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Banking Supervision and Government Policy: Capital Standards Regulation

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BANKING SUPERVISION AND GOVERNMENT POLICY: CAPITAL STANDARDS REGULATION*

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It is a pleasure to be here to discuss some of the issues I believe are important regarding risk management practices in banking today. We seem to hear constantly about the rapid pace of innovation in all aspects of business and finance, about globalization of financial markets brought on by improved technologies and increased international trade, and about all the changes these trends have caused in banking and bank supervisory practices.

I would like to review some of the steps bank supervisors have taken to adapt to changing times and to offer some thoughts about where we could be heading. In particular, I want to focus on the recent performance of market risk models and on issues surrounding regulatory capital standards for credit risk.

WHAT A YEAR!

In terms of financial markets and bank supervision, last year was a doozy. We began the year by implementing the Market Risk Amendment to the Basle Capital Accord,[1] which has served as the international capital standard for banks over the past

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1. AMENDMENT TO THE CAPITAL ACCORD TO INCORPORATE MARKET RISKS (Basle Comm. on Banking Supervision 1996) [hereinafter MARKET RISK AMENDMENT], *amending* INTERNATIONAL CONVERGENCE OF CAPITAL MEASUREMENT AND CAPITAL STANDARDS (Basle Comm. on Banking Supervision 1988) [hereinafter BASLE CAPITAL ACCORD]. The MARKET RISK AMENDMENT and the BASLE CAPITAL ACCORD may be obtained at <http://www.bis.org/publ/index.htm>.

decade.[2] The amendment permitted banks to use internal models for calculating regulatory capital requirements for their trading activities. Outside the United States, regulators permitted banks to use either their internal models or a standardized supervisory measure to calculate their market risk capital requirements. In this country, there was no alternative to models because we believed the supervisory measure was simply too crude, artificial, burdensome, and incorrect. It also failed to provide the risk management incentives that we believe are necessary.

Last year also saw historically high levels of market volatility, leading to the near collapse last fall of the large, highly regarded hedge fund, Long-Term Capital Management ("LTCM").[3] All in

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2. Risk-Based Capital Standards: Market Risk, 62 Fed. Reg. 68,064 (1998) (to be codified at 12 C.F.R. pt. 3, 208, 225 & 325 as amended by 64 Fed. Reg. 19,034 (1999)) (implementing the Market Risk Amendment jointly by the Office of the Comptroller of the Currency, Treasury, Board of Governors of the Federal Reserve System, and the Federal Deposit Insurance Corporation).

3. On September 23, 1998, with the encouragement of the Federal Reserve Bank of New York, fifteen major banks injected $3.625 billion into Long-Term Capital Management, L.P. [hereinafter LTCM], a private investment fund engaged in highly leveraged securities transactions based on advanced mathematical models, to prevent its collapse and potential default on an estimated $125 billion it had borrowed on $2.2 billion in capital. *See* Anita Raghavan & Mitchell Pacelle, *To the Rescue? A Hedge Fund Falters, so the Fed Persuades Big Banks to Ante Up; Firms to Lend $3.6 Billion as Long-Term Capital Loses on its Bond Bets*, WALL ST. J., Sep. 24, 1998 at A1 (reporting on an "extraordinary gathering" in which the Federal Reserve Bank of New York persuaded large banks to invest over $3.5 billion in LTCM in return for a 90% ownership stake, and to prevent a financial crisis should it unwind its positions); Steven Mufson, *What Went Wrong? Fund's Big Bettors Learned that Risk Trumps Math, History*, WASH. POST, Sep. 27, 1998, at H1 (corrected Sep. 29, 1998) (listing fourteen major banks and institutions which invested a total of $3.6 billion); Steven Syre, *Fleet, BankBoston in Syndicate Backing Troubled Hedge Fund*, BOSTON GLOBE, Sep. 26, 1998, at F1 (reporting that Fleet Financial Group had loaned $25 million to LTCM as part of the bail-out); Joseph Kahn & Peter Truell, *Troubled Investment Fund's Bets Now Estimated at $1.25 Trillion*, N.Y. TIMES, Sep. 26, 1998, at A1 (citing financiers' estimates that LTCM had leveraged borrowings of $125 billion into $1.25 trillion in open trading positions). For comprehensive information on LTCM's background and near-collapse, see Michael Lewis, *How the Eggheads Cracked*; N.Y. TIMES, Jan. 24, 1999, § 6, at 24; Carol J. Loomis, *A House Built on Sand*, FORTUNE, Oct. 26, 1998, at 110; Michael Siconolfi, Anita Raghavan & Mitchell

all, 1998 provided a great test for the internal model approach. Third quarter events not only emphasized the uncertainty, volatility, and complexity in financial markets today, but also drove home the importance of evaluating counterparty credit risk and stress testing.

As these events transpired, we were again reminded of the need to emphasize fundamental principles of banking and risk management, which include things like maintaining adequate diversification, capital adequacy, internal controls, and containing the level of credit risk. Whether the issues involve Russia, LTCM, ING Barings, real estate lending, derivatives sales, or whatever, we find ourselves returning to these concepts. We all know them. The difficulty is putting everything into practice.

Indeed, the changes taking place in financial markets today are also affecting our supervisory techniques. It becomes clearer every day that we can no longer focus on validating balance sheets during examinations, particularly at our largest banks, but rather we must emphasize these principles of risk management. Bank risk profiles can simply change too fast, and we need to know that adequate policies and practices are continuously in place. The same technology, management, and innovation that accommodate a $28 trillion market in derivatives transactions for United States banks alone must also be used to measure and control the related risks. As the market grows, so must our ability to manage it.

MARKET RISK MODELS

In terms of risk measurement, trading activities have provided bank supervisors with an opportunity to review innovative industry practices to strengthen the practices of many banks, both here and abroad, and to make fundamental changes to our regulatory approach. In deciding to rely on internal models for market risk capital requirements, the supervisory community pursued an entirely new technique in constructing a capital standard. Let me expand on some of the factors that we

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Pacelle, *All Bets are Off: How the Salesmanship and Brainpower Failed at Long-Term Capital*; WALL ST. J., Nov. 16, 1998, at A1.

considered in developing that standard and how I view its performance during the past year.

Internal models for bank trading of cash and derivative instruments are based on a measure of "value-at-risk" ("VAR").[4] That measure, in turn, indicates the maximum loss expected on a portfolio during a particular period of time and a given percentage-level of confidence. We chose this measure because it was used by the banks in their daily management of trading risks and because it was more accurate and far more risk sensitive to changing market conditions than any identified alternative. However, it was no panacea for determining the amount of capital necessary for a trading business, and was rarely used for that purpose by banks.

The principal weaknesses of VAR models were apparent to all. By that I mean not so much the mathematical errors that a complex model might contain, which can be its own concern, but perhaps more importantly, the input to the models and the assumptions the models reflect. The computer adage "G.I.G.O." (i.e., garbage in, garbage out) always applies, and requires institutions to have timely and accurate inputs about their positions and historical market moves. In some markets, particularly the emerging markets, historical data are unavailable or irrelevant, making the measurement of past volatility difficult, at best. Identifying the key assumptions in every model can be harder still. Testing the sensitivity of those assumptions to the modeling results is crucial, but it is a task not always undertaken.

Beyond the question of mathematics, inputs, and assumptions are numerous decision points, such as what period to use for measuring past market volatility and how to create an appropriate level of rigor in a capital standard. The choices can

4. Value-at-risk [hereinafter VAR] is a type of sophisticated risk-management model used by banks to estimate the amount of loss on a given portfolio they are likely to incur over a given period of time. *See The Risk Business*, ECONOMIST, Oct. 17, 1998, at 21, 23 (discussing VAR modeling and its vulnerabilities). *See also* Risk-Based Capital Standards: Market Risk, 62 Fed. Reg. 68,064-65 (explaining how institutions use VAR calculations in connection with regulatory capital standards); Jose A. Lopez, *Methods for Evaluating Value-at-Risk Estimates*, ECON. POL'Y REV., Oct. 1997, at 119 (Fed. Res. Bank of N.Y. 1998) (discussing the use of VAR estimates by banks under the "internal models" approach of the Market Risk Amendment).

have big effects. Future events need not repeat the past, at least not as seen by the models; the experience of LTCM attests to that. Loss frequency distributions are notoriously "fat-tailed," producing losses far larger and more frequent than most models will predict. Measuring exposures on financial options is particularly troublesome, and related modeling techniques continue to evolve.

Taking these weaknesses into consideration, we built regulatory capital requirements with an approximate ninety-nine percent confidence level, a minimum one-year historical observation period for evaluating market volatility, and an assumed ten-day holding period to address the possible market liquidity problems banks might encounter when closing certain portfolio positions. Then we multiplied the resulting VAR measure by three.

While the industry applauded the general direction we took, it criticized many of the details, particularly the ten-day holding period and the apparently arbitrary multiplier.[5] Ten-day holding periods were argued to be too long, because loss positions could be closed within a few hours. Critics said the level of rigor we imposed was much too harsh.

Similarly, it was claimed that the multiplier was inappropriate and produced an excessive capital charge. Regulators, to the contrary, viewed it as necessary, given market uncertainties and the acknowledged limitations of VAR models in dealing with rare events. Moreover, analysis of historical, daily market moves going back nearly twenty years also supported the need for a multiplier of that size in order to cover losses on seemingly reasonable portfolios.

Another key consideration was that we could afford to make mistakes in designing capital requirements for trading activities. For most commercial banks, the level of market risk and the related capital charge are relatively small. Whether we required

5. *See e.g.*, Darryll Hendricks & Beverly Hirtle, *Bank Capital Requirements for Market Risk: The Internal Models Approach*, ECON. POL'Y REV., Dec. 1998, at 1, 6 (Fed. Res. Bank of N.Y. 1998) (noting that many commentators have criticized the ten-day standard for introducing "a discrepancy between the value-at-risk estimates validated in the backtest [of VAR calculations] and the estimate actually used for capital purposes.").

materially too little capital or too much, banks would still survive, and they would also be able to compete. For example, the market risk capital charge for most large U.S. banks is roughly two to three percent of their total regulatory capital requirements.

It is somewhat surprising, then, that within this first year I read so much in the press and banking journals about how models have "failed." Who is surprised? That they failed was to be expected. At a ninety-nine percent confidence level, with more than 200 trading days each year, mathematically we *expect* the model to fail at least twice every year. The analysis of the viability of these models must go further than that. In what way did they fail, and what damage was done? And what should supervisors and banks learn from the experience?

Did trading results in the stressful third quarter exceed regulatory capital requirements? The answer is no. The standard worked largely as expected. Only a handful of U.S. banks reported a full quarterly trading loss, and in each case the allocated capital was materially more than the reported loss. Were daily losses larger than what the models predicted? Sure, but that was to be expected. In 1998, we also found cases where banks had more than the expected two or so exceptions, but it was an exceptionally tough year. Some daily losses extended well beyond the worst expectations. That may be what some critics of models have in mind, but it is also the nature of "fat" distribution tails, and why we have the multiplier.

Our supervisory approach is to evaluate the integrity of the models in terms of the *frequency* of daily exceptions to the measured maximum expected loss. We never gave VAR models much credit for covering the *size* of an exceptional loss; that is the role of the multiplier. Traders and management have every incentive to take action, and not just sit on losing positions as markets turn against them. Their responses and the presence of internal controls provide comfort, too. The principal remaining concern is whether, during a crisis period, markets will provide sufficient depth and liquidity for institutions to reduce exposures without causing too dramatic a change in market values.

Indeed, the Market Risk Amendment and our supervisory approach require much more than "sufficiently accurate" VAR

models. In developing the standard, we placed much importance on a variety of so-called "qualitative factors." These include the need for separate risk management units in banks that calculate exposures and that are organizationally independent of the trading functions. They include a process of back-testing the model's performance that goes beyond counting exceptions and explores the underlying cause when a loss exceeds expectations.

These qualitative factors also include a process for stress testing, in order to gain greater insight into the possible *magnitude* of a loss if things do go materially wrong. Results of these stress tests should be weighed heavily by management in evaluating its trading positions and the amount of capital the trading function needs. Such tests must be tailored to each institution and to its specific trading strategy. They are not easily standardized through regulations. Stress testing is critical to sound practices, as recent events have shown. Banks here and throughout the world need to devote greater attention to this area.

Overall, in judging VAR models, we should be neither overly harsh nor naive. They are important tools, but no more. In my view as a bank supervisor, VAR models generally performed well in a difficult first year, and appear to have served their intended role. Banks simply need to continue to make them better.

THE MATTER OF CREDIT RISK

With the development of the Market Risk Amendment behind it, the Basle Committee is now turning its focus to the far more important risk in lending. Since 1988, credit risk has been measured crudely for regulatory purposes. Unfortunately, most banks have also measured it crudely. The problem is that it is hard to do. Despite the legitimate criticism directed at the current Basle Capital Accord,[6] there is no practical, broadly accepted replacement to that standard readily at hand. Current efforts in Basle to explore ways to finely tune risk buckets can only lead to a partial, short-term fix.

6. *See supra* note 5 and accompanying text (discussing criticism).

As we began to evaluate the variety of emerging credit risk models, we found clear reason to pause. Make no mistake; much progress is being made, and such progress needs to continue. But few supervisors anywhere in the world believe these models are ready for "prime time."

One problem is that credit risk counts. Where we could afford mistakes with market risk, here we cannot. Credit risk drives a bank's capital needs, and, except for fraud, is almost always the cause of bank failures. Even with trading activities, much of the risk relates to the possibility that a counterparty will default, a fact that many traders have been reminded of in recent months.

Much of the difficulty in measuring credit risk relates to the data problem (G.I.G.O.), long-term exposures, and the complex mathematics involved. Credit losses happen relatively infrequently compared to market risk, but typically cause more damage when they occur. Unlike trading, there is rarely "upside" potential. The best that can happen is that the loan will be repaid. Evaluating the credit worthiness of a borrower or counterparty is also more subjective than measuring the expected profit on a derivatives contract. Factors like the industry outlook and the management strength of the borrower play important roles. The value of any collateral and other details of the loan contract also affect the amount of loss if a customer defaults.

This matter of subjective judgment is key. No matter how sophisticated a bank's model may be, the core input for the model is the rating assigned to the borrower or loan facility. In virtually all cases these ratings are based on judgments applied by credit analysts or relationship officers, subject to an after-the-fact loan review. There clearly is discipline in the process, but it is far from rocket science.

The training provided to these individuals seems to be gained as much through osmosis and exposure to the bank's credit culture, as through formal policies and instruction. Moreover, the rating process at many banks has focused in large part on weak or problem loans for regulatory and internal reporting. Fortunately for most banks, those loans are only a small part of the total, which often leaves the vast bulk of the loan portfolio distributed among only a few credit ratings.

This lack of differentiation among performing credits provides a poor basis on which to build a regulatory capital framework. Credit rating agencies such as Moody's Investors Service and Standard and Poor's employ four basic ratings for investment grade products and subdivide those ratings further. Adding non-investment grade ratings brings their number of total categories to nearly twenty. Credit markets believe such fine distinctions are relevant for judging a bond's underlying strength and proper price. To use their credit risk models most effectively, banks may eventually need to be similarly precise, perhaps not as much for regulatory purposes as for themselves.

Obviously, credit ratings cover a wide range of probabilities of default. "AAA" or "AA" rated credits, for example, virtually never default, and would require little bank equity capital for support. Risks increase exponentially, though, as the rating declines. By simply moving from Moody's "Baa1" rating to "Ba1," which is still investment grade, the expected one-year default rate increases seven-fold, from 0.1 percent to 0.7 percent. The speculative "B3" rating shows default rates greater than 13 percent, and lower-rated instruments have default rates much higher than that.

Credit rating agencies can make such fine gradations because they are paid specifically to provide the ratings (always on large transactions), and because their livelihood rests on such accurate and precise distinctions. Banks simply cannot afford to do that for every one of the many thousands of commercial loans.

In addition, banks have generally not invested in retaining historical data on default and loss performance for their institutions by loan type and risk grade. Consequently, unlike bond ratings, the losses, and thus implied capital requirements, for each grade must be guessed at. Some institutions use hard data, based on judgmentally driven "mappings" from their rating scales to that of Moody's or Standard and Poor's. Others may make use of bankruptcy prediction models or similar tools to provide further insight. Nonetheless, at the end of the day, we do not yet have the sort of well-established quantitative regularities that made VAR possible for market risk.

What does that mean for understanding and measuring the risk in a portfolio, and indeed the accuracy of a model's output, if

credit ratings are broad and relatively imprecise, yet the expected default frequency associated with individual ratings swings by such large factors? This is a crucial question we must resolve if we are to make meaningful progress in improving regulatory capital standards for credit risk.

It is also an issue banks should no longer ignore for their own risk management and business purposes. As markets become ever more competitive and refined, banks will need to identify, monitor, and measure their risks more precisely, too. That information should be used throughout the bank in product pricing, performance measurement, profitability analysis, and in the determination of necessary capital and reserves.

What can we do in the meantime, given the growing inadequacy of the current capital standard, at least as applied to large banks? Although U.S. supervisors, in particular, are looking hard for a way to move forward, the way forward is not quite so clear. Before we can have confidence in a bank's internal rating and risk measurement systems, we must see that the bank has confidence in them too. Before regulators can use these systems to build a capital standard, we must see banks relying on them to guide their own practices in managing and evaluating risks.

These systems need to address not only commercial lending, which represents less than 20 percent of the industry's balance sheet, but virtually all activities of the bank, both on and off balance sheet. In many cases, banks need more gradations in their internal ratings, and in general, they need to make greater use of the information the ratings and risk models provide. Until at least the large banks do this, how can we?

The Division of Banking Supervision and Regulation expects to issue a supervisory policy statement to the Federal Reserve Banks and the banking system discussing this need, and urging banks to make greater progress in the areas I have described. I hope that everyone takes that message to heart. I would also highly recommend a recent article by Bill Treacy and Mark Carey published in the Federal Reserve Bulletin.[7] It provides an excellent discussion of the credit risk rating processes at large

7. William F. Treacy & Mark S. Carey, *Credit Risk Rating at Large U.S. Banks*, *in* 84 FED. RES. BULL. 897 (Bd. of Govs. of the Fed. Res. Bank 1998).

U.S. banks. As I mentioned, that is where a review of the risk modeling process should begin.

CONCLUSION

In closing, I would note that developing new capital standards and implementing them through the regulatory process takes time, particularly in an international context that involves the European Union. Do not expect substantial change soon.

Nevertheless, under the leadership of President McDonough of the Federal Reserve Bank of New York, the Basle Supervisors Committee is undertaking a concerted effort to address the more glaring problems of the Basle Capital Accord within a relatively brief period. Some proposals for change are expected this year.

Long-term, more permanent solutions of the nature I discussed will take more time. Much of the difficulty is that while the theory for measuring credit risk may sound good, numerous practical problems remain. As with market risk, U.S. banks must show the way. However, with credit risk, our banks may have a long way to go.