

**REGULATORY IMPACT ANALYSIS**

**For**

**Risk-Based Capital Standards: Revised Capital Adequacy Guidelines**

(Basel II: Advanced Approach)

2007

Office of the Comptroller of the Currency  
International and Economic Affairs

## **REGULATORY IMPACT ANALYSIS**

Executive Order 12866 requires federal agencies to conduct a regulatory analysis for any economically significant regulatory action, which includes any rule that may have an annual effect on the economy of \$100 million or more. The Office of the Comptroller of the Currency (OCC) anticipates that the rule, Risk-Based Capital Standards: Revised Capital Adequacy Guidelines (Basel II Advanced Approach), will meet the \$100 million criterion and is thus an economically significant regulatory action.

In conducting the regulatory analysis of a significant regulatory action that may, among other things, have an annual effect on the economy of \$100 million or more (economically significant regulatory action), Executive Order 12866 requires each federal agency to provide to the Administrator of the Office of Management and Budget's (OMB) Office of Information and Regulatory Affairs (OIRA):

- The text of the regulatory action, together with a reasonably detailed description of the need for the regulatory action and an explanation of how the regulatory action will meet that need;
- An assessment of the potential costs and benefits of the regulatory action, including an explanation of the manner in which the regulatory action is consistent with a statutory mandate and, to the extent permitted by law, promotes the President's priorities and avoids undue interference with State, local, and tribal governments in the exercise of their governmental functions;
- An assessment, including the underlying analysis, of benefits anticipated from the regulatory action (such as, but not limited to, the promotion of the efficient functioning of the economy and private markets, the enhancement of health and safety, the protection of the natural environment, and the elimination or reduction of discrimination or bias) together with, to the extent feasible, a quantification of those benefits;
- An assessment, including the underlying analysis, of costs anticipated from the regulatory action (such as, but not limited to, the direct cost both to the government in administering the regulation and to businesses and others in complying with the regulation, and any adverse effects on the efficient functioning of the economy, private markets (including productivity, employment, and competitiveness), health, safety, and the natural environment), together with, to the extent feasible, a quantification of those costs; and
- An assessment, including the underlying analysis, of costs and benefits of potentially effective and reasonably feasible alternatives to the planned regulation, identified by the agencies or the public (including improving the current regulation and reasonably viable nonregulatory actions), and an explanation why the planned regulatory action is preferable to the identified potential alternatives.

We submit this regulatory impact analysis to meet the requirements of Executive Order 12866. In doing so, we believe that this regulatory impact analysis also meets the regulatory assessment requirements of the Unfunded Mandates Reform Act of 1995 (UMRA). The regulatory analysis for Executive Order 12866 captures most of the analytical requirements of the UMRA. The UMRA asks for additional estimates of any disproportionate budgetary effects of the federal mandate upon any particular regions of the nation or particular State, local, or tribal governments, urban or rural or other types of communities, or particular segments of the

private sector. The OCC does not expect the revised capital adequacy guidelines to have any disproportionate budgetary effect on any particular regions of the nation or particular State, local, or tribal governments, urban or rural or other types of communities, or particular segments of the private sector. The UMRA also requires the OCC to include estimates of the effect the rulemaking action may have on the national economy if the OCC determines that such estimates are reasonably feasible and that such effect is relevant and material. We discuss the effect of the rule on the financial sector and the national economy in this regulatory analysis.

## EXECUTIVE SUMMARY

### I. THE NEED FOR THE REGULATORY ACTION

Federal banking law directs federal banking agencies including the Office of the Comptroller of the Currency (OCC) to require banking organizations to hold adequate capital. The law authorizes federal banking agencies to set minimum capital levels to ensure that banking organizations maintain adequate capital. The law also gives banking agencies broad discretion with respect to capital regulation by authorizing them to also use any other methods that they deem appropriate to ensure capital adequacy.

Capital regulation seeks to address market failures that stem from several sources. Asymmetric information about the risk in a bank's portfolio creates a market failure by hindering the ability of creditors and outside monitors to discern a bank's actual risk and capital adequacy. Moral hazard creates market failure in which the bank's creditors fail to restrain the bank from taking excessive risks because deposit insurance either fully or partially protects them from losses. Public policy addresses these market failures because individual banks fail to adequately consider the positive externality or public benefit that adequate capital brings to financial markets and the economy as a whole.

Capital regulations cannot be static. Innovation in and transformation of financial markets require periodic reassessments of what may count as capital and what amount of capital is adequate. Continuing changes in financial markets create both a need and an opportunity to refine capital standards in banking. The Basel II framework, and its implementation in the United States, reflects an appropriate step forward in addressing these changes.

### II. REGULATORY BACKGROUND

The capital regulation examined in this analysis will apply to commercial banks and thrifts. Three banking agencies, the OCC, the Board of Governors of the Federal Reserve System (Board), and the FDIC regulate commercial banks, while the Office of Thrift Supervision (OTS) regulates all federally chartered and many state-chartered thrifts. Throughout this document, the four are jointly referred to as the federal banking agencies.

The Basel II framework comprises three mutually reinforcing "pillars" as summarized below.

#### 1. Minimum capital requirements (Pillar 1)

The first pillar establishes a method for calculating minimum regulatory capital. It sets new requirements for assessing credit risk and operational risk while retaining the approach to market risk as developed in the 1996 amendments to the 1988 Accord.

The Basel II framework offers banks a choice of three methodologies for determining risk weights. The first approach, called the Standardized Approach, essentially refines the risk-weighting framework of the 1988 Accord. The other two are variations on an internal ratings-based (IRB) approach that leverages banks' internal credit-rating systems: a "foundation" methodology in which organizations estimate the probability of borrower or obligor default, and

an “advanced” approach in which organizations also supply other inputs needed for the capital calculation. In addition, the new framework uses more risk-sensitive methods for dealing with collateral, guarantees, credit derivatives, securitizations, and receivables.

The Basel II framework also introduces an explicit capital requirement for operational risk.<sup>1</sup> The Basel II framework offers banks a choice of three methodologies for calculating their capital charge for operational risk. The first method, called the Basic Indicator Approach, requires banks to hold capital for operational risk equal to 15 percent of annual gross income (averaged over the most recent three years). The second option, called the Standardized Approach, uses a formula that divides a bank’s activities into eight business lines, calculates the capital charge for each business line as a fixed percentage of gross income (12, 15, or 18 percent depending on the nature of the business, again averaged over the most recent three years), and then sums across business lines. The third option, called the Advanced Measurement Approaches (AMA), uses an institution’s internal operational risk measurement system to determine the capital requirement.

## **2. Supervisory review process (Pillar 2)**

The second pillar calls upon banking organizations to have an internal capital assessment process and banking supervisors to evaluate each banking organization’s overall risk profile as well as its risk management and internal control processes. This pillar establishes an expectation that organizations hold capital beyond the minimums computed under Pillar 1, including additional capital for any risks that are not adequately captured under Pillar 1. It encourages organizations to develop better risk management techniques for monitoring and managing their risks. Pillar 2 also charges supervisors with the responsibility to ensure that organizations using advanced Pillar 1 techniques, such as the IRB approach to credit risk and the Advanced Measurement Approaches for operational risk, comply with the minimum standards and disclosure requirements of those methods, and take action promptly if capital is not adequate.

## **3. Market discipline (Pillar 3)**

The third pillar of the Basel II framework sets minimum disclosure requirements for banking organizations. The disclosures, covering the composition and structure of the bank’s capital, the nature of its risk exposures, its risk management and internal control processes, and its capital adequacy, are intended to improve transparency and strengthen market discipline. By establishing a common set of disclosure requirements, Pillar 3 seeks to provide a consistent and understandable disclosure framework that market participants can use to assess key pieces of information on the risks and capital adequacy of a bank.

## **B. U.S. implementation**

The rule for implementing Basel II’s advanced approaches in the United States will apply the new framework to the largest and most internationally active banking organizations. All banking organizations will fall into one of three regulatory categories. The first category, called “mandatory” organizations, consists of organizations with total banking assets of at least \$250

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<sup>1</sup> Operational risk is the risk of loss resulting from inadequate or failed processes, people, and systems or from external events. It includes legal risk, but excludes strategic risk and reputation risk.

billion or total on-balance-sheet foreign exposures of \$10 billion or more. Mandatory organizations will have to use Basel II's most advanced methods only: the advanced internal ratings-based approach (Advanced IRB) to determine capital for credit risk and the Advanced Measurement Approaches (AMA) to determine capital for operational risk. A second category of organizations, called "opt-in" organizations, includes organizations that do not meet the size criteria of a mandatory organization but choose voluntarily to comply with the more advanced requirements specified under the new capital framework. The third category, called "general" organizations, encompasses all other organizations, and these will continue to operate under existing risk-based capital rules, subject to any changes made to those standards.<sup>2</sup>

Various changes to the rules that apply to general organizations are under consideration. The banking agencies have decided to issue for comment a proposal that would allow the voluntary adoption of the standardized methodology for credit risk and the basic indicator methodology for operational risk for non-mandatory institutions (referred to hereafter as the Standardized Option). Because the Standardized Option is a separate rulemaking, our analysis will focus just on the implementation of the Advanced Approach. However, we will note how the Standardized Option might affect the outcome of our analysis if we anticipate the possibility that its adoption could lead to a significantly different outcome.

While introducing many significant changes, the U.S. implementation of Basel II retains many components of the capital rules currently in effect. For example, it preserves existing Prompt Corrective Action provisions for all banks. The U.S. implementation of Basel II also keeps intact most elements of the definition of what comprises regulatory capital.

### III. COSTS AND BENEFITS OF THE RULE

This analysis considers the costs and benefits of the fully phased-in rule. Under the rule, current capital rules will remain in effect in 2008 during a parallel run using both old and new capital rules. For the following three years, the rule will apply limits on the amount by which minimum required capital may decrease. This analysis, however, considers the costs and benefits of the rule as fully phased in.

Cost and benefit analysis of changes in minimum capital requirements entail considerable measurement problems. On the cost side, it can be difficult to attribute particular expenditures incurred by institutions to the costs of implementation because institutions would likely incur some of these costs as part of their ongoing efforts to improve risk measurement and management systems. On the benefits side, measurement problems are even greater because the benefits of the rule are more qualitative than quantitative. Measurement problems exist even with an apparently measurable effect such as lower minimum capital because lower minimum requirements do not necessarily mean lower capital. Healthy banking organizations generally hold capital well above regulatory minimums for a variety of reasons, and the effect of reducing the regulatory minimum is uncertain and may vary across regulated institutions.

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<sup>2</sup> Under the U.S. implementation (including the proposal for Basel II: Standardized Option), the Foundation IRB approach to credit risk in the Basel II framework would not apply. Also, the Standardized Approach to operational risk in the Basel II framework would not apply.

## Benefits of the Rule

1. Better allocation of capital and reduced impact of moral hazard through reduction in the scope for regulatory arbitrage: By assessing the amount of capital required for each exposure or pool of exposures, the advanced approach does away with the simplistic risk buckets of current capital rules. Getting rid of categorical risk weighting and assigning capital based on measured risk instead greatly curtails or eliminates the ability of troubled organizations to “game” regulatory capital requirements by finding ways to comply technically with the requirements while evading their intent and spirit.
2. Improved signal quality of capital as an indicator of solvency: The advanced approaches are designed to more accurately align regulatory capital with risk, which should improve the quality of capital as an indicator of solvency. The improved signaling quality of capital will enhance banking supervision and market discipline.
3. Encourages banking organizations to improve credit risk management: One of the principal objectives of the rule is to more closely align capital charges and risk. For any type of credit, risk increases as either the probability of default or the loss given default increases. Under the rule, risk weights depend on these risk measures and consequently capital requirements will more closely reflect risk. This enhanced link between capital requirements and risk will encourage banking organizations to improve credit risk management.
4. More efficient use of required bank capital: Increased risk sensitivity and improvements in risk measurement will allow prudential objectives to be achieved more efficiently. If capital rules can better align capital with risk across the system, a given level of capital will be able to support a higher level of banking activity while maintaining the same degree of confidence regarding the safety and soundness of the banking system. Social welfare is enhanced by either the stronger condition of the banking system or the increased economic activity the additional banking services facilitate.
5. Incorporates and encourages advances in risk measurement and risk management: The rule seeks to improve upon existing capital regulations by incorporating advances in risk measurement and risk management made over the past 15 years. An objective of the rule is to speed adoption of new risk management techniques and to promote the further development of risk measurement and management through the regulatory process.
6. Recognizes new developments and accommodates continuing innovation in financial products by focusing on risk: The rule also has the benefit of facilitating recognition of new developments in financial products by focusing on the fundamentals behind risk rather than on static product categories.
7. Better aligns capital and operational risk and encourages banking organizations to mitigate operational risk: Introducing an explicit capital calculation for operational risk eliminates the implicit and imprecise “buffer” that covers operational risk under

current capital rules. Introducing an explicit capital requirement for operational risk improves assessments of the protection capital provides, particularly at organizations where operational risk dominates other risks. The explicit treatment also increases the transparency of operational risk, which could encourage banking organizations to take further steps to mitigate operational risk.

8. Enhanced supervisory feedback: Although U.S. banking organizations have long been subject to close supervision, aspects of all three pillars of the rule aim to enhance supervisory feedback from federal banking agencies to managers of banks and thrifts. Enhanced feedback could further strengthen the safety and soundness of the banking system.
9. Enhanced disclosure promotes market discipline: The rule seeks to aid market discipline through the regulatory framework by requiring specific disclosures relating to risk measurement and risk management. Market discipline could complement regulatory supervision to bolster safety and soundness.
10. Preserves the benefits of international consistency and coordination achieved with the 1988 Basel Accord: An important objective of the 1988 Accord was competitive consistency of capital requirements for banking organizations competing in global markets. Basel II continues to pursue this objective. Because achieving this objective depends on the consistency of implementation in the United States and abroad, the Basel Committee has established an Accord Implementation Group to promote consistency in the implementation of Basel II.
11. Ability to opt in offers long-term flexibility to nonmandatory banking organizations: The U.S. implementation of Basel II allows banking organizations outside of the mandatory group to individually judge when the benefits they expect to realize from adopting the advanced approaches outweigh their costs. Even though the cost and complexity of adopting the advanced methods may present nonmandatory organizations with a substantial hurdle to opting in at present, the potential long-term benefits of allowing nonmandatory organizations to partake in the benefits described above may be similarly substantial.

## **Costs of the Rule**

Because banking organizations are constantly developing programs and systems to improve how they measure and manage risk, it is difficult to distinguish between expenditures explicitly caused by adoption of the rule and costs that would have occurred irrespective of any new regulation. In an effort to identify how much banking organizations expect to spend to comply with the U.S. implementation of Basel II: Advanced Approach, the federal banking agencies included several questions related to compliance costs in the fourth Quantitative Impact Study (QIS-4).<sup>3</sup>

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<sup>3</sup> For more information on QIS-4, see Office of the Comptroller of the Currency, Board of Governors of the Federal Reserve System, Federal Deposit Insurance Corporation, and Office of Thrift Supervision, "Summary Findings of



1. Overall Costs: According to the 19 out of 26 QIS-4 questionnaire respondents that provided estimates of their implementation costs, organizations will spend roughly \$42 million on average to adapt to capital requirements implementing Basel II's Advanced Approach. Not all of these respondents are likely mandatory organizations. Counting just the likely mandatory organizations, the average is approximately \$46 million, so there is little difference between organizations that meet a mandatory threshold and those that do not. Aggregating estimated expenditures from all 19 respondents indicates that these organizations will spend a total of \$791 million over several years to implement the rule. Estimated costs for nine respondents meeting one of the mandatory thresholds come to \$412 million.
2. Estimate of costs specific to the rule: Ten QIS-4 respondents provided estimates of the portion of costs they would have incurred even if current capital rules remain in effect. Those ten indicated that they would have spent 45 percent on average, or roughly half of their Basel II expenditures on improving risk management anyway. This suggests that of the \$42 million organizations expect to spend on implementation, approximately \$21 million may represent expenditures each institution would have undertaken even without Basel II. Thus, pure implementation costs may be closer to roughly \$395 million for the 19 QIS-4 respondents.
3. Ongoing costs: Seven QIS-4 respondents were able to estimate what their recurring costs might be under the U.S implementation of Basel II. On average, the seven organizations estimate that annual recurring expenses attributable to the revised capital framework will be \$2.4 million per institution. Organizations indicated that the ongoing costs to maintain related technology reflect costs for increased personnel and system maintenance. The larger one-time expenditures primarily involve money for system development and software purchases.
4. Implicit costs: In addition to explicit setup and recurring costs, banking organizations may also face implicit costs arising from the time and inconvenience of having to adapt to new capital regulations. At a minimum this involves the increased time and attention required of senior bank and thrift management to introduce new programs and procedures and the need to closely monitor the new activities during the inevitable rough patches when the rule first takes effect.
5. Government Administrative Costs: OCC expenditures fall into three broad categories: training, guidance, and supervision. Training includes expenses for Advanced Measurement Approaches (AMA) workshops, Internal Ratings Based (IRB) workshops, and other training courses and seminars for examiners. Guidance expenses reflect expenditures on the development of IRB and AMA guidance. Supervision expenses reflect organization-specific supervisory activities related to the development and implementation of the Basel II framework. The largest OCC expenditures have been on the development of IRB and AMA policy guidance. The \$5.4 million spent on guidance represents 54 percent of the estimated total OCC

Advanced Approach-related expenditure of \$10.0 million through the 2006 fiscal year. In part, this large share reflects the absence of data for training and supervision costs for several years, but it also is indicative of the large guidance expenses in 2002 and 2003 when the Basel II framework was in development. To date, Basel II expenditures have not been a large part of overall OCC expenditures. The \$3 million spent on Basel II in fiscal year 2006 represents less than one percent of the OCC's \$579 million budget for the year.

6. Total Cost: The OCC's estimate of the total cost of the rule includes expenditures by banking organizations and the OCC from the present through 2011, the final year of the transition period. Combining expenditures by mandatory banking organizations and the OCC provides a present value estimate of \$498.9 million for the total cost of the rule.
7. Procyclicality: Procyclicality refers to the possibility that banking organizations may reduce lending during economic downturns and increase lending during economic expansions as a consequence of minimum capital requirements. There is some concern that the risk-sensitivity of the Advanced IRB approach may cause capital requirements for credit risk to increase during an economic downturn. Although procyclicality may be inherent in banking to some extent, elements of the advanced approaches could reduce inherent procyclicality. Risk management and information systems may provide bank managers with more forward-looking information about risk that will allow them to adjust portfolios gradually and with more foresight as the economic outlook changes over the business cycle. Regulatory stress-testing requirements included in the rule also will help ensure that institutions anticipate cyclicity in capital requirements to the greatest extent possible, reducing the potential economic impact of changes in capital requirements.

#### IV. COMPETITION AMONG PROVIDERS OF FINANCIAL SERVICES

One potential concern with any regulatory change is the possibility that it might create a competitive advantage for some organizations relative to others, a possibility that certainly applies to a change with the scope of this rule. However, measurement difficulties described in the preceding discussion of costs and benefits also extend to any consideration of the impact on competition. Despite the inherent difficulty of drawing definitive conclusions, this section considers various ways in which competitive effects might be manifest, as well as available evidence related to those potential effects.

1. Explicit Capital for Operational Risk: Some have noted that the explicit computation of required capital for operational risk could lead to an increase in total minimum regulatory capital for U.S. "processing" banks, generally defined as banking organizations that tend to engage in a variety of activities related to securities clearing, asset management, and custodial services. Some have suggested that the increase in required capital could place such firms at a competitive disadvantage relative to competitors that do not face a similar capital requirement.

A careful analysis by Fontnouvelle *et al*<sup>4</sup> considers the potential competitive impact of the explicit capital requirement for operational risk. Overall, the study concludes that competitive effects from an explicit operational risk capital requirement should be, at most, extremely modest.

2. Residential Mortgage Lending: The issue of competitive effects has received substantial attention with respect to the residential mortgage market. The focus on the residential mortgage market stems from the size and importance of the market in the U.S. and the fact that the rule may lead to substantial reductions in credit-risk capital for residential mortgages. To the extent that corresponding operational-risk capital requirements do not offset these credit-risk-related reductions, overall capital requirements for residential mortgages could decline under the rule. Studies by Calem and Follain<sup>5</sup> and Hancock, Lennert, Passmore, and Sherlund<sup>6</sup> suggest that banking organizations operating under rules based on Basel II's Advance Approach may increase their holdings of residential mortgages. Calem and Follain argue that the increase would be significant and come at the expense of general organizations. Hancock *et al* foresee a more modest increase in residential mortgage holdings at institutions operating under the new rules, and they see this increase primarily as a shift away from the large government sponsored mortgage enterprises.
3. Small Business Lending: One potential avenue for competitive effects is small-business lending. Smaller banks – those that are less likely to adopt the advanced approaches to regulatory capital under the rule – tend to rely more heavily on smaller loans within their commercial loan portfolios. To the extent that the rule reduces required capital for such loans, general banking organizations not operating under the rule might be placed at a competitive disadvantage. A study by Berger<sup>7</sup> finds some potential for a relatively small competitive effect on smaller banks in small business lending. However, Berger concludes that the small business market for large banks is very different from the small business market for smaller banks. For instance, a “small business” at a larger banking organization is usually much larger than small businesses at community banking organizations.
4. Mergers and Acquisitions: Another concern related to potential changes in competitive conditions under the rule is that bifurcation of capital standards might change the landscape with regard to mergers and acquisitions in banking and

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<sup>4</sup> Patrick de Fontnouvelle, Victoria Garrity, Scott Chu, and Eric Rosengren, “The Potential Impact of Explicit Operational Risk Capital Charges on Bank Processing Activities,” manuscript, Federal Reserve Bank of Boston, January 12, 2005. Available at [www.federalreserve.gov/generalinfo/basel2/whitepapers.htm](http://www.federalreserve.gov/generalinfo/basel2/whitepapers.htm).

<sup>5</sup> Paul S. Calem and James R. Follain, “Regulatory Capital Arbitrage and the Potential Competitive Impact of Basel II in the Market for Residential Mortgages”, *The Journal of Real Estate Finance and Economics*, Vol. 35, pp. 197-219, August 2007.

<sup>6</sup> Diana Hancock, Andreas Lennert, Wayne Passmore, and Shane M. Sherlund, “An Analysis of the Potential Competitive Impact of Basel II Capital Standards on U.S. Mortgage Rates and Mortgage Securitization”, manuscript, Federal Reserve Board, April 2005. Available at [www.federalreserve.gov/generalinfo/basel2/whitepapers.htm](http://www.federalreserve.gov/generalinfo/basel2/whitepapers.htm).

<sup>7</sup> Allen N. Berger, “Potential Competitive Effects of Basel II on Banks in SME Credit Markets in the United States,” *Journal of Financial Services Research*, 29:1, pp. 5-36, 2006. Also available at [www.federalreserve.gov/generalinfo/basel2/whitepapers.htm](http://www.federalreserve.gov/generalinfo/basel2/whitepapers.htm).

financial services. For example, institutions operating under the new capital requirements might be placed in a better position to acquire institutions operating under the old rules, possibly leading to an undesirable consolidation of the banking sector. Research by Hannan and Pilloff<sup>8</sup> suggests that the rule is unlikely to have a significant impact on merger and acquisition activity in banking.

5. Credit Card Competition: The U.S. implementation of Basel II might also affect competition in the credit card market. Overall capital requirements for credit card loans could increase under the rule. This raises the possibility of a change in the competitive environment among banking organizations subject to the new rules, nonbank credit card issuers, and banking organizations not subject to the new capital rules. A study by Lang, Mester, and Vermilyea<sup>9</sup> finds that implementation of a rule based on Basel II will not affect credit card competition at most community and regional banking organizations. The authors also suggest that higher capital requirements for credit cards may only pose a modest disadvantage to institutions that are subject to rules based on Basel II's Advanced Approach.

Overall, the evidence regarding the impact of the rule on competitive equity is mixed. The body of recent economic research discussed in the body of this report does not reveal persuasive evidence of any sizeable competitive effects. Nonetheless, the U.S. banking agencies recognize the need to closely monitor the competitive landscape subsequent to any regulatory change. In particular, the OCC and other federal banking agencies will be alert for early signs of competitive inequities that might result from this rule. A multi-year transition period before full implementation of rules based on the Advance Approach of Basel II should provide ample opportunity for the banking agencies to identify any emerging problems. In particular, after the end of the second transition year, the agencies will publish a study that evaluates the new framework to determine if there are any material deficiencies.<sup>10</sup> The banking agencies will consider any egregious competitive effects associated with the framework, whether domestic or international in context, to be a material deficiency. To the extent that undesirable competitive inequities emerge, the agencies have the power to respond to them through many channels, including but not limited to suitable changes to the capital adequacy regulations.

## V. ANALYSIS OF BASELINE AND ALTERNATIVES

In order to place the costs and benefits of the rule in context, Executive Order 12866 requires a comparison between the rule, a baseline of what the world would look like without the rule, and several reasonable alternatives to the rule. In this regulatory impact analysis, we analyze a baseline and three alternatives to the rule. The baseline analyzes the situation where

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<sup>8</sup> Timothy H. Hannan and Steven J. Pilloff, "Will the Proposed Application of Basel II in the United States Encourage Increased Bank Merger Activity? Evidence from Past Merger Activity," Federal Reserve Board Finance and Economics Discussion Series, 2004-13. Available at [www.federalreserve.gov/generalinfo/basel2/whitepapers.htm](http://www.federalreserve.gov/generalinfo/basel2/whitepapers.htm).

<sup>9</sup> William W. Lang, Loretta J. Mester, and Todd A. Vermilyea, "Potential Competitive Effects on U.S. Bank Credit Card Lending from the Proposed Bifurcated Application of Basel II," manuscript, Federal Reserve Bank of Philadelphia, December 2005. Available at [www.federalreserve.gov/generalinfo/basel2/whitepapers.htm](http://www.federalreserve.gov/generalinfo/basel2/whitepapers.htm).

<sup>10</sup> The full text of the Regulatory Impact Analysis describes the factors that the interagency study will consider.

the United States does not adopt the rule, but other countries with internationally active banking organizations do adopt Basel II.<sup>11</sup>

1. Baseline Scenario: Current capital standards based on the 1988 Basel Accord continue to apply in the United States, but the rest of the world adopts the Basel II framework: Abandoning the Basel II framework in favor of current capital rules would eliminate essentially all of the benefits of the rule described earlier. In place of these lost or diminished benefits, the only advantage of continuing to apply current capital rules to all banks is that maintaining the *status quo* should alleviate concerns regarding competition among financial service providers. Although the effect of the rule on competition is uncertain in our estimation, staying with current capital rules (or universally applying a revised rule that might emerge from the Standardized Option) eliminates bifurcation. Concerns regarding competition usually center on this characteristic of the rule. However, the emergence of different capital rules across national borders would at least partially offset this advantage. Thus, while concerns regarding competition among U.S. financial service providers might diminish in this scenario, concerns regarding cross-border competition would likely increase. While continuing to use current capital rules eliminates most of the benefits of adopting the capital rule, it does not eliminate many costs associated with Basel II. Because Basel II costs are difficult to separate from the organization's ordinary development costs and ordinary supervisory costs at the banking agencies, not implementing Basel II would reduce but not eliminate many of these costs associated with the rule.<sup>12</sup> Furthermore, because the United States would be operating under a set of capital rules different from the rest of the world, U.S. banking organizations that are internationally active may face higher costs because they will have to track and comply with more than one set of capital requirements.
2. Alternative A: Permit U.S. banking organizations to choose among all three Basel II credit risk approaches: The principal benefit of Alternative A that the rule does not achieve is the increased flexibility of the regulation for organizations that would be mandatory organizations under the rule. Organizations that are not prepared for the adoption of the advanced approach to credit risk under the rule could choose to use the Foundation IRB methodology or even the Standardized Approach. How Alternative A might affect benefits depends entirely on how many organizations select each of the three available options. The most significant drawback to Alternative A is the increased cost of applying a new set of capital rules to all U.S. banking organizations. The vast majority of banking organizations in the United States would incur no direct costs from new capital rules. Under Alternative A, direct costs would increase for every U.S. banking organization that would have continued with current capital rules. Although it is not clear how high these costs might be, general organizations would face higher costs because they would be changing capital rules regardless of which option they choose under Alternative A.

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<sup>11</sup> In addition to the United States, members of the Basel Committee on Banking Supervision implementing Basel II are Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, and the United Kingdom.

<sup>12</sup> Cost estimates for adopting a rule that might result from the Standardized Option are not currently available.

3. Alternative B: Permit U.S. banking organizations to choose among all three Basel II operational risk approaches: The operational risk approach that organizations ultimately selected would determine how the overall benefits of the new capital regulations would change under Alternative B. Just as Alternative A increases the flexibility of credit risk rules for mandatory organizations, Alternative B is more flexible with respect to operational risk. Because the Standardized Approach tries to be more sensitive to variations in operational risk than the Basic Indicator Approach and AMA is more sensitive than the Standardized Approach, the effect of implementing Alternative B depends on how many organizations select the more risk sensitive approaches. As was the case with Alternative A, the most significant drawback to Alternative B is the increased cost of applying a new set of capital rules to all U.S. banking organizations. Under Alternative B, direct costs would increase for every U.S. banking organization that would have continued with current capital rules. It is not clear how much it might cost organizations to adopt these capital measures for operational risk, but general organizations would face higher costs because they would be changing capital rules regardless of which option they choose under Alternative B.
4. Alternative C: Use a different asset amount to determine a mandatory organization: The number of mandatory organizations decreases slowly as the size thresholds increase, and the number of organizations grows more quickly as the thresholds decrease. Under Alternative C, the framework of the rule would remain the same and only the number of mandatory organizations would change. Because the structure of the implementation would remain intact, Alternative C would capture all of the benefits of the rule. However, because these benefits derive from applying the rule to individual banking organizations, changing the number of organizations affected by the rule will change the cumulative level of the benefits achieved. Generally, the benefits associated with the rule will rise and fall with the number of mandatory organizations. Because Alternative C would change the number of mandatory organizations subject to the rule, aggregate costs will also rise or fall with the number of mandatory organizations.

### **Overall Comparison of the Rule with Baselines and Alternatives**

The Basel II framework and its U.S. implementation seek to incorporate risk measurement and risk management advances into capital requirements. Risk-sensitive capital requirements are integral to ensuring an adequate capital cushion to absorb financial losses at large complex financial institutions. In implementing the Basel II Advanced Approaches in the United States, the agencies' intent is to achieve risk-sensitivity while maintaining a regulatory capital regime that is as rigorous as the current system. Total capital requirements under the advanced approaches, including capital for operational risk, will better allocate capital in the system. This will occur regardless of whether the minimum required capital at a particular institution is greater or less than it would be under current capital rules. In order to ensure that we achieve our goal of increased risk-sensitivity without loss of rigor, the regulation provides a means for the agencies to identify and address deficiencies in the capital requirements that may become apparent during the transition period.

Although the anticipated benefits of the regulation are difficult to quantify in dollar terms because of measurement problems, the OCC is confident that the anticipated benefits will exceed the anticipated costs of this regulation. On the basis of our analysis, we believe that the benefits of the rule are significant, durable, and hold the potential to increase with time. The offsetting costs of implementing the rule are also significant, but appear to be largely because of considerable start-up costs. However, much of the apparent start-up costs reflect activities that the organizations would undertake as part of their ongoing efforts to improve the quality of their internal risk measurement and management, even in the absence of Basel II and this rule. The advanced approaches seem to have fairly modest ongoing expenses. Against these costs, the significant benefits of Basel II suggest that the rule offers an improvement over the baseline scenario.

With regard to the three alternative approaches we consider, the rule offers an important degree of flexibility while significantly restricting costs by limiting its application to large, complex, internationally active banking organizations. Alternatives A and B introduce more flexibility from the perspective of the large mandatory organizations, but each is less flexible with respect to other organizations. Either Alternative A or B would compel these organizations to select a new set of capital rules and require them to undertake the time and expense of adjusting to these new rules. Alternative C would change the number of mandatory organizations. If the number of mandatory organizations increases, then the new rule would lose some of the flexibility it achieves with the opt-in option. Furthermore, costs would increase as the new rule would compel more organizations to incur the expense of adopting the advanced approaches. Decreasing the number of mandatory organizations would decrease the aggregate social good of each benefit achieved with the rule. The rule offers a better balance between costs and benefits than any of the three alternatives.

End of Executive Summary

## REGULATORY IMPACT ANALYSIS

### I. THE NEED FOR THE REGULATORY ACTION

#### A. Statutory Authority for Capital Regulation

Federal banking law<sup>13</sup> directs federal banking agencies including the Office of the Comptroller of the Currency (OCC) to require banking organizations to hold adequate capital. The law authorizes federal banking agencies to set minimum capital levels to ensure that banking organizations maintain adequate capital. The law also gives banking agencies broad discretion with respect to capital regulation by authorizing them to also use any other methods that they deem appropriate to ensure capital adequacy. Congress has directed the federal banking agencies to apply consistent accounting standards in determining regulatory capital. Specifically, 12 USC 1831n(b), which is titled "Uniform accounting of capital standards", states that "each appropriate federal banking agency shall maintain uniform accounting standards to be used for determining compliance with statutory or regulatory requirements of depository institutions." Further, 12 USC 1831n(c) mandates that the agencies report annually to Congress on any capital differences with explanations of the reasons for any discrepancies.

As the primary supervisor of national banks, the OCC oversees the capital adequacy of national banks and federal branches of foreign banking organizations. If banks under the OCC's supervision fail to maintain adequate capital, federal law authorizes the OCC to take enforcement action up to and including placing the bank in receivership, conservatorship, or requiring its sale, merger, or liquidation.

#### B. Capital Regulation Seeks to Address Market Failures

Capital regulation seeks to address market failures that stem from the unique structure and role of banks in the financial system. These market failures tend to create incentives for managers of banking organizations to hold less capital than is optimal from a broader societal perspective. Managers, in responding rationally to those distorted incentives, may try to hold capital that may not adequately account for the institution's exposure to risk. This in turn can lead banking organizations to hold a level of capital that differs from a socially optimal level.<sup>14</sup> The market failures creating these perverse incentives stem from several sources.

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<sup>13</sup> 12 U.S.C. Section 3907: Capital adequacy

(a)(1) Each appropriate Federal banking agency shall cause banking institutions to achieve and maintain adequate capital by establishing minimum levels of capital for such banking institutions and by using such other methods as the appropriate Federal banking agency deems appropriate.

(2) Each appropriate Federal banking agency shall have the authority to establish such minimum level of capital for a banking institution as the appropriate Federal banking agency, in its discretion, deems to be necessary or appropriate in light of the particular circumstances of the banking institution.

(b)(1) Failure of a banking institution to maintain capital at or above its minimum level as established pursuant to subsection (a) of this section may be deemed by the appropriate Federal banking agency, in its discretion, to constitute an unsafe and unsound practice within the meaning of section 1818 of this title.

<sup>14</sup> Several factors will determine a banking organization's ultimate level of capital. In determining capital levels, banking institutions must begin with the regulatory minimum. Because of Prompt Corrective Action, falling below the regulatory minimum has serious consequences. Beyond the regulatory minimum, institution management will



Banking faces a market failure attributable to asymmetric information. This arises because of the difference between the information a banking organization has about the risk of its asset portfolio and the information available to outside monitors of the institution, such as depositors and creditors. If outside monitors and inside managers shared the same information about the true amount of risk an institution had assumed, then through financial markets the outsider would be able to compel the organization to hold capital at a level commensurate with its level of risk. This information asymmetry operates to some extent in virtually all firms. However, it is particularly a problem in banking because of the opaque nature of most lending relationships; although borrowers are willing to share information about their finances with their lenders to gain financing, they typically will not share such private information with others. Furthermore, even if borrowers were willing to share this information with outsiders, the cost to outsiders of gathering and evaluating this information for each of an institution's borrowers would be prohibitive. Because outside monitors lack complete information about the risk of the banking organization's portfolio, they may not induce the organization to hold adequate amounts of capital. If outside monitors underestimate the amount of risk, they will demand too little capital from the institution. If they overestimate the risk, they will demand excessive amounts of capital.

Moral hazard problems related to deposit insurance could exacerbate the market failure created by asymmetric information. In banking, moral hazard refers to the incentive financial institutions have to accept greater risks in pursuit of higher returns when they do not bear the full cost of losses associated with risky ventures. Because the Federal Deposit Insurance Corporation (FDIC) insures deposits, the FDIC, rather than depositors, bears some of the cost of taking those risks. Thus, even if banking markets were not subject to asymmetric information problems, depositors would expend less effort to monitor capital levels and to constrain risk-taking than they would in the absence of deposit insurance. Deposit insurance may also reduce bankers' concerns about jeopardizing depositors' funds, if they recognize that insurance protects the depositor. Troubled institutions may be particularly willing to take greater risks in an effort to recover by pursuing opportunities along the risk-return frontier that promise higher returns but at much greater risk. Moral hazard problems such as these likely contributed to the savings and loan crisis in the 1980s.<sup>15</sup>

These individual market failures might be of less concern if not for the presence of externalities in banking. The failure of an individual banking organization can have external effects on depositors, borrowers, and the local economy. Weakness at one institution may affect how the market perceives the health of other banking organizations and lead to pressures on those institutions. Furthermore, a loss in confidence in the banking system can impose considerable costs on the macroeconomy. Adequate capital, therefore, conveys important benefits that extend beyond an individual banking organization and affect the ability of the

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typically add capital to provide an appropriate buffer to the regulatory minimum. A banking organization will also seek a capital level that is consistent with achieving the institution's target credit rating from credit rating agencies. For further discussion of the drivers of capital levels, see Chris Matten, *Managing Bank Capital*, Second Edition, New York: John Wiley & Sons, 2000, p. 26.

<sup>15</sup> For one discussion of moral hazard and the savings and loan crisis, see Elijah Brewer III and Thomas H. Mondschean, "Ex ante Risk and Ex Post Collapse of S&Ls in the 1980s", *Economic Perspectives*, Federal Reserve Bank of Chicago, July/August 1992, pp. 2 – 12.

banking system as a whole to absorb unexpected losses. Whereas each institution's capital protects it from losses, the ability of each individual institution to absorb losses strengthens the collective ability of the banking system to absorb losses like combining individual wires to form a stronger cable. A banking organization does not receive compensation for its contribution to the overall strength of the banking system. Because banking organizations do not receive compensation for the external benefit of their capital, they are likely to hold less than a socially optimal level of capital in the absence of capital requirements.

To sum up, asymmetric information about the risk in a bank's portfolio creates a market failure by hindering the ability of creditors and outside monitors to discern a bank's actual risk and capital adequacy. Moral hazard creates market failure in which a bank's creditors fail to restrain the bank from taking excessive risks because deposit insurance either fully or partially protects them from losses. These market failures engender concerns that public policy seeks to address because of externalities inherent in the banking system. Individual banks' decisions regarding their own capital levels fail to adequately consider the positive externality that adequate capital brings to the banking system. Ensuring adequate capital through regulation seeks to address these market failures and produce the positive externality that adequate capital brings to financial markets and the economy as a whole.

Capital regulations that address the market failures described above cannot be static. Innovation in and transformation of financial markets require periodic reassessments of what may count as capital and what amount of capital is adequate. For example, after financial market turbulence in the 1980s, the implementation of new capital standards based on the 1988 Basel Accord introduced significant changes to the definition of what constitutes both capital and capital adequacy and strove to standardize capital requirements across international boundaries. Continuing changes in financial markets, including new types of financial instruments and transactions, a growing emphasis on business lines with higher risk relative to their balance-sheet impact, and advances in the areas of risk management and risk measurement have all combined to create both a need and an opportunity to refine capital standards in banking. The Basel II framework, and its implementation in the United States, reflects an appropriate step forward in addressing these changes.

## **II. REGULATORY BACKGROUND**

### **A. The regulated community**

The capital regulation examined in this analysis applies to commercial banks and thrifts. Three banking agencies, the OCC, the Board of Governors of the Federal Reserve System (Board), and the FDIC regulate commercial banks, while the Office of Thrift Supervision (OTS) regulates all federally chartered and many state-chartered thrifts. The OCC is the primary supervisor of national banks. The Board supervises state-chartered banks that are members of the Federal Reserve System, and the FDIC supervises state-chartered banks that are not members of the Federal Reserve System. Throughout this document, the four regulators are jointly referred to as the federal banking agencies.<sup>16</sup>

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<sup>16</sup> The term bank will refer to any commercial bank or thrift regulated by one of the federal banking agencies.

As of December 31, 2006, there were 7,402 commercial banks with \$10.1 trillion in assets and 844 OTS-supervised thrifts with \$1.5 trillion in assets. Among commercial banks, national banks comprised 1,715 of the total with \$6.8 trillion in assets. Thus, national banks account for 23 percent of the total number of commercial banks and 68 percent of commercial bank assets.

## **B. Capital adequacy regulation before 1988**

The assessment of capital adequacy has been a cornerstone of bank and thrift regulation since the earliest days of the national banking system. In 1864, the National Banking Act set capital requirements for each national bank based on the population of its service area. Around the start of the 20th Century, supervisors began focusing on capital-to-deposit ratios. In succeeding years, as the demand for loans outstripped the supply of deposits and banking organizations turned to other sources of funding, capital-to-assets ratios gradually supplanted capital-to-deposits ratios as the preferred measure of capital adequacy. By the 1950s, supervisors had begun to study ways of adjusting assets for risk in order to compute capital-to-risk-weighted-assets ratios, but these early efforts did not gain wide acceptance.

Throughout this period, supervisors employed a subjective, case-by-case approach to assessing capital adequacy. Regulators felt that reducing capital adequacy to a formula would preclude the supervisory judgments needed to evaluate the many factors influencing an institution's ability to sustain losses. This view changed in the 1970s and early 1980s when a decline in average capital ratios and a series of high-profile bank and thrift failures convinced supervisors of the need to set a regulatory floor on capital.

In 1981, the federal banking agencies introduced the first explicit minimum capital ratio: a “leverage ratio” of primary capital (consisting mainly of equity and loan loss reserves) to total assets. Initially there were some differences in the thresholds set by the different agencies, but by 1985 they had agreed on a uniform minimum leverage ratio of 5.5 percent for all banking organizations. The banking agencies considered it “unsafe and unsound” for institutions to operate with leverage ratios below 3 percent and subjected such institutions to enforcement action. Legislation strengthened the link between capital ratios and supervisory intervention in the aftermath of the thrift crisis of the late 1980s.

During the 1980s, regulators in the United States and other industrialized countries became concerned that simple capital-to-assets ratios required too much capital for safe assets such as Treasury securities and not enough for riskier assets. Another concern was that the rules did not require any capital for banking organizations’ rapidly growing portfolios of off-balance-sheet exposures. These concerns led to the development of the risk-based capital framework that the Basel Committee on Banking Supervision<sup>17</sup> adopted in 1988 and implemented at the end of 1992 (the 1988 Accord). This 1988 Accord serves as the basis for current U.S. capital regulations. The 1988 Accord required that internationally active banking organizations adopt

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<sup>17</sup> The Basel Committee on Banking Supervision includes representatives from the central banks and other authorities with bank supervisory responsibilities in the G-10 countries. Current member countries are Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

the new capital rules, but some countries, including the United States, chose to apply the 1988 Basel framework to all banks and thrifts.

### C. The 1988 Accord

Drafters of the 1988 Accord designed capital rules to create a level playing field for institutions in different countries and to strengthen the soundness and stability of the international banking system. The 1988 Accord sought to level the playing field in international banking by enhancing international consistency and to strengthen the international banking system by more closely aligning required capital with risk. The 1988 Accord consists of three basic elements: a target minimum capital ratio of 8 percent; a definition of the capital instruments to comprise the numerator of the capital-to-risk-weighted-assets ratio; and a system of risk weights for calculating the denominator of the ratio.

As implemented in the United States, the risk-weighting criteria of the 1988 Accord divide credit exposures into four basic categories and assign a fixed risk weight to each category. The four categories and their respective risk weights are (1) cash and sovereign exposures with a risk weight of 0 percent, (2) interbank and certain other relatively low-risk exposures with a risk weight of 20 percent, (3) residential mortgages with a risk weight of 50 percent, and (4) all other exposures (including unsecured corporate exposures), which carry a 100 percent risk weight. A risk weight of 100 percent means that the calculation of risk-weighted assets includes the exposure at its full value, which translates to a capital requirement equal to 8 percent of the amount of the exposure. Off-balance-sheet exposures convert into “credit-equivalent amounts” by applying specified “credit conversion factors” to their notional amounts and then risk-weighting them in the same way as on-balance-sheet exposures.

The 1988 Accord also specifies what instruments may count toward the capital requirement. The Accord requires that equity capital (common and non-cumulative preferred shares) and disclosed reserves cover at least half of the target ratio. Qualifying hybrid capital instruments, subordinated debt, and general, undisclosed, and revaluation reserves may cover the remainder subject to various limitations.

The acknowledged central focus of the original 1988 Accord was credit risk. Minimum required capital did not depend directly on the other types of risk that banks and thrifts must manage, such as interest-rate risk, liquidity risk, or operational risk, although the level of required capital provided *de facto* coverage for such risks. Amendments to the Accord in 1996 added explicit capital charges for interest-rate related instruments and equities in the trading book and for foreign exchange risk and commodity risk throughout the institution.

The 1988 Accord had several beneficial effects. At a time when supervisors viewed capital ratios as too low, it had a positive effect on capital levels: during the 1988-1992 transition period, the capital ratios of nearly all internationally active banking organizations increased substantially. The 1988 Accord also fostered greater competitive equity among internationally active banking organizations and introduced an era of improved information sharing and coordination among national supervisors. It also reduced incentives for institutions to avoid liquid, low-risk assets such as Treasury securities, which had capital requirements far in excess of their actual credit risk under the preceding regime of uniform leverage requirements. Perhaps

most importantly, it created a mechanism by which bank capital requirements could reflect, at least to some extent, differences in risk across institutions and over time.

With the passage of time, however, it became clear that the 1988 Accord was not providing a sufficiently accurate measure of capital adequacy. It introduced only a small degree of risk-sensitivity into risk weightings, ignoring an important dimension of risk: the difference between more and less creditworthy counterparties within a given asset class. It did not provide adequate recognition of risk mitigation techniques, probably discouraging institutions from using such techniques and so detracting from the safety and soundness of the banking system. The rigidity of the risk-weighting framework tended to encourage transactions whose sole benefit was regulatory capital relief. Finally, the 1988 Accord could not anticipate financial innovations such as securitization, which shifts most of the notional amount of a credit exposure off the balance sheet while retaining most of the credit risk. In all of these areas, internal systems for measuring risk at many banking organizations have outstripped the 1988 Accord. The Basel II framework aims to maintain and extend the benefits of the 1988 Accord while addressing these signs of age.

#### **D. The Basel II Framework**

The Basel II framework comprises three mutually reinforcing “pillars” as summarized below.<sup>18</sup>

##### **1. Minimum capital requirements (Pillar 1)**

The first pillar establishes a method for calculating minimum regulatory capital. It sets new requirements for credit risk and operational risk while retaining the approach to market risk as developed in the 1996 amendments to the 1988 Accord.

The new capital requirements for credit risk are more risk-sensitive than the 1988 Accord. In effect, risk weights are a function of the credit rating assigned to each borrower. The Basel II framework offers banks a choice of three methodologies for determining these risk weights. The first approach, called the Standardized Approach, essentially refines the risk-weighting framework of the 1988 Accord. The other two are variations on an internal ratings-based (IRB) approach that leverages banks’ own internal credit-rating systems: a “foundation” methodology in which organizations estimate the probability of borrower or obligor default, and an “advanced” approach in which organizations also supply other inputs needed for the capital calculation. In addition, the new framework uses more risk-sensitive methods for dealing with collateral, guarantees, credit derivatives, securitizations, and receivables.

The Basel II framework also introduces an explicit capital requirement for operational risk.<sup>19</sup> Although capital under the 1988 Accord implicitly covered non-credit-related risks such as operational risk, its risk weights did not explicitly reflect this aspect of a bank’s risk profile. As with credit risk, the Basel II framework offers banks a choice of three methodologies for calculating their capital charge for operational risk. The first method, called the Basic Indicator

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<sup>18</sup> The reference document for the Basel II framework is “International Convergence of Capital Measurement and Capital Standards: A Revised Framework,” Basel Committee on Banking Supervision, November 2005.

<sup>19</sup> Operational risk is the risk of loss resulting from inadequate or failed processes, people, and systems or from external events. It includes legal risk, but excludes strategic risk and reputation risk.

Approach, requires banks to hold capital for operational risk equal to 15 percent of annual gross income (averaged over the most recent three years). The second option, called the Standardized Approach, uses a formula that divides a bank's activities into eight business lines, calculates the capital charge for each business line as a fixed percentage of gross income (12, 15, or 18 percent depending on the nature of the business, again averaged over the most recent three years), and then sums across business lines. The third option, called the Advanced Measurement Approaches (AMA), uses a bank's internal operational risk measurement system to determine the capital requirement.

Pillar 1 includes an extensive set of qualitative requirements designed to help ensure that the internal measurement and control systems used to determine capital adequacy for credit risk and operational risk are sound. The 1996 market-risk rules reflect similar requirements.

## **2. Supervisory review process (Pillar 2)**

The second pillar calls upon banking organizations to have an internal capital assessment process and for banking supervisors to evaluate each bank's overall risk profile as well as its risk management and internal control processes. This pillar establishes an expectation that organizations hold capital beyond the minimums computed under Pillar 1, including additional capital for any risks that are not adequately captured under Pillar 1. It also encourages organizations to develop better risk management techniques for monitoring and managing their risks. Pillar 2 charges supervisors with the responsibility to ensure that organizations using advanced Pillar 1 techniques, such as the Advanced IRB approach to credit risk and the AMA for operational risk, comply with the minimum standards and disclosure requirements of those methods. Supervisors are to take action promptly if capital is not adequate.

## **3. Market discipline (Pillar 3)**

The third pillar of the Basel II framework sets minimum disclosure requirements for banking organizations. The disclosures, covering the composition and structure of the institution's capital, the nature of its risk exposures, its risk management and internal control processes, and its capital adequacy, are intended to improve transparency and strengthen market discipline. By establishing a common set of disclosure requirements, Pillar 3 tries to provide a consistent and understandable disclosure framework that market participants can use to assess key pieces of information on the risks and capital adequacy of a bank.

## **E. U.S. implementation**

The rule implementing Basel II: Advanced Approach in the United States applies the new framework to the largest and most internationally active banking organizations. In effect, all banking organizations fall into one of three regulatory categories. The first category, called "mandatory" organizations, consists of organizations with total banking assets of at least \$250 billion or total on-balance-sheet foreign exposures of \$10 billion or more. Following the precedent set by the implementation of the 1996 market risk amendments in the United States, mandatory organizations will use the most advanced methods only: the advanced internal ratings-based approach (Advanced IRB) to determine capital for credit risk, and the Advanced

Measurement Approaches (AMA) to determine capital for operational risk.<sup>20</sup> A second category of organizations, called “opt-in” organizations, includes organizations that do not meet the size criteria of a mandatory organization but choose voluntarily to comply with the more advanced requirements specified under the new capital framework. The federal banking agencies expect only a small number of nonmandatory organizations to choose initially to opt in. The third category, called “general” organizations, encompasses all other organizations, which will continue to operate under current risk-based capital rules, subject to possible amendment by the banking agencies.<sup>21</sup>

While introducing many significant changes, the U.S. implementation of Basel II retains many components of the capital rules currently in effect. For example, the implementation of Basel II preserves existing Prompt Corrective Action provisions for all banks.<sup>22</sup> The U.S. implementation of Basel II also keeps intact most elements of the definition of what comprises regulatory capital. An organization’s total risk-based capital ratio is determined as:

$$\text{Total Risk-Based Capital Ratio} = \frac{(\text{Tier 1 Capital} + \text{Tier 2 Capital} + \text{Tier 3 Capital})}{\text{Total Risk-Weighted Assets}}$$

By keeping most of the definitions of Tier 1, Tier 2, and Tier 3 capital intact, Basel II preserves the numerator in the risk-based capital ratio.<sup>23</sup> Thus, the principal changes in Basel II apply to calculating total risk-weighted assets, the denominator of the risk-based capital ratio. Nonetheless, the rule implementing Basel II: Advanced Approach in the United States does introduce substantial changes into the way organizations measure and manage their capital. We discuss the costs and benefits of these changes to capital rules in the following section.

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<sup>20</sup> Similarly, when the federal banking agencies implemented the 1996 Market Risk Amendment, they determined that U.S. banks with significant trading activity should only use the more advanced internal models approach. They did not permit use of the simpler standardized approach to market-risk capital.

<sup>21</sup> If adopted, general banking organizations could use the Standardized Option.

<sup>22</sup> The rule does not include any changes to existing Prompt Corrective Action regulations. Adequately capitalized institutions must maintain an 8 percent total risk-based capital ratio and Tier 1 risk-based and leverage ratios of 4 percent. Well-capitalized institutions must maintain a minimum 10 percent total risk-based capital ratio and Tier 1 risk-based and Tier 1 leverage ratios of 6 percent and 5 percent, respectively. Note that the minimum 5 percent leverage ratio ensures a base level of capital regardless of which risk-based capital approach an institution uses. Tier 1 capital consists of common stockholders’ equity capital, noncumulative perpetual preferred stock, and minority interests in the equity capital accounts of consolidated subsidiaries. Tier 2 capital consists of allowances for loan and lease losses; cumulative perpetual, long-term, intermediate term, and perpetual preferred stock; hybrid capital instruments, term subordinated debt; and net unrealized holding gains on equity securities. Tier 3 capital consists of short-term subordinated debt.

<sup>23</sup> The calculation of regulatory capital may change for many banks adopting advanced approaches because of changes in how loan-loss reserves count toward capital.

### III. BENEFIT-COST ANALYSIS OF THE RULE

This analysis considers the costs and benefits of the rule as fully phased in. Under the revised rule, current capital rules will remain in effect in 2008 during a parallel run using both old and new capital rules. For the following three years, the rule limits the amount by which minimum required capital may decrease.<sup>24</sup> This analysis, however, considers the costs and benefits of the rule as fully phased in.

Cost and benefit analysis of changes in minimum capital requirements entail considerable measurement problems. On the cost side, it can be difficult to attribute particular expenditures because institutions would likely incur some of these costs as part of their ongoing efforts to improve risk measurement and management systems. On the benefits side, measurement problems are even greater because the benefits of Basel II are more qualitative than quantitative. Measurement problems exist even with an apparently measurable effect such as lower minimum capital because lower minimum requirements do not necessarily mean lower capital. Healthy banking organizations generally hold capital well above regulatory minimums for a variety of reasons, and the effect of reducing the regulatory minimum is uncertain and may vary across regulated institutions.

#### A. Organizations Affected by the Rule<sup>25</sup>

The implementation of Basel II in the United States creates a bifurcated system of capital requirements, in which one system based on the Advanced IRB approach and AMA will apply to mandatory and opt-in organizations, while a second system using current capital rules will apply to all general organizations. However, as noted above organizations for which the advanced approaches are not mandatory will have the option of using the advanced approaches if they are able to meet certain minimum standards established by banking supervisors.

##### 1. Mandatory Organizations

The number and identity of mandatory organizations depends to some extent on changes that might occur in the industry prior to the effective date of the rule. However, recent data are indicative of a potential outcome. According to Call Report data as of December 31, 2006, ten organizations meet the size criteria for determining mandatory Basel II: Advanced Approach organizations. Four institutions meet both criteria, two organizations meet just the \$250 billion minimum in total assets criterion and four organizations surpass only the \$10 billion foreign asset threshold.<sup>26</sup> Table 1 shows these 10 “threshold” organizations, their total assets, and their total foreign assets. Together, these 10 organizations have over \$5.6 trillion in total assets and approximately \$1.3 trillion in foreign assets, which account for 47 percent and 96 percent, respectively, of total assets and foreign assets held by all FDIC-insured organizations.

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<sup>24</sup> For the years 2009 through 2011, these capital floors are 95 percent, 90 percent, and 85 percent, respectively, of the risk-weighted assets under the general risk-based capital rules.

<sup>25</sup> Unless otherwise noted, the population of banks and thrifts used in this analysis consists of all FDIC-insured institutions. Banking organizations are aggregated to the top holding company level.

<sup>26</sup> Foreign assets are used as a proxy for foreign exposure.



## 2. General Organizations

General organizations are those that do not meet the size criteria that obligate them to adopt the advanced capital approaches and elect not to adopt these approaches. General organizations will continue to calculate capital requirements according to current capital regulations.<sup>27</sup> Under the rule, required capital levels and the calculation of capital will not change for the vast majority of U.S. banking organizations. Over 7,000 banking organizations accounting for more than half of U.S. banking assets fall into this category. Some smaller organizations may choose to adopt the advanced approaches over time, particularly as the industry gains experience and familiarity with these approaches.

Table 1. Major U.S. Banking Organizations and Mandatory Criteria, as of December 31, 2006 (Bold numbers indicate criterion met.)

<b>Holding Company Name</b>	<b>Total Assets (\$ millions)</b>	<b>Total Foreign Assets (\$ millions)</b>
Bank of America Corporation	<b>\$1,376,139</b>	<b>\$133,229</b>
Bank of New York Company, Inc.	87,848	<b>33,221</b>
Citigroup Inc.	<b>1,121,487</b>	<b>481,908</b>
J. P. Morgan Chase & Co.	<b>1,263,823</b>	<b>534,732</b>
HSBC Holdings	167,990	<b>12,407</b>
Northern Trust Corporation	62,732	<b>18,955</b>
State Street Corporation	96,296	<b>13,644</b>
Wachovia Corporation	<b>682,665</b>	<b>30,229</b>
Washington Mutual Bank	<b>345,611</b>	0
Wells Fargo & Company	<b>429,081</b>	125
Total for 10 “Threshold” Organizations	5,633,671	1,258,450
Total for All U.S. Banking Organizations	11,880,395	1,305,163
“Threshold” Organizations’ Share of Total	47%	96%

<sup>27</sup> As will be described in the Standardized Option proposal, the federal banking agencies are considering changes to existing capital rules that would apply to general organizations.

### 3. Opt-in Organizations

Under the U.S. implementation of Basel II, all general organizations are eligible to adopt the advanced approaches required of mandatory organizations. Like mandatory organizations, opt-in organizations will have to meet infrastructure requirements to comply with supervisory standards for credit risk and operational risk and will have to make specified public disclosures before the banking agencies will allow them to use the advanced approaches. Although a significant benefit of the rule may be that it leaves the door open for any organization to eventually use the advanced capital calculations, obstacles to adopting these techniques at smaller organizations will almost certainly reduce the initial set of feasible opt-in candidates to relatively larger organizations.

It is unknown how many organizations will opt into the new framework. From the perspective of a cost and benefit analysis, the mere existence of opt-in organizations is important because the fact that any organization will voluntarily adopt the advanced approaches implies that internal benefits outweigh internal costs for that organization.<sup>28</sup> While minimum regulatory capital standards will address the market failures described earlier, the opt-in decision is a private business decision based on each institution's particular determination of its costs and benefits.<sup>29</sup> As institutions decide whether to opt in, the sizes of the smallest opt-in organizations may suggest a size range in which internal costs and benefits are similar. Although the critical break-even point for opting into the advanced approaches will certainly vary for each nonmandatory organization, assume for illustrative purposes that organizations in the initial set of feasible opt-in organizations have at least \$30 billion in assets.<sup>30</sup> As of December 31, 2006, there are 34 banking organizations that fall short of the mandatory size thresholds but have at least \$30 billion in assets. The largest has \$222 billion in assets, while the smallest has just over \$30 billion in assets. Together, these 34 banking organizations account for \$2.7 trillion in assets, or 23 percent of total banking assets, and provide the likely pool of opt-in candidates.

Several organizations have publicly indicated their intent to opt in. Press reports based on interviews with bank and thrift officials have mentioned several organizations that were either opting in or considering opting in. Organizations reportedly inclined toward opting in include organizations as large as SunTrust Bank with \$188 billion in assets, and as small as Comerica Incorporated with approximately \$59 billion in assets as of December 31, 2006.<sup>31</sup> Another indication of potential interest comes from the number of participants in the Fourth Quantitative Impact Study (QIS-4) conducted by the federal banking agencies; 26 banking organizations participated in this exercise designed to assess the impact of the implementation of Basel II: Advanced Approach on required capital.<sup>32</sup>

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<sup>28</sup> However, the actions of other banks that adopt the advanced approaches may affect this calculation of private net benefits; that is, one "benefit" may be avoiding an appearance of lagging behind competitors.

<sup>29</sup> Some banking organizations may opt in if their foreign parent company is using the advanced approach overseas.

<sup>30</sup> Note that the \$30 billion cutoff is arbitrary; the minimum asset size of the institutions that ultimately do opt in may be higher or lower.

<sup>31</sup> *American Banker*, "Takers and Tire Kickers: Where 29 of the Largest Banking Companies Stand on Participation in Basel II," July 24, 2004.

<sup>32</sup> For more information on QIS-4, see Office of the Comptroller of the Currency, Board of Governors of the Federal Reserve System, Federal Deposit Insurance Corporation, and Office of Thrift Supervision, "Summary Findings of the Fourth Quantitative Impact Study," February 2006, available online at <http://www.occ.treas.gov/ftp/release/2006-23a.pdf>.

## B. Benefits of the Rule

Each of the three pillars of Basel II, which the rule incorporates, produces benefits. The first pillar improves the risk sensitivity of regulatory capital requirements. Simulated capital requirements provide an example of how the advanced approach to credit risk improves the risk sensitivity of capital requirements. Table 2 shows illustrative risk weights for unexpected losses for residential mortgages using the advanced internal ratings-based capital formula.<sup>33</sup> For any type of credit, risk increases as either the probability of default or the loss given default increases. As shown in table 2, risk weights for residential mortgages increase as the probability of default increases for any given level of loss given default. Similarly, as loss given default increases, risk weights increase for any given probability of default. Thus, under the rule, capital requirements rise and fall with risk. Under current rules, residential mortgages carry a 50 percent risk weight.

Table 2. Illustrative Residential Mortgage Advanced IRB Risk Weights

Probability of Default	Loss Given Default	
	25 percent	45 percent
0.03 percent	2.30%	4.15%
0.05 percent	3.46%	6.23%
0.10 percent	5.94%	10.69%
0.25 percent	11.83%	21.30%
0.50 percent	19.49%	35.08%
1.00 percent	31.33%	56.40%
2.00 percent	48.85%	87.94%
5.00 percent	82.35%	148.22%
10.0 percent	113.56%	204.41%
20.0 percent	140.62%	253.12%

Representative capital requirements for other types of assets would show results similar to those of table 2. While the fixed capital charge from current capital rules may approximate the appropriate capital charge for assets with certain risk characteristics, this same capital charge is likely to be grossly inappropriate for either much riskier assets or much safer assets within each type of asset class.

In addition to the benefits derived from pillar one, the second pillar underscores the importance of banks' internal assessments of capital adequacy and supervisory evaluations of those efforts. The third pillar explicitly incorporates market discipline into the regulatory framework. Taken together, application of these three pillars in the United States should provide important benefits that will enhance capital adequacy and thus improve the safety and soundness of the banking system. The remainder of this section enumerates and discusses these benefits.

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<sup>33</sup> This table reproduces data from Basel Committee on Banking Supervision, "Internal Convergence of Capital Measurement and Capital Standards", June 2004, p. 197.

**1. Better allocation of capital and reduced impact of moral hazard through reduction in the scope for regulatory arbitrage**

Ignoring credit quality differences within a specific asset category can exacerbate the moral hazard problems discussed in the introduction to this analysis. While regulatory capital charges typically serve as a nonbinding minimum charge for healthy organizations, regulatory minimums may become binding as capital declines. In an effort to rebuild capital, an organization has an incentive to seek higher returns by lending at higher rates to firms or individuals with lower credit quality. Current capital rules do not capture the increasing risk of such lending; by shifting assets toward riskier loans in the same risk-weight category, a banking organization is able to try to increase its return by assuming more risk without having to change the amount of capital it holds. Moral hazard could even lead a troubled organization to try to increase its return and lower its required capital by diverting assets toward risky loans in an asset class with a lower risk weight. For instance, an organization could divert funds from commercial loans that carry a 100 percent risk weight to higher-margin residential mortgages with high loan-to-value ratios that carry only a 50 percent risk weight but are in fact riskier than the commercial loans they replace.

The advanced approach to credit risk in the rule will reduce such behavior. Because the credit risk of individual loans or pools of loans determines the capital requirement under the advanced approach to credit risk, efforts to shift toward riskier assets will result in higher regulatory capital requirements. By looking at the capital required for each exposure or pool of exposures, the advanced approach does away with the simplistic risk buckets of current capital rules. Getting rid of categorical risk weighting and assigning capital based on measured risk instead greatly curtails or eliminates the ability of troubled organizations to manipulate regulatory capital requirements in this manner.

Another moral hazard problem associated with misaligning capital charges and risk is the creation of an opportunity for banking organizations to reduce regulatory capital requirements through capital arbitrage. With capital arbitrage, organizations avoid capital charges by selling or securitizing assets that carry a high regulatory charge relative to what the market would demand. At the other end of the risk spectrum, these organizations retain higher risk assets for which the regulatory capital charge may be too low relative to the market for sold or securitized assets. Under the framework, capital requirements based on measures of credit risk that are more comprehensive, rigorous, and precise should eliminate many opportunities for capital arbitrage.

**2. Improved signal quality of capital as an indicator of solvency**

Improving the alignment of capital and risk should improve the quality of capital as an indicator of solvency. Limited risk differentiation means that calculated capital ratios might provide misleading information about the quality of an organization's portfolio; banks with similar capital positions might have very different levels of risk. As a result, current capital ratios are less useful than more discerning measures of risk would be as indicators of risk or strength at larger banks. The advanced approaches of the rule are designed to more accurately align regulatory capital with risk, and the subsequent improved signaling quality of capital will enhance banking supervision and market discipline. Improved signaling of capital quality to

investors could also enhance the efficient flow of investment funds, thus promoting economic growth.

**3. Encourages banking organizations to improve credit risk management**

One of the principal objectives of the rule is to more closely align capital charges in relation to risk. This objective underpins the effort to increase the precision of the measurement of capital requirements for credit risk and the introduction of an explicit capital charge for operational risk. These advanced approaches make required capital more sensitive to risk, for example, by focusing on loan-level determinants of risk such as probability of default and loss given default. Enhancing this link between capital requirements and risk will encourage banking organizations to improve credit risk management.

**4. More efficient use of required bank capital**

Increased risk sensitivity and improvements in risk measurement will allow banking organizations to achieve prudent objectives more efficiently. If the rule can better align capital with risk, then a given level of capital will support a higher level of banking activity while maintaining the same degree of confidence regarding bank safety and soundness. Alternatively, the better alignment of capital and risk could lead to a higher effective level of solvency at the same levels of overall banking activity. Social welfare is enhanced by either the stronger condition of the banking system or the increased economic activity the additional banking services facilitate. The benefit in terms of capital efficiency from more closely aligning regulatory capital charges with risk is likely to be substantial, in view of the volume of assets at large U.S. banks.

**5. Incorporates and encourages advances in risk measurement and risk management**

The rule seeks to improve upon existing capital regulations by incorporating advances in risk measurement and risk management made over the past 15 years. Although the differences between the advanced approaches and current capital rules are substantial, especially with respect to the level of quantitative sophistication, the rule actually builds upon the risk-based approach to risk measurement and management that many large complex organizations already use internally.

The advanced approaches of the rule also encourage further advances in risk measurement and management. Just as experience after implementing the 1988 Accord led banking organizations and their supervisors toward the innovations and methods embodied in the Basel II framework, so too will experience with the advanced approaches be likely to encourage further improvements. An objective of the rule is to speed adoption of new risk management techniques and to promote the further development of risk measurement and management through the regulatory process. For example, banks will be able to incorporate promptly any advances in techniques for estimating risk parameters for the capital formulas as they develop, without changes in the regulatory framework. Overall, the rule is flexible and allows risk measurement and risk management to continue to evolve at the banking organizations and the banking agencies.

6. Recognizes new developments and accommodates continuing innovation in financial products by focusing on risk

In addition to paving the way for innovations in risk measurement and management techniques, the rule also has the benefit of facilitating recognition of new developments in financial products by focusing on the fundamentals behind risk rather than on static product categories. It does not lock regulatory capital into the static bucket approach of current capital rules. As financial markets continue to create innovative financial products, the advanced approaches will allow regulators and financial organizations to appropriately address these innovations within the same framework. Because the advanced approaches focus on fundamental risk measures that are largely independent of static product descriptions, new financial products and activities can fit easily within the overall framework, making that framework more robust to such likely market evolution. Products almost certainly will change over time; the fundamental nature of risk will not.

7. Better aligns capital and operational risk and encourages banking organizations to mitigate operational risk

Just as the Advanced IRB approach to credit risk replaces the four-bucket approach of the 1988 Accord, introducing an explicit capital calculation for operational risk eliminates the implicit and imprecise “buffer” that covers operational risk (along with other risks) under current capital rules. Because the current rules do not measure operational risk, introducing a method to measure operational risk in order to calculate required capital eliminates the cost of inappropriate capital requirements much the same way the Advanced IRB approach does so by more closely aligning credit risk capital charges with credit risk. Organizations with relatively more operational risk will have to hold more capital to cover that risk, in contrast to the current undifferentiated approach to operational risk.

Introducing explicit capital requirements for operational risk is important because operational losses can be significant, and the risk may be increasing over time. Then Federal Reserve Vice Chairman Ferguson testified that operational risks “have become an even larger share of total risk [and] at some banks they are the dominant risk”. Table 3 summarizes data on 10 large operational losses affecting banking organizations from 1992 to 2002.<sup>34</sup> The substantial losses shown in table 3 suggest that focusing specific attention on operational risk is appropriate and potentially beneficial.

Introducing an explicit capital requirement for operational risk improves how well capital reflects risk at organizations where operational risk dominates other risks. Organizations with significant operational risk but little credit risk exposure have very little capital required under the current system. This shortcoming of the current capital framework could be exacerbated because the Advanced IRB approach to credit risk eliminates the implicit capital buffer for operational risk. An explicit measure of operational risk should generate minimum capital requirements at these organizations that are more appropriate to the actual risk.

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<sup>34</sup> Roger Ferguson presented these data in an appendix to his June 18, 2003, testimony before the Committee on Banking, Housing, and Urban Affairs, U.S. Senate.

The AMA for operational risk in the United States uses a measure of operational risk exposure generated by a banking organization’s internal operational risk measurement system. Just as the Advanced IRB approach calibrates capital for credit risk based on the risk characteristics of credit exposures, the AMA uses internal loss event data, relevant external loss event data, business environment and internal control factors, and scenario analysis to determine an organization’s operational risk exposure. The AMA builds on the fact that many banking organizations have now incorporated operational risk into their economic capital models.<sup>35</sup> Many organizations have already begun to use such measurement techniques for internal purposes and AMA is flexible enough to incorporate those techniques.

The explicit treatment also increases the transparency of operational risk. This is important regardless of whether operational risk plays a large or small role relative to other risks at the organization. In addition to helping organizations identify their own operational risk “hot spots,” the federal banking agencies and financial markets will benefit from having a clearer picture of operational risk. The banking agencies will be better able to supervise and provide supervisory feedback, and financial market participants can better apply the market discipline envisioned in Pillar 3, if they have a better view of operational risk.

Table 3. 10 Large Operational Losses Affecting Banking Organizations, 1992-2002

Year	Loss Amount (\$ millions)	Firm	Description
1992	\$440	Standard Chartered Bank PLC	Loss in connection with a Bombay stock market scandal
1995	\$1,110	Daiwa Bank Ltd.	Losses incurred between 1983 and 1995 due to unauthorized trading
1995	\$1,330	Barings PLC	Loss due to unauthorized trading
1997	\$636	Morgan Grenfell Asset Management (Deutsche Bank)	A mutual fund manager violated regulations limiting investments in unlisted securities.
2001	\$440	Superior Bank FSB	Bank failed due to improper accounting for retained interests in securitized subprime loans
2001	\$611	Republic New York Corp.	Restitution and fines for its role as custodian
2001	\$770	First National Bank of Keystone	Bank failed due to embezzlement and loan fraud
2002	\$490	Bank of America	Settlement of class action lawsuits
2002	\$691	Allied Irish Banks	Losses due to unauthorized trading over the previous five years
2002	\$900	J.P. Morgan Chase	Reserve established for Enron-related litigation and regulatory matters

Source: Roger Ferguson, Testimony before the Senate Committee on Banking, Housing, and Urban Affairs, June 18, 2003

<sup>35</sup> Patrick de Fontnouvelle, Victoria Garrity, Scott Chu, and Eric Rosengren, “The Potential Impact of Explicit Operational Risk Capital Charges on Bank Processing Activities,” manuscript, Federal Reserve Bank of Boston, January 12, 2005. Available at [www.federalreserve.gov/generalinfo/basel2/whitepapers.htm](http://www.federalreserve.gov/generalinfo/basel2/whitepapers.htm).

An explicit requirement for operational risk capital should also encourage organizations to try to mitigate operational risk. Because of the explicit charge and the reporting required as part of any operational risk framework meeting the AMA supervisory standards, operational risk may receive much more attention from a banking organization's management, banking supervisors, and financial market participants. The increased attention and transparency of the explicit charge will create an incentive to manage operational risk more aggressively. This incentive should encourage organizations to adopt procedures to reduce operational risk or mitigate it using such measures as insurance.<sup>36</sup> These same incentives may even encourage organizations using the AMA to research and develop risk-reducing innovations.

#### **8. Enhanced supervisory feedback**

Although U.S. banking organizations have long been subject to close supervision, aspects of all three pillars of the rule aim to enhance supervisory feedback from federal banking agencies to managers of banks and thrifts. Supervisory standards will play an important role in establishing both the Advanced IRB approach and the AMA of Pillar 1. Ongoing supervision and validation of the methods organizations use to calculate capital adequacy should provide constructive feedback in keeping with the supervisory review objectives of Pillar 2. Oversight of the reports required as part of the new disclosure requirements of Pillar 3 will give the banking agencies another opportunity to provide useful feedback to bank and thrift management on their risk measurement and risk management techniques. Overall, the rule provides a consistent framework across institutions to gather additional data and insights into risk management that will enhance the dialog between supervisors and bank management. This enhanced feedback could further strengthen the safety and soundness of the banking system.

#### **9. Enhanced disclosure promotes market discipline**

The rule seeks to aid market discipline through the regulatory framework by requiring specific disclosures relating to risk measurement and risk management. Disclosure of this material will certainly enhance the transparency of mandatory and opt-in organizations to the public, banking supervisors, and financial markets, thereby reducing informational asymmetries. Increased disclosure enables financial markets to more accurately impose discipline by increasing the transparency of banking organizations. In addition to facilitating market discipline, such information could play an important role in containing ripple effects when shocks to one organization or one market threaten to spill over. If spillovers are more likely to occur when there is a dearth of information in the market regarding exposures and susceptibility, supplying this information will limit spillover and lessen the likelihood of systemic problems. Overall, market discipline could complement regulatory supervision in bolstering safety and soundness.

As the rule indicates, disclosures made in public financial reports will fulfill the applicable disclosure requirement. To the extent organizations already disclose this information, these disclosure requirements will not add to the reporting burden. To the extent that

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<sup>36</sup> A bank can use risk mitigants such as insurance to reduce its operational risk exposure by up to 20 percent according to the U.S. rule.



organizations do not currently make these disclosures, the requirements will add to the costs of implementation, which we discuss later in the analysis.

**10. Preserves the benefits of international consistency and coordination achieved with the 1988 Basel Accord**

Several important objectives will be achieved through the implementation of Basel II as a whole and on an international basis. One such goal is the preservation of international consistency and coordination. An important objective of the 1988 Accord was competitive consistency of capital requirements for banking organizations competing in global markets. Basel II continues to pursue this objective. Because achieving this objective depends on the consistency of implementation in the United States and abroad, the Basel Committee has established an Accord Implementation Group to promote consistency in the implementation of Basel II. Consistent implementation of Basel II will also help to avoid any cross-border flows of capital that might occur because of regulatory differences across countries.

The rule also seeks to improve safety and soundness and reduce systemic risks within the banking system. The existence of large internationally active organizations carries the danger that problems at one such organization might lead to serious disruptions in international banking and world markets. By increasing the risk sensitivity of capital charges, enhancing supervisory review, and improving market discipline, the U.S. implementation of Basel II improves overall risk management at these large organizations, reducing the risk of problems with global consequences.

Achieving international capital consistency also strengthens the global banking system because of banking externalities. As mentioned earlier in this analysis, capital protects individual institutions from losses and strengthens the ability of the entire U.S. banking system to absorb losses. This externality extends to the global banking system as well. Capital at each institution provides a loss buffer that strengthens the bank, that bank's domestic banking industry, and the international banking system. International consistency and coordination also strengthen the global banking system by facilitating communication and cooperation among the world's banking supervisors. Without a consistent set of capital rules across international borders, banking organizations that must adhere to stricter capital regulation could be at a competitive disadvantage relative to institutions facing weaker capital rules.

**11. Ability to opt in offers long-term flexibility to nonmandatory banking organizations**

A perhaps less immediate but potentially significant benefit of the U.S. implementation of Basel II is that it allows banking organizations outside of the mandatory group to individually judge when the benefits of adopting the advanced approaches outweigh their costs. Although the rule will only affect large banking organizations upon initial implementation, nothing in the rule prohibits smaller organizations from eventually opting to use the advanced approaches. Even though the cost and complexity of adopting the advanced methods may present smaller organizations with a substantial hurdle to opting in at present, the potential long-term benefits of allowing smaller organizations to partake in the benefits described above may be similarly substantial.

Before any banking organization, large or small, chooses to opt in, it has to compare benefits and costs. At present, the costs of electing to use the advanced approaches to capital calculations will likely exceed the benefits for all but relatively large organizations. However, over time, technological innovation, market pressure, and experience gained by organizations using the advanced approaches should lower the costs of and hurdles to opting into the implementation of Basel II for nonmandatory banking organizations.

There is some evidence already that smaller organizations would like to be able to adopt the advanced approaches once the hurdles to opting in diminish. For instance, one industry group noted that “Even many of our smaller members would like the opportunity to improve their risk management practices to such a degree that they can use their own internal assessment of risk to determine adequate capital levels.”<sup>37</sup>

### C. Costs of the Rule

In counterpoint to the benefits just described are offsetting costs of the rule. The costs of the rule include expenditures by banks and thrifts necessary to comply with the new regulation and costs to the federal banking agencies of implementing the new rules. In addition to these explicit costs, Basel II raises the issue of potential indirect costs arising from the effect of the regulatory change on competition. An analysis of competitive effects should examine whether the regulation creates a competitive advantage for any group affected by the regulation. Because Basel II in general and the U.S. implementation of Basel II in particular creates a system of capital regulations that applies different capital rules to different types of organizations, the analysis of competitive effects has to examine whether the different capital treatment for mandatory and opt-in organizations, on one hand, and general organizations, on the other, gives either type of organization a relative advantage. The competitive analysis will also explore competition between banking organizations and nonbanks where they provide similar products.

#### 1. Costs to Banking Organizations

Explicit costs of implementing the rule at banking organizations fall into two categories: setup costs and ongoing costs. Setup costs are typically one-time expenses associated with introducing the new programs and procedures necessary to achieve initial compliance with the U.S. version of new Basel II regulatory capital standards. Setup costs may also involve expenses related to tracking and retrieving data needed for the advanced approaches along with establishing systems to meet reporting requirements under the disclosure provisions. Data costs may also occur as ongoing costs for retrieving, using, and preserving data to sustain compliance. Ongoing costs also include reporting costs incurred to meet reporting requirements specified in the disclosure provisions of the rule.

Because banking organizations regularly develop programs and systems to improve how they measure and manage risk, it is difficult to distinguish between expenditures explicitly caused by adoption of the rule and costs that would have occurred irrespective of any new regulation. Indeed, sophisticated banks have made significant efforts to develop economic

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<sup>37</sup> America’s Community Bankers, Comment Letter on Risk-Based Capital Guidelines, November 3, 2003.

capital models that incorporate internal ratings of credit quality and internal measures of operational risk. For instance, comment letters received in response to the August 2003 Advance Notice of Proposed Rulemaking (ANPR) cite Basel II costs for added systems for credit administration, risk management, financial reporting, internal auditors, and external auditors.<sup>38</sup> However, each of these systems already exists under current capital rules. Where possible, in the discussion of costs, we will make this distinction. Otherwise, to be conservative, we will assume that all costs are due to the regulation. This way, we can investigate costs with the understanding that such cost estimates provide an upper bound on the likely costs of the regulation.

In an effort to identify how much banking organizations expect to spend to comply with the U.S. implementation of Basel II, the federal banking agencies included several questions related to compliance costs in the fourth Quantitative Impact Study (QIS-4). In a June 2004 press release, the banking agencies announced QIS-4 and asked institutions willing to participate to contact their federal supervisor.<sup>39</sup> The press release indicated that QIS-4 would focus on mandatory banking organizations subject to the Basel II framework based regulations and suggested that potential opt-in institutions might also want to participate. Thirty institutions indicated a willingness to participate in QIS-4 and 26 provided responses, including all mandatory banks. Although not all respondents were able to provide complete information, the data that are available seem to be representative of the population of mandatory and potential opt-in banking organizations as a whole.

In requesting QIS-4 information, the banking agencies acknowledged that participants would be providing best-effort estimates given that relevant data and systems were still in development. In providing best-effort estimates, participants noted where simplifying assumptions or approximations were necessary. Despite the limitations inherent in a data-gathering exercise that depends on self-selected participants, QIS-4 provided a unique data set to help the banking agencies evaluate the potential effects of the U.S. implementation of Basel II. QIS-4 also provided participants an opportunity to grapple with the internal risk measurement information that the new rules would require.

Cost questions in QIS-4 requested information on dollar amounts budgeted for compliance with the rule, estimates of one-time and recurring costs, and what portion of the costs would have been incurred even if the 1988 Accord remained in effect. In addition to overall budget figures, the questionnaire requested itemized cost estimates for upgrading internal rating and risk management systems, modifying information technology systems, constructing historical databases, preserving transaction data, and making Pillar 3 disclosures. Questionnaire responses from 26 QIS-4 participants inform the following discussion of costs.<sup>40</sup>

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<sup>38</sup> E.g., First Tennessee Bank, Comment Letter on Risk Based Capital Guidelines, October 31, 2003.

<sup>39</sup> Board of Governors of the Federal Reserve System, Federal Deposit Insurance Corporation, Office of the Comptroller of the Currency, and Office of Thrift Supervision, "Banking Agencies Announce Publication of Revised Capital Framework and Describe U.S. Implementation Efforts," Joint Release NR 2004-52, June 26, 2004.

<sup>40</sup> The banking agencies conducted QIS-4 on a voluntary basis. The agencies contacted participants in the third Quantitative Impact Study (QIS-3) and asked if they would participate in QIS-4. Of the 26 institutions in QIS-4, 15 had also participated in QIS-3.

## Overall Costs

According to the 19 out of 26 QIS-4 questionnaire respondents that provided estimates of their implementation costs, organizations will spend roughly \$42 million on average to adapt to capital requirements that implement the U.S. version of Basel II. Not all of these respondents are likely mandatory organizations. Counting just the likely mandatory organizations, the average is approximately \$46 million, so there is little cost difference between organizations that meet a mandatory threshold and those that do not. Aggregating estimated expenditures from all 19 respondents indicates that these organizations will spend a total of \$791 million to implement the rule. Estimated costs for nine respondents meeting one of the mandatory thresholds come to \$412 million.

However, in their QIS-4 responses, many organizations indicated that they had difficulty separating expenses attributable to the U.S. implementation of Basel II from expenses they would have undertaken even without Basel II. The ten organizations that provided estimates of the portion of costs they would have incurred even if current capital rules remain in effect indicated that they would have spent 45 percent on average, or roughly half of their implementation expenditures, on improving risk management anyway. A few organizations indicated they would have spent the same amounts regardless of any changes in capital regulations. These figures suggest that of the \$42 million that the average organization operating under the new framework expects to spend on implementation, approximately \$21 million represents pure costs attributable to compliance with the rule, for a total of roughly \$395 million for the 19 QIS-4 respondents.

## Setup and Ongoing Costs

QIS-4 participants also had difficulty trying to separate one-time setup costs from ongoing costs. Nonetheless, the seven organizations that were able to estimate what their recurring costs would be suggest that the vast majority of costs are one-time setup costs. On average, the seven organizations estimate that annual recurring expenses attributable to the rules based on Basel II will be \$2.4 million per institution. In questionnaire responses, organizations indicated that the ongoing costs to maintain related technology reflect costs for increased personnel and system maintenance. The larger one-time expenditures primarily involve money for system development and software purchases.

Some Basel II induced costs occur because the advanced approaches require organizations to provide their own estimates of the probability of default, the amount of loss given that default occurs, the exposure at the time of default, and a self-assessment of operational risk based on past experiences. Producing these estimates often require organizations to reconstruct historical databases and to upgrade or modify internal risk management and information technology systems. Although the QIS-4 questions requested information on the cost of these various Basel II driven initiatives, only a few organizations were able to separate their costs into more detailed components. From those that were able to provide some breakdown of costs, it appears that most organizations earmarked expenses for upgrading and modifying information technology systems.

## Consistency with Earlier Basel II Cost Estimates and Costs Abroad

The cost data from QIS-4 is somewhat consistent with earlier estimates of Basel II costs, though more toward the lower end of these earlier estimates. Several banking organizations and associations provided cost estimates as part of their comment letters sent in response to the Advance Notice of Proposed Rulemaking issued in August 2003. Table 4 lists implementation cost estimates from various organizations taken from public comment letters. The \$44 million cost estimate from QIS-4 falls roughly in the middle of the \$10 million to \$100 million range estimated by several trade associations.

A report from the Financial Services Authority (FSA) estimates that Basel II costs in the United Kingdom may range between \$180 million and \$310 million. The FSA estimates that its own costs of implementation will be approximately \$9 million. A separate survey of 20 banks in the United Kingdom and Ireland found that banks there were together spending \$1.4 billion, or an average of roughly \$68 million per institution.<sup>41</sup>

Table 4. Early Basel II Cost Estimates: 2003 Comment Letters

Estimating Organization	Cost Estimate	Estimate Covers:
America's Community Bankers	\$100 million or more for large, internationally active organizations	Implementation Costs
Independent Community Bankers of America	\$10 million for smaller organizations and \$200 million for the largest organizations	Implementation Costs
Zions Bancorporation	Over \$10 million over several years	Implementation Cost

### Implicit Costs

In addition to explicit setup and recurring costs, banking organizations may also face implicit costs arising from the time and inconvenience of having to adapt to new capital regulations. At a minimum this involves the increased time and attention required of senior bank and thrift management to introduce new programs and procedures and the need to closely monitor the new activities during the inevitable rough patches when the rules first take effect. Such heightened oversight will necessarily have to continue until the new programs settle into place. Because of the additional reporting, disclosure, and validation requirements of the advanced approaches, some of the increased time and attention required of senior management at the outset of the rule may prove to be necessary permanently.

In comment letters responding to the August 2003 Advance Notice of Proposed Rulemaking, correspondents listed additional costs and concerns related to Basel II. While many of these concerns had to do with specific components of the Advanced-IRB and AMA methodologies, others expressed concern about the hidden costs of having to work with regulations as complex as the advanced approaches at both the banking organizations and the banking agencies. The letters suggested some of these costs might occur because of the need to

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<sup>41</sup> See Financial Services Authority, "Report and first consultation on the implementation of the new Basel and EU Capital Adequacy Standards," Consultation Paper 189, July 2003, and "Basel II Compliance Costs UK Banks £2.5 Billion," *Global Risk Regulator*, July/August 2005.

hire consultants and auditors. There were also concerns that the banking agencies might have difficulty finding sufficient talent to understand Basel II models and to make sure that mandatory organizations do not understate risks.

However, because the advanced approaches make much use of risk measurement programs that many large organizations already use, the costs of converting to these more complex methods may not be as significant as some fear. Furthermore, organizations that have used the internal models approach to market risk introduced with the 1996 amendments to the 1988 Accord have already had an opportunity to work with a similar approach to capital management in a regulatory context. Thus, even though the switch from current capital rules may require significant changes in risk measurement and management methods, organizations have the benefit of being familiar with many aspects of the techniques incorporated in the advanced approaches. Similarly, because the agencies have been supervising banks with sophisticated, model-based risk management systems for some time, they already possess significant expertise of the type needed under the revised capital framework. Also, the period of “parallel run” and the subsequent years of phase-in of the new capital levels with constraints on the overall impact provide banking organizations and banking supervisors additional opportunity to gain familiarity with the new regime.

Although institutions applying the new capital formulas may also encounter difficulties modeling and estimating risk, so called “model risk”, current capital rules also have this problem. The static bucket approach under current rules uses a very simple model for risk: determine which bucket an asset belongs to and assign the appropriate risk-weight to that asset. While this is a very simple estimate of risk, it is also likely to be wrong for most assets. The new capital rules involve a more rigorous approach to estimating risk and, unlike fixed risk weights, they incorporate additional information over time in an effort to improve the accuracy of their risk estimates.

Nonetheless, every model has limitations and accompanying model risk. Model risk includes potential problems with performance of the model, problems with the data driving the model, and inappropriate application of the model.<sup>42</sup> The rule recognizes the potential limitations of credit risk models and addresses potential problems through model validation requirements. Under current capital rules, the OCC incorporates the evaluation of model risk into the overall supervisory and examination process. Because the implementation of Basel II is likely to expand the use of quantitative models, the OCC is aware that the importance of model validation will increase. Under the rule, the banking agencies will require institutions to use a broad range of validation tools to determine the accuracy and consistency of the organization’s internal rating system and model estimates of risk components, such as default probabilities. Supervisors will also ensure that models incorporate stress scenarios. While banking organizations bear primary responsibility for validating the models they use, the banking agencies will work with these institutions to develop appropriate model validation under the capital framework.

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<sup>42</sup> See Emanuel Derman, “Model Risk,” in *VAR: Understanding and Applying Value-at-Risk*, KPMG Risk Publications, London, 1997.

The supervisory model of credit risk underlying the IRB framework embodies specific assumptions about the economic drivers of portfolio credit risk at banks. As with any modeling approach, these assumptions represent simplifications of very complex real-world phenomena and, at best, are only an approximation of the actual credit risks at any bank. To address the possibility of such shortcomings, the banking agencies must first qualify institutions to use the Basel II framework and will conduct formal supervisory reviews of each institution's progress toward meeting the Basel II framework qualification requirements. As mentioned above, the agencies will also work with institutions to develop appropriate model validation.

During the three-year transition period, the floors will limit any reductions in minimum required capital. The tier 1 leverage ratio and other existing prudential safeguards (for example, Prompt Corrective Action) will remain in place beyond the transition period. To assuage concerns regarding model failure, the leverage ratio remains a straightforward and tangible measure of solvency that serves as an important complement to the risk-sensitive Basel II framework.

If there is a material reduction in aggregate minimum regulatory capital requirements because of the implementation of the Basel II framework, the agencies will propose regulatory changes or adjustments during the transition period from 2008 to 2011. After the end of the second transition year, the agencies will publish a study that evaluates the new framework to determine if there are any material deficiencies. For any primary Federal supervisor to authorize any bank to exit the third transitional floor period, the study must determine that there are no material deficiencies that existing supervisory tools cannot address.

In conducting this study, the agencies intend to establish a transparent and collaborative process consistent with the recommendations made by the U.S. Government Accountability Office (GAO) in its report on implementation of the New Accord in the United States (GAO report).<sup>43</sup> The agencies will consider, for example, the following:

- The level of minimum required regulatory capital under U.S. advanced approaches compared to the capital required by other international and domestic regulatory capital standards.
- Peer comparisons of minimum regulatory capital requirements, including but not limited to banks' estimates of risk parameters for portfolios of similar risk.
- The processes banks use to develop and assess risk parameters and advanced systems, and supervisory assessments of their accuracy and reliability.
- Potential cyclical implications.
- Changes in portfolio composition or business mix, including those that might result in changes in capital requirements per dollar of credit exposure.
- Comparison of regulatory capital requirements to market-based measures of capital adequacy to assess relative minimum capital requirements across banks and broad asset categories. Market-based measures might include credit default swap spreads, subordinated debt spreads, external rating agency ratings, and other market measures of risk.

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<sup>43</sup> United States Government Accountability Office, "Risk-Based Capital: Bank Regulators Need to Improve Transparency and Overcome Impediments to Finalizing the Proposed Basel II Framework" (GAO-07-253), February 15, 2007.

- Examination of the quality and robustness of advanced risk management processes related to assessment of capital adequacy, as in the comprehensive supervisory assessments performed under Pillar 2.
- Additional reviews, including analysis of interest rate and concentration risks that might suggest the need for higher regulatory capital requirements.

## 2. Government Administrative Costs

Like the banking organizations subject to new requirements based on Basel II, the costs to government agencies of implementing the rule involve both startup and ongoing costs. Startup costs include expenses related to the development of the revised regulation, costs of establishing new programs and procedures, and costs of initial training of bank examiners in the new programs and procedures. Ongoing costs include maintenance expenses for the likely additional examiners and analysts needed to regularly apply potentially more complex supervisory processes.

It is difficult to separate some costs specific to the U.S. implementation of Basel II from other supervision costs. Just as costs are often conjoined with ordinary expenditures to improve systems and risk management at banking organizations, at the banking agencies it is difficult to separate costs associated with the rule from ordinary safety and soundness activities and reviews. To be conservative, we will assume that all costs are for the implementation of the framework based on Basel II, and once again we can think of these budget numbers as an upper limit on expenditures. While the implementation of the rule affects all of the U.S. banking agencies, we only have information on expenditures at the OCC. However, OCC expenses are particularly relevant, as the OCC is the primary supervisor of many of the banks likely to be subject to the mandatory requirements.

OCC expenditures fall into three broad categories: training, guidance, and supervision. Training includes expenses for AMA workshops, IRB workshops, and other training courses and seminars for examiners. Guidance expenses reflect expenditures on the development of IRB and AMA guidance. Supervision expenses reflect organization-specific supervisory activities with a Basel II relationship. For instance, a safety and soundness review of operational risk at an organization would count as a Basel II supervision expense because of overlap with Basel II's AMA process.

Table 5 provides a summary of estimated OCC expenditures related to Basel II for fiscal years 2002 through 2006. For the years indicated, the OCC identified employee salary and benefit costs and travel expenditures associated with the implementation of Basel II.<sup>44</sup> As table 5 shows, the largest OCC expenditures have been on the development of IRB and AMA policy guidance. The \$5.4 million spent on guidance represents 54 percent of the estimated total OCC

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<sup>44</sup> To estimate the dollar equivalent of a work day, we convert the OCC's 2005 median annual salary plus benefits of \$107,000 into a daily salary plus benefits of \$410 by dividing the annual salary by 261, the number of federal work days in a year. The product of work days and \$410 equals the \$ Work Day figures in table 5. The OCC did not capture Basel II specific expenditures in each area during the 2002 and 2003 fiscal years. The figures in table 5 may not sum to totals because of rounding.



expenditure of \$10.0 million. In part, this large share reflects the absence of data for training in 2002 and supervision costs in 2002 and 2003, but it also is indicative of large guidance expenses in 2002 and 2003 when the Basel II framework was in development. Training and guidance expenses fell between 2005 and 2006, while supervision costs rose. Looking forward, guidance and training expenditures, which are primarily startup costs, may taper off while supervision expenses will likely rise.

To date, Basel II expenditures have not been a large part of overall OCC expenditures. The \$3 million spent on Basel II in fiscal year 2006 represents less than one percent of the OCC's \$579 million budget for the year. OCC expenses have been \$10.0 million to date, and we estimate expenditures of \$3 million per year between 2007 and 2011. Applying a five percent discount rate to future expenditures, past expenses (\$10.0 million) plus the present value of future expenditures (\$12.9 million) equals total OCC expenditures of \$22.9 million on Basel II.

### Total Cost Estimate of Rule

The OCC's estimate of the total cost of the rule includes expenditures by banking organizations and the OCC from the present through 2011, the final year of the transition period. According to QIS-4, expenditures by each banking organization will be, on average, \$42 million per organization for setup costs and \$2.4 million per year for ongoing costs. Splitting setup costs evenly over the next two years and applying a five percent discount rate, the present value of each institution's setup costs will be \$39.1 million. The present value of ongoing costs of \$2.4 million per year from 2008 through 2011 is \$8.5 million. Thus, the present value of each mandatory institution's expenditures from the rule is \$47.6 million, or \$476 million for the ten mandatory institutions. Combining expenditures by banking organizations and the OCC provides an estimate of \$498.9 million for the total cost of the rule for mandatory institutions.<sup>45</sup>

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<sup>45</sup> We estimate that each opt-in institution will also incur present-value costs of \$47.6 million. If between five and ten institutions opt in, then the total estimated cost of the rule for mandatory and opt-in institutions would rise to between \$736.9 million and \$974.9 million.

Table 5. Summary of OCC Time and Travel Costs Related to Basel II Advanced Approach:  
Fiscal Year 2002 – Fiscal Year 2006

Subject	Item	Fiscal Year			Total
		2002-2004	2005	2006	
Training	Work Days	424	1,293	543	2,260
	\$ Work Days	\$173,799	\$530,130	\$222,630	\$926,559
	\$ Travel	\$143,626	\$313,058	\$157,091	\$613,775
	\$ Total	\$317,425	\$843,188	\$379,721	\$1,540,334
Guidance	Work Days	6,984	2,416	1,750	11,150
	\$ Work Days	\$2,863,235	\$990,560	\$717,500	\$4,571,295
	\$ Travel	\$589,313	\$179,592	\$83,639	\$852,544
	\$ Total	\$3,452,548	\$1,170,152	\$801,139	\$5,423,839
Supervision	Work Days	694	2,212	3,548	6,454
	\$ Work Days	\$284,499	\$906,920	\$1,454,680	\$2,646,099
	\$ Travel	\$21,698	\$136,378	\$227,490	\$385,566
	\$ Total	\$306,197	\$1,043,298	\$1,682,170	\$3,031,665
Total	Work Days	8,101	5,921	5,841	19,863
	\$ Work Days	\$3,321,533	\$2,427,610	\$2,394,810	\$8,143,953
	\$ Travel	\$754,637	\$629,028	\$468,220	\$1,851,884
	\$ Total	\$4,076,170	\$3,056,638	\$2,863,030	\$9,995,837

### The Uncertainty of Costs and Benefits

As with any rule change, there is bound to be some uncertainty regarding the actual extent of costs and benefits engendered by the new regulation. In addition to uncertainty surrounding costs and benefits that might arise from unanticipated effects of the regulation, there will also be varying degrees of uncertainty regarding fully anticipated costs and benefits. For instance, some costs, such as expenditures for new systems to achieve compliance with the advanced approaches, are certain to occur, but the ultimate cost for each institution remains uncertain. Similarly, while improved credit risk modeling under the Advanced IRB approach is certain to better align capital and risk relative to the current fixed-weight model, the ultimate extent of the benefit of this approach remains uncertain. A framework based on Basel II will certainly create some costs and benefits, but uncertainty will continue to obscure their precise delineation.

An even greater degree of uncertainty applies to the sort of spillover effects that may or may not occur because of the new regulation. Spillover effects may be good or they may be bad, but they are usually unexpected consequences. The potential effect of the rule on competition among providers of financial services is a prime example of the rule's potential for uncertain consequences.

One area of particular uncertainty is the number of institutions that will choose to adopt the advanced approaches under the rule. Table 6 shows how many banking organizations are in various size ranges close to but below the mandatory-institution threshold of \$250 billion in total assets. The table also shows the share of total U.S. banking assets owned by these institutions,

an estimate of the aggregate costs of the rule, and an estimate of the effect on aggregate benefits of the rule as more institutions voluntarily adopt the advanced approaches. The estimate of aggregate costs assumes that each institution opting in will pay the \$42 million average compliance cost determined from the QIS-4 results. Clearly, aggregate costs will rise as more institutions elect to adopt the advanced approaches now. However, it is uncertain whether the cost of adopting the rule's advanced approaches will rise or fall in the future, so these aggregate costs may rise or fall if banking organizations decide to wait to opt in. It is reasonable to conjecture that aggregate benefits will increase as the share of total banking assets subject to the advanced approaches increases.

Table 6. Size Distribution of Banking Organizations as of December 31, 2006

Size Thresholds Total Assets: Foreign Assets	Cumulative Number of Banking Organizations in Size Class	Cumulative Share of Total Assets	Estimated Aggregate Costs	Estimated Aggregate Benefits
<b>\$250 Billion: \$10 Billion</b>	<b>10</b>	<b>47%</b>	<b>\$420 mil.</b>	<b>Rule</b>
\$200 Billion: \$8 Billion	11	49%	\$462 mil.	Increasing
\$150 Billion: \$6 Billion	14	53%	\$588 mil.	Increasing
\$100 Billion: \$4 Billion	20	59%	\$840 mil.	Increasing
\$50 Billion: \$2 Billion	35	67%	\$1,470 mil.	Increasing

Another area of uncertainty relates to the overall extent of changes in minimum capital requirements. Data from the 26 participants in the fourth quantitative impact study (QIS-4) indicates that overall minimum capital requirements may decrease 16 percent on average. Table 7 shows a summary of the results from QIS-4. There is considerable uncertainty regarding whether these results reflect the impact of the framework based on Basel II, or various problems with data collection, or relative readiness at the 26 institutions participating in the study. At the very least, minimum required capital will not immediately decrease to the extent suggested by QIS-4. Under the plan announced by the agencies in September 2005<sup>46</sup>, required capital will be at least 95 percent of required capital as calculated under the standards applicable to general banking organizations in the first year of implementation, at least 90 percent during the second year, and at least 85 percent in the third year. Furthermore, Pillar 2 supervisory requirements will also help prevent inappropriate decreases in capital. The banking agencies view the parallel run and transitional floor periods as a trial of the new framework under controlled conditions. The agencies may find it necessary to adjust the framework during those transitional years. Were results similar to QIS-4 results obtained under an up-and-running risk-based capital regime, they may not meet the agencies' minimum risk-based capital objectives. The banking agencies could consider such a decline in capital requirements unacceptable.

<sup>46</sup> Board of Governors of the Federal Reserve System, Federal Deposit Insurance Corporation, Office of the Comptroller of the Currency, and Office of Thrift Supervision, "Banking Agencies Announce Revised Plan for Implementation of Basel II Framework," Joint Release NR 2005-99, September 30, 2005.

Table 7. QIS-4 Changes in Minimum Required Capital (MRC)

Portfolio	% Change in MRC	Share of Basel I MRC	Share of Basel II MRC
Wholesale Credit	(24.6%)	44.3%	38.2%
Retail Credit	(25.6%)	30.6%	26.0%
--Home Equity	(74.3%)	6.1%	1.8%
--Mortgages	(61.4%)	11.1%	4.9%
--Credit Cards	66.0%	6.1%	11.6%
--Other Consumer	(6.5%)	6.0%	6.4%
--Retail Business	(5.8%)	1.2%	1.3%
Equity	6.6%	1.3%	1.6%
Other Assets	(11.7%)	10.0%	10.1%
Securitization	(17.9%)	8.1%	7.6%
Operational Risk	NA	0.0%	10.5%
Trading Book	0%	5.2%	5.9%
<b>Portfolio Total</b>	<b>(12.5%)</b>	100.0%	100.0%
<b>Change in Effective MRC</b>	<b>(15.5%)</b>	NA	NA

Finally, there will always be a degree of uncertainty accompanying the introduction of a rule as complex and significant as the U.S. implementation of Basel II: Advanced Approach. The ability to fully attain the benefits described in this analysis presupposes that both banking organizations and banking regulators are completely prepared to implement the new rule. A lack of thorough preparation at banking organizations or the banking agencies would likely diminish the benefits of the rule, at least temporarily, and may lead to some additional costs unanticipated by this regulatory impact analysis. For instance, because Basel II and its U.S. implementation treats operational risk in a novel way, banking organizations may have difficulty preparing the information necessary to properly implement the AMA required under the rule. The novelty of the operational risk approach also suggests that bank and thrift management and banking regulators may be unfamiliar with problems that might arise in applying the AMA. In order to capture the significant benefits of the rule, banking organizations and the banking agencies must be ready to meet the challenges that might come hand-in-hand with a more complex set of rules for determining minimum required capital.

### Procyclicality

Another uncertainty concerning the rule is how it ultimately will affect the procyclicality that is inherent in banking. Bank capital standards may exacerbate the business cycle if they lead banks to reduce the availability of credit during economic contractions and increase credit during expansions. For example, under either the existing or the revised capital standards, banking organizations may reduce lending during an economic downturn as increasing loan losses erode capital and banking organizations reduce exposure in order to replenish capital to meet internal or regulatory capital requirements; similarly, institutions may increase lending during economic expansions as diminishing loan losses help augment existing capital. A somewhat different source of procyclicality, related specifically to aspects of the Basel II framework, is that the risk-sensitivity of the Advanced IRB approach may cause capital requirements for credit risk to

increase during a downturn as organizations' portfolios migrate toward internal risk grades or segments with higher default probabilities. An increasing requirement for capital could further reduce the availability of bank credit during the downturn. Improving economic conditions would imply the opposite: migration to less risky segments or grades, lower default probabilities and required capital, and enhanced credit availability. Both the erosion of capital due to higher-than-expected losses and any cyclical component of credit migration within institutions' portfolios could exacerbate the business cycle by reducing the availability of credit during economic contractions and increasing credit during expansions.

However, aspects of the U.S. implementation of Basel II will tend to reduce the extent to which default probabilities, and therefore required capital, will vary over time. In particular, the estimated default probability for each internal rating grade must be the long-run average for that grade, and consequently it is less likely to vary dramatically over the economic cycle. Recent research by Pederzoli and Torricelli<sup>47</sup> suggest that such a long-run average may preserve risk sensitivity and at the same time dampen procyclicality.

Furthermore, banking organizations are aware that risk varies over time and they take steps to address uncertainty through capital buffers, underwriting standards, and internal risk ratings. Indeed, the U.S. implementation will create an explicit expectation that banking organizations will stress-test portfolios to gauge the impact of cyclical changes in credit quality, taking into account the details of each organization's unique credit risk environment. Improvements in data and information systems under the framework, together with thorough stress testing, may make it easier for institutions to anticipate problems further in advance. Reducing unanticipated shocks to capital could make credit less procyclical than it is under current capital rules. Under Basel II, underwriting concerns and deteriorating credit conditions that often precede a downturn could bring countercyclical increases in required capital to the extent that these problems reflect changing default probabilities for particular credit instruments.

#### **IV. COMPETITION AMONG PROVIDERS OF FINANCIAL SERVICES**

One potential concern with any regulatory change is the possibility that it might create a competitive advantage for some organizations relative to others, a possibility that certainly applies to a change with the scope of this rule. However, measurement difficulties that were clear in the preceding discussion of costs and benefits extend to any consideration of the impact on competition. Despite the inherent difficulty of drawing definitive conclusions, this section considers various ways in which competitive effects might be manifest, as well as available evidence related to those potential effects.

During the lengthy development process of the rule, a number of groups have made claims regarding its possible competitive effects; some completely dismiss competitive effects, while others point to effects that could be quite substantial. Changes brought about by implementation could conceivably affect competition on at least three fronts. First, because the

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<sup>47</sup> Chiara Pederzoli and Costanza Torricelli, "Capital Requirements and Business Cycle Regimes: Forward-looking Modelling of Default Probabilities," *Journal of Banking & Finance*, Volume 29, Issue 12, December 2005.

rule creates a bifurcated system of capital regulation in the United States, it might affect competition between general organizations and organizations that apply the advanced approaches either by choice or by mandate. Second, the rule might affect competition between organizations subject to the rule and non-banking firms that are not subject to capital regulations. Finally, the rule might have implications for international competition between financial services firms if there are significant differences in how countries implement and enforce their national-level regulations implementing the Basel II framework.

#### **A. Avenues for Potential Competitive Effects**

The primary avenue through which the rule could affect competition is through its impact on costs at organizations subject to the rule relative to those not subject to the rule (including, in the international context, organizations subject to similar but slightly different rules in other countries). Two types of cost effects are relevant. First, implementing a new regulatory capital framework requires expenditures by organizations subject to the new rule. As noted above, there are both initial costs to establish compliant systems and ongoing costs to operate those systems. Second, changes in capital requirements may affect funding costs. The impact on funding costs could be direct: changes in the mix of capital and other funding instruments on bank balance sheets could change the overall weighted average cost of funds, either raising or lowering that cost. Alternatively, the impact could be indirect: changes in capital might affect the measured return on equity, which could affect investor perceptions of the organization, in turn altering the terms on which they are willing to hold capital instruments or other financial claims issued by organizations subject to the rule.<sup>48</sup>

With either type of cost effect – implementation costs or funding costs – a potential competitive impact could arise in either of two ways. An organization could alter pricing to reflect changes in marginal cost, thereby creating a pricing advantage or disadvantage; or the cost impact could be absorbed by an organization in the form of higher or lower profitability relative to competitors. Which of these channels – or which combination of the two – is most relevant in any particular case depends on the nature of competition, including the extent to which individual competitors are able to exercise pricing power in the various markets in which organizations operate. Because market conditions may vary by product, we consider the evidence for several key markets that have been identified as particular concerns. However, it is important to note that regulatory capital requirements are only one of many factors that affect the amount of capital banks hold, and capital is only one of many factors that affect costs and pricing; thus, even if regulatory capital requirements affect pricing or profitability, the magnitude of the impact may be quite small.

#### **B. Explicit Capital for Operational Risk**

Some have noted that the explicit computation of required capital for operational risk could lead to an increase in total minimum regulatory capital for U.S. "processing" banks, generally defined as banking organizations that tend to engage in a variety of activities related to securities clearing, asset management, and custodial services. As discussed above, existing

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<sup>48</sup> For a discussion of the effects of capital requirements on the long-run competitiveness of banking organizations, see Jackson *et al*, "Capital Requirements and Bank Behaviour: The Impact of the Basle Accord," Basle Committee on Banking Supervision Working Papers, No. 1, April 1999, and studies cited therein.

capital standards do not explicitly separate out capital for operational risk, embedding it instead in a more general capital calculation. Thus, under present rules, institutions with relatively high operational risk do not find that risk difference translated into appropriately higher required regulatory capital. With the separate treatment of credit risk and operational risk under the rule and the more risk-sensitive treatment of operational risk, institutions with significant operational risk relative to credit risk may find that capital requirements under the rule are higher. This is arguably the situation for the processing banks, as they probably bear more operational risk relative to credit risk than most other banking organizations. Some have suggested that the increase in required capital could place such firms at a competitive disadvantage relative to competitors that do not face a similar capital requirement.

A careful analysis by Fontnouvelle *et al*<sup>49</sup> considers the potential competitive impact of the explicit capital requirement for operational risk. That paper divides the main business activities of processing banks into three categories: custody, asset management, and other general processing activities such as cash management and securities clearing. The study finds that in the custody business, the main competitors are other large banking organizations, almost all of which are expected to face the explicit operational risk charge under the rule. In the area of asset management, the study demonstrates that competitors either are banks that are expected to face similar capital requirements, or non-bank firms that generally operate with higher capital ratios than required of the processing banks under the rule. Within the broad category of more general processing activities, non-bank competitors appear to have higher capital levels than will be required of the processing banks. Overall, the study concludes that competitive effects from an explicit operational risk capital requirement should be, at most, extremely modest.

As noted in the study by Fontnouvelle *et al*, U.S. processing banks generally hold significant capital buffers in excess of regulatory capital requirements so that any increase in minimum regulatory capital may not necessarily lead to an increase in actual total capital held. Even if capital levels do change as a result of the rule, capital is only one of many factors affecting pricing in the relevant business lines; other aspects of costs are generally more important and relative competitive position depends to a large extent on factors such as the quality of client services. In addition, the treatment of operational risk within the rule is extremely flexible, leaving banking organizations considerable scope to tailor their internal systems to suit the precise nature of their business mix and risk profile. This flexibility increases the likelihood that any indicated increase in required capital for these processing banks under the rule appropriately reflects the risks they bear.

### C. Residential Mortgage Lending

The issue of competitive effects has received substantial attention with respect to the residential mortgage market. For example, this market (along with small-business lending) was one of two markets identified by a leading industry group as a particular concern for its members.<sup>50</sup> The focus on the residential mortgage market stems from the size and importance of the market in the U.S. and the fact that the rule may lead to substantial reductions in credit-risk

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<sup>49</sup> As cited above.

<sup>50</sup> Independent Community Bankers of America, Comment Letter on Risk Based Capital Guidelines, November 3, 2003.

capital for residential mortgages. To the extent that corresponding operational-risk capital requirements do not offset these credit-risk-related reductions, overall capital requirements for residential mortgages could decline under the rule.<sup>51</sup>

A study by Calem and Follain examines the potential impact of a capital framework similar to that in the rule on the U.S. residential mortgage market.<sup>52</sup> Calem and Follain observe that capital required under current regulations tends to exceed the capital banking organizations would set aside for their own risk management purposes absent regulation, making it likely that regulatory capital is a binding constraint for mortgages under current capital rules. This makes it more likely that the rule would have at least some impact. They construct a theoretical model of asset allocation for a banking organization facing a binding regulatory capital constraint. Within this theoretical model, they are able to show that organizations will tend to shift their portfolios toward riskier assets when they are subject to a binding regulatory capital constraint and toward less risky assets when that constraint is relaxed. Based on that result, Calem and Follain argue that mandatory and opt-in organizations may increase their holdings of low-risk loans relative to general organizations.

A study by Hancock *et al* also evaluates the potential competitive impact in residential mortgage markets. They look specifically at the potential for an impact through changes in relative pricing advantages as well as changes in the profitability of holding mortgages on-balance-sheet.<sup>53</sup> The analysis concludes that, due to the specific features of U.S. mortgage markets, the rule is very unlikely to affect residential mortgage pricing, and it is unlikely that the rule would have any direct impact on competition between institutions subject to the rule and other institutions. Similar to Calem and Follain, the Hancock *et al* paper suggests that large banks may increase their holdings of residential mortgages, but argues that this increase would be appropriate and would primarily reflect a shift relative to the large government sponsored mortgage enterprises.

#### **D. Small Business Lending**

Another area identified in comments as a potential avenue for competitive effects is small-business lending. Smaller banks – those that are less likely to adopt the advanced approaches to regulatory capital under the rule – tend to rely more heavily on smaller loans within their commercial loan portfolios. To the extent that the rule reduces required capital for such loans, general banking organizations not operating under the rule might be at a competitive disadvantage.

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<sup>51</sup> Residential mortgages may also be subject to substantial interest rate risk, and under the rule the agencies would have the power to require additional capital to cover interest rate risk.

<sup>52</sup> Paul S. Calem and James R. Follain, “Regulatory Capital Arbitrage and the Potential Competitive Impact of Basel II in the Market for Residential Mortgages”, *The Journal of Real Estate Finance and Economics*, Vol. 35, pp. 197-219, August 2007.

<sup>53</sup> Diana Hancock, Andreas Lennert, Wayne Passmore, and Shane M. Sherlund, “An Analysis of the Potential Competitive Impact of Basel II Capital Standards on U.S. Mortgage Rates and Mortgage Securitization”, manuscript, Federal Reserve Board, March 7, 2005.

Available at [www.federalreserve.gov/generalinfo/basel2/whitepapers.htm](http://www.federalreserve.gov/generalinfo/basel2/whitepapers.htm).



Research into this possibility by Allen Berger finds only a relatively minor competitive effect on the majority of smaller banks.<sup>54</sup> The analysis does find a potential pricing effect, due to a reduction in the marginal cost of this type of lending of about 16 basis points (a figure that may be an overstatement for a number of reasons discussed by Berger). However, based on his review of the existing small-business lending research, as well as an evaluation of recent U.S. small-business lending data, Berger concludes that organizations likely to operate under the rule tend to make very different types of small-business loans to different types of borrowers than do smaller banks. Although the loans are in one sense similar, in that they are all small business loans, they are not truly within the same market segment: the larger institutions tend to make "transaction" loans based on hard information to borrowers who are small but whose condition is relatively transparent.

The Berger analysis does raise the possibility that larger banking organizations that choose not to opt into the revised capital framework might be less able to compete within the same segment as other large banks. If these larger institutions all tend to emphasize high-volume, relatively homogeneous small-business loans that rely on scoring techniques for underwriting and pricing decisions, any slight pricing advantage derived from differences in capital standards might convey a competitive advantage. However, to the extent that such capital-driven pricing differences reflect true differences in credit risk, it would be difficult to characterize the competitive differential as unfair. Moreover, the benefits of the lower pricing would accrue to the kinds of relatively small U.S. businesses that are commonly believed to be central to job creation and economic activity.

#### E. Mergers and Acquisitions

Another concern related to potential changes in competitive conditions under the rule is that bifurcation of capital standards might change the landscape with regard to mergers and acquisitions in banking and financial services. For example, banks operating under the new requirements might be placed in a better position to acquire institutions operating under the rules that apply to general banking organizations, possibly leading to an undesirable consolidation of the banking sector.

Research by Hannan and Pilloff examines these potential effects using two different but complementary approaches.<sup>55</sup> As one test, they consider whether a potential increase in excess regulatory capital might foster subsequent merger activity. They find some supporting evidence, but note a number of statistical concerns that may invalidate their findings. In part because of these statistical concerns, they apply a second test, in which they look for evidence that past changes in regulatory capital standards led to changes in bank merger activity. In particular, they

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<sup>54</sup> Allen N. Berger, "Potential Competitive Effects of Basel II on Banks in SME Credit Markets in the United States," *Journal of Financial Services Research*, 29:1, pp. 5-36, 2006. Also available at [www.federalreserve.gov/generalinfo/basel2/whitepapers.htm](http://www.federalreserve.gov/generalinfo/basel2/whitepapers.htm).

<sup>55</sup> Timothy H. Hannan and Steven J. Pilloff, "Will the Proposed Application of Basel II in the United States Encourage Increased Bank Merger Activity? Evidence from Past Merger Activity," Federal Reserve Board Finance and Economics Discussion Series, 2004-13. Available at [www.federalreserve.gov/generalinfo/basel2/whitepapers.htm](http://www.federalreserve.gov/generalinfo/basel2/whitepapers.htm).

study the merger effect of the introduction of prompt corrective action (PCA) standards in the early 1990s. Although PCA standards tended to increase capital requirements, evidence that capital constrained institutions reduced their merger activity because of PCA would suggest that decreased capital requirements under the framework based on Basel II might increase merger activity. This second type of test generally finds no evidence of a significant impact of changes in capital requirements on merger activity; in the few cases in which the results are statistically significant, the magnitudes are small.

Hannan and Pilloff also survey the existing research regarding whether banks with lower capital tend to acquire higher capital banks, reflecting the general belief that acquirers might target institutions with greater potential for ROE improvement from increased leverage. Hannan and Pilloff term this the “relative capital advantage” argument for a link between capital requirements and merger activity. They conclude that while a number of studies have been conducted, they do not support this “relative capital advantage” story. The results uniformly reject the hypothesis that acquirers seek to purchase more highly capitalized targets. Taking these results as a whole, the evidence suggests that the rule is unlikely to have a significant impact on merger and acquisition activity in banking.

#### **F. Credit Card Competition**

U.S. implementation of Basel II might also affect competition in the credit card market. Overall capital requirements for credit card loans could increase under the rule. This raises the possibility of change in the competitive environment between banking organizations subject to the new standards, nonbank credit card issuers such as American Express, and banking organizations operating under current capital rules.

A study by Lang, Mester, and Vermilyea examined the potential competitive effects of Basel II implementation on the credit card market in the United States.<sup>56</sup> They found that implementation of the rule will not affect credit card competition at most community and regional banking organizations because these institutions do not compete in the credit card market. The top 20 credit card issuers manage approximately 98 percent of outstanding credit card loans. The authors also suggest that nonmandatory banking organizations and nonbank credit card issuers like American Express will be in a similar competitive position. Although the advanced approaches are likely to raise regulatory capital requirements for credit card exposures at institutions subject to the new rules, the authors suggest that the increased capital requirement will only pose a modest disadvantage to such institutions because they may be able to meet the additional capital needs with less expensive tier 2 capital as opposed to typically more expensive tier 1 capital.

#### **G. Competitive Effects: Conclusion**

Overall, the evidence regarding the impact of the rule on competitive equity is mixed. The body of recent economic research discussed above does not reveal persuasive evidence of any sizeable competitive effects. Nonetheless, the U.S. banking agencies recognize the need to

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<sup>56</sup> William W. Lang, Loretta J. Mester, and Todd A. Vermilyea, “Potential Competitive Effects on U.S. Bank Credit Card Lending from the Proposed Bifurcated Application of Basel II,” manuscript, Federal Reserve Bank of Philadelphia, December 2005. Available at [www.federalreserve.gov/generalinfo/basel2/whitepapers.htm](http://www.federalreserve.gov/generalinfo/basel2/whitepapers.htm).

closely monitor the competitive landscape subsequent to any regulatory change. In particular, they will be alert for early signs of competitive inequities that might result from this rule. The issue of competition in the banking industry has been and will continue to be a very active area of economic research.<sup>57</sup> In addition to the research on competitive pressures already completed by the Federal Reserve and described above, the banking agencies intend to monitor and encourage research on competition in banking on an ongoing basis in order to fully assess the rule's competitive implications. Furthermore, after the end of the second transition year, the agencies will publish a study that evaluates the new framework to determine if there are any material deficiencies. The banking agencies will likely consider any egregious competitive effects associated with the framework, whether domestic or international in context, to be a material deficiency. To the extent that undesirable competitive inequities emerge, the agencies have the power to respond to them through many channels, including but not limited to suitable changes to the capital adequacy regulations.<sup>58</sup>

## V. ANALYSIS OF BASELINE AND ALTERNATIVES

In order to place the costs and benefits of the rule in context, Executive Order 12866 requires a comparison between the rule, a baseline of what the world would look like without the rule, and several reasonable alternatives. In this regulatory impact analysis, we analyze a baseline scenario and three alternatives. The baseline analyzes the situation where the United States does not adopt the rule, but other countries with internationally active banks implement the Basel II framework.<sup>59</sup>

The baseline scenario appears in this analysis in order to estimate the effects of adopting the rule relative to a hypothetical regulatory regime that might exist without implementation of the Basel II framework in the United States. Because the baseline scenario considers costs and benefits as if the rule never existed, we set the costs and benefits of the baseline scenario to zero. Obviously, banking organizations face compliance costs and reap the benefits of a well-capitalized banking system even under the baseline. However, because these costs and benefits cannot be quantified, we normalize the baseline costs and benefits to zero and estimate the costs and benefits of the rule and alternatives as deviations from this zero baseline.<sup>60</sup>

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<sup>57</sup> For instance, see Patric Karl Glöde, "Measuring Competition in the Banking Industry," manuscript, April 19, 2005 and the references cited therein. Available at [www.mi.uni-erlangen.de/~snpagloe/competition\\_paper.pdf](http://www.mi.uni-erlangen.de/~snpagloe/competition_paper.pdf).

<sup>58</sup> Changes in minimum risk-based capital requirements described in the Standardized Option may further dampen the likelihood of competitive inequities emerging.

<sup>59</sup> Changes in capital requirements described in the Basel II: Standardized Option would result in an outcome very similar to that described by Alternative A, discussed below. This is because of many similarities between the Standardized Option and the Basel II standardized approach.

<sup>60</sup> QIS-4 does provide one estimate of baseline costs. QIS-4 responses indicate that, on average, institutions would incur 50 percent of their Basel II expenditures even without the rule. This suggests that baseline costs are \$21 million per institution, or an aggregate baseline of \$210 million for the 10 mandatory institutions.

## A. Baseline Scenarios

1. Baseline Scenario: Current capital standards based on the 1988 Basel Accord continue to apply in the United States, but the rest of the world adopts the Basel II framework.

### Description of Baseline Scenario

Under the Baseline Scenario, current capital rules would continue to apply to all banks in the United States, but other countries considering the Basel II framework would adopt it. Other member countries of the Basel Committee on Banking Supervision appear committed to moving forward under Basel II. With respect to uncertainties regarding this baseline scenario, one significant uncertainty is what regulatory proposal would emerge to replace Basel II. Even if the United States rejects the current Basel II proposals, widespread dissatisfaction with current capital rules suggests that a modified Basel II would soon emerge.

### Change in Benefits: Baseline Scenario

Staying with current capital rules while other countries adopt the Basel II framework would eliminate essentially all of the benefits of the rule for banking organizations in the United States. Table 8 lists the benefits of the rule and indicates whether the baseline scenario would capture these benefits. As table 8 makes clear, without the advanced approaches to calculate capital in relation to credit and operational risk, the associated benefits from that calculation disappear. The old capital rules would continue to ignore credit quality differences within the four asset categories, they would not incorporate an explicit capital requirement for operational risk, and market discipline would remain weaker because of the loss of the disclosure requirements of Pillar 3. Abandoning Basel II in the United States would not improve the allocation of capital and hence would not reduce moral hazard. Problems from misaligned capital and risk would persist in the United States. By continuing with current rules, the United States could lose its position of leadership in development and innovation in financial markets, risk measurement, risk management, and risk-based supervision. Benefits from further advances in these areas will likely occur as a result of experience gained working with the advanced approaches, but would probably accrue first to banks in countries that adopt Basel II, and not to U.S. banking organizations.

Under this scenario, banking organizations and banking agencies would lose the important benefits attained with the international consistency and coordination of the 1988 Basel Accord. Organizations in the United States would be operating under a different set of capital rules than organizations abroad. Furthermore, internationally active banking organizations in the United States would have to contend with two sets of capital rules, one for offices in the United States and another set for foreign offices. Although it is uncertain how the adoption of Basel II might affect competition among financial service providers, the difference in capital rules could put internationally active U.S. organizations at a disadvantage if foreign organizations benefit from the better alignment of risk and capital under Basel II.

One advantage of the baseline scenario is that there would be no bifurcation of capital rules within the United States. However, the emergence of different capital rules across national borders would at least partially offset this advantage. Thus, while concerns regarding competition among U.S. financial service providers might diminish in this scenario, concerns regarding cross-border competition would likely increase. Not adopting standards based on Basel II would also only weaken rather than eliminate enhanced supervisory feedback as a benefit. The banking agencies would likely incorporate into their supervisory reviews as much as possible of what they have learned developing guidance for Basel II regarding risk measurement and management. Nonetheless, the absence of the supervisory standards to establish and validate advanced risk measurement approaches would substantially diminish this benefit.

Table 8. Benefit Comparison of Rule with Baseline Scenario

Benefit	Rule	Baseline: No U.S. Basel II
1. Better allocation of capital and reduced impact of moral hazard	Yes	No
2. Improved signal quality of capital	Yes	No
3. Encourages banking organizations to improve credit risk management	Yes	No
4. More efficient use of required capital	Yes	No
5. Incorporates and encourages advances in risk measurement and management	Yes	No
6. Recognizes new developments in financial products	Yes	No
7. Better aligns capital and operational risk and encourages operational risk mitigation	Yes	No
8. Enhances supervisory feedback	Yes	Less
9. Enhanced disclosure promotes market discipline	Yes	No
10. Preserves the benefits of international consistency and coordination	Yes	No
11. Opt-in program offers long-term flexibility to nonmandatory organizations	Yes	No

#### Changes in Costs: Baseline Scenario

While continuing to use current capital rules eliminates most of the benefits of adopting the capital rule, it does not eliminate many costs associated with developing the kinds of systems required for a framework based on Basel II. Because Basel II costs are difficult to separate from an institution's other development costs and ordinary supervisory costs at the banking agencies,

retaining current capital rules would reduce but not eliminate many of the costs associated with the rule.

Table 9 compares cost estimates of the rule with cost estimates of the baseline scenario. As shown, under the rule we estimate that both mandatory and non-mandatory organizations would spend \$42 million on average on implementation-related expenditures. We also estimate that approximately half of those expenses would occur regardless of what happens with the rule. We also estimate that total implementation costs for mandatory organizations would range between \$400 million and \$800 million. If organizations had never begun to prepare for a possible new capital rule based on Basel II, then mandatory organizations would have saved half of those expenses, or between \$200 million and \$400 million. Of course, actual savings from not adopting the rule would be much less because organizations undertook many of the projects behind these expenditures in anticipation of the implementation of Basel II in the United States. However, organizations should be able to fully avoid the estimated \$2.4 million per year in annual recurring expenses attributable to the rule.

Because the United States would be operating under a set of capital rules different from the rest of the world, U.S. banking organizations that are internationally active may face higher costs because they will have to comply with two different sets of capital requirements. Reconciling the needs of international and domestic capital rules may lead to higher system and management costs. While we do not know the exact extent of these higher costs, table 9 shows our estimate of their general direction.

Although overall expenditures would likely be less than the costs of the rule, we estimate that costs may be greater than under the baseline scenario for U.S. banking organizations with foreign operations, reflecting the need to operate under two different regulatory capital regimes. As shown in table 9, these potentially higher costs apply not only to startup compliance costs, but also to annual recurring expenses. Similarly, the higher implicit costs shown in table 9 under the baseline scenario reflect the additional time and inconvenience of having to navigate two separate capital systems.

Retaining current capital rules does imply that banking organizations would be able to eliminate many of the implicit costs associated with the rule. In particular, mandatory and opt-in organizations would be able to avoid future time and inconvenience costs of becoming and remaining compliant with the rule. Because the rule includes new requirements for ongoing reporting, disclosure, and validation, abandoning the rule implies that senior management would also have to spend substantially less time and attention on issues arising because of capital requirements. However, it is likely that banks would engage in at least some of these activities regardless of any rulemaking as they incorporate desirable advances in risk management practices on their own.

Table 9. Cost Comparison of Rule with Baseline Scenario

Cost Estimate	Rule	Baseline: No U.S. Basel II
Compliance Cost per Mandatory Organization	\$42 million	Likely less than rule
Pure Basel II Expenditures per Mandatory Organization	\$21 million	Likely less than rule
Annual Recurring Expenditures	\$2.4 million	Likely less than rule
OCC Training Expenditures	\$1.5 mil. to date and future expenditures	Likely future expenditures on a revised rule
OCC Guidance Development Expenditures	\$5.4 mil. to date and decreasing future expenditures	Likely increased future expenditures
OCC Basel II Supervision Expenditures	\$3.0 mil. to date and future expenditures	Uncertain future expenditures
Implicit Costs	Not Monetized	Possibly more than rule

If work on Basel II had never begun, then banking agency costs in addition to current expenditure levels would have been close to zero. However, as discussed earlier, it is difficult to separate Basel II supervision from work related to ordinary safety and soundness examinations. To the extent that past supervision expenditures would have occurred without Basel II, especially those related to risk measurement and risk management, those supervision expenditures would continue even without the rule. Even if the rule were dropped, the original concerns that led to the rule would remain, and likely would require some sort of policy response. In that case, banking agency costs could increase depending on the regulatory response. Aside from the costs for guidance and training, U.S. banking agencies would likely see expenditures repeated in these areas as they prepare a modified proposal. However, supervisory expenditures would probably not disappear because the presence of Basel II rules in the rest of the world may increase the need for additional supervisory activities at internationally active organizations.

## B. Policy Alternatives

In order to compare costs and benefits under the rule with the costs and benefits of reasonable options, we consider three possible alternatives to the U.S. implementation of Basel II. The first alternative examines how costs and benefits might change if the new capital rule permitted all U.S. banking organizations to choose among all three Basel II credit risk approaches. The second alternative looks at costs and benefits if the new rule allowed all U.S.

banking organizations to choose among all three Basel II operational risk approaches.<sup>61</sup> The third alternative would follow the rule except that it considers the effects of changing the size threshold for determining a mandatory organization. Again, for purposes of comparison, we normalize baseline costs and benefits to zero and contrast estimated costs and benefits of the rule and the three alternatives with these normalized baselines.

1. Alternative A: Permit U.S. banking organizations to choose among all three Basel II credit risk approaches.

#### Description of Alternative A

Under Alternative A, all U.S. banking organizations would choose which of the three Basel II credit risk approaches they would like to use. The Basel II framework offers banks a choice of three methodologies for calculating regulatory capital for credit risk. These choices include the Standardized Approach, the foundation internal ratings based approach (Foundation IRB), and the Advanced IRB approach used in the U.S. implementation.

The Standardized Approach refines the standardized risk weighting approach of the 1988 Accord to make the weights more risk sensitive. It also uses external credit ratings to help determine which risk weight an asset should receive. Under both the Foundation and Advanced Approaches, banking organizations use risk-weight formulas provided in supervisory guidance. These formulas incorporate the following risk components: probability of default, loss given default, exposure at default, and maturity. Under the Foundation Approach, organizations provide their own measure of probability of default, but use estimates provided by banking supervisors for the other risk components. Under the Advanced Approach, organizations provide their own estimates for each of the risk components.

There are two important distinctions between the rule and Alternative A. Under the rule, the vast majority of banking organizations in the United States are nonmandatory organizations and would only incur compliance costs if they choose to opt in for the Advanced Approach. Otherwise, they continue using current capital rules and incur no direct costs under the rule. Under Alternative A, all U.S. banking organizations would have to select one of the three Basel II methodologies and incur the costs of converting to new capital regulations. The second important distinction is that the rule does include a small set of mandatory organizations, i.e., those organizations must adopt the Advanced IRB approach to credit risk. Under Alternative A, all organizations would be able to select which of the three Basel II methodologies they wish to use.

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<sup>61</sup> The three Basel II approaches to credit risk are the Standardized Approach, the Foundation IRB Approach, and the Advanced IRB Approach. The three operational risk approaches are the Basic Indicator Approach, the Standardized Approach, and the Advanced Measurement Approaches. We briefly described these approaches earlier in the analysis. Because of similarities between the Standardized Option and the Basel II Standardized Approach, adoption of the Standardized Option could result in an outcome similar to that described in Alternative A.



### Change in Benefits: Alternative A

The principal benefit of Alternative A that the rule does not achieve is the increased flexibility of the regulation for what would be mandatory organizations under the rule. Organizations that are not ready to adopt the Advanced IRB approach to credit risk under the rule could choose to use the Foundation IRB methodology or even the Standardized Approach. While under the rule, nonmandatory organizations have the choice of the Advanced IRB approach or staying with current capital rules, Alternative A would open up the Foundation IRB approach to any bank and would make all organizations nonmandatory. The Foundation IRB approach could be an attractive alternative to organizations considering opting into the Advanced IRB approach under the rule. The Standardized Approach would provide more risk sensitivity than current capital rules.

How Alternative A might affect benefits depends entirely on how many organizations select each of the three available options. The degree of risk sensitivity changes with each of the Basel II options, and many of the benefits of the rule relate directly to achieving better capital allocation through increased sensitivity to risk. Thus, the benefits derived from that risk sensitivity depend on how many organizations select the more risk sensitive options.

Based on these relative degrees of risk sensitivity of each Basel II option, table 10 gives a qualitative sense of how benefits might change under Alternative A compared to the rule. If all U.S. banking organizations selected the Standardized Approach, then benefit accrual would likely be much lower than the rule because no banking organization would be taking advantage of the Advanced Approaches to risk measurement and management. On the other extreme, if all banking organizations selected the Advanced IRB approach, then the benefits derived from so many organizations incorporating advanced risk measurement techniques would likely be higher than the aggregated benefits under the rule. However, because the rule does allow all organizations to opt into the Advanced Approaches and we know that only a few organizations are likely to do so, we know that the cost of adopting the Advanced IRB approach appears too expensive for smaller organizations for now. It seems more probable that choices might fall close to where they would be under the rule, with large internationally active organizations choosing the Advanced IRB approach and other organizations choosing the Standardized Approach. If this were the case, then benefits under the rule and Alternative A would be fairly close to each other.

Benefits from sources other than increased risk sensitivity should be approximately the same under either the rule or Alternative A. As shown in table 10, Alternative A would enhance supervisory feedback, incorporate market discipline into the regulatory framework, and would actually increase international consistency and coordination because Alternative A is closer than the rule to Basel II implementation in other countries. Presumably under Alternative A, banking organizations would be able to change their selected option over time, and this would maintain the rule's benefit of the long-term flexibility for nonmandatory organizations. Because all U.S. banking organizations would have to select one of the Basel II options, these benefits would apply to more organizations under Alternative A than with the rule. Consequently, the cumulative benefits from these sources might actually be greater under Alternative A. Also, assuming the operational risk rules would be the same for Alternative A and the rule, the operational risk benefits would remain unchanged.

Table 10. Benefit Comparison of Rule with Alternative A

Benefit	Rule	Alternative A: Credit Risk Approaches		
		Standardized	Foundation	Advanced
1. Better allocation of capital and reduced impact of moral hazard	High	Low	Medium	High
2. Improved signal quality of capital	High	Low	Medium	High
3. Encourages banking organizations to improve credit risk management	High	Low	Medium	High
4. More efficient use of required capital	High	Low	Medium	High
5. Incorporates and encourages advances in risk measurement and management	High	Low	Medium	High
6. Recognizes new developments in financial products	High	Low	Medium	High
7. Better aligns capital and operational risk and encourages operational risk mitigation	Yes	Yes	Yes	Yes
8. Enhances supervisory feedback	Yes	Yes	Yes	Yes
9. Enhanced disclosure promotes market discipline	Yes	Yes	Yes	Yes
10. Preserves the benefits of international consistency and coordination	Yes	Yes	Yes	Yes
11. Opt-in program offers long-term flexibility to nonmandatory organizations	Yes	Yes	Yes	Yes

Changes in Costs: Alternative A

The most significant drawback to Alternative A is the increased cost of applying a new set of capital rules to all U.S. banking organizations. The vast majority of banking organizations in the United States would incur no direct costs from new capital rules under the rule. Under Alternative A, direct costs would increase for every U.S. banking organization that would have continued with current capital rules under the rule. Although it is not clear how high these costs might be, general organizations would face higher costs because they would be changing capital rules regardless of which option they choose under Alternative A.

Table 11 shows how Alternative A might affect costs. We assume that the cost of adopting the Advanced Approaches would be the same under either Alternative A or the rule. Because of the complexity of the Advanced IRB approach relative to the Standardized and Foundation IRB approaches, we expect that the costs of complying with the Foundation IRB approach would be less than the Advanced IRB approach, but we do not know how much less.

Similarly, the cost of complying with the Standardized Approach should be less than the cost of complying with the Foundation IRB approach. However, even though adopting the Standardized Approach is likely the least costly of the three Basel II options, because every U.S. banking organization must bear at least the cost of the Standardized Approach, we expect that the aggregate cost of Alternative A would be greatly higher than the rule. For instance, if each bank spends just \$100,000 adopting the Standardized Approach, with more than 7,000 banking organizations in the United States, the aggregate cost for these institutions would be \$700 million. This considerable amount would be in addition to expenditures made by mandatory and opt-in organizations. Clearly, by requiring expenditures from all U.S. banking organizations, the cost of the alternative rises considerably.

For similar reasons, government administrative costs would be higher under Alternative A than under the rule. We would expect an increase in training, guidance development, and supervision expenditures. Government costs would be higher because rather than training and guidance development for just the Advanced IRB approach, Alternative A would entail guidance development and training for the Standardized and Foundation IRB approaches as well. Costs would also be higher for training and supervision under Alternative A because these activities would have to be conducted for all U.S. banking organizations rather than just the mandatory and opt-in organizations envisioned under the rule.

Adopting Alternative A rather than the rule would probably drive up the implicit costs of capital regulation, but not have much effect on competition among providers of financial services. Implicit time and inconvenience costs would likely increase because the new capital rules would apply to so many more organizations under Alternative A than under the rule.

Differences between Alternative A and the rule should not affect the competitive landscape to a significant degree because different capital rules will still apply to different organizations, much like the rule's bifurcation of capital rules. However, Alternative A could have less of an effect on competition than the rule because the Standardized Approach is more risk sensitive than current capital rules. Thus, the improved alignment of risk and capital available to organizations following the Standardized Approach should diminish any unintended advantage accruing to organizations that adopt the Advanced Approaches.

Table 11. Cost Comparison of Rule with Alternative A

Cost Estimate	Rule	Alternative A: Credit Risk Approaches		
		Standardized	Foundation	Advanced
Compliance Cost per Mandatory Organization	\$42 million	Low	Medium	High: same as rule for organizations adopting the advanced approach
Compliance Cost per Non-mandatory Organization	\$0 for general organizations	Low, but greater than zero	Medium	High: same as rule for organizations opting-into the advanced approach
Pure Basel II Expenditures per Mandatory Organization	\$21 million	Low	Medium	High: same as rule for organizations adopting the advanced approach
Annual Recurring Expenditures	\$2.4 million	Low	Medium	Same for organizations adopting the advanced approach
OCC Training Expenditures	\$1.5 mil. to date and future expenditures	Higher than the Rule, reflecting additional training for standardized and foundation approaches		
OCC Guidance Development Expenditures	\$5.4 mil. to date and decreasing future expenditures	Higher than the Rule, reflecting additional guidance development for standardized and foundation approaches		
OCC Basel II Supervision Expenditures	\$3.0 mil. to date and future expenditures	Perhaps higher than the Rule, reflecting additional supervision for standardized and foundation approaches		
Implicit Costs	Not Monetized	Low	Medium	High, same as rule

- Alternative B: Permit U.S. banking organizations to choose among all three Basel II operational risk approaches.

#### Description of Alternative B

Under Alternative B, all U.S. banking organizations would choose which of the three Basel II operational risk approaches they would like to use. The Basel II framework offers banks a choice of three methodologies for calculating regulatory capital for operational risk. These choices include the Basic Indicator Approach, the Standardized Approach, and the Advanced Measurement Approaches (AMA). The rule only allows mandatory and opt-in organizations to use the AMA methodology.

The Basic Indicator and Standardized Approaches use a formula based on an organization's gross income to determine the capital requirement for operational risk. Capital for

operational risk under the Basic Indicator Approach is 15 percent of an organization's annual gross income averaged over three years. The Standardized Approach is similar to the Basic Indicator Approach, but organizations calculate the capital requirement for operational risk for each of eight business lines. The percentage of gross income varies from 12 to 18 percent for the different business lines. Under the AMA, organizations use their own method for assessing their exposure to operational risk. With the AMA, the method an organization uses needs supervisory approval and must be comprehensive and systematic.

We assume that under Alternative B the provisions of the rule with respect to capital for credit risk would remain intact. In other words, mandatory organizations would use the Advanced IRB approach for credit risk while general organizations would remain under current capital rules for credit risk. However, all U.S. banking organizations would have to choose among the three approaches to operational risk capital. As with Alternative A, there are two important distinctions between the rule and Alternative B. Under the rule, the vast majority of banking organizations in the United States are nonmandatory organizations and would only incur compliance costs if they choose to opt-in for the AMA. Otherwise they continue using current capital rules and incur no direct costs under the rule. Under Alternative B, all U.S. banking organizations would have to select one of the three Basel II methodologies for operational risk and incur the costs of converting to new capital regulations. The second distinction is that the rule includes a small set of mandatory organizations, whereas under Alternative B, all organizations would be able to select any of the three Basel II methodologies for operational risk.

#### Change in Benefits: Alternative B

The operational risk approach that organizations ultimately choose will determine how the overall benefits of the new capital regulations would change under Alternative B. Because the Standardized Approach aims for greater risk sensitivity than the Basic Indicator Approach and the AMA is more sensitive than the Standardized Approach, the effect of implementing Alternative B will depend on how many and which organizations select each approach.

Table 12 shows how the benefits of the rules vary across the three operational risk options. The impact of Alternative B on the benefits largely parallels the earlier discussion of credit risk under Alternative A. Computing explicit capital for operational risk better aligns capital with measured risk, and should improve the signal quality of required capital as an indicator of risk. Explicitly incorporating operational risk into regulatory capital rules would make the capital standards more robust to the development of new types of financial products and services, and would encourage advances in risk measurement and management. Also, aggregate benefits would be higher if more organizations choose the more risk-sensitive approaches to operational risk.

Because of the varying degrees of risk sensitivity of the three approaches, as more organizations select the Basic Indicator Approach, there will be less of a benefit from aligning capital and operational risk. This benefit will increase as more organizations opt for the more risk sensitive Standardized Approach and AMA. An explicit capital charge for operational risk also encourages banking organizations to take steps to reduce operational risk. The AMA gives an organization considerable scope to recognize the impact of better risk management in the operational risk capital requirement. However, because both the Basic Indicator and

Standardized Approaches of Alternative B simply relate capital for operational risk to measures of income, there is little opportunity to use risk management to reduce required capital; an organization could only reduce the income on which the capital calculation is based. For this reason, both the Basic Indicator and Standardized Approaches show a lower level of potential benefit relative to the AMA.

Table 12. Benefit Comparison of Rule with Alternative B

Benefit	Rule	Alternative B: Operational Risk Approaches		
		Basic	Standardized	AMA
1. Better allocation of capital and reduced impact of moral hazard	High	Low	Medium	High
2. Improved signal quality of capital	High	Low	Medium	High
3. Encourages banking organizations to improve credit risk management	High	Low	Medium	High
4. More efficient use of required capital	High	Low	Medium	High
5. Incorporates and encourages advances in risk measurement and management	High	Low	Medium	High
6. Recognizes new developments in financial products	High	Low	Medium	High
7. Better aligns capital and operational risk and encourages operational risk mitigation	High	Low	Medium	High
8. Enhances supervisory feedback	Yes	Yes	Yes	Yes
9. Enhanced disclosure promotes market discipline	Yes	Yes	Yes	Yes
10. Preserves the benefits of international consistency and coordination	Yes	Yes	Yes	Yes
11. Opt-in program offers long-term flexibility to nonmandatory organizations	Yes	Yes	Yes	Yes

#### Changes in Costs: Alternative B

As was the case with Alternative A, the most significant drawback to Alternative B is the increased cost of applying a new set of capital rules to all U.S. banking organizations. Under Alternative B, direct costs would increase for every U.S. banking organization that would have continued to use current capital rules under the rule. It is not clear how much it might cost organizations to adopt these capital measures for operational risk, but general organizations would face higher costs because they would be changing capital rules regardless of which option

they choose under Alternative B. As with Alternative A, because there are over 7,000 banking organizations in the United States, every \$100,000 that each bank has to spend to determine capital for operational risk translates into over \$700 million in costs for the U.S. banking industry. Because it would directly affect many more institutions, the cost of Alternative B could potentially be much higher than the rule.

Table 13 shows how Alternative B might affect costs. While we are not able to estimate how much it will cost organizations to implement each of the operational risk options, the simple formula used under the Basic Indicator and Standardized Approaches suggest that these costs would not be great. Standards and data requirements necessary under the AMA suggest that this option would be expensive for organizations that do not already have an independent operational risk management function. For this reason, we expect that most general organizations would select either the Basic Indicator or Standardized Approach if given the choice under Alternative B. As table 13 shows, we estimate that the costs under Alternative B would be similar to the costs of Alternative A. Costs for mandatory organizations choosing AMA under Alternative B would be the same as the rule, while costs would likely be lower for organizations selecting either the Basic Indicator Approach or the Standardized Approach.

Costs for nonmandatory organizations that do not select the AMA would be greater than what they would incur under the rule. However, we would not expect their implementation costs to be high and the annual recurring expenses after implementation would likely be close to zero. Because each of these organizations would likely incur time and inconvenience costs in converting to an explicit capital charge for operational risk, we suggest in table 13 that the implicit costs of Alternative B could be higher than under the rule.

Because Alternative B would apply operational risk calculations to all U.S. banking organizations, government administrative costs would likely increase under this alternative. The banking agencies would have to develop guidance for the two operational risk options that are available with Alternative B but not with the rule. The agencies would also have to extend training to a wider group of examiners in order to accommodate the wider application of the operational risk rules. Supervision costs under Alternative B should not be much more than under the rule because of the simple formulas of the Basic Indicator and Standardized Approaches. However, supervisory costs would increase with the number of organizations that select the more complex AMA.

Table 13. Cost Comparison of Rule with Alternative B

Cost Estimate	Rule	Alternative B: Operational Risk Approaches		
		Basic	Standardized	AMA
Compliance Cost per Mandatory Organization	\$42 million	Low	Medium	High: same as rule for organizations adopting AMA
Compliance Cost per Non-mandatory Organization	\$0 for general organizations	Low, but greater than zero	Medium	High: same as rule for organizations opting-into AMA
Pure Basel II Expenditures per Mandatory Organization	\$21 million	Low	Medium	High: same as rule for organizations adopting AMA
Annual Recurring Expenditures	\$2.4 million	Low	Medium	Same for organizations adopting AMA
OCC Training Expenditures	\$1.5 mil. to date and future expenditures	Higher than the Rule, reflecting additional training for basic and standardized approaches		
OCC Guidance Development Expenditures	\$5.4 mil. to date and decreasing future expenditures	Higher than the Rule, reflecting additional guidance development for basic and standardized approaches		
OCC Basel II Supervision Expenditures	\$3.0 mil. to date and future expenditures	Perhaps higher than the Rule, reflecting additional supervision for basic and standardized approaches		
Implicit Costs	Not Monetized	Low	Medium	High, same as rule

3. Alternative C: Use a different asset amount to determine a mandatory organization.

Description of Alternative C

Under Alternative C, we look at a range of alternatives by considering the effects of changing the threshold amounts for mandatory organizations. Mandatory organizations under the rule have at least \$250 billion in consolidated assets or \$10 billion in foreign exposures. As reported earlier, 10 organizations meet the mandatory thresholds according to Call Report data as of December 31, 2006. In table 14, we show how raising or lowering the thresholds affects the number of mandatory organizations and the share of both total assets and foreign assets held by mandatory organizations.



Table 14. Organizations Meeting Alternative Mandatory Criteria as of December 31, 2006

Mandatory Thresholds Total Assets : Foreign Assets	Number of Mandatory Organizations	Share of Total Assets	Share of Total Foreign Assets
\$400 Billion : \$16 Billion	7	42%	94%
\$350 Billion : \$14 Billion	7	42%	94%
\$300 Billion : \$12 Billion	10	47%	96%
<b>\$250 Billion : \$10 Billion</b>	<b>10</b>	<b>47%</b>	<b>96%</b>
\$200 Billion : \$8 Billion	11	49%	97%
\$150 Billion : \$6 Billion	14	53%	97%
\$100 Billion : \$4 Billion	20	59%	98%
\$50 Billion : \$2 Billion	35	67%	99%

As table 14 shows, the number of mandatory organizations decreases slowly as the size threshold increases. The number of mandatory organizations begins to grow more quickly the more the threshold decreases. Under the rule, mandatory organizations would account for 47 percent of total banking assets and 96 percent of total foreign assets. The shares gradually rise to 67 percent of total assets and 99 percent of foreign assets as the threshold decreases, and decreases to 42 percent of total assets and 94 percent of foreign assets as the threshold increases.

#### Change in Benefits: Alternative C

Under Alternative C, the framework of the rule would remain the same and only the number of mandatory organizations would change. Because the structure of the implementation would remain intact, Alternative C would capture the same array of benefits as the rule. However, because these benefits derive from applying the rule to individual banking organizations, changing the number of organizations affected by the rule will change the scale of the benefits achieved. For instance, while the implementation of Basel II would help to improve the signal quality of capital at mandatory and opt-in organizations, fewer organizations would emit this improved signal as the mandatory thresholds increase, and more organizations would as the size thresholds fall.

Generally, the benefits associated with the rule will rise and fall with the number of mandatory organizations. Table 15 reflects this tendency, showing that the benefits of the rule would tend to increase as the thresholds decline and more organizations become mandatory organizations. On the other hand, the cumulative effect of each benefit would tend to diminish as the thresholds increase and the number of mandatory organizations decreases.

Table 15. Benefit Comparison of Rule with Alternative C

Benefit	Rule	Alternative C: Lower Thresholds	Alternative C: Higher Thresholds
1. Better allocation of capital and reduced impact of moral hazard	Yes	Increasing	Decreasing
2. Improved signal quality of capital	Yes	Increasing	Decreasing
3. Encourages banking organizations to improve credit risk management	Yes	Increasing	Decreasing
4. More efficient use of required capital	Yes	Increasing	Decreasing
5. Incorporates and encourages advances in risk measurement and management	Yes	Increasing	Decreasing
6. Recognizes new developments in financial products	Yes	Increasing	Decreasing
7. Better aligns capital and operational risk and encourages operational risk mitigation	Yes	Increasing	Decreasing
8. Enhances supervisory feedback	Yes	Increasing	Decreasing
9. Enhanced disclosure promotes market discipline	Yes	Increasing	Decreasing
10. Preserves the benefits of international consistency and coordination	Yes	Increasing	Decreasing
11. Opt-in program offers long-term flexibility to nonmandatory organizations	Yes	Decreasing	Increasing

Externalities associated with capital imply that most benefits to the banking industry and society will rise and fall with the number of mandatory organizations. However, lowering the mandatory thresholds removes the flexibility that opting-in provides for many organizations under the rule. This is reflected in benefit 11 in table 15, where the flexibility offered by the opt-in program is the one benefit that decreases as the thresholds decrease and increases as the thresholds increase. This flexibility allows most organizations to judge for themselves the appropriate timing for adoption of the Advanced Approaches.

#### Change in Costs: Alternative C

Because Alternative C would change the number of mandatory organizations subject to the rule, aggregate costs will rise or fall with the number of mandatory organizations. We assume that the average cost of complying with the Advanced Approaches would be relatively consistent across organizations. Table 16 compares estimated costs of the rule and two possible thresholds under Alternative C. Table 16 shows that aggregated costs for compliance would increase to \$1.5 billion if there were 35 mandatory organizations, compared to \$420 million for 10 organizations under the thresholds. Aggregate costs would decline to \$294 million if only 7 organizations were mandatory, which would be the case if the total asset and foreign exposure

thresholds were \$400 billion and \$16 billion, respectively. Our estimates of pure implementation expenditures and annual recurring expenditures change in similar ways.

Table 16. Cost Comparison of Rule with Alternative C

Estimate	Estimated Aggregate Costs		
	Lower Thresholds (\$50 bil. & \$2 bil.)	Thresholds (\$250bil. & \$10bil.)	Higher Thresholds (\$400 bil. & \$16 bil.)
Number of Mandatory Organizations	35	10	7
Compliance Cost for Mandatory Organizations	\$1,470 mil.	\$420 mil.	\$294 mil.
Compliance Cost per Non-mandatory Organization	\$0 for general organizations	\$0 for general organizations	\$0 for general organizations
Pure Basel II Expenditures for Mandatory Organizations	\$735 mil.	\$210 mil.	\$147 mil.
Annual Recurring Expenditures	\$84.0 mil	\$24.0 mil.	\$16.8 mil.
OCC Training Expenditures	Higher	\$1.5 mil. to date and future expenditures	Lower
OCC Guidance Development Expenditures	Same	\$5.4 mil. to date and decreasing future expenditures	Same
OCC Basel II Supervision Expenditures	Higher	\$3.0 mil. to date and future expenditures	Lower
Implicit Costs	Higher	Not Monetized	Lower

Government administrative costs would not vary much as the number of mandatory organizations changes. Expenditures for developing guidance, in particular, should not change at all. Training would have to increase as the number of mandatory organizations increases, so training expenditures would increase. Similarly, training costs would fall slightly as the number of mandatory organizations falls. The number of opt-in organizations would also be likely to affect training costs. If a change in the number of opt-in organizations completely offsets the change in mandatory organizations, then training costs would not change. This also holds true for the costs of supervision. Because there would be more mandatory organizations to supervise if thresholds are lower, supervision costs would likely increase, and costs would probably decrease as the number of mandatory organizations decreases. However, these costs would

ultimately depend on the number and nature of the organizations using the Advanced Approaches, and this depends in part on the number of organizations that elect to opt in.

We would also expect implicit costs to rise and fall with the number of organizations that adopt the Advanced Approaches. With more organizations affected by the new rules, the aggregate implicit time and inconvenience costs of adapting to new rules would increase. Again, this number ultimately depends on the combined number of mandatory organizations and organizations that choose to opt in. Increasing the number of mandatory organizations is likely to be mostly offset by a decrease in the number of opt-in organizations if the organizations just below the threshold are the institutions most likely to opt in anyway.

### C. Overall Comparison of Rule with Baseline and Alternatives

An objective of banking regulation is to ensure the safety and soundness of the banking system. Capital helps achieve this objective by protecting banking organizations against insolvency. Moral hazard and asymmetric information are market failures that could lead banking organizations to hold less than a socially optimal level of capital. Capital regulation addresses these market failures and compels banking organizations to meet minimum capital requirements. Advances in risk measurement and risk management since the adoption of the first Basel Accord in 1988 make it possible to better align capital and risk.

The Basel II framework and its U.S. implementation is an attempt to incorporate risk measurement and risk management advances into capital requirements. Risk-sensitive capital requirements are integral to ensuring an adequate capital cushion to absorb financial losses at large complex financial institutions. In implementing the Basel II Advanced Approaches in the United States, the agencies' intent is to achieve risk-sensitivity while maintaining a regulatory capital regime that is as rigorous as the current system. Total capital requirements under the advanced approaches, including capital for operational risk, will better allocate capital in the system. This will occur regardless of whether the minimum required capital at a particular institution is greater or less than it would be under current capital rules. In order to ensure that we achieve our goal of increased risk-sensitivity without loss of rigor, the regulation provides a means for the agencies to identify and address deficiencies in the capital requirements that may become apparent during the transition period.

Although the anticipated benefits of the regulation are difficult to quantify in dollar terms because of measurement problems, the OCC is confident that the anticipated benefits will exceed the anticipated costs of this regulation. On the basis of our analysis, we believe that the benefits of the rule are significant, durable, and hold the potential to increase with time. The offsetting costs of implementing the rule are also significant; however, these appear to be largely start-up costs, and many of these start-up costs are costs the organizations would bear anyway as part of ongoing efforts to improve the quality of internal risk measurement and management. Costs of ongoing operation under the advanced approaches seem to be fairly modest. Against these costs, the significant benefits of the more risk-sensitive approach suggest that the rule offers an improvement over the baseline scenario.

With regard to the three alternative approaches we consider, the rule offers an important degree of flexibility, while significantly restricting its cost, by limiting its initial application to large, complex, internationally active banking organizations. Alternatives A and B introduce more flexibility from the perspective of the large mandatory organizations, but impose costs on other organizations. Either Alternative A or B would compel these organizations to select a new set of capital rules and require them to undertake the time and expense of adjusting to these new rules. Alternative C would change the number of mandatory organizations. If the number of mandatory organizations increases, then the new rule would lose some of the flexibility it achieves with the opt-in option, and costs would increase as more organizations incur the expense of adopting the Advanced Approaches. Decreasing the number of mandatory organizations would decrease the aggregate social good of each benefit achieved with the rule. The rule offers a better balance between costs and benefits than any of the three alternatives.