

DERIVATIVES AND PUBLIC POLICY
FEDERAL RESERVE BANK OF CHICAGO

Chicago, Illinois
June 6, 1996



The Regulation Of Derivatives

Good morning, and welcome to the Federal Reserve Bank of Chicago. I'm glad that you could join us to explore public policy issues related to financial markets. The Fed of course is one of the principal financial regulators, so public policy questions are always a key concern.

While there are many advantages to free and unfettered markets, there are times when market-determined outcomes are less than perfect. Problems that demand regulatory attention in financial markets are fairly well-known and include unfair barriers to credit access, the possibility of anti-competitive monopolies, fraud or insider trading, systemic crises due to illiquidity or insolvency of individual financial institutions, and the moral hazard concern regarding deposit insurance.

Now I think most would agree regulation is a necessary feature of the current financial landscape. Having said this, it seems that regulations and, I might add, regulators are not always well-liked by the regulated. Perhaps the reason is that regulation is often pursued in uneven ways that causes needless economic disruption. The challenge for regulators, then, is to achieve their goals in the most efficient and effective way possible. As part of the regulatory community, the Federal Reserve System has a special interest in finding new and more effective ways of threading this needle: How can we foster safety and soundness without disrupting the smooth and efficient operation of our regulatory clients?

Today I want to point out that there is a better way to thread this needle than what one typically thinks of regarding regulation. It's the increased use of the most potent tool that we know — market forces. It's what the regulatory community refers to as the use of incentive-compatible regulation.

Now I need to step back for just a moment to provide a framework for thinking about this. For the sake of time, let me start by noting that there are basically two approaches to regulation: the “command and control” approach and the “incentive compatible” approach.

Under the command approach, the regulator simply states what a regulated firm can and cannot do. There are a number of problems with this. First, there is the problem of *informational asymmetry*. Regulations cannot be enforced effectively if they require credible information about a firm that is either not readily available or is overly costly to obtain.

This leads to a second problem: the law of *unintended consequences*. Pure command regulations may induce unintended behavior by regulated firms. Here, to give an example, deposit insurance is intended to safeguard the depository system. However, it’s widely argued that deposit insurance contributed to the Savings-and-Loan debacle: Deposit insurance actually gave weak thrifts an incentive to increase the risk of their loan portfolios. If the risk paid-off, they were out of trouble; if it didn’t, the thrift insurance fund absorbed the loss.

A third problem with the command approach is *implementation*. Due to the prior two problems, command and control regulations require significant and sometimes intrusive monitoring. This can also lead to command regulations becoming more “complicated” than the activity they regulate. What sometimes results is “one-size-fits-all” rules, which tend to be overly restrictive and to limit a firm’s ability to capitalize on its differences.

The evolution towards incentive compatible regulation is a response to the above mentioned problems. This approach seeks to align the incentives of firm owners and operators with social goals. It makes it in the firms’ *own self-interest* to efficiently achieve the regulatory objectives. It spells out desired outcomes and then allows the firm to determine how to best achieve this result.

Although incentive compatible regulation is a preferred approach over the long-term, the Federal Reserve currently utilizes command and control regulatory approaches. We’re working diligently to improve this type of regulation. We’re moving towards more “performance-based” regulation where well-managed banks are granted greater autonomy and consequently less scrutiny than less well-managed firms. We’re focusing more on risk management and internal control. We’ve also worked with other federal banking regulators to modify the CAMEL (Capital, Asset Quality, Management, Earnings, Liquidity) risk rating system to formally incorporate risk management. In parallel efforts, we are making significant progress in developing more efficient and effective examinations by reducing the time spent at banks and dramatically increasing the use of computer technology in exams. And we’re also working with State bank regulators and the FDIC to eliminate any duplication of effort in the examination process.

But longer term, I’m particularly enthusiastic about using market forces to a greater extent to encourage behavior desired by regulators, as was done by the EPA when it created a market in emissions permits to help control air pollution, which I’ll discuss later on. Appropriately designed regulatory structures cause firms to internalize regulatory objectives, thereby encouraging firms with expertise or an advantage to act in their own best interest, to innovate, and to benefit from this advantage. Firms have an incentive to voluntarily choose actions that further the public interest and they can do this more efficiently than under the command approach because of their superior access to information and their expertise. Incentive-compatible regulation is thus generally preferred by regulated

firms since it provides them with greater autonomy and they can choose the least burdensome way of meeting the regulatory objectives.

Probably the leading example of successful incentive-compatible regulation is the trading of pollution rights. The problem that this addresses is a classic example of what economists call an *externality problem*. Some firms release excessive amounts of sulfur dioxide and other airborne pollutants. This is costly to society, but these costs don't accrue directly to the firm that generated the pollution. According to one study, every ton of sulfur dioxide released into the atmosphere causes over \$3,000 of health related damages. In the absence of government intervention or more well-developed markets by which to trade these "rights" to pollute, the polluting firms would not fully take these costs into account when making production decisions. The result would be higher production and consequently more pollution than otherwise would exist if these firms did bear the full cost of their production.

The Clean Air Act of 1990 addressed this problem by mandating that utilities cut sulfur dioxide emissions in half by the year 2000. The EPA could have used the command approach and set a maximum yearly emission level per plant. Any company that exceeded this maximum would be fined. This certainly would be a straightforward way of addressing an important social issue.

However, it would have all the problems associated with command regulation. Reducing pollution is costly. In 1990, for example, the industry reported that reducing sulfur dioxide would cost \$1,500 per ton. The EPA itself put the cost at \$600/per ton. The important point is that these costs vary from firm to firm. Some plants can reduce emissions more cheaply than others. Unfortunately, it's difficult to impose different rules for different plants because of the "asymmetry of information" problem I mentioned earlier. The EPA cannot reliably elicit information about a particular plant's cost of pollution reduction, since plants may tend to exaggerate their reported costs and it may not be clear what's being reported. As a result, command regulation would end up imposing a crude, one-size-fits-all rule that ignores these differences among plants.

One can imagine unintended consequences from enforcing this one-size-fits-all rule. Utilities with high costs of reducing pollution would face pressure to drastically increase their prices, potentially impairing economic activity in those regions. In the extreme, we might actually see utilities close, which could lead to shortages.

As it happens, the EPA moved to an incentive-compatible approach to address the externality problem. The EPA now issues emission allowances which permit the holder to release one ton of sulfur dioxide in a given year. The total number of allowances equals the maximum desired pollution level.

What makes this approach incentive-compatible is that the allowances can be traded. There is a market-determined price for the right to emit pollutants. This price represents the marginal cost of reducing economy-wide pollution to the level stipulated in the Clean Air Act. Firms that find it relatively expensive to reduce emissions will buy allowances from firms that have a lower cost to reduce pollution levels. In the end, the firms with the lowest cost of emission reduction end up doing most of the clean-up. In a more typically command approach, firms with little comparative advantage in pollution reduction end-up committing resources that would be better utilized elsewhere.

As a result of the incentives approach, the cost of reducing pollution is minimized. We get cleaner air with less impact on economic activity. Recall that the EPA estimated the average cost of emission reduction at \$600/ton. In reality, the average market price of emission allowances in 1994 was only \$141.50/ton. Competition allowed those in the best position to reduce pollution to do so and to gain an advantage from their capabilities as industry participants paid them for the right to pollute.

This rather dramatic success story should motivate us to seek ways of applying this philosophy to financial markets. In the banking industry one market-based regulation proposal is an approach to bank capital regulation known as “pre-commitment.” A few months ago the Federal Reserve Board solicited comments on a proposal incorporating this approach. The comments from both banks and regulators were generally quite favorable, although there are a number of issues still to be resolved. The staff here at the Chicago Fed is heavily involved in this research and we along with many others in the Federal Reserve have a strong interest in determining whether the pre-commitment approach can be put into practice.

The pre-commitment approach deals with the issue of how much capital banks should be required to hold against market risk, that is, the risk of losses due to adverse price movements in financial markets. Two decades ago, market risk was not much of a concern to regulators, because few commercial banks had substantial trading operations. Over the past fifteen years, however, assets traded in financial markets have grown to be a more significant source of profits and losses for large banks.

This presents a problem for regulators. Bank capital, and, ultimately, the Bank Insurance Fund, is at risk if the value of a banks' trading book falls rapidly due to a sudden change in market prices. Fears of a bank collapse triggered by such changes have been exacerbated by the increased use of derivatives. Of course, derivatives are designed as a tool for controlling risk, and much of the media furor over derivative trading ignores this fact. However, derivatives do offer an inexpensive way to construct a highly leveraged asset position, a position that could be particularly vulnerable to rapid movements in financial markets. Consider the collapse of Barings last year, which was the result of a high-stakes bet on the direction of Japanese stocks using derivatives traded on the SIMEX and the Osaka exchange. In other words, if improperly used, derivatives make it easier for an imprudent institution to damage itself, the Bank Insurance Fund, and the safety and soundness of the financial services sector.

It had become clear by the early 1990's that regulators would have to incorporate minimal capital levels for bank market risk. The Federal Reserve and other central banks, through the Basel Committee on Banking Supervision, jointly developed a series of proposals for setting regulatory capital levels against this type of risk. The initial Basel proposal followed the conventional philosophy of command regulation. Known as the “Standardized Approach,” this proposal divided trading-book assets into different risk classes, and assessed a fixed capital charge against each class.

The reaction of most U.S. bankers, some of whom may be in this room, to the “Standardized Approach” was very negative and their comment letters read like a textbook on the problems with command regulation. I'd like to highlight three of these problems. First, capital would be based only on the bank's *current* asset position. It would ignore the possibility that banks can use *dynamic trading strategies* for risk-control. For example, a bank may have contingency plans to move in and out of certain markets as risk levels change. A bank's ability to do so is not considered in the “Standardized Approach.”

Second, the “Standardized Approach” would not take advantage of the detailed knowledge of different asset classes and financial markets possessed by large banks. Third, even if the regulators did possess this level of expertise, the cost of administering capital requirements specified at this level of detail would be prohibitive. As a result, the “Standardized Approach” would impose an overly simple, many have said “crude,” set of regulations. For example, under the “Standardized Approach” all sovereign debt is treated as risk-free. I’m sure that this will bring great relief to banks that invested in third-world debt during the 1970s.

In response to these problems, the Basel Committee developed an alternative proposal to capital regulation referred to as the “Internal Models” approach for implementation in January of 1998. Under this approach, banks would use their own internal risk-assessment models to assess their market risk. Banks would then report this value at risk number to the regulator and set regulatory capital based on it. This internal models approach allows banks and regulators to make use of the banks’ risk-management expertise. Another positive feature is that it limits the degree to which the regulator intrudes into a bank’s trading business and focuses on assessing the institution’s risk-management practices.

Nonetheless, the “Internal Models” approach still has some command-based attributes and requires some supervisory review, though it adds significant flexibility over earlier approaches. Consequently, a number of staff members in the Federal Reserve System have suggested moving one step further, advocating what is now referred to as the “Pre-commitment approach” to capital regulation.

The idea behind this approach is quite simple. Each bank would state the maximum loss that its trading book will sustain over, say, the next three-months. So, the bank, in effect, “pre-commits” to a maximum loss level. Their capital charge for market risk equals this pre-committed maximum loss level. If the bank’s losses exceed this level, a significant penalty is imposed. Notice that the bank is free to choose *both* the amount of market risk in their trading book, and the amount of capital to hold against this risk based on its own internal models. However, if they hold too little capital for their chosen risk level, then they increase the probability of incurring the penalty. This provides an incentive for the banks to voluntarily choose an adequate level of capital against risks associated with their trading portfolio.

The “Pre-commitment” approach has a number of advantages. First, banks can choose whether to control risk through higher capital levels or by using more sophisticated dynamic hedging strategies. Second, “Pre-commitment” takes fuller advantage of bank’s risk-assessment abilities in setting capital. Banks have a clear incentive to use the most sophisticated methods for assessing portfolio risk. It actually *encourages* banks to improve their risk-assessment and risk-management technologies. Third, unlike the command approach, there’s no need for the regulators to impose a crude model of portfolio risk in setting regulatory capital. Rather, regulators need only to verify initially that the bank has an adequate risk-management structure in place, to review the bank’s profit-and-loss information, and, in the event of a violation, to impose the penalty in a consistent fashion.

The response of bank executives to the pre-commitment proposal has been very encouraging. They note that pre-commitment is less burdensome and less intrusive. Banks would run their affairs pretty much as they liked, provided their capital level was commensurate with their risk. Furthermore, the only data that the banks would have to report to the regulators would be period-

ic profit-and-loss statements on their trading book. This data is already computed by banks on a regular basis for risk management purposes.

However, I want to emphasize that the intent is not to deregulate, but rather to “re-regulate”. We still have the same objective — adequate capitalization, but we seek to regulate more efficiently.

We’re very excited about the potential advantages of this proposal. However, it’s important to note that the devil is in the details and that there are many important questions still to be resolved. As part of the process, the New York Clearing House Association is organizing a pilot study of “pre-commitment.” Obviously, this pilot will provide valuable experience with this innovative approach.

One implementation detail to be addressed is the design of the penalty to be imposed for exceeding the pre-committed loss level. Ideally, we would want a penalty sufficient to deter undercapitalization, but not so excessive as to push a bank into financial distress. The penalty structure could incorporate monetary fines, higher future capital requirements, or restrictions on future trading. The Federal Reserve Bank of Chicago research staff is The pre-commitment paradigm.

One type of “penalty” that’s very consistent with the spirit of incentive-compatibility is public disclosure of the violation. Public disclosure that a bank had greater than expected trading losses would subject it to the critical evaluation of the marketplace. This market scrutiny may itself be an effective deterrent to undercapitalization. Furthermore, the market’s response reflects its judgement of the implications of these trading losses for the bank’s continued viability. This is precisely the concern of regulators: the extent to which the bank’s failure might put the Bank Insurance Fund at risk. In effect, the market penalizes the bank according to the severity of the bank’s violation.

I hope that this brief tour through recent developments in financial regulation stimulates some thought on the future regulatory environment we are likely to face. Regulation may be a necessary feature of the financial services industry. It is encouraging, though, that the regulations of the future can be expected to be less intrusive and less disruptive than the regulatory structures we’ve inherited from the past. Furthermore, we are confident that all of this can be accomplished while continuing to protect the public interest — our ultimate goal.