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Remarks by

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Good morning It is a pleasure to once more address this impressive conference Through the years the Chicago Federal Reserve Bank has consistently identified the most important issues that policymakers are confronting. It has done so again The rapidity of technological change, the globalization of finance, and the institutional expansion of financial competition are changing the banking environment so dramatically that regulators, of necessity, must continually re–evaluate their strategy and procedures

It is useful, I think, to begin a discussion of "what should regulators do?" by reminding ourselves just why there is bank regulation, by which I mean regulation designed to assure a minimum level of prudential soundness At bottom, of course, is the historical experience of the effects on the real economy of financial market *disruptions and bank failures, especially when the disruptions and failures spread* beyond the initial impetus

Perhaps equally important is the unintended market response to a safety net designed to address systemic concerns and protect "small" depositors Deposit insurance and the discount window, by changing the terms under which banks deal with their creditors, distort the signals and incentives that banks receive from the market, creating a substantial potential for excessive risk–taking by banks In response, bank regulators have been forced to try to minimize this moral hazard that, in the absence of the safety net, the market itself would police The problems that arise from the short–circuiting of the pressures of market discipline have led us increasingly to understand that the ideal strategy for supervision and regulation is to simulate the market responses that would occur if there were no safety net, but without giving up the basic requirement that financial market disruptions be minimized

Such a realization highlights the basic tensions between stability and risk taking, between regulation and market forces, between government guarantees and

business choices Our goal is, in effect, to make the safety net moot in order to give wider range to market forces But our constraint is to avoid systemic risk, by which — as I have noted at this conference before — I do *not* mean a zero bank failure rate Far from it For we should not forget that the basic economic function of these regulated entities is to take risk If we minimize risk taking in order to reduce failure rates to zero, we will, by definition, have eliminated the purpose of the banking system

Since dramatic institutional and regulatory change is rare, the challenge is to develop evolutionary modifications that balance risk–taking and stability, market incentives and regulations Happily there are, I think, reasons to be optimistic that this can be done The source of my optimism, as I will explain, is the potential to harness one of the main forces that is also challenging our current regulatory structure technology

Supervisors and regulators have already begun to do so by emphasizing risk management procedures at individual banks and, most recently, by proposing the use of internal risk models for purposes of allocating capital for trading risk Nonetheless, the most fundamental recent change — to which the others are simply modifications — is the adoption of risk–based capital The risk–based capital accord of 1988 was a genuine step forward at the time However, compromises were inevitably made to achieve consensus The regulators knew the shortcomings, but were — in my view, correctly — willing to compromise in order to establish both a meaningful capital floor and to recognize, in a rough way, differences in risks for broad categories of assets The capital rules were especially helpful to halt — and reverse — the secular decline in bank capital ratios Moreover, the Fed was — and continues to be — supportive of prompt corrective action that builds upon the accord by requiring specific regulatory responses at different risk–based capital ratios

In recent years, however, the weaknesses in the risk–based capital structure have become ever more evident its sole focus on credit risk, its one–size–fits all risk weight for nonmortgage loans, its inability to adjust weights for hedges, portfolio diversification, and management controls, and the difficulties of folding in interest rate risk, to name a few Most, if not all, of these problems were known before adoption Most, if not all, are addressed judgmentally by the supervisors in their case–by–case onsite examination and review Nonetheless, despite these efforts and greater attention to internal bank risk management and control, our current procedures are linked too closely, in my view, to the risk–based capital *ratio* At the same time, the market place has become more complicated in ways that risk–based capital rules cannot handle, even with the increasing complexity of the rules

These market complexities, however, would not have occurred without the same technology that has recently made it possible to quantify risks that only a short time ago we could just conceptualize Like internal models for measuring risk on trading positions, quantifiable measures for other risks make it possible for banks and others to choose more carefully their risk positions and better link those positions to the appropriate capital levels

Consider securitization, which, of course, has been evolving for several years, but is, in an important sense, a paradigm of the evolving risk management techniques in financial markets In a typical securitization, the sponsoring entity — which is often a bank — establishes a special purpose vehicle, or conduit, that acquires a loan pool from an originator Frequently, to exploit regulatory loopholes, the conduit itself originates the loans The conduit then issues varying tranches of securities to fund the loan pool It achieves double– or triple–A ratings on most of these securities by providing for their credit enhancement, typically by having the sponsor purchase the most junior securities, which are structured to absorb virtually all of the credit risk inherent in the underlying loan pool The sponsoring bank retains all of the residual

spread between the return on the loan pool and the costs incurred by the conduit, including the interest and noninterest costs on the loan–backed securities

For present purposes, what is most critical about securitizations is that the participants — the originator and the credit enhancer (who are often one and the same), as well as the purchasers of the senior securities — all need to have a fairly clear and *quantifiable* idea of their risk exposure Typically, however, bank loans are opaque to outsiders, making such knowledge hard, if not impossible, to come by Nevertheless, this problem often can be overcome by using loan portfolios with standard loan contracts having well–known characteristics — like credit card and auto loans — or by overcollateralizing, or by providing appropriate levels of credit enhancement Most often a combination of these is used

While perhaps not designed originally with the purpose in mind, one method for making such loans more amenable to securitization is credit scoring Credit scoring applies formal statistical procedures to the credit decision process By subjecting loans to uniform underwriting standards, credit scoring facilitates analysis of the credit risk inherent in a securitized loan pool Such procedures are being applied to an ever wider array of bank loans, including, most notably, small business loans In the future, one can thus expect to see an increasing volume of securitized small business loans that are not guaranteed by the SBA It is also worth emphasizing that the credit scoring exercise — and the market evaluation accompanying securitizations of loan pools — requires that banks capture, monitor, study, and present historical loss data on a large volume of their loans The development of such data bases was a necessary prerequisite to mortgage, credit card, and auto loan securitization Such data bases will be equally critical not only to the evolving technology of internal risk management at banks and for securitization of other loan pools, but, as I will be noting shortly, also for evaluations of risk by the supervisor/regulator

A brief digression may be useful at this point A common misunderstanding of credit scoring and securitization is that both will cause banks to refrain from making the nonstandard loans that their special knowledge has made possible, including the credits that, in the past, I have referred to as character loans It is also sometimes argued that securitization of loans will undermine the economic franchise of banking, driving down spreads on the last profitable credit function in the banks' economic franchise But such a result is not at all preordained, especially for those banks willing and able to take advantage of new technologies Of course, the new technologies of loan standardization and credit scoring can be viewed as chipping away at the monopoly rents associated with specialized knowledge of the local loan customer In effect, barriers to entry are lowered when the new technologies allow nonlocal competitors to offer standardized products through nationwide marketing campaigns using toll–free "800" telephone numbers But the by–products of standardization and credit–scoring include lower underwriting expenses and the more accurate estimation of loss probability distributions These byproducts act to offset the effects of a reduction in barriers to entry, both by raising profits on existing operations and by opening up opportunities with customers previously not served Better and quantifiable estimates of risk are tantamount to risk reduction

Moreover, securitization, by expanding lower cost funding sources, increases the ability of banks to make more loans and to diversify their risks Risk reduction, lower funding costs, and lower noninterest costs in making the credit decision, all act to *increase* banks' risk–adjusted rate of return In addition, banks can, will, and do, continue to make the nonstandard loan based on judgment and asymmetrical information, retaining the resultant whole loan in their portfolios Indeed, the new technology should enable banks efficiently to evaluate borrowers they could not assess in a cost–efficient way before Thus, new banking opportunities will be

opened The new procedures I have just described also induce banks to price all loans — but especially nonstandard loans — more accurately to reflect their true costs and risks This, too, works to increase risk–adjusted rates of return and results in a better allocation of resources True, some banks, unwilling or unable to adapt to the changing technology, will lose market share and perhaps suffer lower rates of return But the banks that embrace the cost–cutting and risk–reducing effects of the technology will, in my judgment, tend to find it a rewarding experience

Beyond credit scoring and securitization, larger banks are moving into new areas of risk evaluation for internal management purposes, including the quantification of credit risk Most large banking organizations have — or are developing — procedures for allocating capital against various types of loans, based on estimates of credit risk for various categories For example, in middle market lending at these institutions, a first step is to classify loans into various rating categories — usually 1 to 10, with 1–rated loans being equivalent to triple–A securities and 10–rated loans about to be written off as loss Periodically, each loan is re–evaluated and re–categorized if necessary Such categorizations have been done for some time, but the more sophisticated banks are going an important step beyond this point They are using historical data to estimate the mean and variance of defaults *and* actual losses on each grade of loan The result can be interpreted as attempting to infer the loss probability distribution for each category or subportfolio of loans, and for the entire loan portfolio

Consider how such information can be used Estimates of expected losses and the probability distribution of unexpected losses are critical for pricing credits correctly and deciding whether competitive market rates thus imply withdrawing, cutting back, or expanding various types of credit A prerequisite, however, is the judgment by management as to the proper amount of capital to allocate to each of the subportfolios or risk categories so that risk–adjusted rates of return can be calculated The most

common approach is to allocate sufficient capital so that the probability of actual credit loss exceeding the allocated capital is no greater than, say, one–half percent This probability "target," in turn, could be arbitrarily chosen or selected to be consistent with, say, maintaining a double–A bond rating on the bank's own debt

These capital allocations, as I noted, are for internal management, not regulatory, purposes But I am impressed with what they teach us, the regulators, and what they imply for regulatory capital The internal capital allocations used by banks range from less than 2 percent for highly rated loans to 20 percent or more for the most risky credits In addition, credit enhancements, such as most junior positions in securitized loan pools, can have theoretical capital allocations that widen still further the range of appropriate internal capital allocations Compare this wide range of *internal* capital allocations with the 8 percent, one–size–fits–all Basle standard In fact the average risk–based capital ratio for U S banks approaches 12 percent for large banks, far above the 8 percent minimum Nonetheless, consider the contradiction implicit when a bank with a 12 percent risk weighted capital ratio may be viewed by the public as having a strong capital position when the bank's *own* capital allocation models suggest that it should have 15 percent capital, or more The supervisor, I believe, is not being misled in most such cases, and is making the appropriate judgmental adjustments Moreover, the markets clearly make such adjustments I note that the banks with very high risk–based capital ratios still do not achieve triple–A ratings on their debt, and some do not even have single–A ratings

One can conceive of a bank following a portfolio policy that would engender an average *internal* capital allocation that would be well *below* our 8 percent minimum In such a case, our rules would significantly disadvantage the bank and induce it to find loopholes and to engage in regulatory arbitrage to avoid the standard But consider a bank carrying capital considerably above what the regulatory guidelines suggest, but below what the bank's own internal capital allocation procedures imply

Such a bank has no reason to adjust its position for *regulatory* purposes if the supervisor does not see through the veil of nominally high regulatory capital As I noted, I believe that supervisors generally have been able to do so But should they fail to see through that veil, in an environment of increasingly complicated financial transactions, there could be a serious inconsistency between our desired regulatory soundness standard and actual bank risk levels

Federal Reserve staff members are beginning a review of the major banks' internal credit risk–capital allocation models in order to understand better the strengths and weaknesses of these models We already know, however, that there has been an irreversible application of risk measurement technology without which banks would not be able to design, price, and manage many of the newer financial products, like credit derivatives These same or similar technologies can and are beginning to be used to price and manage traditional banking products

Some of these developments are at an early stage, and all are evolving rapidly Today's technology allows us to measure risk in ways that were unthinkable a decade ago The next decade will likely produce further dramatic change But already today, the markets — including credit rating agencies — are *using* these quantitative tools

Indeed, for the first time, we can seriously begin to contemplate a regulatory quantification of what we mean by "soundness " Recall that while the objective of bank regulation and supervision is to assure a minimum level of prudential soundness, the precise meaning of soundness has always been tenuous and ill–defined This is why judgment has been, and will continue to be, a critical component of prudential supervision However, the technology and techniques banks have developed, and are developing, allow us greatly to improve that judgment by constructing measures of soundness in probability terms If we can obtain reasonable

estimates of portfolio loss distributions, soundness can be defined, for example, as the probability of losses exceeding capital In other words, soundness can be defined in terms of a quantifiable insolvency probability Moreover, one can conceive of definitions of soundness that go beyond simply the probability of insolvency to encompass also the level and variability of losses to the FDIC in the event of insolvency Going still further, regulatory targets for quantifiable soundness could be made to reflect market–based goals For example, soundness could be defined in terms of some implied, minimum credit rating for the bank's deposits, as if they were uninsured All of these approaches, however, require the regulators to establish targets regarding acceptable failure rates or the FDIC's exposure to potential losses Note that a bank could meet any particular quantitative soundness standard by increasing its capital or by reducing the risk of its portfolio

I do not mean to suggest that we have reached the point at which we can now establish quantitatively precise soundness standards We have not These procedures are in their infancy and are hampered by the lack of historical micro data bases which have to be laboriously constructed at, or by, individual banks Moreover, ascertaining relevant probabilities, the basis of an evaluation of soundness, presupposes an estimation of the shape of these distributions, arguably the most difficult aspect of this process The technical methodology is also changing with experience and with conceptual progress in the academic and professional communities

As I noted, we have already decided to use internal bank model approaches for measuring market risks at banks and allocating regulatory capital to those risks In addition, the Federal Reserve Board has been studying an alternative capital allocation process for market risk, the so–called "pre–commitment" approach This methodology would provide market and other financial incentives for banks to choose capital allocations for trading risk that are consistent with their own risk

management capabilities, as well as with regulatory objectives With the Board's encouragement, the New York Clearing House Association is organizing a pilot study of the pre–commitment approach The next natural step is to begin to review ways to harness, for supervisory purposes, the banks' own models for the measurement of credit risk

The private sector, for a considerable time, has been accustomed to product planning cycles — created by rapid technological change — in which the planning of the replacement product is begun, if not well along, by the time a new product is being introduced The United States banking system is not only the largest in the world, but it is also the most complex and the most innovative We cannot escape the reality that the banking supervisors and regulators will have to innovate to continue to carry out their responsibilities Bank, and more generally financial institution supervision, is, of necessity, a continually evolving process reflecting the continually changing structure and policies of the supervised institutions We will eventually correct, for example, all, or most, of the anomalies which we perceive in risk–based capital, only in a few years to be required to "correct" those corrections This is not a fault, but a description of an appropriate regulatory process Indeed, given our own long lead times, we, like banks and nonfinancial firms for their products, must begin designing the next generation of supervisory procedures even while introducing the latest modification

What about principles that can be developed to address the original question of this conference What should regulators do? In light of my remarks this morning, let me suggest a basic principle Whenever possible, regulators should use approaches to regulation and supervision that include or simulate market techniques and signals Importantly, our soundness standards should be no more or no less stringent than those the market place would impose In the unregulated market, of course, a financial firm can take on any amount of insolvency risk it wishes, and the

market will rate its liabilities, and price them, accordingly Unfortunately, we do not have a system in which deposit insurance premiums are permitted to vary as widely as simulating that response would require But, at least theoretically, we can adjust the individual bank's regulatory capital requirement to offset the reduction in market discipline attributed to the safety net Perfection would occur if bankers had a genuinely difficult choice deciding if they really wanted to remain an insured bank or become an unregulated financial institution

In the final analysis, such an approach is the only way to control the moral hazard of the safety net, to square the circle in balancing stability requirements with risk–taking An important — and increasingly feasible — prerequisite in achieving that balance is for the regulators to quantify what their goals are, especially what is meant by "soundness " Measuring actual risks relative to these goals would be facilitated if regulators harness for supervisory purposes the market–oriented tools already used internally by banks for management purposes

When seeking to implement this principle and utilize new technologies, we must take care to remember that we are unlikely ever to be able to measure risk in absolutely precise ways Quantification procedures are still extrapolations of the past, and behavior is always changing Models wil still doubtless be haunted by specification and estimation errors The world will still remain a highly complex place, and I have no doubt that financial participants and markets will continue to invent instruments and procedures that models will not be able to capture until sufficient experience is gained Thus, neither am I proposing nor do I anticipate that bank supervisors will be relying on a black box based on statistical and econometric rules I *am* suggesting, however, that new paradigms are in the process of evolving which will provide us with tools that will permit greater quantification of both risk standards and risk management Such quantification will not solve all of our problems, nor will it ever substitute for human judgment, which is the only technology we have available to parse the most difficult

regulatory problems Nonetheless, quantification will facilitate great improvements in both risk management and what regulators will be able to do The financial world is dynamic and I have little doubt that there will be a continuous need to modify what we develop In the end, judgment must be augmented with technology, and technology must be tempered with judgment

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