The Potential Impact of Explicit Basel II Operational Risk Capital Charges on the Competitive Environment of Processing Banks in the United States[*]

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January 12, 2005

Executive Summary

Basel II replaces Basel I's implicit capital charge on operational risk with an explicit charge. Certain U.S. banks concentrated in processing-related business lines – which have significant operational risk – could thus face an increase in overall minimum regulatory capital requirements. Some have argued that, as a result, these so-called "processing banks" would be disadvantaged vis-à-vis competitors not subject to regulatory capital requirements for operational risk.

This paper evaluates these concerns. To do so, we first describe the five markets where processing banks have concentrated their activities: securities custody, institutional asset management, mutual fund management, private wealth management, and general processing. Second, we investigate whether the major competitors in each market are expected to be subject to regulatory capital requirements for operational risk. Third, we consider whether the processing banks would actually need to raise capital to accommodate the new operational risk charge.

[*] The opinions expressed in this paper do not necessarily reflect those of the Federal Reserve Bank of Boston or the Federal Reserve Board.

The information we gather suggests that processing banks are well positioned for the introduction of an explicit operational risk charge. In global custody, almost all competitors are banks that are expected to adopt Basel II. The likelihood that the operational risk charge would have a competitive impact on the processing banks in this business line thus appears small.

In institutional asset management, the main competitors who will not be subject to a regulatory charge for operational risk are firms that specialize in asset management and are not part of a bank holding company or other financial conglomerate structure. These "stand-alone" asset managers' high equity-to-assets ratios suggest that the market already requires them to hold capital sufficient to cover their operational risk exposures. The asset management affiliates of two European insurance groups also rank among the top institutional asset managers. However, both of these insurance groups already incorporate operational risk in their internal risk-based capital calculations.

The processing banks do not have a dominant presence in the mutual fund market. Only one processing bank ranks among the top thirty U.S. mutual fund providers, and that bank is expected not to be required to adopt Basel II. Thus, it would seem that the new operational risk charge is not a significant competitive issue in this business line. In any case, the main competitors in mutual fund management who would not be subject to an operational risk charge are stand-alone asset managers, who appear highly capitalized and might not need to raise additional capital even if subject to Basel II.

Three processing banks rank among the top U.S. private wealth managers. They face competition in this market from investment banks, large U.S. banks, and foreign banks, all of which are expected to face regulatory capital requirements for operational

risk. Smaller U.S. banks that will not be required to adopt Basel II – and will thus not be subject to an explicit capital charge for operational risk – are also active in this market. However, these banks would remain subject to Basel I's implicit operational risk charge, and are expected to face higher overall minimum regulatory capital requirements than if they were to opt in to Basel II.

In general processing, competitors include many other financial firms that are expected to face a regulatory capital requirement for operational risk. Processing banks also face potential competition from firms that are not subject to capital regulation. However, these non-financial competitors tend to be highly capitalized – as evidenced by their high equity-to-assets ratios – and do not have the benefits from the federal safety net that banks enjoy. Although they are not subject to any regulatory capital requirement, these firms appear to be subject to a market-determined capital requirement to cover all of their risks including operational risk. Thus, the playing field in general processing appears level in the sense that banks will be held by the regulators to certain capital standards under Basel II, and non-banks will be held to similar or higher standards by the market. The competitive impact of the operational risk capital charge in the processing business line could be blunted further by the fact that many processing services are bundled with custody services, a business line where almost all of the major providers are banks that are expected also to face an operational risk charge.

We next consider the relationship among minimum regulatory capital requirements and other capital measures at the processing banks to evaluate whether an increase in regulatory capital requirements might force these banks to raise additional capital. We address two questions in this regard: whether the processing banks are

currently holding capital in excess of minimum regulatory requirements, and whether they are doing so because they are already being required by the market to hold sufficient capital to cover their operational risks. If the market currently demands a significant capital "buffer" over current minimum regulatory requirements that do not include an explicit operational risk capital charge, it is unlikely that Basel II would require the bank to raise additional capital.

We find that the U.S. processing banks hold a significant amount of capital in excess of current regulatory minima. The results are suggestive that the processing banks would be able to align regulatory capital with levels suggested by their internal models without raising additional capital. In fact, the amount of capital actually held by processing banks – either because of market or rating agencies' demands or because of their own internal risk evaluations – suggests that these institutions may already be holding capital for operational risk.

These arguments and evidence suggest that the potential competitive effects of the Basel II operational risk charge will be, at most, modest. The processing banks hold considerable capital in excess of the regulatory minima under Basel I, suggesting that they are already covering their operational risks in order to satisfy market/rating agency demands. Furthermore, many of the processing banks' competitors are banks and other firms who will likely face a regulatory charge for operational risk. Although the processing banks also compete against firms that will not face an explicit operational risk charge, the market appears to require these latter firms to hold sufficient capital to cover their operational risk exposure.

This having been said, the operational risk charge under Basel II could still reduce the buffer between actual capital held and minimum regulatory requirements to levels below what is desired by management for financial flexibility. If, as a result, processing banks raised additional capital, their costs could rise, adversely impacting their competitive position. Although our analysis of capital ratios *suggests* that U.S. processing banks are most likely to be able to accommodate the new charge for operational risk without increasing total actual capital levels, the analysis is not definitive. If the processing banks' total actual capital held does increase due to Basel II, and the non-banks' total actual capital held is unchanged, processing banks could face reduced profits or market share.

However, this possibility should be viewed in perspective. Although the minimal leverage (i.e., high equity-to-assets ratios) displayed by non-banks does not eliminate the potential for a competitive impact on banks, it does affect the interpretation of this possible impact. As none of the non-banks has access either to the federal safety net provided to banks or faces any regulatory capital requirements, their relatively high equity-to-assets ratios could be considered a proxy for the capital the market requires for asset management and processing activities. Thus, even if the operational risk charge leads to an increase in total actual capital held by processing banks, it appears that the new requirements would still be less than the amount of capital held by prudently-run asset management and processing firms that do not have access to the benefits of the federal bank safety net.

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Abstract

This paper considers the potential competitive impact of the Basel II capital charge for operational risk. Some have expressed concerns that this new charge could lead to an increase in total minimum regulatory capital for U.S. processing banks, as they face more operational risk relative to credit risk than most other banking organizations. In this case, some believe that processing banks could be placed at a competitive disadvantage vis-à-vis some of their competitors who do not face a similar charge for operational risk. To address these concerns, we consider the processing banks' main business activities: custody, general processing, and asset management. We find that in custody, the main competitors are banks, almost all of which are expected to face an operational risk charge under Basel II. In processing, many non-bank competitors display a minimal degree of financial leverage, and thus appear to have higher capital levels than the processing banks would be required to have under Basel II. In asset management, many competitors are expected to face Basel II-based capital charges for operational risk, or already have much higher capital ratios than the processing banks. We also note that the 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. Overall, the information we present suggests that the competitive effects of the Basel II operational risk charge will be, at most, extremely modest.

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[*] The opinions expressed in this paper do not necessarily reflect those of the Federal Reserve Bank of Boston or the Federal Reserve Board. The authors thank Linda Barriga, Robert Crepinsek, Kimberly DeTrask, Kabir Dutta, Amy Kingsley, Paul Marcotte, Cynthia Martin, Peter McAvoy, Phil Patch, Jason Perry, Michael Ravid, Ricki Sears, and Maureen Tighe for their significant contributions. We also thank Roger Cole, Steven Durfey, Edward Ettin, Diana Hancock, Erik Heitfield, Daryl Hendricks, Beverly Hirtle, David Jones, Myron Kwast, Michael Macchiaroli, Eugene Morris, Mark O'Dell, Mark Schittig, Amrit Sekhon, and Mitch Stengel for their helpful comments on an earlier draft of this paper.

1. Introduction

Over the past decade, financial institutions have been developing statistical models to assess their overall risk profile, and to ensure that capital is sufficient to cover unexpected losses. Such models, generally referred to as economic capital models, have many applications. In addition to serving as risk management and measurement tools, economic capital models are used to guide investment decisions and determine executive compensation.

As financial institutions have increased the sophistication of their economic capital models, they have also expanded the range of risks they attempt to measure. One area where significant progress is being made in this regard is the measurement of operational risk. Traditionally, operational risk exposure was either measured in an *ad hoc* manner (e.g., as a fixed percent of revenues) or was not measured at all. Many banks have now incorporated operational risk in their economic capital models, and are using the models' output to allocate operational risk capital across the organization. Some are even publicly disclosing estimates of their aggregate operational risk exposure, together with the capital that they hold for operational risk.

As banks have developed improved economic capital models, regulators have undertaken a concerted effort to incorporate the improvements into regulatory capital requirements. The intent is to use the principles of economic capital to better align minimum regulatory capital requirements with banks' actual risk exposures. As part of this effort to leverage banks' progress in economic capital modeling, Basel II, the current

proposal to revise the capital regulations for depository institutions, introduces an explicit minimum regulatory capital charge for operational risk.[1]

Some banks have voiced support for an operational risk capital charge based on internal models and procedures. Others have expressed concern that banks concentrating on processing-related business lines – which have significant operational risk – could face a significant increase in overall minimum regulatory capital. As banks that have chosen to concentrate in processing activities compete against firms not subject to similar regulatory requirements, they argue that the new regulatory charge could place the banks at a competitive disadvantage.

This paper evaluates these concerns. To do so, we first describe the three markets where processing banks have concentrated their activities: securities custody, asset management, and general processing. Second, we investigate whether the major competitors in each market would be subject to an operational risk capital charge under the proposed minimum capital requirements. Third, we examine the relationship among other capital measures and minimum regulatory capital requirements at the processing banks to evaluate whether an increase in regulatory capital requirements might force these banks to raise additional capital.

Two significant *caveats* regarding our analysis are in order. First, sizing the charge is complicated by the fact that the U.S. processing banks have not publicly

[1] In June 2004, central bank governors and the heads of bank supervisory authorities in the Group of Ten (G10) countries issued a press release and endorsed the publication of "International Convergence of Capital Measurement and Capital Standards: a Revised Framework," the new capital adequacy framework commonly known as Basel II. In the U.S., Basel II will be mandatory only for the largest banks – those with more than $250 billion in total assets or $10 billion in international exposure. Other banks will be allowed to opt in, provided that their risk management infrastructure meets the same standards required for the mandatory banks. Banks that do not opt in will remain under the current Basel I-based capital regime. Another notable feature of U.S. implementation is that participating banks will be required to adopt the advanced methods for determining capital requirements for both credit and operational risk.

disclosed estimates of their operational risk exposure. Second, detailed and comprehensive data regarding these markets and the relevant firms are difficult to come by. Much of our analysis is thus more narrative than empirical, and should be interpreted accordingly.

The above *caveats* notwithstanding, the information we gather suggests that processing banks are well positioned for the introduction of an explicit operational risk minimum capital requirement. In custody services, the most important activity for processing banks, all of the main competitors will be subject to capital requirements for operational risk. In processing, in which non-bank competitors are active, many non-bank competitors display a minimal degree of financial leverage, and thus appear to have significantly higher capital levels than the processing banks would be required to have under Basel II. The results are less clear in asset management. However, many asset managers will either also have Basel II-based mandatory operational risk capital charges or are much less leveraged than are processing banks.

We also find that the U.S. processing banks hold a significant amount of capital in excess of current regulatory and supervisory minima. The results are suggestive that the processing banks would be able to align regulatory capital with results from their internal models without raising additional capital. In fact, the amount of capital actually held by processing banks – either because of market or rating agencies' demands or because of their own internal risk evaluations – suggests that these institutions may already be holding capital for operational risk.

The remainder of this paper is organized as follows. Section 2 identifies the processing banks, and discusses the markets in which they operate. Section 3 provides a

summary of Basel I and Basel II, as well as other U.S. and E.U. capital requirements faced by the processing firms identified in Section 2. Section 4 considers whether the processing banks would need to raise capital to accommodate the new operational risk charge. We consider two questions in this regard: whether the processing banks are currently holding a capital buffer over minimum regulatory requirements, and whether they are doing so because they are already basing their capital allocation decisions on economic capital models or are already being required by the market to hold excess regulatory capital to cover their operational risks. If a bank's economic capital model suggests – or if the market demands – holding a significant capital buffer over current minimum regulatory requirements (that do not include an explicit operational risk capital charge), it is unlikely that the proposed changes in regulatory requirements would require the bank to raise additional capital. On the other hand, if the reduction in buffer capital erodes the processing banks' flexibility to absorb shocks more than is tolerable to management, the new regulations might require processing banks to raise additional capital. Section 5 brings together the information from the previous sections to assess whether the new capital charge could place the processing banks at a competitive disadvantage, and if so relative to what competitors. Section 6 concludes.

2. Market Identification

To examine the potential competitive impact of an operational risk capital requirement on U.S. bank holding companies (BHCs), we focus on those firms with a small volume of credit-related activities relative to their operational activities. Under Basel II, such firms could have a higher percentage of operational risk capital to total

capital than other BHCs, and would likely not receive much of a benefit from reduced capital charges for lower-risk credit exposures. In contrast, U.S. institutions that are primarily engaged in lower-risk credit activities are expected to face a lower minimum regulatory credit risk (and total) capital charge than is required under current rules.

To identify firms focused on operational activities, we select those with a high share of income from such activities and a relatively small loan portfolio. More precisely, we select firms with an operational income-to-total income ratio of more than 50 percent, and a loans-to-assets ratio of less than 50 percent.[2] While these thresholds are somewhat arbitrary, examination of Table 1 indicates that they do seem to distinguish between traditional commercial banks and those that have chosen to concentrate in processing activities.

Table 1 lists the top fifty U.S. BHCs, together with the ratio of operational income to total income and the ratio of loans to assets for each. Of the seven institutions meeting our selection criteria, we focus on the four domestic banks not primarily engaged in brokerage activities: State Street Corporation (State Street), Mellon Financial Corporation (Mellon), Northern Trust Corporation (Northern), and The Bank of New York Corporation (BNY).[3] We refer to these four institutions as "the processing banks."

To assess the potential competitive impact of the proposed Basel II operational risk capital charge, we first consulted with staff at the processing banks to determine the non-credit related business lines in which these firms participate. We also reviewed

[2] Operational income is defined as income from the following sources: fiduciary activities; investment banking, advisory, brokerage, and underwriting; venture capital; servicing; and other non-interest income earning activities as defined in the instructions to the form FR Y-9C. Total income is defined as net interest income plus noninterest income. Insurance underwriting income is excluded from both non-interest income and total income.

management's description of business activities contained in annual reports, and considered the primary sources of reported non-interest income for each bank. Based on this information, we found that the processing banks are primarily engaged in the following three non-credit related businesses lines: custody, asset management, and general processing.

We then consulted with knowledgeable industry sources to understand the nature and structure of these business lines, and to identify the main competitors in each. These sources included staff at banks, asset managers, and rating agencies, as well as Federal Reserve examiners specializing in each of the processing banks. Table 2 lists the external sources with which we held discussions to gather information for this paper. Our findings for each of the three business lines are presented in Sections 2.1-2.3, below.

2.1 Custody

Custody is a primary business line for each of the four processing banks. At its most basic level, custody is defined as the business of providing safekeeping and settlement for client assets. Custodians are responsible for holding a broad range of financial assets, including equities and bonds on behalf of their clients, and for handling the back-office portion (settlement) of a securities trade which involves the exchange of a financial instrument for cash. Typical custody clients include pension and retirement funds, asset managers, insurance companies, and banks.

[3] We do not consider Taunus or CIBC Delaware as they are owned by foreign parents (Deutsche Bank and CIBC, respectively). We do not consider Charles Schwab because they are primarily a securities firm rather than a bank.

Global custody is the business of providing settlement and safekeeping on a cross-border basis. Global custody is distinguished from domestic custody in that domestic custody relates to financial assets from only one country, while global custody involves handling assets and currencies from different countries. Technically, a custodian could be called "global" if it services assets in at least two countries. However, the major global custodians typically cover 100 national markets or more.

Tables 3 and 4 list the largest global custodians by assets under custody (AUC), the standard size measure in the custody business, as well as some background information about the custodians. A custodian's size and the breadth of its global network are two important factors in determining its success in the global custody market, as custody involves significant economies of scale and scope. Within the group listed in Table 3 is a subset of firms that are viewed by the industry as major global custodians. This subset can be identified by the indicators in the table that report which companies were included in two industry-recognized surveys of the top providers in the custody business (panel b).[4] Table 3 also includes an indicator for the geographic areas in which each custodian services clients and a list of the types of clients served.

Table 3 indicates that most global custodians are banks.[5] That the only U.S. institutions on the list are banking groups may reflect certain features of the infrastructure of the U.S. banking system. Fedwire, the Federal Reserve System's electronic payment processing service, provides custodians with the ability to move funds through the

[4] The Buttonwood Survey is an annual survey that provides specific information on companies that Buttonwood International, an industry research group, deems to have the size and scale to be significant competitors in the global custody market. The institutions in this survey overlap significantly with those on the list of the largest global custodians by assets under custody (AUC). The Global Investor Magazine survey is an annual survey of custody clients that identifies the predominant global custodians and measures customer satisfaction with these custodians.

financial system for same day settlement, but an entity must be structured as a bank to access Fedwire. Fedwire also allows custodians to move government securities through the financial system with the same rapidity and finality as funds; trades in these securities can be settled only on Fedwire or on the books of a depository institution with access to Fedwire. The bank infrastructure also provides U.S. banks with access to the discount window, which provides the benefit of an emergency source of liquidity, and thus a competitive advantage vis-à-vis non-bank competitors, since the ability to transfer funds and securities rapidly and with certainty is highly valued by custodial customers.

2.2 Asset Management

Asset management is the process of investing client assets according to specified objectives, monitoring such investments, and changing investment allocations as market factors change. Table 5 provides a list of the largest asset managers based on worldwide assets under management (AUM) as of 12/31/03. AUM, the volume of funds invested on behalf of clients, is the standard measure of market share in the asset management industry. Table 5 also reports total balance sheet assets, as well as equity-to-assets ratios and risk-based capital ratios (panel b). For insurance companies reported in Table 5 (and in all other tables), separate account assets are excluded from both total assets and equity-to-assets.[6] This is done in order to put these figures on the same basis as those for banks, whose assets under management are not included in balance sheet assets.

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[5] Except for SIS Segaintersettle AG which is owned by a group of Swiss banks (including UBS and Credit Suisse) and serves as a central securities depository for Switzerland.

[6] In the U.S. and certain other countries, separate account assets are included as offsetting line items in the asset and liability portions of insurance companies' balance sheets.

As Table 5 shows, the top asset managers include not just banks, but also insurance affiliates and non-depository firms specializing in asset management. In contrast to the custody function, the ability to access Fedwire or the discount window (or more generally being a bank) adds no special advantage (or disadvantage) to the asset management function. As will be seen in Section 3, each of the entity types that conduct asset management is subject to different regulatory requirements regarding operational risk capital. This will make the analysis of the operational risk capital charge more complex as compared to global custody, where most competitors were banks.

Interviews with industry experts, as well as multiple trade publications and data sources, suggest that the asset management market can be broken down into three submarkets based on the type of client served: institutional asset management, mutual fund management, and private wealth management. The following sections provide an overview of each.

a. Institutional Asset Management

Institutional asset managers provide investment management services, typically in the form of separate accounts, to clients such as pension funds, financial institutions, and foundations and endowments. All four processing banks offer institutional asset management services to clients on a worldwide basis. For the purposes of this analysis, the institutional market is viewed as a global market, and competition is measured by worldwide AUM. Table 6 lists the fifty largest institutional asset managers by worldwide AUM.

As shown in Table 6, three of the four processing banks under consideration (Mellon, Northern, and State Street) are among the top ten global institutional asset

managers. (BNY manages $58 billion in institutional assets, ranking 56th among global institutional asset managers.) Several non-banking U.S. firms specializing in asset management (Fidelity, Wellington, and Vanguard) also rank among the top ten, as do two foreign banks (Barclays and Deutsche Bank). Rounding out the top ten are several affiliates of insurance companies (AIG and Allianz). The top of the list is dominated by firms with large passive management businesses (State Street, Barclays, and Vanguard), because there are significant scale economies in this area.[7]

Interviews with industry participants suggested that firms are typically classified along multiple dimensions within the institutional asset management market. Two of the most important such dimensions are asset classes offered (e.g., equity, fixed income, cash), and types of strategies offered (e.g., active vs. passive, quantitative vs. fundamental).[8] To keep the length and complexity of the paper manageable, we did not pursue these additional dimensions. This approach can be considered conservative, as segmenting institutional asset management into multiple submarkets would reduce the likelihood of any two firms being considered direct competitors.

b. Mutual Fund Management

A mutual fund pools money from shareholders and invests it in a diversified portfolio of securities. In the U.S., mutual funds are structured as investment companies with their own governance structure, and are owned by the fund shareholders. A fund

[7] Passive management refers to the strategy of managing a portfolio to match the return of a benchmark, such as a market index. Active management refers to the strategy of managing a portfolio with the aim of exceeding the return on a benchmark. Scale economies arise in asset management because the number of staff required to manage a large pool of assets is not much greater than the number of staff required to manage a small pool of assets. For active strategies, however, these scale economies are offset by the difficulty and cost of taking large positions in individual securities, which is necessary if the benchmark is to be exceeded.

manager is hired by the mutual fund to manage the investment portfolio in accordance with the stated objectives of the fund prospectus.

All of the processing banks provide mutual fund management services.[9] As they offer mutual funds mostly to U.S. clients, our analysis will focus on the U.S. market.[10] Table 7 lists the largest mutual fund companies in the U.S. It is worth noting that due to data limitations, the mutual fund assets reported in Table 7 come from both institutional and retail investors, so that there is some overlap with the institutional assets considered in section 2.2a.[11] However, the firms listed as top competitors in Table 7 all have a significant presence in the retail segment of the mutual fund market.

The top three U.S. mutual fund companies are firms that specialize in asset management and are not part of a bank holding company or other conglomerate structure. (We will refer to such firms as "stand-alone asset managers.") None of these three firms is publicly traded, so there are very limited financial data for them.[12] As with the institutional asset management market, banks and insurance affiliates are also competitors.

The mutual fund market can be segmented along multiple dimensions. Like institutional asset managers, mutual fund managers can be classified by asset classes and strategies offered. However, the mutual fund market could also be segmented by

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[8] A quantitative manager selects his portfolio via mathematical formulae, whereas a fundamental manager relies on more traditional "stock picking" techniques.

[9] BNY's mutual fund assets (approximately $11 billion) were not large enough to place it among the top 50 firms reported in Table 7.

[10] It is natural to segment the market is this way, as SEC regulations permit only U.S.-registered mutual funds to market themselves to customers in the U.S.

[11] Our data on mutual funds are collected from the CRSP mutual fund database. Based on the information provided in this database, it is not possible to segregate retail and institutional assets. In its *2004 Mutual Fund Fact Book* (p. 138), the Investment Company Institute reports that 46 percent of all mutual fund assets were held in institutional accounts as of year-end 2003.

distribution channel. For example, some mutual fund companies "own" their distribution channel; some distribute via commissioned brokers; and some distribute via mutual fund "supermarkets." Some of the industry experts we interviewed suggested that firms operating via different distribution channels would not tend to view themselves as direct competitors. We also believe that the relationship between size and competitiveness is quite nuanced in mutual fund management. On one hand, smaller companies not shown on Table 7 can be viable competitors against even the largest firms, especially if they have one or two successful niche strategies. On the other hand, size does offer several benefits in this market, as larger firms are typically more well-known, and there may be scale economies in mutual fund marketing and distribution. As with institutional asset management, however, we will take the conservative approach of not pursuing more granular segmentations of the mutual fund market.

c. Private Wealth Management

Private wealth managers provide investment management services to wealthy individuals and families. Mellon, Northern, and BNY provide private wealth management services and focus this business primarily on U.S. clients.[13] As a result, our analysis focuses on companies that compete for U.S. clients.[14] The 40 largest such firms as of June 2003 are listed in Table 8. Northern, Mellon and BNY are ranked 9, 14, and 24, respectively.

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[12] Fidelity and The Capital Group Companies are privately held, and Vanguard is a mutual company (owned by the shareholders of its funds).

[13] State Street sold its private wealth management business in 2003 to US Trust.

[14] It is possible that certain wealthy U.S. citizens may seek out a private banker that has no presence in the U.S. However, our interviews with industry participants suggested that a physical presence in the U.S. is required to compete in this market, as this is a highly relationship-driven business.

Merrill Lynch and Citigroup (Smith Barney) dominate this market with $630 billion and $497 billion in assets under management, respectively. Fidelity ranks third, with $295 billion in AUM. Most of the other firms listed in Table 8 are banks. These bank competitors include large U.S. banks (e.g., J.P. Morgan Chase), smaller U.S. trust companies (Bessemer Trust), and foreign banks (UBS). The predominance of banks in this market may be explained by cross-selling (e.g., banks have other products besides asset management that high net worth individuals are interested in) or by marketing (e.g., being a bank is a natural advantage in a market where stability and dependability are key attributes of any player). Interestingly, only one processing bank (Northern) ranks among the top ten private wealth managers.

2.3 Processing

The focus of this paper is on activities undertaken by the processing banks that do not involve the extension of credit. We have already considered the two most important such activities, custody and asset management. In this section, we will define the term "processing" to include all other material non-credit business lines undertaken by the processing banks. To identify these business lines, we gathered information from various documents (e.g., annual reports, websites) for each processing bank, and confirmed this information with resident examiners and with staff at the banks themselves. The business lines we identified via this process are listed in Table 9.

There is no comprehensive list of firms engaged in the processing business lines listed in Table 9. We consulted multiple sources to construct such a list. These include Hoovers' list of major competitors for each processing bank, industry surveys, and

business line overviews published in various trade journals. We confirmed this information and also added a few firms through interviews with examination staff, the processing banks, and other industry participants. The resulting list is limited to the U.S. processing market, as that was the focus of most of the data sources we identified. Otherwise, the list is probably overly inclusive, in that it includes firms that may not be direct competitors of the processing banks. Table 10 lists all of the processing firms identified, as well as the processing activities in which they compete.

In recent years, the custody market has become more complex as custodians have expanded their service offerings. It is now typical for global custodians to provide a bundled custody product to clients, which includes the provision of one or more of the processing services listed in Table 9, along with custody.[15] Banks may enjoy a competitive advantage when custody-related activities are bundled with the core custody product. Many clients also prefer to obtain processing services from their custodian, as it can be more efficient from both management and cost perspectives. As indicated in Table 9, fifteen of the seventeen processing activities we consider are custody-related.[16]

While custody and related processing services are often purchased as a bundled product, there are instances when custody clients choose to obtain one or more of the custody-related services in Table 9 from a company other than a global custodian. Non-financial technology-oriented companies such as Sungard and BISYS may provide a few

[15] See "Custody Clients Demand More," Global Investor, May 2000, p. 14; "Searching for the Cream: Added Value," *Financial Times*, 7/14/00, p. 7.

[16] We have identified only two processing activities that are not related to custody: employee benefit plan administration, and human resource outsourcing and consulting. State Street provides benefit plan administration primarily in the U.S. through CitiStreet, a joint venture with Citigroup. Mellon, through their Human Resources & Investor Solutions business line, provides human resource services that include outsourcing human resource functions and consulting on issues such as employee retention and health care costs.

of these services or the technology for a client to perform the service themselves. However, such companies do not provide the core custody product or a full range of processing services. They also tend to focus on smaller clients and have a more limited geographic scope than the global custodians.

At this point, it is unclear to what extent the non-bank entities are directly competing with the processing banks to provide processing services. On one hand, most processing activities are closely related to custody, where banks have special advantages. On the other hand, customers can purchase processing services separately from non-bank providers, and in certain instances have done so. For the purposes of this paper, we will assume that non-banks are fully competitive with banks for the provision of custody-related services. This is a conservative assumption, in that it increases the likelihood of identifying a potential competitive impact for the operational risk capital charge, since non-banks would not be subject directly to Basel II capital requirements.

3. Capital Regulation Faced by Processing Banks and Their Competitors

This section reviews current and future operational risk capital requirements for firms competing in the custody, asset management, and processing markets. We first discuss the two Basel Accords, and then focus on U.S. regulatory capital requirements for the processing banks and their competitors. We conclude with a parallel discussion of capital requirements for non-U.S. firms. As almost all of these are domiciled in Europe, we focus our attention on the E.U. regulatory environment.

3.1 The Basel Accords

In 1988, the Basel Committee on Banking Supervision issued the Basel I framework governing capital adequacy for internationally active banks. The Committee sought to strengthen the soundness and stability of the international banking system and to foster regulatory consistency across different countries, thereby reducing an existing source of competitive inequality. Basel I set minimum regulatory capital at 8 percent of risk-weighted assets, and also specified two tiers of capital. Tier 1 capital is primarily equity capital and retained earnings, and must represent at least 4 percent of risk-weighted assets. Tier 2 capital includes such elements as loan loss reserves, hybrid capital instruments, and subordinated debt.

Basel I incorporated only crude proxies for risk: the calculation of risk-weighted assets captured primarily credit risk based on a simple classification of exposures into four buckets. Banks' internal economic capital models, being more risk-sensitive than Basel I, derived different capital assessments than the regulatory framework. In general, regulatory capital exceeded economic capital for banks' less risky assets, while economic capital exceeded regulatory capital for the more risky assets. On average, regulatory minimum capital was probably exceeded by economic capital at the typical bank. The minimal risk-sensitivity of the Basel I capital weights – with their resultant deviations from economic capital estimates – encouraged banks to move safer assets off balance sheet through securitizations. Because of this regulatory arbitrage, *regulatory* capital ratios have become increasingly disconnected from banks' true financial risk profiles.

The new Basel Accord is intended to use the principles of economic capital to better align minimum regulatory capital with banks' actual risk exposures. Banks will be

expected to have sufficient capital to cover significant but not catastrophic losses. Basel II will require banks to use formal procedures (e.g., internal ratings) to measure credit risk, and will require them to hold capital for unexpected losses based on those procedures.[17] Another major innovation is the introduction of an explicit capital charge for operational risk.

Basel II lays out a series of increasingly sophisticated approaches for measuring both credit and operational risk. The most sophisticated are the Advanced Internal Ratings Based (AIRB) approach for credit risk, and the Advanced Measurement Approach (AMA) for operational risk.[18] The intent of the Basel Committee is to calibrate the simpler approaches to yield a higher capital charge than would be expected under the advanced approaches, thus encouraging banks to migrate to the AIRB and AMA. It is expected that for many banking organizations using the advanced approaches, the sum of the credit and operational risk charges may result in a somewhat lower total minimum regulatory capital charge than under Basel I, particularly if the portfolio exposures at the particular bank are less risky than average.

The Advanced Measurement Approach allows a bank to hold regulatory capital for operational risk based on its own internal procedures, provided that these conform to a general framework laid out by the regulators. One key element of this framework is the formal definition of operational risk, which is "the risk of loss resulting from inadequate

[17] Basel II does not require banks to hold credit risk capital to cover expected losses (EL), provided that eligible loan loss reserves meet or exceed EL. If eligible reserves fall short of EL, Basel II reduces measured Tier 1 and Tier 2 capital.

[18] The two simpler models for operational risk are the Basic Indicator Approach and the Standardized Approach. Banks using the Basic Indicator Approach must hold capital for operational risk equal to the average over the previous three years of a fixed percentage of positive annual gross income. In the Standardized Approach, banks' activities are divided into eight business lines, and the capital charge for each business line is calculated by multiplying gross income by a factor assigned to that business line.

or failed internal processes, people and systems or from external events." To convey a less formal and more intuitive understanding of what operational risk is and why it is important, we also consider four causal categories into which operational losses can be classified.[19] The first such category is fraud, which includes activities such as rogue trading, embezzlement, and theft. The second category consists of lawsuits arising from improper business practices; this category is very broad, and the alleged behavior can range from anti-competitive practices to false advertising to employee discrimination. A third category covers losses caused by system failures (e.g., computer and telecommunications equipment breakdowns) and process failures (e.g., "fat finger" trades and model errors). The final category covers losses arising from physical causes such as terrorism, natural disasters, and workplace safety.

Banks will also be required to incorporate four major elements into their operational risk quantification methodology. These are:

- *Internal loss data.* Institutions must collect data on their own operational loss history. The data must cover at least five years, and should cover all loss types and all material business lines.

- *External loss data*. The term "external loss data" refers to data on operational losses that have occurred at other financial institutions. AMA banks are required to consider such data as a supplement to internal data for low-frequency risks to which they are exposed.

- *Scenario analysis*. Scenario analysis refers to a systematic process for obtaining expert opinions regarding the likelihood and potential impact of large operational losses. Like external data, scenario analysis is meant to supplement internal data in cases where a bank's own experience is limited.

[19] We have diverged somewhat from the standard Basel loss types for expositional purposes. The standard loss types are: internal fraud; external fraud; employment practices and workplace safety; clients, products, and business practices; damage to physical assets; business disruption and system failure; and execution, delivery, and process management.

- *Business environment and internal control factors.* Banks are required to monitor and measure both the external business environment and the internal control environment, and to adjust capital for changes that have not been reflected in the other three components of the framework (internal data, external data, and scenarios).

The rules allow banks considerable flexibility in combining these four elements, and impose no minimum standards on how much weight should be given to each. However, banks are required to consider each when estimating their Aggregate Loss Distribution (ALD), which represents the total losses they may face over a one year period. Basel II requires a bank to hold capital for unexpected losses (UL) from operational risk, where UL is defined as the difference between the mean and the 99.9^{th} percentile of the ALD.[20]

As noted, the expectation is that most banks adopting the AIRB and AMA will have a modest reduction in their minimum regulatory capital stemming mostly from the treatment of certain low-risk credit exposures. However, processing banks, by definition, have modest credit exposures and relatively high operational risk exposures. As operational risk is not *explicitly* addressed under Basel I, processing banks might well have their minimum *regulatory* capital increased under Basel II. However, as we shall see, this may not necessarily imply an increase in total capital *held*.

3.2 The Regulatory Framework for U.S. Financial Institutions

This section introduces current and proposed regulatory frameworks for financial institutions in the U.S., and seeks to identify which firms discussed in Section 2 would be subject to an explicit operational risk capital charge under Basel II.

[20] The Basel II Accord states that "to base the minimum regulatory capital requirement on UL alone, the bank must be able to demonstrate to the satisfaction of its national supervisor that it has measured and accounted for its EL exposure." See Basel Committee on Banking Supervision (2004, p. 144). The expected loss (EL) exposure is calculated as the mean of the ALD.

a. The U.S. Implementation of Basel II

There are two notable features of the U.S. implementation of Basel II. First, Basel II will be mandatory only for the largest U.S. banks – those with more than $250 billion in total assets or $10 billion in international exposure. Other banks will be allowed to opt in, provided that their risk management infrastructure meets the same standards required for the mandatory banks. Banks that do not opt in will remain under the current Basel I-based capital regime.

U.S. banks do not publicly disclose their international exposure, nor have they been required to announce their intention to opt in.[21] It is thus difficult for the agency the authors represent to identify those U.S. banks that will adopt Basel II. For these reasons, we will refer to a list recently published in the *American Banker* to identify U.S. banks that, in that newspaper's opinion, will likely adopt Basel II. (Our use of such a list is neither an endorsement nor a statement regarding its accuracy.) The list is reproduced in Table 11. Three of the so-called processing banks (BNY, Northern, and State Street) are expected to adopt Basel II. The fourth, Mellon, is listed as undeclared.

The second notable feature of U.S. implementation is that participating banks will be required to adopt the advanced methods for determining capital requirements for *both* credit and operational risk. It is expected that overall capital will be somewhat lower for many banks under the advanced approaches of Basel II than under Basel I, and the potential capital reduction provides an incentive to opt in.[22] However, developing the

[21] U.S. banks are required to report their material foreign exposures on form FFIEC 009a, which is publicly available. However, full information regarding banks' aggregate foreign exposure is reported only on form FFIEC 009, which is not publicly available.

[22] Industry comments, regulatory reviews, and data collection exercises such as the previous Quantitative Impact Studies, all suggest that credit risk capital at a typical bank would decline upon implementation of the AIRB approach. For banks with a high credit risk exposure relative to their operational risk exposure, the decline in the credit charge may more than offset the new operational risk charge.

data and models necessary to quantify credit and operational risk requires a sizable fixed cost investment. As the net benefits of capital reduction are variable, it is expected that smaller institutions will choose at least initially to forego both costs and benefits and remain under the current Basel I-type U.S. regulatory capital rules.

It should also be noted that rating agencies recognize the exposure operational risk poses and have begun phasing in an assessment of this risk and the associated risk management practices in their analyses of bank creditworthiness. Operational risk management practices are becoming an important factor considered for all rated banks regardless of the regulatory capital regime to which they are subject (Basel I or Basel II).[23]

The remainder of this section will review the regulatory capital requirements faced by competitors to processing banks, both banks that are unlikely to be required to adopt (or choose to adopt) Basel II and non-banks that operate under entirely different capital regimes. Many of the latter firms face regulatory capital charges, some specifically for operational risk. Others do not face regulatory capital charges, but nonetheless appear to hold a significant amount of economic capital.

b. Mutual Funds

SEC regulations do not impose capital requirements on either mutual funds or their managers. However, if a mutual fund manager is part of a Financial Holding Company (FHC), the Federal Reserve Board may take into account the manager's activities in assessing the consolidated capital of the FHC. If the FHC is subject to Basel

[23] See Ramadurai, Krishnan et al. "The Oldest Tale but the Newest Story: Operational Risk and the Evolution of its Measurement under Basel II," A Special Report by FitchRatings, January 7, 2004; and Young and Theodore, "Moody's Analytical Framework For Operational Risk Management Of Banks," Moody's Investors Service, January 2003.

II, a mutual fund manager's operational risk exposure would be reflected in the parent's regulatory capital requirement. If a mutual fund manager is not part of a FHC subject to Basel II, then it will not be subject to an operational risk charge – either directly or indirectly via a parent company.

c. Asset Management Affiliates of Insurance Companies

In the U.S., asset management and processing activities of insurance companies conducted outside the legal structure of the insurance company are not subject to any insurance regulatory capital charges either directly or indirectly at the consolidated level. Not surprisingly, most insurers conduct these activities via subsidiaries held directly under the parent company. In fact, almost all of the insurance-affiliated asset managers and processors considered in this paper adopt this capital-efficient (i.e., regulatory capital avoiding) legal structure.[24]

d. Investment Banks

The Securities and Exchange Commission (SEC) has adopted a final rule entitled "Alternative Net Capital Requirements for Broker-Dealers That Are Part of Consolidated Supervised Entities," which amends the SEC's existing net capital rule by establishing a voluntary, alternative method of computing certain deductions for net capital purposes for certain broker-dealers. The rule became effective on August 20, 2004.

The rule was enacted in part to provide a mechanism for E.U. affiliates of U.S. broker-dealers to comply with the E.U.'s Financial Conglomerates Directive (FCD), which requires that such affiliates be subject to consolidated group-wide supervision and

[24] The one exception is Jackson National Life, which provides fund accounting services within the insurance entity. However, there is no explicit capital charge for operational risk in the U.S. even in the case of an asset manager held under an insurance underwriter.

capital requirements in their home country. For affiliates that are not subject to such consolidated supervision, the FCD would require E.U. or European nation "host" oversight of the European affiliate or possibly the establishment of an E.U. – or European nation "host" – regulated holding company and the restriction of exposures between the E.U. sub-group and the worldwide group. To avoid such non-U.S. regulation, a U.S. institution can apply for consolidated group-wide supervision by the SEC, in which case it would be referred to as a "Consolidated Supervised Entity" (CSE).[25] Only the largest broker-dealers, with tentative net capital of at least $1 billion and net capital of at least $500 million, are eligible. According to SEC staff, Goldman Sachs, Morgan Stanley, Merrill Lynch, Lehman Brothers and Bear Stearns have expressed keen interest in CSE status.[26]

The CSE regime allows broker-dealers to calculate net capital deductions for market risk with mathematical models that are consistent with the framework of Basel II. There would be no explicit charge for operational risk at the broker-dealer level. However, the ultimate holding companies of broker-dealers would be required to compute capital reflecting market, credit, and operational risks across the entire organization, if they elect Basel II at the outset. Otherwise, a broker-dealer may elect Basel I pending formal implementation of Basel II.

[25] The Commission in addition adopted rules which create a new framework for allowing the holding company of a registered broker-dealer to elect to become a supervised investment bank holding company, which would subject it to supervision on a consolidated basis comparable to the supervision envisioned under the CSE proposal. No net capital exemption would be available, but the minimum capital required of the broker-dealer would be substantially less than that required of CSE broker-dealers.

[26] See "US SEC clears new net-capital rules for brokerages," Reuters News, April 28, 2004. According to this newswire story, "Goldman Sachs, Morgan Stanley, Merrill Lynch, Lehman Brothers and Bear Stearns have expressed keen interest in CSE status, SEC Market Regulation Director Annette Nazareth told reporters after the meeting." The meeting in question is the open meeting at which the Commission voted to approve the Alternative Net Capital Rule.

The treatment of operational risk under the CSE regime follows Basel II very closely. One significant difference is that the former allows the simpler approaches for operational risk capital (as well as the AMA), whereas the latter allows only the AMA.[27] However, the intent of the Basel Committee is for the simpler approaches to yield higher operational risk capital charges than the AMA. The staff of the SEC have advised that they expect that each of the investment banking firms will elect the AMA approach eventually, in part to avoid unfavorable comparison with the larger banking institutions.

3.3 European Union Regulatory Capital Requirements for Operational Risk

This section reviews current and future operational risk capital requirements for the non-U.S. firms identified in Section 2. As almost all of these non-U.S. firms are domiciled in Europe, we focus our attention on the E.U. regulatory environment.[28] Regulations in other foreign countries are discussed on an as-needed basis throughout the paper.

a. Banks and Investment Firms

The European Union will implement Basel II via a new Capital Adequacy Directive, CAD3. There are two key differences between the proposed E.U. and U.S. implementations of Basel II. First, E.U. implementation will have a wider scope of application than U.S. implementation, as CAD3 will apply to all credit institutions and investment firms. Recall that in the U.S., Basel II will be required only for a select group

[27] See footnote 18 for a discussion of the simpler approaches.

[28] Several of the firms (e.g., Credit Suisse and UBS) that compete with the processing banks are domiciled in Switzerland, which is not part of the E.U.. For the purposes of this paper, however, Swiss implementation of Basel II is similar to the E.U. implementation. In particular, banks will have the option of choosing one of the simpler approaches to operational risk in addition to the AMA. It is anticipated that the simpler approaches will yield higher operational risk capital charges than the AMA.

of large commercial banks, and will be voluntary for smaller commercial banks (and thrifts) as well as large investment banks (under the SEC's CSE regime). Second, CAD3 would allow all banks to apply one of the simpler approaches for determining the capital charge for operational risk (in addition to the AMA).[29] In the U.S., the AMA will be the only option for quantifying operational risk exposure. However, as noted, the intent of the Basel Committee is for the simpler approaches to yield higher operational risk capital charges than the AMA, in which case an E.U. bank or investment firm would face an operational risk capital charge that is at least as great as a U.S. bank with a similar risk profile. E.U. implementation of Basel II will begin in 2007 with the simpler approaches for both credit and operational risk, with the advanced approaches (including the AMA) starting in 2008.

b. Supervisory standards in the U.S. and Europe

Although all European banks will face a capital charge for operational risk under Basel II, it can be argued that the charge will depend as much on supervisory implementation in each jurisdiction as it does on the actual regulations. It is not possible to address this argument directly, as the rigor with which various supervisors implement the Basel II framework will not be observable until 2008. However, the argument can be addressed indirectly, by observing the actions of the banks and interpreting these as a signal on how demanding they expect their supervisors to be. Specifically, if a bank anticipates rigorous supervision of its AMA model, then we would expect it to begin work early on a comprehensive modeling approach.

[29] See footnote 18 for a discussion of the simpler approaches.

Table 12 lists all U.S. and European banks exceeding $500 billion in total assets as of December 31, 2002, and reports information regarding each institution's publicly stated plans to pursue an AMA. The table reports whether each bank has already published estimates of its operational risk exposure, and whether it is pursuing each of the four required AMA elements. This information was obtained from public sources including annual reports, SEC filings, and other official documents, as well as presentations that bank staff have made at industry conferences.

The three U.S. banks reported in the table appear to have made significant progress towards AMA implementation. Two (Citigroup and J.P. Morgan Chase) have disclosed an operational risk capital estimate. All three have acquired both internal and external loss data, and have also conducted risk self-assessments. Furthermore, two of the three U.S. banks have constructed scenarios to better understand those operational risk exposures for which internal and external data are either limited or nonexistent.[30]

The European banks have also made significant progress: all of the European institutions reviewed have begun collecting internal loss data, 13 of 15 have acquired external loss data, 10 have incorporated self-assessment results in their capital model, and 6 have incorporated scenario analysis. Of course, it is difficult to conclude based on public information whether U.S. or European banks are more advanced in AMA implementation. Based on their substantial progress in this regard, however, it would appear that banks in both the E.U. and the U.S. are expecting rigorous supervision of the AMA standards.

To address potential differences in supervisory approaches within G-10 countries and outside the G-10 countries, the Basel Committee created the Accord Implementation

Group (AIG). The aim of the AIG is to promote consistency in the application of the Accord through the sharing of plans, experiences, ideas, and approaches. Additional assurance that foreign banks will be held to the same standards as U.S. banks is derived from the disclosure requirements under Basel II, which will provide investors, clients, and regulators access to details regarding an institution's application of the advanced approaches.

c. Affiliates of E.U. Insurance Companies

In the E.U. as in the U.S., asset management and processing activities of insurance conglomerates conducted outside of the legal structure of an insurance company are not subject to any insurance regulatory capital charges.[31] Like their U.S. counterparts, the insurance-affiliated asset managers we considered (Allianz, AXA, and Generali) have chosen a regulatory capital-avoidance structure where these entities are held directly under the parent holding company.

Beginning in 2005, insurance entities with other financial services holdings will be subject to supplementary prudential supervision on a group-wide basis under the Financial Conglomerates Directive (FCD). The FCD will use existing E.U. rules in each sector as building blocks for capital requirements at the conglomerate level. As there is some degree of uncertainty regarding which sectoral rules will apply to asset management affiliates, it is unclear whether these entities will be subject to a regulatory capital charge for operational risk.

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[30] None of these U.S. banking organizations are processing banks.

[31] The E.U. is considering a supervisory capital charge for operational risk as part of the proposed new capital framework for insurance, known as Solvency II. However, Solvency II will not impose any charges on entities that are not legal subsidiaries of an insurance underwriter.

However, two of the firms we consider (Allianz and AXA) already calculate risk-based capital (RBC) requirements for their various business entities, and both firms explicitly include operational risk in their RBC calculations.[32] So whether or not these firms face an explicit regulatory charge, they are already calculating and allocating economic capital for operational risk using methods that appear to be consistent with the Basel II AMA.

4. Would the Operational Risk Charge Imply an Increase in Total Actual Capital Held?

In considering the impact of an explicit regulatory capital charge for operational risk on processing banks, it is useful to distinguish between not only economic and regulatory capital, but also among a number of other capital concepts. *Economic capital*, referred to frequently already, is the amount of capital that bank management believes it should hold to reflect the risks arising from the bank's various positions and activities.[33] To implement economic capital, banks have generally taken the approach of setting capital such that losses would exceed capital with no more than a small probability. In the context of market risk, such an approach is typically referred to as Value at Risk (VaR). The use of VaR models for market risk is now almost universal among large complex banks. Similar techniques have been applied to credit risk, and more recently to operational risk.

[32] See Allianz's 2003 Annual Report (p. 25) and AXA's 2003 Annual Report (pp. 150-151).

[33] The Federal Reserve has issued a supervisory letter on economic capital allocation, generally referred to as SR 99-18. This letter directs bank supervisors to "evaluate internal capital management processes to judge whether they meaningfully tie the identification, monitoring, and evaluation of risk to the determination of the institution's capital needs."

Regulatory capital, also discussed extensively above, is the *minimum* amount of capital that regulators *require* a bank to hold, and is defined under both Basel I and Basel II in terms of a minimum capital ratio of 8 percent of risk weighted assets. Under Basel II, there is also a *supervisory minimum capital* ratio that is expected of banks, a minimum that varies with the supervisors' evaluation of risk profiles. In the United States, there is already an explicit supervisory minimum concept under Basel I; a U.S. bank must maintain a Tier I risk-based capital ratio above 6 percent, a total risk-based capital ratio above 10 percent, and a Tier I leverage ratio above 5 percent in order to be designated as "well-capitalized." Banks must be well-capitalized in order to conduct various activities, and must cease such activities if their capital falls toward the regulatory minimum.

A capital concept not yet discussed is *market-determined capital*, which is the amount of capital that market participants require an institution to hold. In principle, market capital should equal economic capital, but the two may differ because of a lack of transparency or because of investor uncertainty. Rating agencies play a key role in determining a bank's market capital. Many banks aim to hold sufficient capital to maintain target risk profiles (e.g., a AA debt rating), and adjust capital if rating agencies and analysts view actual capital to be inconsistent with the desired profile.

Virtually all U.S. banks hold capital above the regulatory and supervisory minima in order to meet economic and/or market-determined capital requirements. Such *excess regulatory capital* may also be driven by a bank's desire to hold *buffer capital* in excess of regulatory and supervisory requirements. Buffer capital is necessary to absorb unexpected shocks to the balance sheet and earnings (e.g., unexpected losses from market risks undertaken, from investments made, or from business operations) without either

facing more expensive or reduced funding, or being required by the supervisor or by statute to raise additional capital under adverse conditions.

Note that regulatory minimum capital and the *total actual amount of capital held* are the only capital concepts that can readily be observed by the public. Neither economic capital, market capital, supervisory capital, nor buffer capital are readily compared across institutions, even though they might be the real driver of actual capital held. Note also that the Basel II operational risk capital charge directly affects only regulatory capital. It would affect the other measures only if these measures did not already include capital for operational risk.

By design, regulatory minimum capital is the smallest of all the capital concepts (and does not include any buffer capital) so as to minimize the risk that regulatory rules would affect business decisions.[34] Basel II retains the minimum regulatory capital concept of Basel I, but uses principles of economic capital to make the minimum regulatory capital measure more risk-sensitive. Basel II also requires that banks adopting the AIRB and AMA approaches implement more modern and quantitative risk measurement and management techniques. Nonetheless, Basel II's minimum regulatory capital requirements are to be supplemented by supervisory judgment of any special risk characteristics of the individual bank. Moreover, U.S. supervisors have made it clear that they expect banking organizations to continue to operate with capital above regulatory minima. Similarly, at least one rating agency has indicated it would reduce its rating of any bank that lowered its capital to the new Basel II regulatory minimum.[35]

[34] Basel I's regulatory capital charge on residential mortgages is an example where that principle was not met, with the result that banks securitize a high percentage of their high-quality mortgage originations.
[35] See Simensen, Ivar. "Banks could face ratings cuts, warns S&P." *Financial Times*, October 21, 2004.

Table 13 reports capital ratios for the four U.S. processing banks on a quarterly basis over the last two years. Each has Tier 1 and total risk-based capital ratios in excess of the 6 percent and 10 percent thresholds for being designated by bank supervisors as well-capitalized. Each also has a Tier 1 leverage ratio above the 5 percent well-capitalized threshold. As Basel II will not directly affect banks' Tier 1 leverage ratios, we focus on the two risk-based capital ratios that will be directly affected.

The capital ratios presented in Table 13 suggest that the processing banks could absorb a modest regulatory capital charge for operational risk without having to raise additional capital. To see this, suppose that the (additional) capital required for operational risk equaled one percent of a bank's risk-weighted assets. This amount corresponds to ten percent of a "well-capitalized" bank's total risk-based capital requirement. It is straightforward to verify that each processing bank's risk-based capital ratios would remain above the well-capitalized thresholds after adjustment for the hypothetical new charge.[36]

The preceding calculation is just an illustration. There is little current information regarding the likely size of the operational risk charge, and none of this information applies to processing banks.[37] Thus, it is not possible empirically to determine how the

[36] Let K denote a bank's total risk-based capital, and RWA denote its risk-weighted assets. After accounting for the hypothetical operational risk charge of 1 percent of RWA, the bank's new Total RBC ratio would be K / (RWA + 12.5*0.01*RWA) = K/(RWA*1.125).

[37] In their 2003 Annual Reports, Citigroup disclosed 6.1 billion dollars and J.P. Morgan Chase disclosed 3.5 billion dollars in economic capital for operational risk. In its 2003 Annual Report, Wachovia disclosed 5.6 billion dollars of total economic capital, 25 percent of which was for operational risk. These figures imply a ratio of operational risk capital to risk weighted assets of 0.79 percent, 0.69 percent, and 0.50 percent, respectively. In addition, de Fontnouvelle et al. (2004) estimated the operational risk exposure of six large banks using internal data collected as part of the 2001 Loss Data Collection Exercise, and found that the median ratio of operational risk exposure to assets was 46 basis points.

adoption of an operational risk charge would affect actual capital levels at the four U.S. processing banks. However, a number of qualitative arguments may be made.

In principle, operational risk should already be reflected in the capital allocation decisions of banks practicing economic capital. Furthermore, the market is keenly aware of operational risk, given recent high-profile operational losses at some financial institutions.[38] If processing banks are in fact already holding adequate economic/market capital for operational risk, they should not need to raise additional capital for this risk upon implementation of Basel II, unless the increase in regulatory capital results in a capital buffer that is too small to support management's desired level of flexibility. That is, the excess regulatory capital of the processing banks is not excess in any economic or market sense. This "excess" measured amount – a statistical artifact – would decline after Basel II is implemented, but the competitive question is what is likely to happen to the amount of actual capital held, i.e. would the buffer be reduced below the desired level?

While all the processing banks hold excess regulatory capital, the effect of Basel II implementation on actual capital held is still an open question. The practice of economic capital allocation is not universal, the market may not always require banks to

[38] One of the largest recent operational losses occurred in May of 2004, when Citigroup agreed to pay $2.65 billion to settle a class-action lawsuit brought by WorldCom shareholders. In March of 2004, Bank of America paid a total of $455 million ($250 million in disgorgement and restitution, $125 million in fines, and $80 million in fee reductions) to settle for its role in the recent mutual fund market-timing scandal. In 2002, J.P. Morgan Chase recorded a $1.3 billion charge in connection with several Enron-related litigation and regulatory matters. Also in 2002, Allied Irish Bank incurred losses of $691 million due to unauthorized trading that had occurred over the previous five years at its Allfirst subsidiary. In 2001, Republic Bank paid $611M in restitution and fines stemming from its role as custodian of securities sold by Princeton Economics International, which had issued false account statements and commingled client money. Of course, these are only a few examples. In all, more than one hundred operational losses exceeding $100 million have impacted financial firms over the past decade.

hold sufficient economic capital, and an increase in minimum regulatory capital may lower a bank's excess regulatory capital buffer below the level desired by bank management. One reason for this uncertainty is that banks are opaque institutions, and it can be very difficult for outsiders to understand and quantify the full range of risks to which a bank is exposed (Morgan, 2002). Another reason is that because of the bank safety net, the market may allow banks to operate with less capital than similar non-bank institutions (Berger et al., 1995, and Kwast and Passmore, 2000). In addition, because FDICIA's prompt corrective action and other provisions designed to shrink the safety net have not been fully tested in a banking crisis, stockholders and particularly uninsured creditors may believe they are less exposed to loss than would actually be the case.

If a bank is not allocating economic capital and/or the market is not requiring it to hold sufficient total actual capital, or if the excess regulatory capital buffer shrinks too far, then the new capital standards for operational risk may lead to an increase in actual capital held. In this case, the bank would see its costs increase. Meanwhile, competitors who are already practicing economic capital – as well as non-regulated competitors – would not see a change in their capital holdings.

As discussed previously, the data in Table 13 suggest that the processing banks may already hold sufficient capital to meet economic and market-determined capital that already includes capital for operational risk, as well as to absorb the new regulatory requirements and still have enough buffer capital to retain flexibility. However, if a processing bank did have to raise additional capital to meet the Basel II standards, this should not necessarily be viewed as a negative outcome for either prudential or competitive equity reasons. One purpose of the Basel Accord is to ensure that minimum

regulatory capital for banks with access to the safety net is reflective of their risk profile. To the extent that this objective is achieved, stating that a bank's total actual capital held will increase following Basel II may well be equivalent to stating that its current total actual capital held is lower than the economic capital at a rival bank or at a rival non-regulated institution. One could go so far as to argue that before the increase in such a bank's total actual capital holding, the bank in question had an "unfair" competitive advantage over its non-regulated rivals. Seen in this light, and considering only the case where Basel II resulted in an increase in total actual capital held by a processing bank, the new Accord might well rectify, not create, a competitive imbalance between banks and non-banks.

With this discussion of total actual capital held as background, we now turn to an attempt to estimate what the effect of an operational risk capital charge is likely to be for the competitive position of processing banks, business line by business line.

5. Is the Operational Risk Charge Likely to Have a Competitive Impact on the Processing Banks?

This section reviews the information presented in Sections 2 through 4 in order to address the questions raised in the introduction: Is the new operational risk capital charge likely to have a competitive impact on the processing banks? And if so, in what business lines is the impact most probable, and relative to what competitors?

5.1 Custody

As noted in Section 2, almost all custodians are banks. In fact, all four U.S. processing banks rank among the top ten global custodians listed in Table 3. The top ten custodians include two other U.S. banks (J.P. Morgan Chase and Citigroup) and four European banks (UBS, BNP Paribas, HSBC, and Societe Generale). As noted in Section 3, the two U.S. banks will adopt the Advanced Measurement Approach for operational risk (according to the *American Banker*), and the European banks will also be subject to an operational risk charge under Basel II. The processing banks will thus not be at a competitive disadvantage relative to any of these institutions, which together account for 80 percent of the assets under custody listed on Table 3. As almost all of the smaller custodians listed in Table 3 will also be subject to Basel II, it appears unlikely that the new operational risk charge would adversely impact the processing banks in this market.[39]

5.2 Processing

In Section 2, we identified seventeen distinct processing business lines. These include activities such as fund accounting, transfer agency, and securities lending. We first consider bank-affiliated firms engaged in processing, as listed in the second panel of Table 10. The processing banks are involved in most of the activities listed, as are what the *American Banker* believes would be five mandatory AMA banks and a probable opt-

[39] Neither SIS Segaintersettle AG (SIS) nor Brown Brothers Harriman (BBH) will be subject to an operational risk capital charge under Basel II. SIS is owned by a group of Swiss banks (including UBS and Credit Suisse) and serves as a central securities depository for Switzerland. BBH is a private bank structured as a partnership; while BBH does own a state-chartered bank, BBH is not a bank holding company and is not subject to consolidated banking supervision or capital regulation.

in bank (PNC). Also listed are three foreign-owned banks (ABN Amro, ING, and Royal Bank of Canada), that will be subject to an operational risk charge under Basel II.

There are four U.S. banks significantly engaged in processing activities that the *American Banker* does not identify as either mandatory or opt-in Basel II banks (Investors Bank & Trust, Marshall & Ilsley, UMB Financial, and U.S. Bancorp). Each of these institutions engages in multiple processing activities. If the new operational risk capital charge does raise the processing banks' costs, these non-AMA U.S. banks may pose a competitive threat. We would note, however, that two of the potential competitors (Marshall & Ilsley and US Bancorp) are primarily engaged in lower-risk credit activities, and may thus face higher overall capital charges if they remain under Basel I than if they opt in to Basel II. These two banks also are assigned credit ratings by the ratings agencies. The fact that their operational risk and associated risk management practices are part of the rating agencies' assessments may further mitigate competitive concerns.

We next consider the non-bank firms engaged in processing, as listed in the first panel of Table 10. These include four securities firms, three of which (Bear Stearns, Goldman Sachs, and Merrill Lynch) have expressed interest in opting in to the SEC's new CSE regime, in which case they would be subject to an operational risk charge. The fourth (Southwest Securities) engages in only two of the seventeen processing activities, and is thus unlikely to pose a material threat to the processing banks. Likewise, although the five insurance entities listed in Table 10 would not be subject to an explicit operational risk capital charge, their involvement in processing is narrow.[40]

[40] The five insurance entities are Aon, Marsh & McLennan, Nationwide Financial, Prudential PLC, and Western-Southern Financial Group.

The other competitors listed in Table 10 are mostly non-financial firms, but also include several asset management firms (e.g., SEI Investments and T. Rowe Price). The non-financials include firms such as Jack Henry and Omgeo that engage in just one processing activity, as well as firms such as BISYS and SEI Investments that engage in multiple activities. As neither the non-financial firms nor the asset managers face any capital regulation, they stand to gain should the processing banks increase actual capital held because of the new requirements. It is interesting to note, however, that the financial structure of these firms differs significantly from that of the processing banks. That is, these firms all have equity-to-assets ratios exceeding 20 percent, with an average of 47 percent across the 13 such firms reporting equity-to-assets.[41] The processing banks all have equity-to-assets ratios of ten percent or less. This result is not surprising, as it is well-known that banks tend to be much more leveraged than non-financial firms.[42]

The difference in financial structure between banks and non-financial firms (and asset managers) should allay concerns regarding a level playing field in the processing market. That the non-financial firms have such high equity-to-assets ratios suggests that were these firms subject to a Basel-like operational risk capital charge, such a regulation would not require the entities to raise any new capital because their capital held already

[41] The 13 firms being referred to are ADP, Ceridian, DST Systems, EDS, Exult, Fiserv, Hewitt Associates, Jack Henry, SEI Investments, Sungard, T. Rowe Price, and Watson Wyatt.

[42] Various reasons for this difference have been proposed, and it is beyond the scope of this paper to go into them here. Berger et al. (1995) and Orgler and Taggart (1983) provide an overview of this issue. Diamond and Rajan (2000) is also relevant.

exceeds the regulatory minimum by such a wide margin.[43] Furthermore, the non-financial processors' high equity-to-assets ratios suggest that they are in fact subject to a market-based capital requirement. In fact, the median dollar value of equity across the thirteen non-bank processing firms mentioned above is approximately $1 billion. Although not subject to any regulatory capital requirement, these firms are subject to a market-determined capital requirement to cover all of their risks including operational risk. In summary, the playing field appears level in the sense that banks will be held to certain capital standards under Basel II, and non-banks will be held to similar or higher standards by the market.

5.3 Asset Management

As discussed in Section 2, we consider asset management as three separate markets: institutional asset management, mutual fund management, and private wealth management. In addition, our background research suggested that institutional asset management is a global market, and the other two are U.S. markets.

a. Institutional Asset Management

As reported in Table 6, three of the U.S. processing banks rank among the top institutional asset managers. State Street ranks first with $1.1 trillion in Assets Under

[43] Ideally, market analysis would be done by business line, but unfortunately, such data are not available from public sources. As a result, any competitive analysis based on firm-wide capital has the potential to overstate or understate capital allocated to particular business lines. Nonetheless, the significant buffer over minimum capital requirements currently held by most processing banks, the fact that many banks are holding capital consistent with their economic capital models (which if accurate, should result in modest adjustments to the new regulatory standards), and the capital positions and capital requirements of most of their competitors likely indicates that minimum capital requirements are unlikely to be a driving force in these markets.

Management (AUM), Mellon ranks fourth with $468 billion in AUM, and Northern Trust ranks eighth with $344 billion in AUM.

The other firms among the top fifty institutional asset managers reported in Table 6 fall under multiple regulatory categories. We first address the firms that are likely to face an operational risk capital charge in the near future. These include entities that the *American Banker* believes will be AMA-Mandatory U.S. Banks (e.g., J.P. Morgan Chase, PNC, and Citigroup), as well as European banks that will also face a capital charge for operational risk under Basel II (Barclays, Deutsche Bank, UBS). The operational risk capital charge is unlikely to place processing banks at a competitive disadvantage vis-à-vis these firms, who are all expected to face a similar charge. The list of top institutional asset managers also includes several U.S. investment banks (Merrill Lynch, Goldman Sachs, and Morgan Stanley) that have expressed interest in opting in to the SEC's CSE regime, in which case they would also face a capital charge for operational risk.

We next address firms that are not expected to face a regulatory operational risk capital charge.[44] These can be divided into three groups. The first group consists of asset management affiliates of U.S. insurance companies. Several of these entities appear to have a significant amount of institutional AUM. Of the firms listed in Table 6, AIG ranks sixth with $416 billion in AUM and TIAA-CREF ranks twelfth with $302 billion in AUM. However, neither of these firms is a direct competitor to the processing banks: approximately 90 percent of AIG's reported AUM consists of the assets of various AIG insurance companies rather than third-party client assets, and TIAA-CREF's primary market is providing defined contribution retirement plans to nonprofit education and

[44] Two non-AMA U.S. banks are also active in institutional asset management: Metlife and Franklin Resources. However, these are small players in the IAM market, ranking 38th and 41st, respectively.

research organizations.[45] The next largest insurance affiliate listed on Table 6 is Prudential Financial, whose third-party institutional AUM are quite modest at less than $150 billion.[46] We conclude that asset management affiliates of U.S. insurance companies are a limited presence in the institutional asset management market, and as such should not pose a significant competitive threat to the processing banks.

The second group of firms that are not expected to face an operational risk capital charge consists of asset management affiliates of two E.U. insurance conglomerates, Allianz and AXA. As discussed in Section 3, both of these firms include an operational risk calculation in their risk-based capital requirements for their various business entities. As the aim of the Basel II AMA is to align regulatory capital with this type of economic capital model, the processing banks should not be disadvantaged vis-à-vis these two firms.

The third group of firms that are not expected to face an operational risk charge consists of stand-alone asset managers (SAMs) such as Fidelity Investments and Vanguard. As SAMs currently manage $3 trillion of the $12 trillion of institutional assets reported in Table 6, any increase in banks' capital costs that might have to be recaptured in their pricing could lead to an erosion in their market share relative to these competitors. The three most significant SAMs (Fidelity, Wellington, and Vanguard) do not publicly report their financial ratios. However, there are eight smaller SAMs in Table 6 that do, and the average equity-to-assets ratio across these eight is 57 percent. As was

[45] On page 11 of AIG's 2003 Annual Report, it is stated that AIG Global Investment Group manages $395 billion of assets for AIG's insurance companies and $46 billion of assets for third-party clients.

[46] Prudential Financial's quarterly financial supplement for the fourth quarter of 2003 states that the Investment Division manages $94.8 billion of assets for institutional customers. The International Insurance and Investments Division manages an additional $53.9 billion in assets, although the breakdown of this figure between internal insurance funds, retail customers, and institutional customers is not reported.

argued in Section 5.2 for processing, the stand-alone asset managers' unleveraged capital structure should allay concerns regarding a level playing field between banks and non-banks competing in this market.

b. Mutual Fund Management

The processing banks do not have a dominant presence in the mutual fund market. If Mellon does not opt in to Basel II, State Street and Northern Trust would be the only processing banks subject to the new operational risk charge among the top fifty mutual fund families. State Street's and Northern's combined mutual fund assets account for less than 2 percent of the assets reported in Table 7. We will thus not review in detail all the other firms that compete in this market.

However, it is informative to consider the most significant group of competitors – stand-alone asset managers such as Fidelity Investments, Vanguard, and the Capital Group. Together, these firms have almost $3 trillion in assets under management, more than half of all AUM reported in Table 7. As was the case for processing and institutional asset management, the stand-alone asset managers' capital structure (equity-to-assets ratios of 60 percent or higher for those reporting) should allay concerns regarding a level playing field between banks and non-banks. The stand-alone asset managers' high equity-to-assets ratios also suggest that economic and market capital for mutual fund management could be high. For all of these reasons, we would not expect the new charge for operational risk to be a significant competitive issue, as it seems unlikely to exceed economic/market capital requirements for this business line.

c. Private Wealth Management

There are comparatively more banks engaged in private wealth management than in either institutional or mutual fund management. The 27 banks listed in Table 8 include thirteen projected AMA U.S. banks and two foreign banks, all of whom are expected to adopt Basel II. Investment banks (Merrill Lynch, Morgan Stanley, Goldman Sachs, Lehman Brothers) are also a significant presence in this market.[47] All of these firms have expressed interest in opting in to the SEC's new CSE regime, which imposes an operational risk charge calculated in accordance with Basel II.

Other competitors in private wealth management include two stand-alone asset managers, Fidelity Investments and T. Rowe Price. Although neither of these firms faces a regulatory charge for operational risk, we saw in previous sections that the market probably requires both to hold significant economic capital for operational risk. There are also twelve non-AMA banks listed in Table 8. As discussed previously, most of these institutions would likely see a higher capital charge under Basel I than if they were to opt in to Basel II.[48]

d. Other issues.

As discussed at the end of section 4, another factor that must be considered that overarches the competitive position of processing banks vis-à-vis non-bank competitors in all these markets is that the former have direct access to the federal safety net while

[47] Lehman Brothers competes in the private wealth management market via its Neuberger Berman subsidiary.

[48] We verified that the majority of the 11 non-AMA banks have a significant loan portfolio (a loan-to-assets ratio exceeding 50 percent), and would thus likely see a reduced capital charge under Basel II. Four of these banks (Schwab, Bessemer Trust, Franklin, Glenmede) had loan-to-assets ratios of less than 50 percent. However, we also verified that as of 6/30/03 (the date for Table 8), these four all had very high RBC ratios of 20 percent or more. So, it is unlikely that they would need to raise additional capital even if they did opt in to Basel II.

their non-bank rivals do not. This provides a competitive advantage to banks in three ways. First, banks have direct access to the discount window without special action by the Federal Reserve Board, access that confers a liquidity backup particularly important to processing bank customers. Second, banks' direct access to Fedwire enables them to move both funds and U.S. government securities more rapidly and cheaply than their non-bank rivals. Finally, the prudential supervision of banks, in the perception of many customers, confers to them a certification of strength also not available to their rivals. These factors help to explain the higher leverage that the market permits banks, for the same level of risk, and suggests that higher regulatory minimum capital is likely still to leave both economic and total actual capital held lower at banks than at their rivals.

6. Conclusion

Basel II replaces Basel I's implicit capital charge on operational risk with an explicit charge. Certain U.S. banks likely to adopt Basel II are concentrated in business lines that involve minimal credit risk, and could thus face an increase in regulatory capital requirements because of the new explicit regulatory capital charge for operational risk. Some have argued that as a result, the new operational risk capital charge would put these processing banks at a competitive disadvantage vis-à-vis non-AIRB U.S. banks, foreign banks, and non-banks with whom they compete.[49] To address these concerns, we have considered the five business activities in which the processing banks engage:

[49] This paper has focused on the argument that the treatment of operational risk under Basel II would affect a bank's cost structure – and hence its competitiveness – by increasing the amount of capital held by the bank. However, it can be argued that a bank implementing an AMA for operational risk also incurs costs stemming from investments in risk management personnel and infrastructure. Although a full treatment is outside the scope of this paper, we will make two points relevant to addressing this argument. First, banks would continue to perform many operational risk management activities (and to incur the associated costs) even in the absence of Basel II. For example, there is significant overlap between the investments required

custody, institutional asset management, mutual fund management, private wealth management, and general processing. This section briefly reviews our findings for each.

Most global custodians are banks, almost all of which are expected to adopt Basel II. The likelihood that the operational risk charge would have a competitive impact on the processing banks thus appears small. In institutional asset management, the main competitors not subject to a regulatory charge for operational risk will be stand-alone asset managers, as well as the asset management affiliates of two European insurance groups. However, the stand-alone asset managers' high equity-to-assets ratios suggest that the market already requires them to hold economic capital sufficient to cover their operational risk exposures, and the two European insurance groups already incorporate operational risk in their risk-based capital calculations.

The processing banks do not have a dominant presence in the mutual fund market. If Mellon does not opt in to Basel II, State Street and Northern Trust would be the only processing banks subject to the new operational risk charge among the top fifty mutual fund families. State Street's and Northern's combined mutual fund assets account for less than 2 percent of the assets reported in Table 7. The main competitors not subject to an operational risk charge will be stand-alone asset managers, who are highly capitalized and might not need to raise additional capital even if subject to Basel II.

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for Basel II compliance and those required for compliance with both FDICIA and Sarbanes-Oxley – and also with those required for compliance with the internal control best practices laid out by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). The second point is that the same arguments suggesting that any increase in the processing banks' capital costs would not necessarily have a competitive impact also suggest that any increase in infrastructure costs would not necessarily have a competitive impact. That is, many of the processing banks' significant competitors – especially in custody and private wealth management – will also be required to invest in operational risk management under Basel II or equivalent regulation.

Three U.S. processing banks rank among the top U.S. private wealth managers. They face competition in this market from investment banks, AMA banks, and foreign banks, all of which will face an operational risk charge under Basel II or its equivalent. The processing banks also face competition from non-AMA banks that will not be subject to an explicit capital charge for operational risk. However, these banks would remain subject to Basel I's implicit operational risk charge, and are expected to face higher overall capital requirements than if they were to opt in to Basel II.

In processing, banks face potential competition from numerous firms that are not subject to capital regulation. However, these non-bank competitors tend to be highly capitalized – as evidenced by their high equity-to-assets ratios – and do not have the benefits from the federal safety net that banks enjoy. The competitive impact of the operational risk capital charge could be blunted further by the fact that many processing services are bundled with custody.

These arguments and evidence suggest that the potential competitive effects of the Basel II operational risk charge will be, at most, modest. The processing banks hold considerable capital in excess of the regulatory minima under Basel II, suggesting that they are already covering their operational risks in order to satisfy market/rating agency demands. This having been said, the operational risk charge under Basel II could still reduce buffer capital levels below that desired by management for flexibility and other reasons. If, as a result, processing banks raised additional capital, their costs could rise, adversely impacting their competitive position. Although our analysis of capital ratios *suggests* that U.S. processing banks are most likely to be able to accommodate the new charge for operational risk without increasing total actual capital levels, the analysis is

not, and cannot be made, definitive. If the processing banks' total actual capital held does increase due to Basel II, and the non-banks' total actual capital held is unchanged, processing banks could face reduced profits or market share.

However, this possibility should be viewed in perspective. Although the minimal leverage displayed by non-banks does not eliminate the potential for a competitive impact on banks, it does affect the interpretation of this possible impact – in the unlikely event it should occur. As none of these non-bank firms has access to the safety net or faces any regulatory capital requirements, their relatively high equity-to-assets ratios can be considered a proxy for the capital the market requires for asset management and processing activities. Thus, even if the operational risk charge leads to an increase in total actual capital held by banks under Basel II, it appears that the new requirements would still be less than the amount of economic/market capital held by prudently-run asset management and processing firms that do not have access to the benefits of the federal safety net provided to banks.

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Table 1: Financial Ratios for the Top 50 U.S. Bank Holding Companies as of 12/31/03[a]

Rank	Bank Holding Company	Operational Income/ Total Income[b]	Total Loans/ Total Assets	Total Assets (billions)
1	Charles Schwab Corporation	78%	31%	$46
2	State Street	76%	7%	$88
3	Mellon Financial Corporation	73%	22%	$34
4	Taunus Corporation	73%	7%	$291
5	Northern Trust	60%	43%	$41
6	The Bank of New York	60%	37%	$92
7	Synovus Financial	58%	75%	$22
8	CIBC Delaware	50%	31%	$39
9	PNC Financial	46%	49%	$68
10	Marshall & Ilsley	43%	72%	$34
11	Huntington Bancshares	41%	68%	$31
12	Bankmont FC	35%	48%	$39
13	JPMorgan Chase	35%	25%	$771
14	Wachovia Corporation	33%	42%	$401
15	Citigroup	32%	38%	$1,264
16	Regions FC	30%	65%	$49
17	US Bancorp	29%	61%	$189
18	FleetBoston Financial	28%	62%	$200
19	Keycorp	27%	70%	$84
20	Fifth Third Bank	27%	57%	$91
21	Utrecht-American Holdings	27%	63%	$27
22	Bank of America Corporation	26%	50%	$736
23	MBNA Corporation	26%	33%	$59
24	Wells Fargo & Co.	26%	64%	$388
25	Suntrust Bank	25%	64%	$125
26	ABN AMRO North America	25%	40%	$127
27	Bank One Corporation	22%	48%	$327
28	National City Corporation	21%	69%	$114
29	First Tennessee National Corporation	19%	56%	$25
30	Comerica	19%	75%	$53
31	HSBC North America	18%	53%	$126
32	National Commerce Financial Corporation	18%	56%	$23
33	Popular	17%	60%	$36
34	UnionBanCal Corporation	17%	60%	$42
35	Union Planters Corporation	16%	68%	$32
36	AmSouth Bank	16%	63%	$46
37	BB&T Corporation	16%	67%	$90
38	M&T Bank Corporation	15%	69%	$50
39	Zions Bank	15%	68%	$29
40	BankNorth Group	15%	61%	$26
41	Southtrust Corporation	15%	67%	$52
42	Citizens Financial Group	14%	55%	$78
43	Compass Bancshares	13%	63%	$27
44	MetLife	13%	11%	$327
45	Charter One Financial	12%	66%	$43
46	Bancwest Corporation	11%	66%	$38
47	Commerce Bank	10%	32%	$23
48	New York Community Bank	5%	44%	$24
49	Greenpoint FC	4%	43%	$23
50	Countrywide FC	–8%[c]	26.9%	$98

[a] Source: Consolidated Financial Statements for Bank Holding Companies (FR Y-9C).

[b] Operational income is defined as income from the following sources: (i) fiduciary activities, (ii) investment banking, advisory, brokerage and underwriting, (iii) venture capital, (iv) servicing, and (v) other noninterest income earning activities as defined in the instructions to the form FR Y-9C. Insurance underwriting income is excluded from both noninterest income and total income as it is anticipated that such non-credit related activities would be carved out of the Basel II provisions.

[c] Countrywide's ratio is negative as it has negative income from net servicing fees that more than offsets other positive income from operational activities. Reported servicing income is net of the related servicing assets' amortization expense.

Table 2: List of Discussions Held with External Sources

Processing Banks

The Bank of New York Corporation

Mellon Financial Corporation Corporate & Institutional Services

State Street Corporation Global Investor Services

Northern Trust Corporation

Asset Managers

The Dreyfus Corporation

Fidelity Investments

Mellon Financial Corporation Private Wealth Management

Mellon Institutional Asset Management

State Street Global Advisors

The Vanguard Group

Rating Agencies

Moody's

Standard & Poors

Fitch Ratings

Others

Russell Investment Group

Table 3: Largest Global Custodians as of 6/14/04

Panel a: Assets Under Custody from globalcustody.net[a]

Rank	Provider[b]	Assets under Custody (billions)
1	State Street	$9,400
2	The Bank of New York	$8,577
3	JPMorgan Chase	$8,014
4	Citigroup	$6,381
5	Mellon Financial Corporation	$2,903
6	UBS Group	$2,398
7	Northern Trust	$2,300
8	BNP Paribas	$2,167
9	HSBC	$1,483
10	Societe Generale	$1,465
11	SIS Swiss Financial Services Group	$1,329
12	RBC Global Services	$1,182
13	Investors Financial Services	$1,131
14	Brown Brothers Harriman	$950
15	Wachovia Corporation	$854
16	Credit Agricole Group	$691
17	CDC Ixis	$623
18	Banca Intesa	$550
19	Nordea Bank	$466
20	Fortis Group	$450
21	UniCredito Italiano	$414
22	PNC Financial	$400
23	Dexia Fund Services	$382
24	ING	$375
25	SEB Merchant Banking	$256
26	National Australia Group	$235
27	KAS Bank	$210
28	Fifth Third Bank	$194
29	Pictet & Cie	$162
30	Mitsubishi Tokyo Fncl. Group (Union Bank of CA)	$140
31	HVB Group (Bank Austria Creditanstalt)	$120
32	Lombard Odier Darier Hentsch	$91
33	Svenska Handelsbanken	$90
34	Bank of Ireland	$89
35	Credit Suisse (Swiss American Securities)	$70
36	DBS Bank, Ltd	$57
37	Millennium BCP (Banco Comercial Portugues)	$49
38	Bank Julius Baer	$31
39	Credit Suisse (Bank Leu)	$30
40	Daiwa Securities	$17
41	Nikko Bank	$2

Panel b: Additional Information

Button-wood Survey[c]	Global Investor Survey[d]	U.S./ Canada	Europe	Asia	Client Focus[e]
x	x	x	x	x	A, B, I, R
x	x	x	x	x	A, B, I, R
x	x	x	x	x	A, B, I, R
x	x	x	x	x	A, B, I, R
x	x	x	x		A, I, R
			x		A, B, I, R
x	x	x	x	x	A, B, I, R
x			x	x	A, B, I, R
x	x		x		A, B, R
			x		A, C
			x		B, Br
x	x	x	x	x	A, B, I, R
x	x	x			A, B, I, R
x	x	x	x	x	A, B, I, R
		x			A, B, C
			x		A, C
			x		A, B
			x		A, R
			x		A
			x		A, B, I, R
					A, B, I, R
		x			A, I
			x	x	A, B, I, R
			x		C
			x		A
				x	A, R
			x		B, I, R
		x			A, I, R
	x		x		A, Pr
		x			A, B, I, R
			x		Br
			x		P, I
			x		C
			x		A, H
			x		B, Br
				x	C
			x		C
			x		B, Br, I, R
			x		B, Br
				x	A, B, P
				x	C

[a] © 2004 globalcustody.net

Source: www.globalcustody.net

Top providers and worldwide assets under custody from GlobalCustody.net on 6/14/2004, based on the most recent data as of that date. Reprinted with permission. GlobalCustody.net only lists 41 providers. Provider name has been changed from that list to reflect the top holding company.

[b] Companies listed are the top holders of the custody providers listed on GlobalCustody.net and descriptive data are consolidated figures for top holders. To the extent that these companies provide custody services under a subsidiary with a different name, we have tried to identify these companies by including them in parentheses after the top holder.

[c] The Buttonwood Survey is an annual survey of the major global custodians. An "x" indicates that the company is included in this survey.

[d] The Global Investor Survey refers to the Global Custody Survey in the May 2004 issue of *Global Investor Magazine.* An "x" indicates that the company is included in this survey.

[e] Key to client focus: A=Asset Managers, B=Banks, Br=Brokers, Brokerage Houses and Financial Services, C=Corporate and Institutional Clients, H=Hedge Funds, I=Insurance Companies, P=Pension Funds, Pr=Private Clients, R=Retirement Services.

Table 4: Largest Global Custodians as of 6/14/04

Panel a: Assets Under Custody from globalcustody.net[a]

Rank	Provider[c]	Assets under Custody (billions)
1	State Street	$9,400
2	The Bank of New York	$8,577
3	JPMorgan Chase	$8,014
4	Citigroup	$6,381
5	Mellon Financial Corporation	$2,903
6	UBS Group	$2,398
7	Northern Trust	$2,300
8	BNP Paribas	$2,167
9	HSBC	$1,483
10	Societe Generale	$1,465
11	SIS Swiss Financial Services Group	$1,329
12	RBC Global Services	$1,182
13	Investors Financial Services	$1,131
14	Brown Brothers Harriman	$950
15	Wachovia Corporation	$854
16	Credit Agricole Group	$691
17	CDC Ixis	$623
18	Banca Intesa	$550
19	Nordea Bank	$466
20	Fortis Group	$450
21	UniCredito Italiano	$414
22	PNC Financial	$400
23	Dexia Fund Services	$382
24	ING	$375
25	SEB Merchant Banking	$256
26	National Australia Group	$235
27	KAS Bank	$210
28	Fifth Third Bank	$194
29	Pictet & Cie	$162
30	Mitsubishi Tokyo Fncl. Group (Union Bank of CA)[d]	$140
31	HVB Group (Bank Austria Creditanstalt)	$120
32	Lombard Odier Darier Hentsch	$91
33	Svenska Handelsbanken	$90
34	Bank of Ireland	$89
35	Credit Suisse (Swiss American Securities)	$70
36	DBS Bank, Ltd	$57
37	Millennium BCP (Banco Comercial Portugues)	$49
38	Bank Julius Baer	$31
39	Credit Suisse (Bank Leu)	$30
40	Daiwa Securities	$17
41	Nikko Bank	$2

Panel b: Additional Information[b]

Total Assets (billions)	Equity to Assets	Tier 1 RBC Ratio	Total RBC Ratio	Tier 1 Leverage Ratio
$88	6.6%	14.0%	15.8%	5.6%
$92	9.1%	7.4%	11.5%	5.8%
$771	6.0%	8.5%	11.8%	5.6%
$1,264	7.8%	8.9%	12.0%	5.6%
$34	10.9%	8.6%	13.5%	7.9%
$1,116	2.9%	11.8%	13.3%	–
$41	7.4%	11.1%	14.0%	7.6%
$984	4.2%	9.4%	12.9%	–
$1,035	8.3%	8.9%	12.0%	–
$677	3.9%	8.7%	11.7%	–
$1	14.7%	–	–	–
$306	4.6%	9.7%	12.8%	–
$9	5.9%	17.8%	17.8%	5.4%
$3	8.7%	–	–	–
$401	8.7%	8.5%	11.8%	6.4%
$987	3.5%	7.9%	8.9%	–
$169	–	–	–	–
$326	5.7%	7.8%	11.7%	–
$329	4.6%	7.3%	9.3%	–
$657	2.7%	7.9%	12.4%	–
$299	5.9%	7.0%	11.1%	–
$68	10.4%	9.5%	13.8%	8.2%
$439	2.8%	9.9%	11.2%	–
$978	3.2%	7.6%	11.3%	–
$177	3.8%	8.0%	10.2%	–
$271	7.1%	7.5%	9.4%	–
$10	2.7%	20.0%	25.0%	–
$91	9.4%	10.9%	13.4%	9.1%
–	–	–	–	–
$1,023	4.0%	7.1%	13.0%	–
$172	4.5%	7.8%	13.1%	–
–	–	–	–	–
$175	4.5%	7.1%	10.0%	–
$131	4.0%	7.2%	11.3%	–
$775	3.4%	11.7%	17.4%	–
$94	10.0%	10.5%	15.1%	–
$85	6.4%	7.1%	11.8%	–
$11		19.1%	–	–
$775	3.4%	11.7%	17.4%	–
$11	5.6%	–	–	–
$10	–	–	–	–

[a]

Source: www.globalcustody.net

Top providers and worldwide assets under custody taken from GlobalCustody.net on 6/14/2004, based on the most recent data as of that date. Reprinted with permission. GlobalCustody.net only lists 41 providers. Provider name has been changed from that list to reflect the top holding company.

[c] Companies listed are the top holders of the custody providers listed on GlobalCustody.net and additional data are consolidated figures for top holders. To the extent that these companies provide custody services under a subsidiary with a different name, we have tried to identify these companies by including them in parentheses after the top holder.

[b] Source: Bloomberg L.P. Data are as of December 31, 2003. Data for unlisted firms is taken from their Annual Reports.

[d] Data as of 03/31/04 for this firm.

Table 5: Largest Global Asset Managers as of 12/31/03

Rank	Manager	Worldwide AUM (billions)	Total Assets (billions)	Equity to Assets	Tier 1 RBC Ratio	Total RBC Ratio	Tier 1 Leverage Ratio
1	UBS Group	$1,782	$1,116	2.9%	11.8%	13.3%	–
2	Allianz	$1,327	$1,176	3.9%	–	–	–
3	Fidelity Investments	$1,139	–	–	–	–	–
4	State Street	$1,106	$88	6.6%	14.0%	15.8%	5.6%
5	Barclays	$1,070	$791	3.8%	7.9%	12.8%	–
6	AXA Group	$973	$438 [c]	7.4% [c]	–	–	–
7	Credit Suisse	$971	$775	3.4%	11.7%	17.4%	–
8	Kampo	$877	–	–	–	–	–
9	Capital Group	$814	–	–	–	–	–
10	Vanguard Group	$725	–	–	–	–	–
11	Deutsche Bank	$715	$1,010	3.5%	10.0%	13.9%	–
12	Mellon Financial Corporation	$617	$34	10.9%	8.6%	13.5%	7.9%
13	Citigroup	$609	$1,264	7.8%	8.9%	12.0%	5.6%
14	ING	$590	$978	3.2%	7.6%	11.3%	–
15	JPMorgan Chase	$559	$771	6.0%	8.5%	11.8%	5.6%
16	Merrill Lynch	$500	$495	6.1%	–	–	–
17	Northern Trust	$479	$41	7.4%	11.1%	14.0%	7.6%
18	Credit Agricole	$477	$987	3.5%	7.9%	8.9%	–
19	Morgan Stanley	$450	$603	4.6%	–	–	–
20	AIG Global Investment Group	$441	$618 [c]	11.6% [c]	–	–	–
21	Prudential Financial	$432	$215 [c]	9.9% [c]	–	–	–
22	Aviva	$427	$372	3.5%	–	–	–
23	HSBC	$399	$1,035	8.3%	8.9%	12.0%	–
24	CDC Ixis	$397	$169	–	–	–	–
25	Wellington Management	$394	–	–	–	–	–
26	Fortis Group	$384	$657	2.7%	7.9%	12.4%	–
27	American Express	$366	$175	8.8%	–	–	–
28	AMVESCAP	$365	$7	54.3%	–	–	–
29	Societe Generale	$356	$677	3.9%	8.7%	11.7%	–
30	Nippon Life Insurance	$355 [d]	–	–	–	–	–
31	MetLife	$350	$251 [c]	8.4% [c]	9.2%	11.2%	6.1%
32	Generali	$348	$229 [c]	4.7% [c]	–	–	–
33	Goldman Sachs	$348	$404	5.4%	–	–	–
34	BNP Paribas	$346	$984	4.2%	9.4%	12.9%	–
35	Aegon	$346	$294	6.0%	–	–	–
36	Franklin Resources	$337	$7	62.8%	66.0%	66.0%	45.0%
37	Bank of America Corporation	$336	$736	6.5%	7.9%	11.9%	5.7%
38	Norinchukin Bank Group (Zenkyoren)	$331 [d]	$585 [f]	4.1%	7.5%	12.9%	–
39	PNC Financial (BlackRock Inc)	$309	$68	10.4%	9.5%	13.8%	8.2%
40	TIAA-CREF	$307	$298 [c]	4.2% [c]	–	–	–
41	MassMutual Financial	$285	$66 [c]	9.5% [c]	–	–	–
42	Prudential plc	$279	$252.9 [c]	2.4% [c]	–	–	–
43	Legg Mason Wood Walker Inc.	$278	$7	21.8%	–	–	–
44	Sunlife Financial	$277	$126	12.8%	–	–	–
45	Wachovia Corporation	$248	$401	8.7%	8.5%	11.8%	6.4%
46	Charles Schwab Corporation	$245	$46	9.7%	20.3%	20.4%	8.2%
47	Legal & General Group	$242	$218 [c]	3.0% [c]	–	–	–
48	Putnam Investments	$240	$15	36.2%	–	–	–
49	Mitsubishi Tokyo Fncl. Group	$239 [e]	$1,023 [f]	4.0%	7.1%	13.0%	–
50	Dai-ichi Mutual Life Insurance	$235 [d]	–	–	–	–	–

[a] Data from P&I/Watson Wyatt Megamanagers. Reprinted with permission, *Pensions & Investments* (Sept. 6, 2004). Copyright, Crain Communications, Inc.

[b] Source: Bloomberg L.P. Data are as of December 31, 2003. Data for unlisted firms is taken from their Annual Reports.

[c] Total assets exclude separate accounts.

[d] Assets under management as of 3/31/04 for this firm.

[e] Assets under management as of 9/30/03 for this firm.

[f] Additional data as of 3/31/04 for this firm.

Table 6: Largest Global Institutional Asset Managers as of 12/31/03

Panel a: Institutional AUM from P&I Online[a]			Panel b: Additional Information[b]				
Rank	Manager	Institutional AUM (billions)	Total Assets (billions)	Equity to Assets	Tier 1 RBC Ratio	Total RBC Ratio	Tier 1 Leverage Ratio
1	State Street	$1,097	$88	6.6%	14.0%	15.8%	5.6%
2	Barclays	$958	$791	3.8%	7.9%	12.8%	–
3	Fidelity Investments	$730	–	–	–	–	–
4	Mellon Financial Corporation	$468	$34	10.9%	8.6%	13.5%	7.9%
5	Deutsche Bank (Deutsche Asset Mgmt.)	$467	$1,010	3.5%	10.0%	13.9%	–
6	AIG Global Investment Group	$416	$618 [c]	11.6% [c]	–	–	–
7	Wellington Management	$394	–	–	–	–	–
8	Northern Trust	$344	$41	7.4%	11.1%	14.0%	7.6%
9	Vanguard Group	$329	–	–	–	–	–
10	Allianz (Pacific Investment Mgmt.)	$321	$1,176	3.9%	–	–	–
11	JPMorgan Chase (JPMorgan Fleming Asset Mgmt.)	$317	$771	6.0%	8.5%	11.8%	5.6%
12	TIAA-CREF	$302	$298 [c]	4.2% [c]	–	–	–
13	PNC Financial (BlackRock Inc)	$289	$68	10.4%	9.5%	13.8%	8.2%
14	Capital Group[d]	$281	–	–	–	–	–
15	Citigroup (Citigroup Asset Mgmt.)	$279	$1,264	7.8%	8.9%	12.0%	5.6%
16	AXA Group (Alliance Capital Mgmt.)	$270	$438 [c]	7.4% [c]	–	–	–
17	UBS Group (UBS Global Asset Mgmt.)[e]	$265	$1,116	2.9%	11.8%	13.3%	–
18	Prudential Financial	$267	$215 [c]	9.9% [c]	–	–	–
19	Merrill Lynch	$253	$495	6.1%	–	–	–
20	Goldman Sachs (Goldman Sachs Asset Mgmt.)	$246	$404	5.4%	–	–	–
21	Credit Suisse (Credit Suisse Asset Mgmt.)	$219	$775	3.4%	11.7%	17.4%	–
22	Legg Mason Wood Walker Inc.	$203	$7	21.8%	–	–	–
23	Bank of America Corp (Banc Of America Capital Mgmt.)	$202	$736	6.5%	7.9%	11.9%	5.7%
24	Federated Investors Inc.	$181	$1	45.1%	–	–	–
25	Morgan Stanley	$174	$603	4.6%	–	–	–
26	GE Asset Management Inc.	$172	$647	13.1%	–	–	–
27	MassMutual Financial[f]	$160	$66 [c]	9.5% [c]	–	–	–
28	Wachovia Corporation (Evergreen Investments)	$152	$401	8.7%	8.5%	11.8%	6.4%
29	ING[g]	$144	$978	3.2%	7.6%	11.3%	–
30	General Motors Asset Management	$142	$450	5.7%	–	–	–
31	AMVESCAP (Invesco)	$141	$7	54.3%	–	–	–
32	American Express	$139	$175	8.8%	–	–	–
33	NY Life Group (NY Life Investment Mgmt. Holdings)	$132	$116 [c]	12.5% [c]	–	–	–
34	Schroder (Schroder Investment Mgmt. N America)	$127	$5	39.4%	–	–	–
35	Standard Life Group (Standard Life Investments Ltd.)	$120	–	–	–	–	–
36	Bank One Corporation (Banc One Investment Advisors)	$118	$327	7.2%	10.0%	13.7%	8.8%
37	BNP Paribas (BNP Paribas Asset Mgmt. Inc.)	$114	$984	4.2%	9.4%	12.9%	–
38	MetLife	$110	$251 [c]	8.4% [c]	9.2%	11.2%	6.1%
39	T. Rowe Price Associates	$104	$2	85.9%	–	–	–
40	Franklin Resources (Franklin Templeton Investments)	$102	$7	62.8%	66.0%	66.0%	45.0%
41	Janus Capital Group	$101	$4	61.5%	–	–	–
42	Principal Global Investors	$100	–	–	–	–	–
43	HHG PLC (Henderson Global Investors)	$99	–	–	–	–	–
44	Eureko (F&C Mgmt.)	$96	$51	4.4%	–	–	–
45	Dodge & Cox	$90	–	–	–	–	–
46	HSBC (HSBC Asset Mgmt.)	$85	$1,035	8.3%	8.9%	12.0%	–
47	Marsh & McLennan (Putnam Investments)	$84	$15	36.2%	–	–	–
48	Societe Generale (TCW Group)	$69	$677	3.9%	8.7%	11.7%	–
49	CIGNA Corp (CIGNA Retirement)	$68	$56 [c]	8.1% [c]	–	–	–
50	Northwestern Mutual Life Insurance (Russell Investment)	$66	$101 [c]	10.0% [c]	–	–	–

[a] Data from "2004 Largest US Money Managers." Reprinted with permission, *Pensions & Investments* (online). Copyright, Crain Communications, Inc.

[b] Source: Bloomberg L.P. Data are as of December 31, 2003. Data for unlisted firms is taken from their Annual Reports.

[c] Total assets for these firms exclude separate account assets.

[d] Includes Capital Research & Management Co. and Capital Guardian Trust Co.

[e] Includes UBS Global Asset Management (Canada).

[f] Includes MassMutual Financial and David L. Babson.

[g] Includes ING and ING Clarion.

Table 7: Largest U.S. Mutual Fund Companies as of 12/31/03

Rank	Manager	Net Mutual Fund Assets (billions)	Total Assets (billions)	Equity to Assets	Tier 1 RBC Ratio	Total RBC Ratio	Tier 1 Leverage Ratio
		Panel a: Net Mutual Fund Assets from CRSP[a]	**Panel b: Additional Information[b]**				
1	Fidelity Investments (Fidelity Mgmt. Research)	$805	–	–	–	–	–
2	Vanguard Group (Vanguard Group Investment)	$713	–	–	–	–	–
3	Capital Group (Capital Research & Mgmt.)	$494	–	–	–	–	–
4	Franklin Resources[c]	$194	$7	62.8%	66.0%	66.0%	45.0%
5	Federated Investors Inc.[c]	$175	$1	45.1%	–	–	–
6	Morgan Stanley[c]	$151	$603	4.6%	–	–	–
7	Charles Schwab Corporation[c]	$149	$46	9.7%	20.3%	20.4%	8.2%
8	Mellon Financial Corporation (Dreyfus Corporation)	$145	$34	10.9%	8.6%	13.5%	7.9%
9	Allianz (Allianz Dresdner Asset Mgmt America)[c]	$141	$1,176	3.1%	–	–	–
10	Marsh & McLennan (Putnam Investments)	$136	$15	36.2%	–	–	–
11	Citigroup[c]	$135	$1,264	7.8%	8.9%	12.0%	5.6%
12	Merrill Lynch	$125	$495	6.1%	–	–	–
13	T. Rowe Price Associates[c]	$124	$2	85.9%	–	–	–
14	Bank of America Corporation (Banc of America Advisors)	$120	$736	6.5%	7.9%	11.9%	5.7%
15	AMVESCAP[c]	$114	$7	54.3%	–	–	–
16	Janus Capital Group	$111	$4	61.5%	–	–	–
17	MassMutual Financial[c]	$104	$66 [d]	9.5% [d]	–	–	–
18	Bank One Corporation (Banc One Investment Advisors)	$101	$327	7.2%	10.0%	13.7%	8.8%
19	Goldman Sachs (Goldman Sachs Asset Mgmt.)	$100	$404	5.4%	–	–	–
20	Wachovia Corporation (Evergreen Investment Mgmt.)	$100	$401	8.7%	8.5%	11.8%	6.4%
21	Deutsche Bank (Scudder Investments)	$95	$1,010	3.5%	10.0%	13.9%	–
22	JPMorgan Chase (JPMorgan Fleming Asset Mgmt.)	$87	$771	6.0%	8.5%	11.8%	5.6%
23	AXA Group[c]	$87	$438 [d]	7.4% [d]	–	–	–
24	Sunlife Financial (MFS Investment Mgmt.)	$80	$126 [d]	12.8% [d]	–	–	–
25	American Century Investments	$78	–	–	–	–	–
26	Wells Fargo & Co.	$75	$388	8.9%	8.4%	12.2%	6.9%
27	FleetBoston Financial[c]	$72	$200	9.1%	8.9%	12.0%	8.7%
28	American Express (American Express Financial Advisors)	$69	$175	8.8%	–	–	–
29	PNC Financial (BlackRock Institutional Mgmt. Corp.)	$62	$68	10.4%	9.5%	13.8%	8.2%
30	Barclays (Barclays Global Fund Advisors)	$60	$791	3.8%	7.9%	12.8%	–
31	PDR Services[e]	$57	–	–	–	–	–
32	Hartford Investment Fin Svc	$56	$226	5.2%	–	–	–
33	UBS Group (UBS Global Asset Mgmt.)	$50	$1,116	2.9%	11.8%	13.3%	–
34	Dodge & Cox	$49	–	–	–	–	–
35	US Bancorp (US Bancorp Asset Mgmt.)	$49	$189	10.2%	9.1%	13.6%	8.0%
36	Prudential Financial (Prudential Securities)	$47	$215 [d]	9.9% [d]	–	–	–
37	Northern Trust	$44	$41	7.4%	11.1%	14.0%	7.6%
38	State Street[c]	$42	$88	6.6%	14.0%	15.8%	5.6%
39	Lord Abbett & Co.	$40	–	–	–	–	–
40	SEI Investments Inc	$39	$1	61.4%	–	–	–
41	Legg Mason Wood Walker Inc.[c]	$32	$7	21.8%	–	–	–
42	Selected/Venture Advisers L.P.	$31	–	–	–	–	–
43	USAA Investment Management	$28	–	–	–	–	–
44	Dimensional Fund Advisors	$28	–	–	–	–	–
45	CDC Ixis[c]	$27	$169	–	–	–	–
46	Strong Capital Management	$27	–	–	–	–	–
47	Eaton Vance Management	$26	$1	64.4%	–	–	–
48	UniCredito Italiano (Pioneer Investment Mgmt)	$26	$299	5.9%	7.0%	11.1%	–
49	Nasdaq-Amex Investment Product Services[f]	$26	–	–	–	–	–
50	Trusco Capital Management	$24	–	–	–	–	–

[a] Source: Top fund families and net mutual fund assets compiled from the Center for Research in Security Prices (CRSP) Mutual Fund Database. Data as of 12/31/03. Data are for the U.S. fund families with assets over $5 billion, aggregated by top holding company. Total mutual fund assets may include institutional assets.

[b] Source: Bloomberg L.P. Data are as of December 31, 2003. Data for unlisted firms is taken from their Annual Reports.

[c] These top holders have multiple fund families.

[d] Total assets for these firms exclude separate account assets.

Table 8: Largest U.S. Private Wealth Managers as of 6/30/2003

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2003 TOP WEALTH MANAGERS IN THE UNITED STATES

Ranked by private banking assets under management, based on individual clients with accounts of $1 million or more

1. Merrill Lynch
U.S. PRIVATE CLIENT ASSETS: $630 billion
MINIMUM ACCOUNT: $1 million
MEDIAN ACCOUNT: $2 million
PRIVATE CLIENT MANAGERS: 1,888
CLIENTS PER MANAGER: N/A
U.S. PRIVATE CLIENT OFFICES: 610
SPECIALTIES: Assets, tax and concentrated stock management, trusts and estates, philanthropy, family office.
TEL: 1-800-MERRILL
EMAIL: feedback@ml.com
WEB: www.askmerrill.com

2. Smith Barney
U.S. PRIVATE CLIENT ASSETS: $432 billion
MINIMUM ACCOUNT: N/A
MEDIAN ACCOUNT: $1.7 billion
PRIVATE CLIENT MANAGERS: 10,158*
CLIENTS PER MANAGER: 10-11
U.S. PRIVATE CLIENT OFFICES: 531
SPECIALTIES: Estate planning, philanthropic services, tailored lending, trust, asset management, restricted-security management, alternative investments, family advisory, fine art advisory.
TEL: 212-816-8031, ask for Christopher F. Poch
EMAIL: christopher.f.poch@ssmb.com
WEB: www.salomonsmithbarney.com /products_services/wealth_management
*all managers, not just $1 million plus

3. Fidelity Investments
U.S. PRIVATE CLIENT ASSETS: $295 billion
MINIMUM ACCOUNT: $500,000
MEDIAN ACCOUNT: $1.5 million
PRIVATE CLIENT MANAGERS: 128
CLIENTS PER MANAGER: 200-400
U.S. PRIVATE CLIENT OFFICES: 91
SPECIALTIES: Strategic, consultative wealth-management solutions, information and tools for actively involved investors.
TEL: 800-FIDELITY
EMAIL: N/A
WEB: www.fidelity.com

4. UBS Wealth Management U.S.A.
U.S. PRIVATE CLIENT ASSETS: $191.4 billion
MINIMUM ACCOUNT: $2 million
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 7,024
CLIENTS PER MANAGER: N/A
U.S. PRIVATE CLIENT OFFICES: 367
SPECIALTIES: Portfolio management, estate and wealth-transfer planning, financial planning, art banking, single-stock risk management, alternative investments, lending, stock option planning, philanthropy, charitable giving, investment banking.
TEL: N/A
EMAIL: comments@ubs.com
WEB: www.ubs.com/financial/servicesinc

5. Wachovia
U.S. PRIVATE CLIENT ASSETS: $160 billion
MINIMUM ACCOUNT: $1 million
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 3,503
CLIENTS PER MANAGER: N/A
U.S. PRIVATE CLIENT OFFICES: 486
SPECIALTIES: Financial planning, investment management, personal trust, estate planning, settlement and administration, charitable services, insurance, credit and banking, retirement and benefits.
TEL: 888-283-9633 or 800-627-8625
EMAIL: N/A
WEB: www.wachovia.com/wealth and www.wachoviasec.com

6. JPMorgan Private Bank
U.S. PRIVATE CLIENT ASSETS: $147 billion
MINIMUM ACCOUNT: N/A
MEDIAN ACCOUNT: $25 million
PRIVATE CLIENT MANAGERS: 310
CLIENTS PER MANAGER: 50
U.S. PRIVATE CLIENT OFFICES: 24
SPECIALTIES: Integrated advice in investing, credit and cash management, trust and estate planning, wealth structuring.
TEL: 212-464-0290, ask for John Straus
EMAIL: John.a.straus@jpmorgan.com
WEB: www.jpmorgan.com/privatebank

7. Charles Schwab
U.S. PRIVATE CLIENT ASSETS: $130 billion
MINIMUM ACCOUNT: $500,000
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 200
CLIENTS PER MANAGER: 200-300
U.S. PRIVATE CLIENT OFFICES: 360
SPECIALTIES: Portfolio construction, retirement planning, tax-intelligent investing strategies, trust and estate planning, charitable giving.
TEL: 877-977-2237, ask for Timothy Kohn on X47377
EMAIL: N/A
WEB: www.schwab.com

8. Private Bank at Bank of America
U.S. PRIVATE CLIENT ASSETS: $128.6 billion
MINIMUM ACCOUNT: $3 million
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 1,010
CLIENTS PER MANAGER: 100
U.S. PRIVATE CLIENT OFFICES: 122
SPECIALTIES: Integrated advice and solutions in banking, credit, trust, wealth-transfer and investments.
TEL: 800-863-9500
EMAIL: privatebankbusiness@bankofamerica.com
WEB: www.bankofamerica.com/privatebank/

9. The Northern Trust Company
U.S. PRIVATE CLIENT ASSETS: $92.4 billion
MINIMUM ACCOUNT: $1 million for high net worth, $100 million for ultra-high net worth
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 228
CLIENTS PER MANAGER: 95
U.S. PRIVATE CLIENT OFFICES: 84
SPECIALTIES: Asset allocation, investment management and alternative investments.
TEL: 312-630-6000
EMAIL: personal-investments@ntrs.com
WEB: www.northerntrust.com

10. Morgan Stanley Private Wealth Management
U.S. PRIVATE CLIENT ASSETS: $80 billion
MINIMUM ACCOUNT: $10 million
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: N/A
CLIENTS PER MANAGER: N/A
U.S. PRIVATE CLIENT OFFICES: 8
SPECIALTIES: Customized financial advice, global investment management.
TEL: N/A
EMAIL: N/A
WEB: www.morganstanley.com

11. Wells Fargo Private Client Services
U.S. PRIVATE CLIENT ASSETS: $79.6 billion
MINIMUM ACCOUNT: $1 million
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 1,374
CLIENTS PER MANAGER: 125
U.S. PRIVATE CLIENT OFFICES: 86
SPECIALTIES: Wealth planning, affiliated and non-affiliated money managers, customized credit facilities, risk management, hedge funds.
TEL: 877-404-7075
EMAIL: N/A
WEB: www.wellsfargo.com

12. Goldman Sachs Private Wealth Management
U.S. PRIVATE CLIENT ASSETS: $78 billion*
MINIMUM ACCOUNT: $2 million
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 320 in the U.S.
CLIENTS PER MANAGER: N/A
U.S. PRIVATE CLIENT OFFICES: 11
SPECIALTIES: Portfolio management, alternative investments, single-stock risk management, tax, trust and estate planning.
TEL: 800-323-5678 x26970
EMAIL: pwminfo@gs.com
WEB: www.gs.com/pwm
*global does not break out the United States

13. Citigroup Private Bank
U.S. PRIVATE CLIENT ASSETS: $65 billion*
MINIMUM ACCOUNT: $5 million
MEDIAN ACCOUNT: $10 million
PRIVATE CLIENT MANAGERS: 130
CLIENTS PER MANAGER: 30-50
U.S. PRIVATE CLIENT OFFICES: 20
SPECIALTIES: Co-investment opportunities with Citigroup, alternative investments, capital markets products and execution, philanthropic advice, family advisory services, art advisory.
EMAIL: N/A
CONTACT: 212-559-6156, ask for Damian Kozlowski, Head of U.S. Region
WEB: www.citibank.com/privatebank
*approximate US proportion of $180 billion global total

14. Mellon Financial
U.S. PRIVATE CLIENT ASSETS: $63 billion
MINIMUM ACCOUNT: $1 million
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 350
CLIENTS PER MANAGER: 50-75
U.S. PRIVATE CLIENT OFFICES: 63
SPECIALTIES: Asset allocation, alternative investments, fiduciary services, family office and charitable giving services.
TEL: 1-800-582-9423
EMAIL: privatewealthmanagement@mellon.com
WEB: www.melonprivatewealth.com

15. HSBC
U.S. PRIVATE CLIENT ASSETS: $56 billion
MINIMUM ACCOUNT: $5 million in investable assets
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 34
CLIENTS PER MANAGER: 50-80
U.S. PRIVATE CLIENT OFFICES: 12
SPECIALTIES: A full-service bank that is part of a global organization.
TEL: 212-525-5667
EMAIL: N/A
WEB: www.us.hsbc.com

16. U.S. Trust
U.S. PRIVATE CLIENT ASSETS: $52.0 billion
MINIMUM ACCOUNT: $2 million
MEDIAN ACCOUNT: $7 million*
PRIVATE CLIENT MANAGERS: 1,473
CLIENTS PER MANAGER: N/A
U.S. PRIVATE CLIENT OFFICES: 34
SPECIALTIES: Investment management and consulting, fiduciary services, financial, tax and estate planning, and banking.
TEL: 800-USTRUST
EMAIL: Contact via corporate website
WEB: www.ustrust.com
*average account size

17. Credit Suisse First Boston
U.S. PRIVATE CLIENT ASSETS: $49 billion
MINIMUM ACCOUNT: $1 billion
MEDIAN ACCOUNT: $2.5 million
PRIVATE CLIENT MANAGERS: 309
CLIENTS PER MANAGER: 75
U.S. PRIVATE CLIENT OFFICES: 10
SPECIALTIES: Solutions for the needs of wealthy individuals.
TEL: 800-647-2516, ask for Dale Miller
EMAIL: dale.miller@csfb.com
WEB: www.csfb.com/investment_management /private_client_services

18. Bank One Private Client Services
U.S. PRIVATE CLIENT ASSETS: $43.2 billion
MINIMUM ACCOUNT: $1 million
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 634
CLIENTS PER MANAGER: 100
U.S. PRIVATE CLIENT OFFICES: 89
SPECIALTIES: Financial advice, investment management, banking insurance, trust services to affluent individuals, families, and business owners.
CONTACT: 1-866-265-1727; clientservices@oneprivateclient.com
WEB: www.oneprivateclient.com

19. PNC Advisors
U.S. PRIVATE CLIENT ASSETS: $42.2 billion
MINIMUM ACCOUNT: $1 million
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 323
CLIENTS PER MANAGER: N/A
U.S. PRIVATE CLIENT OFFICES: 40
SPECIALTIES: Investment and consulting management; trust services; estate and tax planning, banking.
TEL: 888-762-6226
EMAIL: pncadvisors@pncbank.com
WEB: www.pncadvisors.com

20. Fleet Private Clients Group
U.S. PRIVATE CLIENT ASSETS: $39.3 billion
MINIMUM ACCOUNT: $1 million
MEDIAN ACCOUNT: $2.5 million for high net worth clients, $25 million for family-office wealth management.
PRIVATE CLIENT MANAGERS: 410
CLIENTS PER MANAGER: 10 to 100
U.S. PRIVATE CLIENT OFFICES: 50
SPECIALTIES: Family wealth and estate planning, tax and risk management, philanthropy.
TEL: 800-563-0702
EMAIL: marc_a_white@fleet.com
WEB: www.fleet.com/privateclients

21. U.S. Bank Private Client Group
U.S. PRIVATE CLIENT ASSETS: $34 billion
MINIMUM ACCOUNT: $500,000
MEDIAN ACCOUNT: $1.9 million
PRIVATE CLIENT MANAGERS: 400
CLIENTS PER MANAGER: 90
U.S. PRIVATE CLIENT OFFICES: 122
SPECIALTIES: Financial and estate planning, working with business owners, corporate executives, health-care professionals, legal professional, nonprofit organizations, personal philanthropy and professional athletes.
TEL: 866-481-2077
EMAIL: pcg.marketing@usbank.com
WEB: www.privateclientgroup.usbank.com

22. Deutsche Bank Private Wealth Management
U.S. PRIVATE CLIENT ASSETS: $34 billion*
MINIMUM ACCOUNT: $2 million
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 147
CLIENTS PER MANAGER: N/A
U.S. PRIVATE CLIENT OFFICES: 9
SPECIALTIES: Highly personalized strategic wealth advisory.
EMAIL: N/A
WEB: www.pwm.db.com/us
*includes Scudder Private Investment Counsel

23. Bessemer Trust Company
U.S. PRIVATE CLIENT ASSETS: $32.1 billion
MINIMUM ACCOUNT: $10 million
MEDIAN ACCOUNT: $20.1
PRIVATE CLIENT MANAGERS: 34
CLIENTS PER MANAGER: 42
U.S. PRIVATE CLIENT OFFICES: 10
SPECIALTIES: Integrated wealth management, alternative investments (private equity, venture capital, hedge funds and real estate).
TEL: 212-708-9141, ask for Rob Elliot
EMAIL: elliot@bessemer.com
WEB: www.bessemer.com

24. The Bank of New York Private Client Services
U.S. PRIVATE CLIENT ASSETS: $30 billion
MINIMUM ACCOUNT: $1 million
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 74 portfolio managers with between 40 and 100 relationships per manager plus 264 private bankers, trust, custody and financial planning specialists.
CLIENTS PER MANAGER: 40-100
U.S. PRIVATE CLIENT OFFICES: 15
SPECIALTIES: Asset allocation, investment management, banking, trust, estate and financial planning.
TEL: 212-408-7705, ask for William Flemer
EMAIL: wflemer@bankofny.com
WEB: N/A

25. McDonald Financial Group
U.S. PRIVATE CLIENT ASSETS: $30 billion
MINIMUM ACCOUNT: N/A
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 70
CLIENTS PER MANAGER: N/A
U.S. PRIVATE CLIENT OFFICES: 87
SPECIALTIES: Banking, estate planning, financial planning, retirement planning, brokerage, trust, individual asset management, insurance advice and services, charitable-giving counsel.
TEL: 800-539-7504
EMAIL: N/A
WEB: www.key.com/MFG

26. Neuberger Berman
U.S. PRIVATE CLIENT ASSETS: $24 billion
MINIMUM ACCOUNT: $500,000
MEDIAN ACCOUNT: $3.7 million
PRIVATE CLIENT MANAGERS: 64
CLIENTS PER MANAGER: N/A
U.S. PRIVATE CLIENT OFFICES: 14
SPECIALTIES: Private asset management, tax and financial planning, personal and institutional trust services, alternative investments.
TEL: 866-483-1063, ask for Heidi L. Steiger, Head of Private Asset Management
EMAIL: wealthmanagement@nb.com
WEB: www.nb.com

27. Wilmington Trust
U.S. PRIVATE CLIENT ASSETS: $23.1 billion
MINIMUM ACCOUNT: $1 million
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 55
CLIENTS PER MANAGER: 301
U.S. PRIVATE CLIENT OFFICES: 16
SPECIALTIES: Investment management, trustee services, banking, insurance services.
TEL: 302-651-8561, ask for Allen Snook, Senior Vice President
EMAIL: ssnook@wilmingtontrust.com
WEB: www.wilmingtontrust.com

28. National City
U.S. PRIVATE CLIENT ASSETS: $22 billion
MINIMUM ACCOUNT: $750,000 in assets or $300,000 in income
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 80
CLIENTS PER MANAGER: 180
U.S. PRIVATE CLIENT OFFICES: 45
SPECIALTIES: Integrated wealth-management solutions.
TEL: 800-628-8151
EMAIL: resourcecenter@nationalcity.com
WEB: www.nationalcity.com/wealth

29. State Street Global Advisors*
U.S. PRIVATE CLIENT ASSETS: $19.4 billion
MINIMUM ACCOUNT: $1.5 million
MEDIAN ACCOUNT: $1 million
TEL: 617-786-3000
WEB: www.saga.com
*Based on data from 2002. The company did not respond to survey by press time.

30. Harris Private Bank
U.S. PRIVATE CLIENT ASSETS: $16.5 billion
MINIMUM ACCOUNT: $1 million
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 200
CLIENTS PER MANAGER: 15-200; 5-40 for $25 million-plus accounts
U.S. PRIVATE CLIENT OFFICES: 30
SPECIALTIES: Investment management, personal trust services, banking, financial planning, family-office and philanthropy.
TEL: 312-461-2052, ask for Bill Thonn, head of Harris Bank
EMAIL: contactus@theharris.com

31. William Blair & Company
U.S. PRIVATE CLIENT ASSETS: $13 billion
MINIMUM ACCOUNT: $250,000 for private investors, $2 million for investment management services
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 104
CLIENTS PER MANAGER: N/A
U.S. PRIVATE CLIENT OFFICES: 1
SPECIALTIES: Investment management, financial planning, trust and estate planning.
TEL: 312-364-8621, ask for Carlett McMullan; or 312-364-8129, ask for Michelle R. Seitz
WEB: www.williamblair.com

32. Brown Brothers Harriman
U.S. PRIVATE CLIENT ASSETS: $11.7 billion
MINIMUM ACCOUNT: $5 million
MEDIAN ACCOUNT: $7.6 million
PRIVATE CLIENT MANAGERS: 52
CLIENTS PER MANAGER: 29
U.S. PRIVATE CLIENT OFFICES: 8
SPECIALTIES: Tax-efficient asset management, asset allocation, risk management of concentrated holdings, alternative investments, treasury inflation indexed securities, trust and estate planning.
TEL: 212-493-8231
EMAIL: John.Lee@bbh.com
WEB: www.bbh.com

33. Fiduciary Trust
U.S. PRIVATE CLIENT ASSETS: $10.1 billion
MINIMUM ACCOUNT: $2 million
MEDIAN ACCOUNT: $5.5 million
PRIVATE CLIENT MANAGERS: 32
CLIENTS PER MANAGER: 50
U.S. PRIVATE CLIENT OFFICES: 6
SPECIALTIES: Global investment management, strategic planning for individuals and families, trustee, tax, banking and custody services.
TEL: 212-632-3325, ask for Jim Goodfellow, Vice Chairmen, or 212-632-3229, ask for Murray Stoltz, Senior Vice President
EMAIL: mstoltz@ftci.com or jgoodfellow@ftci.com.
WEB: www.ftci.com

34. City National Corp.
U.S. PRIVATE CLIENT ASSETS: $9.9 billion
MINIMUM ACCOUNT: $1 million
MEDIAN ACCOUNT: $1.5 million
PRIVATE CLIENT MANAGERS: 99
CLIENTS PER MANAGER: N/A
U.S. PRIVATE CLIENT OFFICES: 15
SPECIALTIES: Investment management, personal and business trust services, tax and estate planning, banking.
TEL: 310-888-1082, ask for Shelley Thompson
EMAIL: shelley.thompson@cnb.com
WEB: www.cnb.com

35. Atlantic Trust Private Wealth Management
U.S. PRIVATE CLIENT ASSETS: $8.8 billion
MINIMUM ACCOUNT: $5 million
MEDIAN ACCOUNT: $5 million
PRIVATE CLIENT MANAGERS: 35
CLIENTS PER MANAGER: 20
U.S. PRIVATE CLIENT OFFICES: 10
SPECIALTIES: Integrated wealth management.
TEL: 212-259-3800
EMAIL: jmarkwealter@atlantictrust.com
WEB: www.atlantictrust.com

36. The Glenmede Trust Company
U.S. PRIVATE CLIENT ASSETS: $8.4 billion
MINIMUM ACCOUNT: $3 million
MEDIAN ACCOUNT: $3.5 million
PRIVATE CLIENT MANAGERS: 27
CLIENTS PER MANAGER: N/A
U.S. PRIVATE CLIENT OFFICES: 5
SPECIALTIES: Trust, estate, tax planning, financial planning, asset allocation, structured products, philanthropic advisory, private equity.
TEL: 215-419-6000
EMAIL: pat_mccrossan@glenmede.com
WEB: www.glenmede.com

37. Boston Private Financial Holdings
U.S. PRIVATE CLIENT ASSETS: $6.8 billion
MINIMUM ACCOUNT: $2.0 million
MEDIAN ACCOUNT: $4.5 million
PRIVATE CLIENT MANAGERS: 75
CLIENTS PER MANAGER: 75
U.S. PRIVATE CLIENT OFFICES: 16
SPECIALTIES: Banking, investment management, financial planning, family office services.
TEL: 866-666-1363
EMAIL: adanforth@bpbtc.com
WEB: www.bostonprivate.com

38. Lowry Hill
U.S. PRIVATE CLIENT ASSETS: $5.3 billion
MINIMUM ACCOUNT: $10 million per family relationship
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 16
CLIENTS PER MANAGER: 21
U.S. PRIVATE CLIENT OFFICES: 3
SPECIALTIES: Large cap growth equities, small cap equities, international equities, municipal and government bonds, REITs, private equity, financial planning for families.
TEL: 612-667-1792
EMAIL: SPrem@LowryHill.com
WEB: www.LowryHill.com

39. Thomas Weisel Partners
U.S. PRIVATE CLIENT ASSETS: $5 billion
MINIMUM ACCOUNT: $2 million
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 12
CLIENTS PER MANAGER: 50
U.S. PRIVATE CLIENT OFFICES: 2
SPECIALTIES: Asset-management consulting, restricted-stock transactions, alternative assets, private equity, specialty insurance.
TEL: 415-364-2500, ask for Toni Pitto
EMAIL: tpitto@tweisel.com
WEB: www.tweisel.com

40. T. Rowe Price Asset Management
U.S. PRIVATE CLIENT ASSETS: $3.7 billion
MINIMUM ACCOUNT: $2 million
MEDIAN ACCOUNT: N/A
PRIVATE CLIENT MANAGERS: 4
CLIENTS PER MANAGER: N/A
U.S. PRIVATE CLIENT OFFICES: 1
SPECIALTIES: Customized tax-efficient investment management.
TEL: 866-291-7977, ask for Josh Slater
EMAIL: privateassetmgt@troweprice.com
WEB: www.troweprice.com

Barron's Survey of U.S. Wealth Managers excludes custodial and institutional funds. Assets are as of June 30, 2003.

Table 9: Descriptions of Processing Activities

Activity	Custody-Related	Description
Cash Management	x	Providing short-term investment options such as sweep accounts.
Employee Benefit Plan Administration		Provision of recordkeeping and administration for retirement and health plans.
Foreign Exchange	x	Foreign Exchange trading and research.
Fund Accounting	x	Multicurrency accounting & valuation services.
Fund Administration	x	Monitoring changes and preparing documentation for mutual funds.
Government Securities Clearing	x	Verification of transactions and settlement of government securities.
Human Resource Outsourcing and Consulting		Solutions for human resource departments including benefit plan design and management, compensation structure design, and outsourcing HR functions.
Institutional Brokerage	x	Handling securities trades.
IT System Solutions	x	Developing and providing customer support for processing-related application software.
Outsourcing	x	Outsourcing of plan management and administration. Outsourcing of securities processing and financial accounting.
Performance Analytics	x	Performance measurement and comparison, consulting, and VAR analysis.
Recordkeeping	x	Investor account maintenance, tax reporting, ownership records, and other paperwork associated with mutual and pension funds.
Risk Management & Compliance	x	Monitoring adherence to policy guidelines and pension plan risk management.
Securities Clearing	x	Processing of securities transactions for broker dealers.
Securities Lending	x	Lending securities as an intermediary.
Transfer Agency	x	Investor transaction processing.
Transition Management	x	Handling the process of buying and selling portfolios when clients transition from one asset manager to another.

Table 10: Firms Engaged in U.S. Processing Activities as of 12/31/03[a] (Nonbank Competitors)

Provider	Total Assets[b] (billions)	Equity/ Assets[b]	Cash Management	Employee Benefits	Foreign Exchange	Fund Accounting	Fund Admin.	Govt Securities Clearing	HR	Institutional Brokerage	IT Systems	Outsourcing	Performance Analytics	Recordkeeping	Risk & Compliance	Securities Clearing	Securities Lending	Transfer Agency	Transition Management	Source[c]
ADP	$24.7	21.8%									x			x						A
ALPS Mutual Funds Services	–	–				x	x								x			x		C
Aon Corporation	$27.0	16.6%		x					x											D
Bear Stearns Securities	$212.2	3.8%								x						x				A,E
BISYS	$1.7	48.5%				x	x								x			x		A,C
Ceridian	$5.2	24.5%		x					x											D
Depository Trust & Clearing Corp[d]	–	–						x								x				D
DST Systems	$3.2	21.4%									x							x		A,C
EDS	$18.3	31.3%							x		x									A
Exult	$0.4	58.7%		x					x											D
Fidelity Investments	–	–							x					x		x				A,B,E
Fiserv	$7.2	30.5%									x					x				A,E
Goldman Sachs	$403.8	5.4%	x		x	x	x			x						x	x		x	E
Hewitt Associates	$1.7	45.2%		x					x					x						A,B
InCap Group	–	–				x	x											x		C
Jack Henry	$0.5	74.2%									x									A
Marsh & McLennan	$15.1	36.2%		x					x					x						A,B,D
Meeder Financial	–	–				x	x											x		C
Merrill Lynch	$494.5	6.1%		x										x		x				A,B,E
Nationwide Financial[fe]	$50.1	9.7%												x						B
Omgeo[f]	–	–									x									D
Quantitative Investment Advisors	–	–																x		C
Prudential plc[e]	$252.9	2.4%				x														C
SEI Investments Inc	$0.6	61.4%		x		x					x			x				x		A,C
SunGard Data Systems	$4.0	69.1%									x									A
SWS Group	$4.7	5.2%								x						x				E
T. Rowe Price Associates	$1.5	85.9%												x						A,B
Triad Securities	–	–														x				E
Ultimus Fund Solutions	–	–				x	x											x		C
Unified Financial Services	–	–				x	x											x		C
Vanguard Group	–	–												x						B
Watson Wyatt	$0.5	35.9%		x					x											D
Wedbush Morgan Securities	–	–														x				E
Western-Southern Financial Group	$26.3	17.3%				x	x											x		C

Table Continued on Next Page

Table 10 Continued: Firms Engaged in U.S. Processing Activities as of 12/31/03[a] (Bank-Affiliated Competitors)

Provider	Total Assets[b] (billions)	Equity/ Assets[b]	Cash Management	Employee Benefits	Foreign Exchange	Fund Accounting	Fund Admin.	Govt Securities Clearing	HR	Institutional Brokerage	IT Systems	Outsourcing	Performance Analytics	Recordkeeping	Risk & Compliance	Securities Clearing	Securities Lending	Transfer Agency	Transition Management	Source[c]
ABN Amro	$706.4	2.3%	x		x					x				x			x			E
Bank of America	$736.4	6.5%	x		x		x			x				x	x	x	x			E
Bank of New York	$92.4	9.1%	x		x	x	x	x		x		x	x		x	x	x	x	x	C,E
Boston Financial Data Services[g]	–	–				x								x				x		C,D
Brown Brothers Harriman	$2.6	8.7%	x		x	x	x							x			x			C
Citigroup	$1,264.0	7.8%	x		x	x	x			x		x	x	x	x		x	x		C
CitiStreet[h]	–	–		x										x						B
Clearing House Payments Co.[i]	–	–	x		x											x				D
Fifth Third	$91	9.4%	x		x	x	x			x			x	x			x	x		D
ING	$978.4	3.2%	x	x	x									x						B
Investors Bank & Trust	$9.2	5.9%	x		x	x	x					x			x		x	x	x	C
JPMorgan Chase	$770.9	6.0%	x	x	x	x	x	x		x			x		x	x	x	x	x	C
Marshall & Ilsley (Metavante)	$34.4	9.7%	x		x		x				x			x						A
Mellon Financial Corporation	$34.0	10.9%	x	x	x	x	x		x	x		x	x	x	x		x	x	x	B
Northern Trust	$41.5	7.4%	x		x	x	x			x		x	x	x	x		x	x	x	C
PNC Financial	$68.2	10.4%	x		x	x	x			x				x	x		x	x		C
Royal Bank of Canada Fncl. Group	$305.7	4.6%	x		x	x	x			x		x	x	x	x	x	x		x	E
State Street	$87.5	6.6%	x		x	x	x			x		x	x	x	x	x	x	x	x	C
UMB Financial Corporation	$7.7	10.5%	x		x	x	x			x					x			x		C
US Bancorp	$189.3	10.2%	x		x	x	x							x			x	x		C
Wachovia Corporation	$401.0	8.7%	x	x	x	x	x			x			x	x	x	x	x	x		E
Wells Fargo	$388	8.9%	x	x	x		x			x				x	x	x	x		x	D

[a] Processing bank competitors were compiled using the sources found in footnote c. The processing activities of these companies were expanded beyond those in the sources found in footnote c using information gathered from company reports and websites.

[b] Source: Bloomberg L.P. Data are as of December 31, 2003.

[c] Indicates that a competitor was found in the following source:

A = listed in Hoovers as a nonbank processing competitor of one of the top four U.S. processing banks in the US (Bank of New York, State Street, Mellon Financial, Northern Trust) or as a processing competitor of the major nonbank processors (BISYS, First Data, SEI Investments).

B = listed as part of the survey results for "America's Top 10 Recordkeepers by Total Recordkeeping Assets" (2003) in plansponsor.com.

C = listed as top providers in fund accounting and transfer agent services in the *2003 Mutual Fund Service Guide* published by Thomson.

D = mentioned in an interview we conducted.

E = Included in *Investment News*' "2003 Top U.S. Clearing Firms Ranked by Number of Clients" (Dec. 15, 2003) and providing clearing to 100 or more clients.

[d] DTCC is owned by its principal users - major banks, broker / dealers, mutual funds firms and other companies within the financial services industry, including the National Association of Securities Dealers (NASD) and the New York Stock Exchange.

[e] Total assets for Prudential plc and Nationwide exclude separate account assets.

[f] Joint venture of Thomson and the Depository Trust & Clearing Corporation.

[g] Joint venture of State Street and DST Systems.

[h] Joint venture of Citigroup and State Street.

[i] Clearing House Payments Co. is jointly owned by several banks. Its subsidiaries include Clearing House Interbank Payments System

Table 11: Basel II Status of the 29 Largest Banking Companies[a]

Reprinted with permission. Source: *American Banker* , "Takers and Tire Kickers: Where 29 of the Largest Banking Companies Stand on Participation in Basel II," July 24, 2004.

Mandatory Basel II Banks

Bank	Total Assets as of 03/31/04[b] (billions)
Citigroup	$1,318
Bank of America	$820
JP Morgan Chase	$801
Wachovia	$411
Wells Fargo	$397
Deutsche Bank	$337
Washington Mutual	$248
State Street	$93
Bank of New York	$93

Opting-In Banks

Bank	Total Assets as of 03/31/04[b] (billions)
HSBC North America	$133
SunTrust	$125
LaSalle	$111
PNC	$74
Northern Trust	$40

Probably Opting-In

Bank	Total Assets as of 03/31/04[b] (billions)
KeyCorp	$84
Comerica	$55

Undeclared[c]

Bank	Total Assets as of 03/31/04[b] (billions)
U.S. Bancorp	$192
National City	$111
BB&T	$94
Fifth Third	$94
Citizens Financial	$80
MBNA	$61
AmSouth	$47
Charles Schwab	$46
UnionBanCal	$46
Regions Financial	$45
Harris	$41
BancWest	$39
Mellon	$34

[a] The non-mandatory banks are placed into the opting-in, probably opting-in, and undeclared categories according to responses from *American Banker* interviews with company officials.

[b] Total assets source: Bloomberg L.P.

[c] These companies did not rule out voluntary adoption of Basel II capital standards, but were either undecided or would not discuss their plans in interviews with *American Banker* .

Table 12: Elements of AMA Framework for U.S. and European Banks Exceeding $500 Billion in Assets as of 12/31/02[*,a]

* The following table summarizes a review of banks' publicly available documents regarding their operational risk modeling efforts. A blank entry does not imply that the entity has not implemented an element of the AMA framework, rather no reference to the particular element was found in the public domain during the review.

Institution	Country	Total Assets (billions)	Intends to pursue AMA for OpRisk	Has Published an OpRisk Capital Estimate	Internal Loss Data	External Loss Data	Self Assess-ments	Scenarios	Source[b]
Citigroup	U.S.	$1,097	**	Y	Y	Y	Y		AR,P
J.P. Morgan Chase	U.S.	$759	**	Y	Y	Y[c]	Y	Y	AR,P
Bank of America	U.S.	$660	**		Y	Y	Y	Y	AR,P
UBS	Switzerland	$852	Y	Y[f]	Y			Y	AR
Credit Suisse	Switzerland	$683	Y		Y	Y	Y	Y	AR
Dresdner[e]	Germany	$850	Y	Y	Y	Y[c]	Y		AR
Deutsche Bank	Germany	$792	Y	Y	Y	Y	Y	Y	AR,SEC, P
HVB Group	Germany	$705	Y	Y	Y	Y	Y		AR
HSBC	U.K.	$757			Y	Y	Y		AR
Royal Bank of Scotland	U.K.	$663			Y				AR
Barclays	U.K.	$649	Y		Y	Y[c]	Y	Y	AR
HBOS	U.K.	$572			Y	Y[c]	Y		AR
ING	Netherlands	$752	Y	Y	Y	Y[c]	Y		AR
ABN Amro	Netherlands	$582	Y		Y	Y	Y		AR
Fortis	Belgium	$509	Y	Y	Y	Y	Y	Y	AR
BNP Paribas	France	$745	Y		Y	Y		Y	AR
Credit Agricole	France	$530			Y	Y[d]			AR
Societe Generale	France	$526			Y	Y[c]			AR

** All U.S. banks exceeding $250 billion in total assets will be required to pursue an AMA for operational risk.

[a] Source of asset data is "World's Top Banking Companies, by Assets," *American Banker* , September 17, 2003. Reprinted with permission.

[b] AR: 2003 Annual Report, SEC: 20-F SEC Filing, P: Publication or presentation presented at OpRisk USA Conference, March 30-31, 2004 (New York, New York) or Risk Capital 04 Conference, June 23-24, 2004 (Nice, France) unless otherwise noted.

[c] Not mentioned in annual report, but listed in a FitchRisk press release as having entered into a database agreement, or as a member of the Operational Risk Data Exchange Association (ORX).

[d] Included as part of working paper written in 2002 by staff at acquired institution, Credit Lyonnais, titled "Internal Data, External Data, and Consortium Data for Operational Risk Measurement: How to Pool Data Properly?"

[e] Dresdner Bank is a subsidiary of Allianz Group. As mentioned in section 3, Allianz also calculates capital for operational risks at the parent level, but does not disclose details on the model or which components are included.

[f] UBS published an operational risk capital estimate for its parent company, UBS AG, but did not published a consolidated estimate for the Group in its annual report.

Table 13: Capital Ratios for the U.S. Processing Banks[a]

STATE STREET CORP	2Q02	3Q02	4Q02	1Q03	2Q03	3Q03	4Q03	1Q04	2Q04
Tier 1 Risk-Based Capital (billions)	$4.1	$4.2	$4.7	$4.3	$4.3	$4.4	$4.8	$5.0	$5.1
Total Risk-Based Capital (billions)	$4.4	$4.4	$5.0	$4.5	$4.5	$5.0	$5.4	$5.6	$5.7
Risk-Weighted Assets (billions)	$27.1	$24.9	$27.6	$24.9	$28.9	$34.0	$34.5	$35.7	$35.8
Total Assets (billions)	$79.3	$77.6	$85.8	$79.1	$83.1	$81.8	$87.5	$92.9	$94.1
Tier 1 Leverage Ratio	5.3%	5.6%	5.6%	5.6%	5.2%	5.5%	5.6%	5.5%	5.5%
Tier 1 Risk-Based Capital Ratio	15.1%	16.8%	17.1%	17.1%	14.7%	12.9%	14.0%	13.9%	14.2%
Total Risk-Based Capital Ratio	16.1%	17.8%	18.0%	18.1%	15.6%	14.7%	15.8%	15.6%	15.8%

BANK OF NY CO	2Q02	3Q02	4Q02	1Q03	2Q03	3Q03	4Q03	1Q04	2Q04
Tier 1 Risk-Based Capital (billions)	$5.3	$5.2	$5.0	$5.2	$5.1	$5.2	$5.4	$5.6	$5.8
Total Risk-Based Capital (billions)	$7.8	$7.9	$7.9	$8.3	$8.3	$8.3	$8.3	$8.6	$8.7
Risk-Weighted Assets (billions)	$68.5	$67.0	$66.3	$65.4	$74.4	$74.0	$72.1	$73.1	$74.8
Total Assets (billions)	$81.1	$81.1	$77.6	$79.6	$99.6	$95.3	$92.4	$92.7	$97.6
Tier 1 Leverage Ratio	6.8%	6.8%	6.5%	6.7%	5.9%	5.6%	5.8%	5.8%	6.0%
Tier 1 Risk-Based Capital Ratio	7.7%	7.7%	7.6%	7.9%	6.8%	7.1%	7.4%	7.6%	7.7%
Total Risk-Based Capital Ratio	11.5%	11.7%	12.0%	12.7%	11.1%	11.2%	11.5%	11.7%	11.6%

MELLON FINANCIAL CORP	2Q02	3Q02	4Q02	1Q03	2Q03	3Q03	4Q03	1Q04	2Q04
Tier 1 Risk-Based Capital (billions)	$2.1	$2.1	$2.1	$2.2	$2.3	$2.4	$2.4	$2.5	$2.5
Total Risk-Based Capital (billions)	$3.4	$3.3	$3.3	$3.5	$3.6	$3.8	$3.7	$3.9	$4.0
Risk-Weighted Assets (billions)	$27.1	$26.7	$26.5	$25.5	$29.3	$26.8	$27.7	$28.4	$27.1
Total Assets (billions)	$34.2	$35.3	$36.3	$35.6	$39.1	$33.0	$34.0	$34.0	$35.2
Tier 1 Leverage Ratio	6.7%	6.5%	6.6%	6.7%	7.2%	7.7%	7.9%	8.1%	8.2%
Tier 1 Risk-Based Capital Ratio	7.7%	7.8%	7.9%	8.6%	7.9%	8.9%	8.6%	8.7%	9.3%
Total Risk-Based Capital Ratio	12.7%	12.3%	12.5%	13.6%	12.4%	14.0%	13.5%	13.7%	14.6%

NORTHERN TRUST CORP	2Q02	3Q02	4Q02	1Q03	2Q03	3Q03	4Q03	1Q04	2Q04
Tier 1 Risk-Based Capital (billions)	$2.9	$3.0	$3.0	$2.9	$3.0	$3.0	$3.1	$3.2	$3.2
Total Risk-Based Capital (billions)	$3.8	$3.8	$3.8	$4.0	$3.8	$3.8	$3.9	$4.0	$4.0
Risk-Weighted Assets (billions)	$27.3	$27.3	$27.2	$26.5	$27.1	$28.0	$27.9	$28.1	$28.9
Total Assets (billions)	$37.8	$39.7	$39.5	$36.4	$39.1	$40.7	$41.5	$40.2	$43.3
Tier 1 Leverage Ratio	8.0%	8.2%	7.8%	7.9%	7.8%	7.8%	7.6%	8.0%	7.9%
Tier 1 Risk-Based Capital Ratio	10.8%	10.9%	11.1%	11.1%	11.0%	10.8%	11.0%	11.2%	11.1%
Total Risk-Based Capital Ratio	13.9%	13.9%	14.1%	14.9%	14.2%	13.8%	14.0%	14.1%	13.9%

[a] Source: Consolidated Financial Statements for Bank Holding Companies (FR Y-9C).