors) get punished for bearing the cost of insuring their deposits but are largely unable to effectively monitor their banks, especially in an regime of information asymmetry. This finding is in line with Boyd and Rolnick (1998) and Demirguc-Kunt (2000) who both who recognise that small depsitors are ineffective bank monitors and suggest that bank owners must bear the greater cost of deposit insurance instead.

When banks make periodic payments into an established deposit insurance fund, the profitability of banks tend to decline. Bank profit levels perform better when there are no funds in place, even though the deposit insurance system administrators can organise for the availability of funds relatively quickly should the need arise. Beyond a direct effect on profits, bank officials may have a greater incentive to lend more riskily when they know that there are funds in place awaiting a bank run. The funding of the deposit insurance system has no effect on the asset quality of banks.

In the same light as above, the source of the funds for insuring deposits matter both for the asset quality and profitability of banks. When the funds for insuring deposits come jointly from the public sector and private sector, bank profitability tends downwards and the amount of loans banks issue tend to rise. The reverse is the case when the private sector alone provides the funds for insuring bank deposits. There is greater incentive to exploit public funds, it would appear.

Who administers the deposit insurance system is important for bank profitability but not for asset quality. The profitability of bank is at risk, where the deposit insurance system is administered solely by the public sector (CENTADMIN) and where it is jointly administered by the public and private sector (JOINTADMIN). This is in concurrence with the point raised by Mishkin (2000) discussed in section 1 above that the public sector manager tends to under price the risk premium banks pay for deposit insurance, giving the banks an incentive to treat deposit insurance as a put option on bank profits, and to maximize their put options. Although we were statistically unable to study the effects of a privately administered system, it is safe to assume that a better option is a deposit insurance system that is funded and administered solely by private sector agents like the case of Germany, as surveyed in Beck (2002).

We notice in our findings that in all cases where the design features were found significant, some of their effects gave rise to an increase in bank loan relative to assets alongside a corresponding decrease in bank profits (possibly from the majority of the loans issued going bad), suggesting that the inclusion or exclusion of the design features do create the incentive for banks to take on more risk. Therein lies the crux of the deposit insurance – moral hazard issue as mentioned by most researchers. However knowing which design feature to include or exclude from a deposit insurance system, can help get rid of the moral hazard problem and achieve and achieve a safe and efficient deposit insurance system for financial stability.

Concerning the control variables, all the financial variables are entered by their first lags. As expected, the faster the growth rate of loans, the higher the ratio of loans to assets of banks. The net interest margin increases bank profitability but lowers the ratio of capital relative to bank assets, hence the capital adequacy of banks. An increase in the return on assets causes an increase in the ratio of loans issued by banks relative to their total assets. This is not surprising, since the banks will have more funds available to lend. The higher the amount of liquid assets held by a bank, the higher the ratio of capital to assets (they both indicate prudence) but the return on assets diminishes as liquid asset are lower yielding. The higher the capital adequacy of a bank, the lower the loan to asset ratio, increasing the bank's asset quality. Again, both indicate a prudent approach.

Turning to macro variables, there is slight evidence that banks in more developed countries tend to lend more relative to their assets and are still more profitable than banks in poorer countries. However, countries with a more developed financial system tend to lend less relative to their total assets. This is interesting and perhaps draws attention to the fact that countrywide development as indicated by a high GDP per capita does not necessarily mean financial system development, as is the case in many emerging market countries. Or alternatively, it highlights the greater availability of securities as alternative assets to loans, Banks in countries with high GDP growth rates tend to have higher loan to asset ratios. This buttresses the point above.

The higher the rate of inflation, the more profitable banks become as the return on their assets increase, perhaps due to the benefit of zero interest current accounts that rises with inflation. As real interest rates rise, the loan to asset ratios of banks tend to increase as well. This may be because the banks know they can lend for better rates and so move to lend more.

It is important to mention that from the regressions, bank liquidity and capital adequacy are not explained by any of the macroeconomic variables. The level of liquidity is explained only by its lag and the amount of loans issued by the bank relative to its assets, while the leverage ratio is explained by its lag, the level of liquidity in a bank and the net interest margin.

6 CONCLUSION

The effect a deposit insurance system has on the banking system has been a subject of concern for policy makers and researchers in recent times. This study has sought to assess systematically how the present design package of deposit insurance has affected bank risk taking activity and to ascertain the individual effects of the different design features on bank risk. Our results suggest that the presence of a deposit insurance system does not affect the level of liquidity and the capital adequacy of banks. Instead, the presence of a deposit insurance system mainly affects bank risk through its relationship with the asset quality of banks as indicated by the total loans to total asset ratio and bank profitability as captured by the return on average assets .

We find also that the design features themselves have very different effects on the different financial soundness indicators, giving rise to suggestions for an optimal design package for deposit insurance, which is especially important in the face of the current economic situation that has left bank regulation at a crossroad. All the design features of deposit insurance are relevant but based on our results, we identify those with significant importance and propose the following recommended features:

1. Membership to the deposit insurance system is voluntary.
2. Foreign currency deposits are not covered.
3. Coinsurance of deposits is not practiced.
3. There are no ready funds in place awaiting an eventuality and banks are not allowed to make periodic payments into the deposit insurance system. However, the deposit insurance administrator is able to make funds available in good time when needed.
4. The funds required for insuring the deposits in banks are provided solely by the private sector.
5. The deposit insurance system is administered completely by the private sector.

This research shows that good practices for deposit insurance is not simply a case of implicit or explicit deposit insurance but generally revolves around the five points mentioned above. However, we recommend that policy makers of different nations carry out studies aimed at determining the effects of the individual characteristics of deposit insurance on their banking systems before compiling their deposit insurance packages. These steps, added to ensuring that there is an efficient regulatory and supervisory system in place to check excesses will enable them enjoy the positive objectives of a deposit insurance system and ultimately help achieve banking system soundness. We also call for increased disclosure by banks on balance sheet data as the information provided will aid more research on bank soundness and stability. Further work needs to be done on the bank risk –deposit insurance debate.

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Table 1 Financial Soundness Indicators: The Core and Encouraged Sets

Core Set	
Deposit-takers	
Capital adequacy	Regulatory capital to risk-weighted assets Regulatory Tier 1 capital to risk-weighted assets Nonperforming loans net of provisions to capital
Asset quality	Nonperforming loans to total gross loans Sectoral distribution of loans to total loans
Earnings and profitability	Return on assets Return on equity Interest margin to gross income Noninterest expenses to gross income
Liquidity	Liquid assets to total assets (liquid asset ratio) Liquid assets to short-term liabilities
Sensitivity to market risk	Net open position in foreign exchange to capital
Encouraged Set	
Deposit-takers	Capital to assets Large exposures to capital Geographical distribution of loans to total loans Gross asset position in financial derivatives to capital Gross liability position in financial derivatives to capital Trading income to total income Personnel expenses to noninterest expenses Spread between reference lending and deposit rates Spread between highest and lowest interbank rate Customer deposits to total (noninterbank) loans Foreign-currency-denominated loans to total loans Foreign-currency-denominated liabilities to total liabilities Net open position in equities to capital
Other financial corporations	Assets to total financial system assets Assets to GDP
Nonfinancial corporations sector	Total debt to equity Return on equity Earnings to interest and principal expenses Net foreign exchange exposure to equity Number of applications for protection from creditors
Households	Household debt to GDP Household debt service and principal payments to income
Market liquidity	Average bid-ask spread in the securities market[1] Average daily turnover ratio in the securities market[1]
Real estate markets	Residential real estate prices Commercial real estate prices Residential real estate loans to total loans Commercial real estate loans to total loans

TABLE 1.2: BASELINE REGRESSION WITH DI PRESENCE VARIABLE ONLY

DYNAMIC MODEL REGRESSIONS WITH GMM ESTIMATOR

REGRESSORS	LOANAST	ROAA	LIQUID	LEVRATIO
	GMM STYLE	GMM STYLE	GMM STYLE	GMM STYLE
BANK VARIABLES				
LAG OF DEP. VARIABLE	0.7731	0.1435	0.0398	0.2414
	(0.000)***	(0.001)***	(0.000)***	(0.000)***
LOANGRTH	0.0005	- 0.0075	0.0144	0.1243
	(0.017)**	(0.191)	(0.383)	(0.647)
INTMGNTA	- 0.0785	2.0513	- 0.3894	- 2.8210
	(0.793)	(0.006)***	(0.676)	(0.044)**
LOANAST	NOT INCLUDED	1.2376	- 0.6961	- 7. 5714
		(0.285)	(0.006)*	(0.093)
ROAA	0.0029	NOT INCLUDED	0.0025	- 0.2423
	(0.026)**		(0.812)	(0.247)
LIQUID	- 0.0002	-0.0113	NOT INCLUDED	1.5976
	(0.115)	(0.000)***		(0.000)***
LEVRATIO	- 0.0003	- 0.0020	- 0.0032	NOT INCLUDED
	(0.060)*	(0.165)	(0.684)	
MACRO VARIABLES				
STAGDEV	0.0032	0.0853	- 0.0005	- 0.0861
	(0.075)*	(0.084)*	(0.987)	(0.871)
STAGFINDEV	- 0.0355	- 0.1190	0.0689	5.1727
	(0.000)*	(0.565)	(0.823)	(0.314)
GDPGROWTH	0.0026	0.0193	0.0033	0.0701
	(0.000)***	(0.455)	(0.760)	(0.815)
INFLGROWTH	0.0007	0.3549	0.0003	0.0262
	(0.091)*	(0.030)**	(0.891)	(0.784)
REALINTRATE	0.0009	- 0.0164	- 0.0002	- 0.0295
	(0.002)***	(0.368)	(0.897)	(0.110)
DI	0.0412	- 3.9677	0.0392	0.6379
	(0.104)	(0.000)***	(0.800)	(0.909)
NUMBER OF OBSERVATIONS	2571	2566	2570	2566
NUMBER OF BANKS	764	764	764	763
WALD CHI2 (P-VALUE)	78.34 (0.0000)***	98.98 (0.0000)***	217965.26 (0.000)***	4750.72 (0.0000)***
SARGAN (P-VALUE)	43.0068 (0.001)***	22.482(0.0692)*	9.434 (0.8023)	10.898(0.6940)
2nd ORDER AUTO-CORRELATIONS (p-value)	0.2184 (0.8270)	1.8708 (0.0614)*	0.9180 (0.3586)	1.3773 (0.1684)

***, ** And *** stand for significance at the 10%, 5% and 1% respectively. NOT INCLUDED is used where a variable is excluded from the regression because it is the dependent variable.**

TABLE 1.3: REGRESSION WITH DESIGN FEATURE VARIABLE ONLY - COVER

DYNAMIC MODEL REGRESSIONS WITH GMM ESTIMATOR

REGRESSORS	LOANAST	ROAA	LIQUID	LEVRATIO
	GMM STYLE	GMM STYLE	GMM STYLE	GMM STYLE
COVER	- 0.0292 (0.591)	- 0.2202 (0.841)	- 0.0067 (0.973)	- 1.1566 (0.740)
NUMBER OF OBSERVATIONS	2571	2566	2570	2566
NUMBER OF BANKS	764	764	764	763
WALD CHI2 (P-VALUE)	68.26 (0.0000)***	98.98 (0.0000)***	217965.26 (0.000)***	4750.72 (0.0000)***
SARGAN (P-VALUE)	49.936 (0.001)***	22.482 (0.0692)	9.434 (0.8023)	10.898 (0.6940)
2nd ORDER AUTO-CORRELATIONS (p-value)	0.2340 (0.8149)	1.8708 (0.0614)	0.9180 (0.3586)	1.3773 (0.1684)

***, ** And *** stand for significance at the 10%, 5% and 1% respectively. NOT INCLUDED is used where a variable is excluded from the regression because it is the dependent variable.**

TABLE 1.4: REGRESSION WITH DESIGN FEATURE VARIABLE ONLY - MEMBER

DYNAMIC MODEL REGRESSIONS WITH GMM ESTIMATOR

REGRESSORS	LOANAST	ROAA	LIQUID	LEVRATIO
	GMM STYLE	GMM STYLE	GMM STYLE	GMM STYLE
MEMBER	0.0461 (0.074)*	-3.9035 (0.000)***	0.0384 (0.805)	0.8024 (0.889)
NUMBER OF OBSERVATIONS	2571	2566	2570	2566
NUMBER OF BANKS	764	764	764	763
WALD CHI2 (P-VALUE)	78.44 (0.0000)***	98.98 (0.0000)***	217965.26 (0.000)***	4750.72 (0.0000)***
SARGAN (P-VALUE)	43.2935 (0.001)***	22.482(0.0692)*	9.434 (0.8023)	10.898 (0.6940)
2nd ORDER AUTO-CORRELATIONS (p-value)	0.2166 (0.8285)	1.8708 (0.0614)	0.9180 (0.3586)	1.3773 (0.1684)

***, ** And *** stand for significance at the 10%, 5% and 1% respectively. NOT INCLUDED is used where a variable is excluded from the regression because it is the dependent variable.**

TABLE 1.5: REGRESSION WITH DESIGN FEATURE VARIABLE ONLY - FORCURR

DYNAMIC MODEL REGRESSIONS WITH GMM ESTIMATOR

REGRESSORS	LOANAST	ROAA	LIQUID	LEVRATIO
	GMM STYLE	GMM STYLE	GMM STYLE	GMM STYLE
FORCURR	0.0461	-3.9035	0.0384	0.8024
	(0.074)*	(0.000)***	(0.805)	(0.889)
NUMBER OF OBSERVATIONS	2571	2566	2570	2566
NUMBER OF BANKS	764	764	764	763
WALD CHI2 (P-VALUE)	78.44 (0.0000)***	98.98 (0.0000)***	217965.26 (0.000)***	4750.72 (0.0000)***
SARGAN (P-VALUE)	43.293 (0.001)***	22.482 (0.0692)*	9.434 (0.8023)	10.898(0.6940)
2^{nd} ORDER AUTO-CORRELATIONS (p-value)	0.2166 (0.8285)	1.8708 (0.0614)	0.9180 (0.3586)	1.3773 (0.1684)

***, ** And *** stand for significance at the 10%, 5% and 1% respectively. NOT INCLUDED is used where a variable is excluded from the regression because it is the dependent variable.**

TABLE 1.6: REGRESSION WITH DESIGN FEATURE VARIABLE ONLY - INTERBA

DYNAMIC MODEL REGRESSIONS WITH GMM ESTIMATOR

REGRESSORS	LOANAST	ROAA	LIQUID	LEVRATIO
	GMM STYLE	GMM STYLE	GMM STYLE	GMM STYLE
INTERBA	- 0.0292	- 0.2202	- 0.0067	- 1.1566
	(0.591)	(0.841)	(0.973)	(0.740)
NUMBER OF OBSERVATIONS	2571	2566	2570	2566
NUMBER OF BANKS	764	764	764	763
WALD CHI2 (P-VALUE)	68.26 (0.0000)***	98.98 (0.0000)***	217965.26 (0.000)***	4750.72 (0.0000)***
SARGAN (P-VALUE)	42.936 (0.001)***	22.482(0.0692)*	9.434 (0.8023)	10.898(0.6940)
2^{nd} ORDER AUTO-CORRELATIONS (p-value)	0.2340 (0.8270)	1.8708 (0.0614)	0.9180 (0.3586)	1.3773 (0.1684)

***, ** And *** stand for significance at the 10%, 5% and 1% respectively. NOT INCLUDED is used where a variable is excluded from the regression because it is the dependent variable.**

TABLE 1.7: REGRESSION WITH DESIGN FEATURE VARIABLE ONLY-COINSURE

DYNAMIC MODEL REGRESSIONS WITH GMM ESTIMATOR

REGRESSORS	LOANAST	ROAA	LIQUID	LEVRATIO
	GMM STYLE	GMM STYLE	GMM STYLE	GMM STYLE
COINSURE	0.1356 (0.050)**	- 4.7185 (0.000)***	- 0.0100 (0.971)	- 4.6415 (0.162)
NUMBER OF OBSERVATIONS	2571	2566	2570	2566
NUMBER OF BANKS	764	764	764	763
WALD CHI2 (P-VALUE)	75.90 (0.0000)***	98.98 (0.0000)***	217965.26 (0.000)***	4750.72 (0.0000)***
SARGAN (P-VALUE)	40.9567 (0.002)***	22.482 (0.0692)*	9.434 (0.8023)	10.898 (0.6940)
2nd ORDER AUTO-CORRELATIONS (p-value)	0.2337 (0.8152)	1.8708 (0.0614)*	0.9180 (0.3586)	1.3773 (0.1684)

***, ** And *** stand for significance at the 10%, 5% and 1% respectively. NOT INCLUDED is used where a variable is excluded from the regression because it is the dependent variable.**

TABLE 1.8: REGRESSION WITH DESIGN FEATURE VARIABLE ONLY - FUND

DYNAMIC MODEL REGRESSIONS WITH GMM ESTIMATOR

REGRESSORS	LOANAST	ROAA	LIQUID	LEVRATIO
	GMM STYLE	GMM STYLE	GMM STYLE	GMM STYLE
FUND	0.0412 (0.104)	- 3.9677 (0.000)***	0.0392 (0.800)	0.6379 (0.909)
NUMBER OF OBSERVATIONS	2571	2566	2570	2566
NUMBER OF BANKS	764	764	764	763
WALD CHI2 (P-VALUE)	78.34 (0.0000)***	98.98 (0.0000)***	217965.26 (0.000)***	4750.72 (0.0000)***
SARGAN (P-VALUE)	43.0068 (0.001)***	22.482 (0.0692)*	9.434 (0.8023)	10.898 (0.6940)
2nd ORDER AUTO-CORRELATIONS (p-value)	0.2184 (0.8270)	1.8708 (0.0614)	0.9180 (0.3586)	1.3773 (0.1684)

***, ** And *** stand for significance at the 10%, 5% and 1% respectively. NOT INCLUDED is used where a variable is excluded from the regression because it is the dependent variable.**

TABLE 1.9: REGRESSION WITH DESIGN FEATURE VARIABLE ONLY - SOURCE

DYNAMIC MODEL REGRESSIONS WITH GMM ESTIMATOR

REGRESSORS	LOANAST	ROAA	LIQUID	LEVRATIO
	GMM STYLE	GMM STYLE	GMM STYLE	GMM STYLE
SOURCE	0.0511	- 5.2532	0.0527	1.1392
	0.048**	0.000***	0.773	0.867
NUMBER OF OBSERVATIONS	2571	2566	2570	2566
NUMBER OF BANKS	764	764	764	763
WALD CHI2 (P-VALUE)	80.67 (0.0000)***	98.98 (0.0000)***	217965.26 (0.000)***	4750.72 (0.0000)***
SARGAN (P-VALUE)	41.863 (0.001)***	22.482 (0.0692)*	9.434 (0.8023)	10.898 (0.6940)
2nd ORDER AUTO-CORRELATIONS (p-value)	0.2184 (0.8270)	1.8708 (0.0614)*	0.9180 (0.3586)	1.3773 (0.1684)

***, ** And *** stand for significance at the 10%, 5% and 1% respectively. NOT INCLUDED is used where a variable is excluded from the regression because it is the dependent variable.**

TABLE 1.10: REGRESSION WITH DESIGN FEATURE VARIABLE ONLY- CENTADMIN

DYNAMIC MODEL REGRESSIONS WITH GMM ESTIMATOR

REGRESSORS	LOANAST	ROAA	LIQUID	LEVRATIO
	GMM STYLE	GMM STYLE	GMM STYLE	GMM STYLE
CENTADMIN	0.0346	- 3.8166	0.0426	1.2762
	0.192	0.001***	0.797	0.837
NUMBER OF OBSERVATIONS	2571	2566	2570	2566
NUMBER OF BANKS	764	764	764	763
WALD CHI2 (P-VALUE)	78.34 (0.0000)***	98.98 (0.0000)***	217965.26 (0.000)***	4750.72 (0.0000)***
SARGAN (P-VALUE)	43.0068 (0.001)***	22.482 (0.0692)*	9.434 (0.8023)	10.898 (0.6940)
2nd ORDER AUTO-CORRELATIONS (p-value)	0.2184 (0.8270)	1.8708 (0.0614)*	0.9180 (0.3586)	1.3773 (0.1684)

***, ** And *** stand for significance at the 10%, 5% and 1% respectively. NOT INCLUDED is used where a variable is excluded from the regression because it is the dependent variable.**

TABLE 1.11: REGRESSION WITH DESIGN FEATURE VARIABLE ONLY - JOINTADMIN

DYNAMIC MODEL REGRESSIONS WITH GMM ESTIMATOR

REGRESSORS	LOANAST	ROAA	LIQUID	LEVRATIO
	GMM STYLE	GMM STYLE	GMM STYLE	GMM STYLE
JOINTADMIN	0.0784 0.113	- 4.9842 0.000***	0.0009 0.998	- 4.1241 0. 214
NUMBER OF OBSERVATIONS	2571	2566	2570	2566
NUMBER OF BANKS	764	764	764	763
WALD CHI2 (P-VALUE)	78.34 (0.0000)***	98.98 (0.0000)***	217965.26 (0.000)***	4750.72 (0.0000)***
SARGAN (P-VALUE)	43.0068 (0.001)***	22.482 (0.0692)*	9.434 (0.8023)	10.898 (0.6940)
2nd ORDER AUTO-CORRELATIONS (p-value)	0.2184 (0.8270)	1.8708 (0.0614)*	0.9180 (0.3586)	1.3773 (0.1684)

***, ** And *** stand for significance at the 10%, 5% and 1% respectively. NOT INCLUDED is used where a variable is excluded from the regression because it is the dependent variable.**

TABLE 1.12: REGRESSIONS WITH DI ONLY& DESIGN FEATURE VARIABLES (Merged)*

STATIC MODEL REGRESSION WITH OLS ESTIMATORS

REGRESSORS	LOANAST	ROAA	LIQUID	LEVRATIO
	FIXED EFFECTS OLS DIFFERENCED TRANSFORMATION	FIXED EFFECTS OLS DIFFERENCED TRANSFN	FIXED EFFECTS OLS DIFFERENCED TRANSFN	FIXED EFFECTS OLS DIFFERENCED TRANSFN
BANK VARIABLES				
LOANGRTH	0.000892	- 0.0001104	0.0000153	- 0.000095
	(0.019)**	(0.095)	(0.067)*	(0.976)
INTMGNTA	- 0.0089583	2.616024	- 0.8626638	- 4.299621
	(0.977)	(0.016)**	(0.368)	(0.004)***
LOANAST	NOT INCLUDED	0.07797682	- 1.826257	- 5.048402
		(0.595)	(0.075)*	(0.288)
ROAA	0.0005275	NOT INCLUDED	- 0.044098	- 0.4129301
	0.591		(0.411)	(0.077)*
LIQUID	- 0.000309	- 0.0110297	NOT INCLUDED	1.447451
	(0.018)**	(0.004)***		(0.000)***
LEVRATIO	- 0.0000122	- 0.0014695	0.0205951	NOT INCLUDED
	(0.360)	(0.257)	(0.380)	
MACRO VARIABLES				
STAGDEV	0.0035912	0.1463952	- 0.000236	-0.7658087
	(0.194)	(0.013)**	(0.997)	(0.604)
STAGFINDEV	- 0.0136444	0.0449682	1.209781	- 4.82296
	(0.135)	(0.850)	(0.353)	(0.374)
GDPGROWTH	0.0011917	0.0298306	0.0158093	- 1.11312
	(0.027)**	(0.252)	(0.374)	(0.055)*
INFLGROWTH	0.0011372	0.0841241	0.0106228	0.0644205
	(0.005)***	(0.007)***	(0.325)	(0.482)
REALINTRATE	0.0007812	- 0.0255057	- 0.0099366	0.049799
	(0.003)***	(0.207)	(0.293)	(0.515)
DI	0.0258555	- 5.030522	- 0.2702676	0.4267514
	(0.225)	(0.000)***	(0.443)	(0.936)
COVER	- 0.0574423	- 1.785181	- 0.4032995	- 1.228124
	(0.204)	(0.132)	(0.333)	(0.848)
MEMBER	0.0270586	- 4.923492	- 0.24897	0.421066
	(0.210)	(0.001)***	(0.455)	(0.938)
FORCURR	0.0270586	- 4.923492	- 0.24897	0.421066
	(0.210)	(0.001)***	(0.455)	(0.938)
INTERBA	- 0.1024357	- 0.9665577	- 0.3607111	- 5.518394
	(0.026)**	(0.385)	(0.391)	(0.464)
COINSURE	0.0996379	- 4.714499	0.0526344	- 9.722172
	(0.075)*	(0.000)***	(0.756)	(0.021)**
FUND	0.0258555	- 5.030522	- 0.2702676	0.4267514
	(0.225)	(0.000)***	(0.443)	(0.936)
SOURCE	0.0627097	- 5. 233454	- 0.2681798	2.223395
	(0.002)***	(0.000)***	(0.473)	(0.698)
CENTADMIN	0.0148398	- 5.00565	- 0.2481254	0.3668626
	(0.525)	(0.003)***	(0.478)	(0.953)
JOINTADMIN	0.0711139	- 5.026416	- 0.3443523	0.6505993
	(0.104)	(0.000)***	(0.398)	(0.899)
NUMBER OF OBSERVATIONS	2721	2721	2721	2721
NUMBER OF BANKS	770	770	770	770
F TEST P-VALUE	3.58(0.0001) ***	5.15(0.0000) ***	1.96(0.0296) ***	391.05(0.0000) ***
R-SQ VALUE	0.08234	0.0755	0.0315	0.0433

***, ** And *** stand for significance at the 10%, 5% and 1% respectively. NOT INCLUDED is used where a variable is excluded from the regression because it is the dependent variable. Double lines means that values are from separate regressions**

TABLE 1.13: DEPOSIT INSURANCE EFFECT SUMMARY

VARIABLES	ROBUST GMM SYSTEM REGRESSION OUTPUT			
	LOANAST	**ROAA**	**LIQUID**	**LEVRATIO**
DI PRESENCE	NS	-VE	NS	NS
COVER	NS	NS	NS	NS
MEMBER	+VE	-VE	NS	NS
FORCURR	+VE	-VE	NS	NS
INTERBA	NS	NS	NS	NS
COINSURE	+VE	-VE	NS	NS
FUND	NS	-VE	NS	NS
SOURCE	+VE	-VE	NS	NS
CENTADMIN	NS	-VE	NS	NS
JOINTADMIN	NS	-VE	NS	NS

+VE represents a positive relationship, **-VE** means a negative relationship and **NS** stands for not significant.

APPENDIX

TABLE A1: VARIABLE SUMMARY FOR CHAPTER 1

Variable	Obs	Mean	Std. Dev.	Min	Max
Loangrth	3935	8.652829	260.086	-1073.463	15822.33
Intmgnta	5654	.0349064	.0352432	-.182266	.5635452
Loanast	5744	.4919097	.2243506	-.0788177	.9992812
asquality	5704	.1710107	2.314625	-54.3	66.45
roaa	5766	.9802827	3.567347	-48.79	73.17
liquid	5780	.4713981	3.509758	-20.25	253
levratio	5780	29.94412	255.7391	-142.1667	10067
di	6398	.9659269	.1814313	0	1
cover	6398	.3746483	.4840698	0	1
member	6398	.8952798	.3062165	0	1
forcurr	6398	.719131	.4494588	0	1
interba	6398	.2089716	.4066058	0	1
coinsure	6398	.2821194	.4500663	0	1
fund	6398	.8093154	.3928716	0	1
source	6398	.7474211	.4345254	0	1
centadmin	6398	.4434198	.4968272	0	1
jointadmin	6398	.3155674	.4647778	0	1
stagdev	6398	13.43958	14.53078	.0864188	56.51267
stagfindev	6048	.5925351	.4297858	.0125921	1.775119
gdpgrowth	6398	2.161518	3.075388	-11.6639	11.04466
inflgrowth	6397	-.1095589	4.270745	-28.88453	62.14408
realintrate	5855	9.422948	11.59933	-82.45617	77.68432
group	6398	33.15208	17.66453	1	62
index	6398	457.5	263.8695	1	914

Table A.2 Country coverage

Argentina, Austria, Bahrain, Bangladesh, Belgium, Brazil, Bulgaria, Cameroon, Canada, Central African Republic, Chad, Chile, Colombia, Congo, Croatia, Czech Republic, Denmark, Dominican Republic, Ecuador, El Salvador, Estonia, Finland, France, Gabon, Germany, Greece, Hungary, Iceland, India, Ireland, Italy, Jamaica, Japan, Kenya, Korea, Latvia, Lebanon, Lithuania, Luxembourg, Macedonia, Mexico, Netherlands, Nigeria, Norway, Oman, Peru, Philippines, Poland, Portugal. Romania, Slovakia, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Trinidad and Tobago, Turkey, Uganda, Ukraine, United Kingdom, United States of America and Venezuela.

Table A.3 GMM Style Instruments

D.DI, D.LOANAST, D. LIQUID, D. ROAA, D.LEVRATIO, D.LOANGRRTH, D.INTMGNTA, D.STAGDEV, D.STAGFINDEV, D.GDPGRWTH D.INFLGRWTH D.REALINTRATE. Here, (D) stands for the difference operator.