

Evaluating Liquidity Risk Management at Fannie Mae

R. Glenn Hubbard

R. Glenn Hubbard is the Russell L. Carson Professor of Economics and Finance, Co-Director of the Entrepreneurship Program at Columbia University; and a Research Associate at the National Bureau of Economic Research

Professor Hubbard is a leading expert in public economics, corporate and institutional finance, macroeconomics, and industrial organization. From 2001 to 2003, he served as Chairman of the President's Council of Economic Advisers. A frequent speaker, Professor Hubbard has presented his research at economic conferences throughout the world. He has served as a consultant to several government and international agencies, including the U.S. Department of Treasury, U.S. International Trade Commission, The World Bank, Board of Governors of the Federal Reserve System, Federal Reserve Bank of New York, and the Congressional Budget Office. Professor Hubbard has written over 90 scholarly articles and has edited volumes on international tax policy and financial markets. He is the author of the widely used textbook, *Money, the Financial System, and the Economy*. Professor Hubbard is the 1998 recipient of the Western Finance Association's Best Paper Award for *Corporate Finance*.

Foreword

Peter Niculescu, Executive Vice President – Mortgage Portfolio Business, Fannie Mae

Financial institutions must manage a number of different risks. These risks are often classified as credit risk, market or interest rate risk, operational risk, and liquidity risk. It is very important that each of these risks and any interactions among them be clearly understood and accounted for. However, my 20 years on Wall Street left me with a particular concern for, and appreciation of, liquidity risk.

Goldman Sachs, where I was a managing director and co-head of fixed-income research and strategy, is a company that pays careful attention to its liquidity needs. Best practice at a major broker dealer is to project literally day-by-day how to maintain liquidity, including disposition of assets to raise funds in the event of a liquidity crisis. The impact of liquidity problems at Drexel Burnham Lambert was an object lesson to all that conservative liquidity management is vitally important, and getting it wrong is not an option.

It was with this background that I came to Fannie Mae. In contrast to my experience on the Street, Fannie Mae's liquidity needs are straightforward and its liquidity risk is low. Fannie Mae's liquidity plans enable it to service its short- and long-term debt even in the event of a market disruption. Contingency liquidity plans include drawing down its liquid investments or accessing secured financing collateralized by its unencumbered mortgage portfolio.

It is critical for Fannie Mae's liquidity management to be both effective and transparent. For this reason, we publish on a quarterly basis our ratio of liquid to total assets, and have pledged as part of our voluntary initiatives to keep this ratio above 5 percent at all times. We have also pledged to maintain sufficient liquidity so that we could service our obligations for more than three months without issuing new debt.

*Given the importance of the topic and the attention it has received, we asked Professor R. Glenn Hubbard to review Fannie Mae's management of liquidity risk. Professor Hubbard is an acknowledged expert in finance, with the leading textbook in the field of money and banking, *Money, the Financial System, and the Economy*. He has also had significant policy experience, most recently as the chairman of the President's Council of Economic Advisers.*

In this paper, Professor Hubbard reviews the importance of liquidity management, and the principles that financial regulators use to judge whether a management program is effective. He then reviews Fannie Mae's liquidity management in the context of its wider risk management program and business environment. Based upon the transparency and marketability of Fannie Mae's assets, and the sound risk management approaches the company employs, Professor Hubbard concludes that "Fannie Mae's overall risk profile is lower than that of other financial institutions," and that "a 'liquidity crisis' for Fannie Mae is an extremely remote possibility."

We are pleased to publish this issue of Fannie Mae Papers and believe that Professor Hubbard's analysis offers a valuable perspective on an issue that is important to the markets and policymakers alike.

I. Overview and Statement of Findings

In the past ten years, the Federal National Mortgage Association (Fannie Mae) has experienced tremendous growth. As the U.S. residential mortgage market has grown from \$3.4 trillion to \$7.4 trillion, Fannie Mae's portfolio of mortgage assets has grown from approximately \$170 billion a decade ago to more than \$820 billion ten years later. In addition, as of June 30, 2003, Fannie Mae had issued and guaranteed approximately \$1.7 trillion dollars of mortgage-backed securities (MBS), representing a significant fraction of the \$7.4 trillion U.S. residential mortgage market. Also, as of June 30, 2003, Fannie Mae's borrowings were \$884 billion, making it one of the largest private debt issuers in the country.

As a large and important financial institution, Fannie Mae must and does expend considerable resources monitoring and controlling its risks. Yet, despite this expenditure and its disclosures regarding its risk management, some economists and commentators have expressed concern about Fannie Mae's procedures for managing liquidity risk. In particular, questions have arisen about Fannie Mae's exposure to risk and its ability to deal with a liquidity crisis with little business interruption and impact on financial markets. While Fannie Mae's important role in the U.S. mortgage market reasonably draws the attention of such questions about risk management, my assessment of the firm's liquidity risk management

practices leads me to conclude that a “liquidity crisis” for Fannie Mae is an extremely remote possibility.¹

My principal findings are:

- (i) Fannie Mae’s assets are more transparent than the loan portfolios of commercial banks and its asset portfolio value and earnings are less volatile. Thus, economic intuition about the liquidity risk of financial institutions drawn from commercial banking experience does not easily transfer to Fannie Mae.
- (ii) Fannie Mae has procedures in place to measure and manage its market and credit risk. This is relevant to perceptions of Fannie Mae’s liquidity risk, which are influenced by its overall risk management practices.
- (iii) Fannie Mae manages its liquidity risks in a manner consistent with the Basel Committee Recommendations for Sound Liquidity Management. These Recommendations build on economic analysis of liquidity management and provide a reasonable and prudent benchmark against which to evaluate Fannie Mae’s risk management practices.

The remainder of the paper is organized as follows. To provide the background for understanding the risks faced by Fannie Mae, the next section gives an overview of Fannie Mae including a discussion of its principal business segments and a description of its assets, liabilities, and liquidity. Section III describes the risks faced by Fannie Mae, and Fannie Mae’s management of these risks. Section IV explains the Basel Committee’s Recommendations for Sound Liquidity Management. Section V discusses Fannie Mae’s liquidity management practices in light of the Basel Recommendations.

II. Economic Analysis of Liquidity Management

To begin, it is important to clarify why attention is focused on “liquidity management.” In their day-to-day operations, all business and financial organizations receive cash and also must pay out cash. Maturing debt, interest payments, payroll expenses, and so forth create cash outflows. When cash outflows for a day exceed inflows, the organization must raise cash to meet the outflow obligations or risk default on some or all of its obligations. There are various possible sources a firm can use to make up for a cash flow shortfall in a day. For example, the firm may have an existing positive cash balance in a bank account, the firm may raise cash by borrowing and creating a liability or issuing equity and creating an equity claim, or the firm may sell an asset to raise cash. Some of these actions may make cash available nearly instantly,

while others make cash available only after a time lag. Selling a Treasury bill can generally be done very quickly at a known price. Selling an asset which trades in a thin or illiquid market such as a corporate junk bond may take more time, and there could be some uncertainty over the amount of cash raised until the trade is executed. Cash can be raised almost immediately through a line of credit if it has been set up ahead of time. However, raising cash through a debt or equity offering with no prior planning can take weeks or months.

Generally, liquidity management refers to the day-to-day management of cash flows, and the balancing of cash income and various funding sources with the various cash outflows. Liquidity management also refers to the contingency planning an organization should undertake to deal with cases where traditional sources of cash are not available, and an organization, facing a severe cash shortage, must seek alternatives to meet its cash outflow requirements.

Liquidity Risk in Financial Institutions

Economists have devoted substantial attention to liquidity risk and liquidity risk management in commercial banks.² This emphasis arises from the fact that a large portion of the assets of commercial banks are longer-term loans to businesses and households, and commercial bank liabilities are often short-term. For example, as of October 2003 for commercial banks in the United States in the aggregate, loans and leases of bank credit accounted for approximately 60 percent of total bank assets while deposits accounted for approximately 70 percent of total bank liabilities.³ Commercial bank loans lack the liquidity of marketable securities such as U.S. Treasury bills. In addition, banks have private information about the quality of loans they hold as assets. Indeed, economists’ analyses have shown that these factors can lead to “bank runs,” in which asymmetric information between banks and depositors about the quality of bank loan assets can lead problems at one bank to raise depositors’ concerns at other banks to the point that depositors “run” to the banks to convert their deposits to cash. Required information disclosure by banks, minimum capital requirements, the presence of a lender of last resort (the Federal Reserve in the United States), and deposit insurance are policy responses to asymmetric information problems in commercial banking.⁴

This underlying liquidity risk problem in commercial banking has raised concerns that Fannie Mae is vulnerable to a liquidity crisis, which could affect not only Fannie Mae but also the entire U.S. mortgage market in which the firm is a significant participant.⁵ As I argue below, this argument is not compelling. Fannie Mae’s assets do not

¹ For this paper, colleagues from Analysis Group and I have reviewed or relied upon materials including Fannie Mae’s publicly available documents such as 10-Ks and 10-Qs, interviews with Fannie Mae personnel, internal Fannie Mae documents, and output from Fannie Mae computer programs. We were not asked to independently verify or audit these sources. Additionally, I reviewed or considered publicly available documents from sources such as the Basel Committee and the Federal Reserve.

² For an overview, see R. Glenn Hubbard, *Money, the Financial System, and the Economy*, Chapter 13 (Addison, Wesley Publishing Co., 5th ed. 2004 forthcoming).

³ Source: <http://www.federalreserve.gov/Releases/h8/Current/>.

⁴ For an excellent economic discussion, see Charles W. Calomiris and Gary Gorton, “The Origins of Banking Panics: Models, Facts, and Bank Regulation,” pp. 109-73 (R. Glenn Hubbard, ed., *Financial Markets and Financial Crisis*, Chicago: University of Chicago Press, 1991).

⁵ For example, St. Louis Federal Reserve Bank President William Poole in his March, 2003 OFHEO speech (*available at* http://www.stls.frb.org/news/speeches/2003/3_10_03.html) said, “Any problem in the capital markets affecting these firms could become very large, very quickly...a market crisis could become acute in a matter of days, or even hours.”

have the information problem central to the economic analysis of commercial banking; the firm has rigorous risk management practices in place; and, as I discuss in subsequent sections below, these practices withstood important market tests in the turbulent period of August – October 1998 and the aftermath of September 11, 2001.

Fannie Mae's Business in this Context

Fannie Mae is a federally chartered corporation that is entirely stockholder-owned. The firm operates in the secondary mortgage market in which it provides liquidity. This market is a segment of the U.S. residential mortgage market, which is extremely large and has experienced almost continuous growth. Since 1949, the stock of U.S. residential mortgages has increased every year. U.S. residential mortgage debt outstanding rose from \$2.9 trillion in 1990 to \$5.6 trillion in 2000, and \$7.4 trillion by the second quarter of 2003, an amount larger than the U.S. government's debt in the hands of the public.⁶ As of March 31, 2003, Fannie Mae held approximately 11 percent of U.S. mortgage debt and was the largest single holder of U.S. mortgage debt. Other holders of U.S. mortgage debt were the following: commercial banks: 29 percent; savings institutions: 13 percent; Freddie Mac: 8 percent; foreign investors: 8 percent; life insurance: 7 percent; pension funds: 6 percent; and other: 17 percent.⁷

Fannie Mae provides liquidity to the mortgage markets through its two primary lines of business: (1) its portfolio

business that purchases mortgages, mortgage-backed securities (MBS), mortgage-related securities, and other securities for its own account, and (2) its credit guarantee business that provides credit guarantees for mortgage loans.

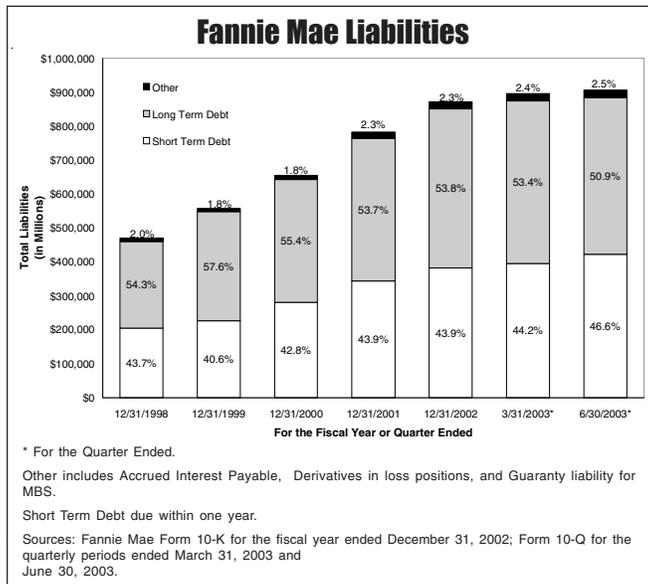
Fannie Mae's portfolio business segment primarily invests in mortgages and mortgage-related securities.⁸ As of June 30, 2003, Fannie Mae held approximately \$820 billion in its mortgage portfolio. Fannie Mae anticipates holding these mortgages and MBS until maturity and earning interest income from them. Income from this business segment arises primarily from the difference between the yield on mortgages and other investments in Fannie Mae's portfolio and Fannie Mae's borrowing costs.

In Fannie Mae's credit guaranty business segment, Fannie Mae receives fees for guaranteeing timely payment of interest and principal on mortgages. In a typical transaction in this business segment, Fannie Mae obtains mortgages from a primary lender who has originated or purchased them. Fannie Mae places these mortgages in trust and delivers MBS certificates with Fannie Mae's guarantee of timely principal and interest payments. These MBS certificates may then be sold or retained by the lender. In 2002, Fannie Mae's guarantee fee income was over \$1.8 billion.

To fund its operations, Fannie Mae issues a number of different types of securities. Fannie Mae is one of the largest private debt issuers. As shown in **Exhibit 1**, as of June 30, 2003, Fannie Mae had \$884 billion in debt outstanding, approximately double its amount of debt at the end of 1998. To increase the liquidity of its debt securities, Fannie Mae issues benchmark notes, bills, and bonds in large sizes on a predictable calendar.⁹ For the six months ended June 30, 2003, Fannie Mae issued over \$1.3 trillion of new debt.¹⁰

As discussed below, Fannie Mae's liability structure is an important tool for managing its risk. As shown in Exhibit 1, Fannie Mae's liabilities include a mix of both long-term and short-term liabilities. For example, at June 30, 2003 Fannie Mae had \$422 billion in debt maturing within one year or less.¹¹ In addition, approximately 78 percent of Fannie Mae's option-embedded debt is either callable or, through options, effectively callable, meaning that the maturity (and the duration) of this debt shortens if interest rates decrease.¹² Moreover, Fannie Mae's debt is of high quality: its senior unsecured long-term debt has a credit rating of AAA/Aaa, and its subordinated debt has a rating of AA-/Aa2. Fannie Mae also has an A1+/Prime1 short-term debt rating. These high debt ratings translate into relatively low interest costs. Ten-year Fannie Mae debt traded at a spread of approximately 50 basis points to ten-year Treasury securities as of September 30, 2003.

EXHIBIT 1



⁶ The Mortgage Banker's Association of America, citing Federal Reserve Board flow of funds data, available at <http://www.mbaa.org/marketdata/index.html>, and the US Department of the Treasury, available at <http://www.publicdebt.treas.gov/opd/opdpenny.html>

⁷ Fannie Mae at a Glance, July 2003, available at <http://www.fanniemae.com/global/pdf/ir/resources/fanniemaeatglance.pdf>. Other sources cited include Federal Reserve, FDIC, OTS, Fannie Mae, Freddie Mac, *Inside MBS & ABS*. "Other" includes Federal Home Loan Banks, credit unions, finance companies, state and local credit agencies, individuals, and other mortgage debt holders not elsewhere classified.

⁸ Fannie Mae's assets also include a liquid investment portfolio made up of non-mortgage assets, which I describe in more detail below.

⁹ Fannie Mae Funding Notes, Volume 7, Issue 5, May 2002, available at http://www.fanniemae.com/markets/debt/pdf/fundingnotes_5_02.pdf.

¹⁰ Fannie Mae, June 30, 2003 Form 10-Q, page 19.

¹¹ Fannie Mae, June 30, 2003 Form 10-Q, page 35.

¹² Fannie Mae, June 30, 2003 Form 10-Q, page 20.

Fannie Mae's assets have also grown substantially in recent years as illustrated in **Exhibit 2A**. As shown in the exhibit, Fannie Mae's assets are primarily mortgage and mortgage-related securities; however, a fraction of Fannie Mae's assets are non-mortgage-related, primarily held in the liquidity portfolio. At September 30, 2003, Fannie Mae's ratio of liquid assets to total assets was 5.6 percent.¹³ Exhibit 2A shows that as of December 31, 2002, mortgages accounted for approximately 25 percent of Fannie Mae's assets while mortgage-related securities accounted for approximately two thirds. Mortgage-related securities include MBS, REMICS, and stripped MBS.¹⁴

As shown in **Exhibit 2B**, the majority of Fannie Mae's mortgage and mortgage-related assets are based on conventional single family home mortgages, which is consistent with Fannie Mae's charter.¹⁵ Conventional conforming mortgages are defined as those mortgages secured by property comprising one to four dwelling units, and where the mortgage does not exceed the conforming loan limit, a limit that is adjusted on an annual basis based upon growth in a house price index.¹⁶

A comparison of these Fannie Mae assets to those of commercial banks provides some useful perspective on the risk characteristics of Fannie Mae. Relative to many types of assets held by commercial banks, Fannie Mae's portfolio of conforming mortgages is transparent, heavily collateralized, geographically diverse, and all loans with loan-to-value ratios greater than 80 percent are backed by mortgage insurance or other credit enhancement.¹⁷

In contrast, commercial banks hold a wide variety of business, consumer, and mortgage loans of various types. As of 2002, real estate loans and leases accounted for approximately 28 percent of the net portfolio of assets of commercial banks. Other banks' assets included: securities at 21 percent, commercial and industrial loans/leases at 14 percent, consumer debt at 9 percent, and other non-interest bearing assets at 13.5 percent.¹⁸ Even among mortgage loans, commercial banks hold many different types of mortgages. In addition to conforming U.S. residential mortgages, commercial banks can hold commercial mortgages, farm mortgages, non-U.S. mortgages, consumer mortgages in the primary market, and non-conforming mortgage loans. One illustration of the difference between bank mortgages and Fannie Mae mortgages can be seen by their credit losses. In the first quarter of 2003, Fannie Mae's credit losses were 0.4 basis points for its average mortgage portfolio and average outstanding MBS, whereas average credit losses for commercial bank mortgages were 14 basis points.¹⁹

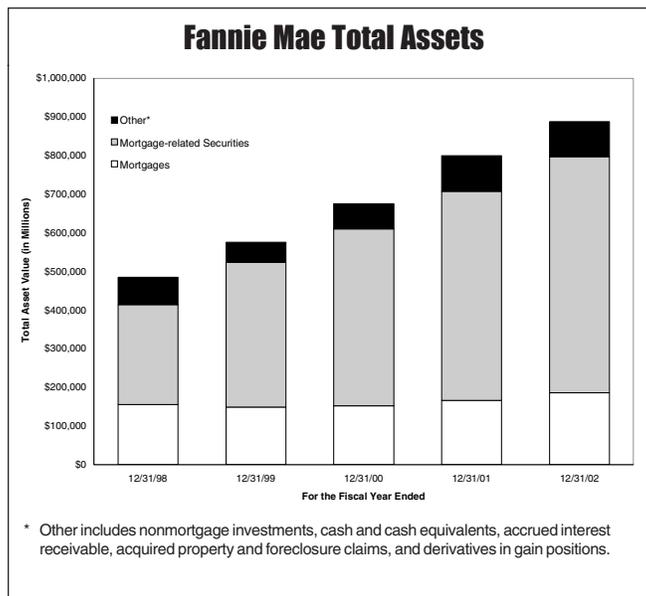


EXHIBIT 2A

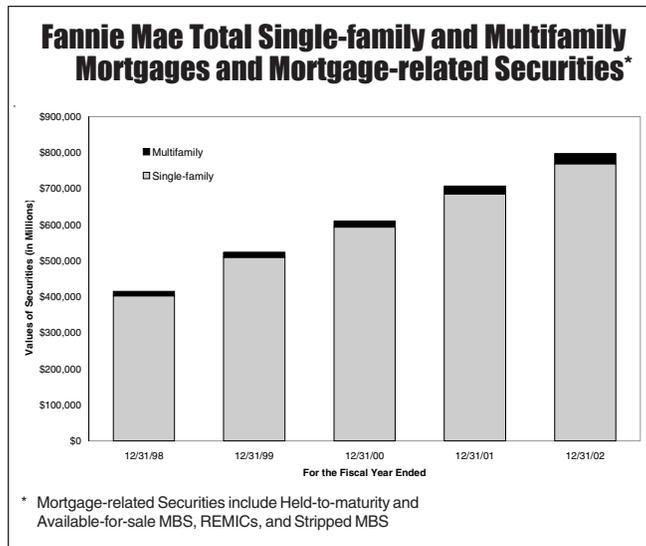


EXHIBIT 2B

¹³ These non-mortgage-related assets play a significant role in Fannie Mae's liquidity management, as I describe in more detail in Section V.

¹⁴ Real Estate Mortgage Investment Conduit (REMIC) – a pass-through tax entity that can hold mortgages secured by any type of real property and can issue multiple classes of ownership interests to investors in the form of pass-through certificates, bonds, or other legal forms. Stripped mortgage backed securities (SMBS) - Securities that redistribute the cash flows from the underlying generic MBS collateral into the principal and interest components of the MBS.

¹⁵ Federal National Mortgage Association Charter Act, 12 U.S.C. § 1717 (1992). Per § 302(b), Fannie Mae is also authorized to purchase several other types of insured or guaranteed loans including Federal Housing Authority (FHA) insured mortgages, loans guaranteed by the Veteran's Administration (VA), and any securities guaranteed by the Government National Mortgage Association (Ginnie Mae).

¹⁶ Ibid, at § Section 302(b)(2).

¹⁷ As I discuss below, Fannie Mae reduces its interest rate risk by hedging.

¹⁸ Mark Carlson, Roberto Perli, Thomas C. Allard, and Steve Piraino, Profits and Balance Sheet Developments at U.S. Commercial Banks in 2002, Federal Reserve Bulletin (June 2003) available at <http://www.federalreserve.gov/pubs/bulletin/2003/0603lead.pdf>.

¹⁹ See Fannie Mae at a Glance, July 2003, available at <http://www.fanniemae.com/global/pdf/ir/resources/fanniemaeataglance.pdf>. Other sources cited include Fannie Mae Annual Reports, investor analyst reports, and the Federal Deposit Insurance Corporation.

In addition, Fannie Mae's home mortgage-based assets are more "transparent" than those of commercial banks. As described on the Office of Thrift Supervision (OTS) website:

*"Assets that trade frequently in deep secondary markets are transparent. If assets on a thrift's books are very much like those that trade freely in the market, they can be valued more easily. Conforming home mortgages are bought and sold frequently. Thus, the assets of a thrift holding a portfolio of conforming mortgages are more transparent than one that holds a portfolio of commercial construction loans."*²⁰

Indeed, for the first half of 2003, the average daily trading volume of Agency MBS was \$233 billion compared to \$416 billion for U.S. Treasury Securities.²¹

In addition to having a less complex asset portfolio than commercial banks, Fannie Mae's returns on assets (ROA) have historically been less volatile than those of banks.

Exhibit 3 shows the annual and quarterly means and standard deviations (STD) of ROA for Fannie Mae and the ten largest domestic bank holding companies by assets for the period between 1991 and the first quarter of 2003.²² The exhibit shows that the annual ROA volatility of

this sample of banks over this period approached three times that of Fannie Mae's annual ROA volatility (0.33 percent compared to 0.12 percent). On a quarterly basis, ROA volatility for the benchmark banks was more than three times that of Fannie Mae (0.12 percent versus 0.03 percent).

Exhibit 4 (on page 6) presents the results for an alternative measure of income volatility - the volatility of Net Interest Margin (NIM) over the period from 1995 to the first quarter of 2003.²³ The conclusions from this alternative measure are similar to those drawn from Exhibit 3. On both a quarterly and annual basis, the volatility of NIM is lower for Fannie Mae than the benchmark banks.²⁴

To summarize, the discussion above suggests that Fannie Mae's assets are more transparent, more easily priced, and more marketable and actively traded than those of commercial banks. In addition, Fannie Mae's earnings have been less volatile than those of commercial banks over approximately the last decade, as measured by Return on Assets and Net Interest Margin. These facts suggest that Fannie Mae's overall asset risk is lower than that of other financial institutions.²⁵

| Fannie Mae and Bank Holding Company Return on Assets (ROA) Q1 1991 – Q1 2003 | | | | | |
|---|---|----------------------------|---------------------------|-------------------------------|------------------------------|
| Bank Holding Company | Q1 2003 Total Assets (000's) | Annual Mean ROA | Annual STD ROA | Quarterly Mean ROA | Quarterly STD ROA |
| Citigroup | \$1,136,973,000 | 1.14% | 0.52% | 0.29% | 0.15% |
| JP Morgan Chase | \$755,156,000 | 0.82% | 0.38% | 0.21% | 0.12% |
| Bank of America | \$679,765,000 | 1.10% | 0.29% | 0.28% | 0.10% |
| Wells Fargo | \$369,669,000 | 1.44% | 0.21% | 0.37% | 0.09% |
| Wachovia | \$348,064,000 | 1.04% | 0.39% | 0.26% | 0.18% |
| Bank One | \$287,864,000 | 1.20% | 0.46% | 0.31% | 0.17% |
| Fleet Boston Financial | \$199,426,000 | 1.07% | 0.48% | 0.27% | 0.17% |
| US Bancorp | \$182,231,000 | 1.62% | 0.35% | 0.41% | 0.11% |
| Suntrust | \$120,062,147 | 1.25% | 0.08% | 0.32% | 0.04% |
| National City | \$117,498,398 | 1.41% | 0.15% | 0.36% | 0.07% |
| MEAN | \$419,670,855 | 1.21% | 0.33% | 0.31% | 0.12% |
| MEDIAN | \$317,964,000 | 1.17% | 0.37% | 0.30% | 0.12% |
| Fannie Mae | \$913,264,000 | 0.81% | 0.12% | 0.21% | 0.03% |

Source: Data from Fannie Mae, Bloomberg and the Bank Holding Company (BHC) database at the Federal Reserve Bank of Chicago.

EXHIBIT 3

²⁰ Mortgage Portfolio Performance: Structural Changes and One-time Shocks, Mortgage Market Trends; Office of Thrift Supervision, Volume 3, Issue 1, March 1998, available at <http://www.ots.treas.gov/docs/19810.pdf>.

²¹ Agency is defined as the government sponsored enterprises (GSEs) and includes Federal National Mortgage Association (Fannie Mae), the Federal Home Loan Mortgage Corporation (Freddie Mac), and the Government National Mortgage Association (Ginnie Mae). Source data is from the Federal Reserve Bank of New York, available at <http://www.newyorkfed.org/markets/statrel.html> (aggregated at <http://www.bondmarkets.com/Research/statist.shtml>).

²² The ten largest domestic bank holding companies by assets (listed in Exhibit 3) also include the ten largest domestic commercial banks. Bank holding company data were obtained from Form FRY-9C. Data were used from bank holding companies, which are more diversified and more stable than their commercial bank subsidiaries, because the data are more readily verifiable with Securities and Exchange Commission (SEC) filings. In addition, given recent consolidations in the industry, the consistency of the data over time was better preserved using bank holding company data rather than data for individual commercial banks. Nevertheless, using available commercial bank data does not produce materially different results.

²³ For Bank Holding Companies, NIM is defined as Net Interest Income on a Fully Taxable Equivalent Basis over Average Interest Earning Assets. Data for this measure spans from 1995 to the first quarter of 2003, and can be found on Form FRY-9C (Consolidated Financial Statements for Bank Holding Companies, available at <http://www.federalreserve.gov/boarddocs/reportforms/CategoryIndex.cfm?WhichCategory=1>). Fannie Mae's NIM is shown as reported in its financial releases and in its recent SEC filings. The GSE's annualized quarterly figures were adjusted using the geometric mean to create comparable figures.

²⁴ Of course, these findings are based on historical data and will only be indicative of future volatility to the extent that future conditions are similar to historical conditions.

²⁵ This may, in part, explain why Fannie Mae has lower capital requirements than commercial banks. These requirements were questioned by William Poole in his March, 2003 OFHEO speech (http://www.stls.frb.org/news/speeches/2003/3_10_03.html) when he said "Why is the standard so far below that required of federally regulated banks?"

Fannie Mae and Bank Holding Company Net Interest Margin (NIM) Q1 1995 – Q1 2003

| Bank Holding Company | Q1 2003 Total Assets (000's) | Annual Mean NIM | Annual STD NIM | Quarterly Mean NIM | Quarterly STD NIM |
|------------------------|------------------------------------|--------------------|-------------------|-----------------------|----------------------|
| Citigroup | \$1,136,973,000 | 4.24% | 0.31% | 1.08% | 0.27% |
| JP Morgan Chase | \$755,156,000 | 2.49% | 0.55% | 0.62% | 0.12% |
| Bank of America | \$679,765,000 | 3.50% | 0.45% | 0.94% | 0.23% |
| Wells Fargo | \$369,669,000 | 5.28% | 0.50% | 1.36% | 0.45% |
| Wachovia | \$348,064,000 | 3.94% | 0.56% | 0.98% | 0.15% |
| Bank One | \$287,864,000 | 4.69% | 0.93% | 1.20% | 0.40% |
| Fleet Boston Financial | \$199,426,000 | 4.83% | 0.49% | 1.20% | 0.33% |
| US Bancorp | \$182,231,000 | 5.30% | 0.61% | 1.29% | 0.35% |
| Suntrust | \$120,062,147 | 3.78% | 0.37% | 0.97% | 0.21% |
| National City | \$117,498,398 | 4.19% | 0.44% | 1.08% | 0.22% |
| MEAN | \$419,670,855 | 4.26% | 0.52% | 1.07% | 0.27% |
| MEDIAN | \$317,964,000 | 4.22% | 0.49% | 1.08% | 0.25% |
| Fannie Mae | \$913,264,000 | 1.10% | 0.07% | 0.28% | 0.02% |

Source: Data from Fannie Mae, Bloomberg and the Bank Holding Company (BHC) database at the Federal Reserve Bank of Chicago.

EXHIBIT 4

Implications for Fannie Mae's Liquidity

The interaction of the cash flows of a firm's assets and liabilities determine its liquidity needs. As of June 30, 2003, Fannie Mae had approximately \$422 billion in debt due within one year.²⁶ However, this figure is only one element of understanding the company's short-term obligations or liquidity needs. Fannie Mae's short term obligations include not only maturing debt, but also principal and interest (P&I) on debt, P&I on MBS, net swap payments, dividends, mortgage and other asset purchase commitments, taxes, and various administrative expenses. Incoming funds include unsettled debt, mortgage P&I from portfolio holdings, and guarantee fees. The difference between obligations and incoming funds defines the net funding requirement. Fannie Mae typically meets this funding need by borrowing in the debt markets. However, an effective liquidity management program does not simply consider how cash flow needs are typically met – an effective program considers alternatives, as I describe below.

III. Fannie Mae Risk Exposure and Risk Management

Stepping back from liquidity risk, Fannie Mae faces two primary risks arising from its business segments: interest rate risk and credit risk.²⁷ A sound risk management program is a critical foundation for effective liquidity management. Understanding the risks faced by Fannie Mae and Fannie Mae's management of these risks is an important aspect of assessing Fannie Mae's liquidity management program and its ability to cope with a liquidity crisis.

Interest Rate Risk

Interest rate risk represents the risk of loss in earnings and value that may result from changes in market interest rates. In the absence of hedging and effective risk management, interest rate risk could affect an investor in mortgages in a number of ways. Fannie Mae's investment strategy differs from that of other classes of mortgage investors.

Leveraged mortgage investors generally follow one of three basic investment strategies. The first is for an investor to forego hedging and instead hold mortgages as part of a diversified investment portfolio. The second is to maintain an asset-liability balance as the market changes by constantly readjusting or "delta hedging." The third is to fund mortgages using callable debt, reducing the optionality held in a mortgage portfolio and seeking to match closely the potential future cash flows of the mortgages.

In general, banks fund mortgages with short-term deposits and adjust the relative weighting of mortgages within their portfolios in order to maintain some overall asset-liability match. In particular, banks generally do not use callable debt to fund mortgage investments. When interest rates increase significantly, banks may see the margins on their mortgage portfolio compress and may choose to sell the mortgages into the market. This strategy has low hedging costs but a higher probability of losing money in some scenarios.

When Wall Street dealers, hedge funds and some other institutions hold mortgages, they also often keep a good portion of the prepayment risk. When interest rates move, they restore their duration match through asset and liability transactions in the market. In low-volatility markets, delta hedging does not carry high costs. In very volatile markets, it can be very costly or difficult to adjust for the change.

²⁶ Fannie Mae, June 30, 2003 Form 10-Q, page 35.

²⁷ A third category of risk is known as "operational risk." Operational risk is common to all firms. It includes human error, fraud, and systems failure, including more specifically to Fannie Mae, model risk arising from potential losses due to improperly modeled interest rate and credit risks. Although I do not consider operational risk in detail, as discussed in its Form 10-K, Fannie Mae has numerous oversight functions in place to manage operational risk including exception reporting and management oversight, management questionnaires that identify key risks, key performance indicators that track operational metrics and potential risk exposure, quarterly senior and executive management internal control certifications, internal audit work, and comprehensive disaster recovery planning.

Fannie Mae match funds the mortgages it purchases, issues callable debt to protect against movements in interest rates, and uses dynamic hedging to maintain an overall asset-liability match. For example, as described earlier, Fannie Mae's investment portfolio consists primarily of long and intermediate term fixed-rate mortgages and mortgage-related securities on which borrowers have the option of prepaying if interest rates drop. When interest rates decline and borrowers prepay, although Fannie Mae receives the full principal, its investments in new mortgages will tend to earn lower returns (as a consequence of lower market interest and mortgage rates). To the extent that the payments Fannie Mae must make on its liabilities are not also reduced, an unhedged Fannie Mae would see its earnings decline as the difference (that is, the spread) between its interest income and interest expense falls.

Fannie Mae takes a number of steps to ensure that it is not overly exposed to interest rate risk. This strategy has three components: (1) match funding mortgage assets at acquisition; (2) buying options to deal with the prepayment risk mentioned above, thereby hedging the risk by structuring a portion of its liabilities to match its investment portfolio; and (3) rebalancing its risk profile over time using interest rate derivatives such as swaps as market and economic conditions change.

Fannie Mae's interest rate risk measurement focuses on portfolio income rather than value, although some interest rate measures Fannie Mae uses are value-related. Portfolio assessment is performed by measuring: (1) the sensitivity of forecasted Net Interest Income to interest rates over the next year and over the next four years; (2) the sensitivity of the match between assets and liabilities to interest rates (that is, measures of duration gap and convexity); (3) the sensitivity of the net asset value of the mortgage portfolio to interest rates; and (4) the impact of extreme scenarios on both forecasted net income and portfolio value. In performing these analyses, Fannie Mae models the effect of interest rates on the underlying cash flows of its mortgage assets and takes into account effects such as borrower prepayment behavior.

An important aspect of Fannie Mae's risk management is the way in which it manages its liabilities. Fannie Mae attempts to match-fund its assets at acquisition, i.e., issue liabilities that have similar expected duration as that of the purchased mortgage assets. A significant portion of this funding is in the form of callable debt, which provides Fannie Mae with the option of refunding debt as yields fall, the precise time at which prepayments will rise. Fannie Mae's strategy is to buy back approximately 50 to

60 percent of the optionality embedded in its mortgage-related assets through the issuance of callable debt and through various derivatives.^{28,29} Fannie Mae also uses maturity matched non-callable debt, approximating the debt maturity to expected prepayments. Additionally, Fannie Mae uses a combination of short-term debt and derivatives to keep its risk within what it considers are acceptable bounds.^{30,31}

Observed interest rate changes in the summer of 2003 present an example of the effectiveness of Fannie Mae's interest rate risk management. From the middle of June 2003 to the end of August 2003, average 30-year mortgage rates increased from 5.2 to 6.3 percent.³² Over this time period, the duration of an unhedged portfolio of mortgages would have increased by more than two years according to some industry models. During this time, however, the monthly average duration gap of Fannie Mae's portfolio was between negative one month and positive six months for June, July, and August.

Credit Risk

Credit risk refers to the risk that a borrower or other counterparty may fail to meet its contractual obligations. Fannie Mae's exposure to credit risk arises from the risk that borrowers may fail to make payments on their mortgages. It also arises at an institutional level from the "counterparty risk" that a counterparty may fail to fulfill its obligations on, for example, a derivatives contract or credit enhancement contract.

Fannie Mae measures and manages mortgage credit and counterparty risks in a number of ways. For mortgage credit risk, a primary risk reduction technique is careful underwriting of borrowers. Various systems are in place to assess the default risk of potential borrowers and monitor the risk of the existing pool of loans. Although these systems help optimize loan management and support decision making, they do not directly reduce or lay off credit risk of the current portfolio of loans. To reduce or lay off the credit risk of its mortgages, Fannie Mae uses credit enhancement contracts in which third-party institutions agree, for a fee, paid by the borrower, the lender, within a structured transaction, or directly by Fannie Mae, to compensate Fannie Mae if there is a loan default.³³ Per the Federal National Mortgage Association Charter Act, credit enhancement is required for all mortgages that Fannie Mae purchases or guarantees that have a loan-to-value ratio exceeding 80 percent. Fannie Mae's charter specifies several forms of credit enhancement that may be used for these loans including primary loan-level mortgage insurance and recourse arrangements with lenders.³⁴

²⁸ Fannie Mae 2002 Form 10-K, pages 67-68, and <http://www.fanniemae.com/ir/issues/financial/confcall071503remarks.jhtml?p=Investor+Relations&s=Current+Issues&t=Financial>. Fannie Mae recently announced its intention to raise the proportion of match funded debt to sixty percent.

²⁹ Fannie Mae has determined that, in its view, buying back this proportion of the optionality provides optimal coverage against prepayment risk given the cost of obtaining the coverage, and the ability to dynamically rebalance over time.

³⁰ Fannie Mae attempts to keep the duration of its portfolio within bounds of plus or minus six months. (See Fannie Mae's June 30, 2003 Form 10-Q.)

³¹ It should be noted that Fannie Mae is also a small player relative to the size of the global derivatives market. For example, at the end of 2002, Fannie Mae had an outstanding \$656 billion notional balance of derivatives which was 0.4 percent of the \$150 trillion of notional balance outstanding. (See <http://fanniemae.com/ir/speeches/2003/0430.jhtml?p=Investor+Relations&s=Speeches>).

³² Freddie Mac Weekly Mortgage Market Survey.

³³ Credit enhancement reduces the risk of mortgage credit loss but does expose Fannie Mae to institutional credit loss on the credit enhancement contract. I later describe steps Fannie Mae takes to mitigate the institutional risk.

³⁴ Recourse arrangements are agreements to share part of the loss of a non-performing loan with a third party. Recourse arrangements can be entered into with parties such as lenders, the government or mortgage insurers. These arrangements may be backed by letters of credit, investment agreements, etc.

Effective credit risk measurement and therefore effective credit risk management requires forecasts and probabilistic measures of credit performance under many scenarios. Fannie Mae uses simulation models and scenario analysis to assess the loss distribution and related credit enhancement under many interest rate and house price scenarios.³⁵ These analyses provide information on the five-year distribution of pretax net guarantee fee income, credit loss, and discounted after-tax net income, along with a substantial amount of more detailed information.

Sketchier data are available on institutional credit risk, making formal modeling of institutional credit risk difficult.³⁶ To minimize its institutional credit risk, Fannie Mae relies on the reasonable and commonly used procedures of selecting low-risk counterparties (based primarily on credit rating), requiring collateral, and monitoring of the counterparty and collateral. These procedures apply (with some exceptions) to derivative counterparties, credit enhancement institutions, servicers, and short-term assets counterparties.

IV. Principles For Liquidity Management

To provide a framework for evaluating liquidity management and liquidity risk, it is useful to build on the recommendations for liquidity management developed by the Basel Committee on Banking Supervision. These recommendations provide a standard against which to benchmark Fannie Mae's liquidity management practices. Indeed, Fannie Mae acknowledged this benchmark by announcing in March 2001 that it had met its commitment of complying with the Basel Committee's principles of sound liquidity management.

The Basel Committee on Banking Supervision ("the Committee") was established by the central bank governors of the Group of Ten (G10) countries in 1974. With current members including Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Spain, Sweden, Switzerland, United Kingdom, and the United States, the Committee meets regularly to formulate guidelines, standards and recommendations of best practices to close gaps in international banking supervisory coverage and reports to the G10 governors.

In addition to its famous 1988 Basel Capital Accord, which promulgated a minimum capital standard and provided a framework for measuring credit risk, the Committee has produced over 100 publications containing its recommendations for banking supervisory policy.³⁷ These papers have been written in a consultative process, in which both the private sector and supervisory authorities have provided input. The most recent Basel Committee's recommendations with regard to liquidity management for banks are contained in the February 2000 document *Sound Practices for Managing Liquidity in Banking Organisations*.

Building on economic analysis of liquidity risk, the Committee's examination of liquidity risk management emphasizes the need to include: good management

information systems, analysis of net funding requirements under alternate scenarios, diversification of funding sources, and contingency planning. The Committee codifies this emphasis in its fourteen principles.

Principles 1 through 3 set general guidelines institutions should follow in formulating and implementing a liquidity management strategy. These principles stress that liquidity management should be maintained and executed on a day-to-day basis. They also stress the importance of communicating the liquidity management strategy throughout the organization and of its approval by the board of directors.

Principles 4 through 5 involve measuring and monitoring funding needs and the reporting of the institution's liquidity situation throughout the organization. According to the Committee, a financial institution must have systems for measuring and monitoring net funding requirements. This involves assessing the institution's cash inflows against its outflows, including off-balance-sheet commitments, to identify any shortfalls.

Principles 6 through 8 are intended to test and assess the robustness of the liquidity plan. As exemplified in Principle 6, a sound liquidity analysis will test the institution's liquidity position not only under the most likely future set of events, but also under alternate "what if" scenarios, including adverse market conditions. Scenarios should take into account both institution-specific internal factors as well as market-wide external factors. The Committee stresses that allowances should be made for scenarios in which the institution's ability to access funds in the market becomes impaired due to a change in the market's perception of the institution's riskiness.

Principle 7 states that management should frequently review the assumptions used to manage liquidity. Market conditions change over time, and a liquidity management program should evolve to reflect changes in market conditions and the organization.

Principle 8 sets out the responsibility of a financial institution to ensure its access to crucial funding markets. One of the more critical components in a liquidity management plan is assessing how much external funding an institution can expect from various sources both under normal and adverse market conditions.

According to Principle 8, a financial institution should utilize these funding sources on a regular basis to cement relationships with these providers, which could prove to be important under more difficult market conditions. Because a high concentration of external funding sources can increase liquidity risk, the Committee recommends examining concentrations of funding instrument type, type of provider of the funding, and geographic market. The capacity of the market to absorb the institution's sale of assets also should be ensured.

Principle 9 states that a contingency plan should be in place that addresses procedures to be followed in the event of a liquidity crisis. These procedures would be part of a workable liquidity strategy and would include

³⁵ Fannie Mae currently releases a scenario analysis in its Form 10-K: the house price index (based on "current data on home values," Fannie Mae 2002 Form 10-K, p. 79) is assumed to drop by five percent and then grow at the previously anticipated rate. In this analysis, home prices drop by 5 percent at day one, and then are simulated forward across a number of paths. The credit loss sensitivity is across the average of these paths relative to the base case.

³⁶ Fannie Mae includes in its credit pricing a factor intended to capture this counterparty risk.

³⁷ US banks must hold capital against this "risk-based" standard as well as a leverage standard.

procedures for dealing with cash flow deficits in emergency situations. The principal goal of the plan would be to ensure access to funds in an emergency. In particular, the plan should spell out how asset sales, potentially an important funding source, would be pursued, and how lines of credit would be accessed, if necessary.

Principles 10 and 11 state that an institution should have a system for measuring, monitoring, and controlling liquidity positions in each of the major currencies in which it is active. Foreign currency issues are not a major concern for Fannie Mae.

Principles 12 through 14 stress the importance of independent review and public disclosure. According to Principle 12, an institution should regularly review and evaluate the effectiveness of its liquidity risk management system so that appropriate revisions or enhancements can be made. The Committee stresses these reviews should be conducted by individuals who are independent of the function being reviewed and that this information should be available to regulatory authorities.

Principle 13 states that an adequate level of public disclosure of information about the institution will positively impact the public perception of the organization and its soundness. If material adverse information regarding the organization becomes public, then management should be prepared to immediately announce corrective actions.

Finally, according to Principle 14, the supervisory authorities appropriate to the financial institution should independently evaluate the strategies, policies, and practices regarding liquidity management. The Committee indicates that the supervisors should verify that all of the principles of effective liquidity management as outlined in the Basel Committee recommendations are reflected in the liquidity management plan. Supervisors should independently consider the appropriateness of all the assumptions embodied in the various “what if” scenarios that will have been examined by the institution.

V. Fannie Mae's Execution Of Sound Liquidity Management Principles

In March 2001, Fannie Mae announced that it met its commitment to comply with the Basel Committee's fourteen principles. Indeed, with a well-developed liquidity management program, Fannie Mae's liquidity management is consistent with the spirit of the Basel Committee principles.

Fannie Mae's Liquidity Management Program

The management of cash activities is performed on a consolidated basis within Fannie Mae's Treasurer's Office by the Cash Management Group. All business units must report expected cash outflows and inflows to this group. Working in concert with the Cash Management Group, the Short-term Funding desk and the Liquid Investments Portfolio (LIP) staff are responsible for raising required funds and investing excess cash, respectively.

Seamless real-time communication is essential for efficient cash management. Fannie Mae accomplishes this through its “Market Room.” The Market Room is the communication hub for staff involved in liquidity management. Several vice presidents and key individuals responsible for the mortgage portfolio, debt marketing, LIP, and short- and long-term funding are physically located in the Market Room. In this way, any liquidity event can be immediately reported to senior management. To ensure liquidity operations are not disrupted because of system failure, Fannie Mae also maintains a backup market room offsite that can also accomplish critical functions.

Fannie Mae's Contingency Plan and Stress Checks

Fannie Mae has developed a rigorous contingency plan and stress checks for a liquidity crisis. Although Fannie Mae regularly borrows in the capital markets, the contingency plan, which is tested daily, is developed under the assumed scenario that Fannie Mae cannot borrow directly in the short-term debt markets for three months.³⁸ Under this scenario, Fannie Mae requires that its liquidity plan allows it to meet on time all of its cash flow obligations resulting from its debt, MBS principal and interest payments, and payments to derivative counterparties for ninety days. Fannie Mae also requires that all administrative expenses, taxes, and dividends are paid on time. The contingency plan therefore requires that Fannie Mae have at least three months of liquidity readily available from sources other than the short-term debt market, its usual and primary source for immediate liquidity.

In a liquidity crisis, Fannie Mae's initial alternate funding source is its portfolio of liquid assets and non-mortgage assets known as the LIP, created in 1986, made up of highly rated readily marketable or short-term assets. In October 2000, Fannie Mae voluntarily agreed to maintain at least 5 percent of total assets in liquid non-mortgage assets. As shown in Exhibit 5, over the last six years, the ratio of Fannie Mae's liquid non-mortgage assets to total assets has, in fact, ranged from 6.7 percent to 12.2 percent of total assets. Indeed, as of June 30, 2003, Fannie Mae

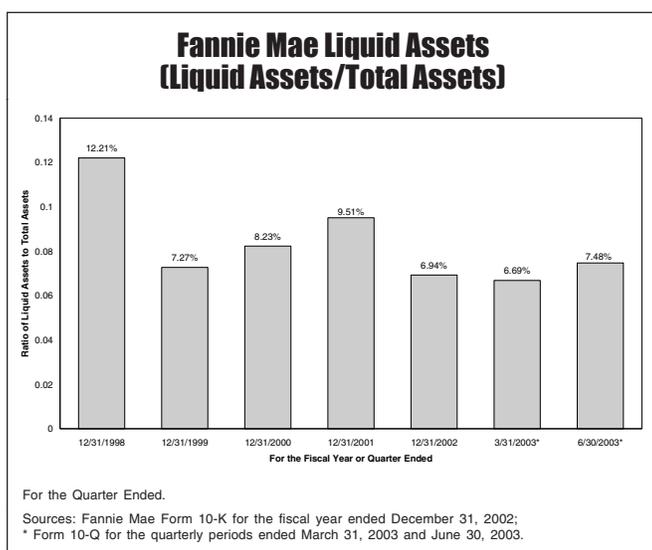


EXHIBIT 5

³⁸ Fannie Mae regularly issues securities corresponding to the needs of a broad spectrum of investors. For example, Fannie Mae issues “Benchmark Securities” in large sizes on the basis of a predictable calendar. These securities are used for pricing and hedging other securities in the fixed income markets as well as for capital requirement purposes for banks. (See Fannie Mae Funding Notes, Volume 7, Issue 5, May 2002.)

held approximately \$70 billion in non-mortgage liquid assets, accounting for approximately 7.5 percent of its total assets. In its stress checks, Fannie Mae also assumes a 5 percent loss on sale for its assets in the LIP, which, as I describe below, appears conservative.

As **Exhibit 6** shows, as of June 30, 2003, Fannie Mae's LIP and other liquid securities include investments in cash, money market securities, asset-backed securities, floating-rate notes, repurchase agreements and some corporate bonds. For each category, with the exception of corporate bonds, more than 90 percent of the securities are rated A or better. Corporate bonds account only for a very small percentage, less than 2 percent, of the liquid portfolio, and in this category, approximately 75 percent of the bonds are rated A or better. The credit rating is often considered a reasonable measure of a security's liquidity, the ease with which a security can be sold or converted into cash. For example, it became difficult to transact quickly without large price concessions in lower-rated securities during the "flight to quality" that occurred during the international financial crisis of August – October 1998.

In addition to being both highly rated and liquid, the assets in the LIP exhibit low interest rate risk. First, a sizeable portion of the liquid assets are corporate and asset-backed floating rate notes. The coupons of floating rate notes vary with interest rates, and therefore, unlike bonds with fixed coupons, their values are very insensitive to interest rates. In addition, the weighted average maturity of the LIP and other liquid assets is quite low.³⁹ As Exhibit 6 shows, more than a third of the liquid assets have a weighted average maturity less than half a month. Based on these characteristics, the LIP and other liquid assets could easily and readily generate cash to assist Fannie Mae in the unlikely event of a liquidity crisis in which it was foreclosed from short-term debt markets.⁴⁰

However, due to the size of Fannie Mae's short-term obligations, the LIP and other liquid assets by themselves may not provide complete coverage in the event that short-term debt markets are not accessible. In conjunction with funds from maturing LIP assets and the sale of remaining LIP and other liquid assets, Fannie Mae's contingency plan calls for Fannie Mae to tap the most liquid portion of its MBS portfolio, the 15 and 30 year pass-throughs, using repurchase agreements ("repos").

A repo is effectively a collateralized loan, in which Fannie Mae could borrow cash by using MBS as collateral. At the maturity date of the repo, which could be one day or months after the cash was borrowed, Fannie Mae would agree to "repurchase" the MBS at the repurchase price – in other words, Fannie Mae would agree to repay the loan plus interest in return for its collateral where the repurchase price includes both the loan amount and interest. The difference between the loan amount received and the value of the collateral at inception of the loan is

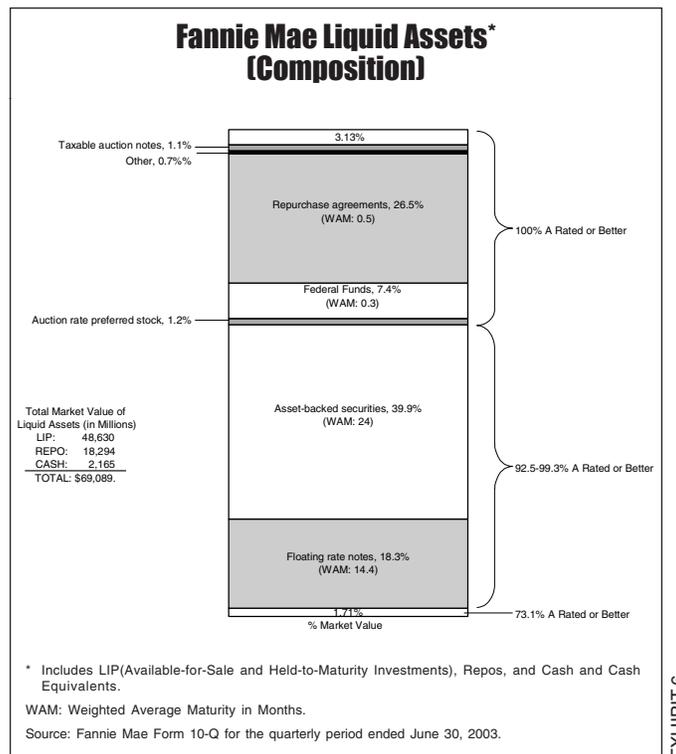


EXHIBIT 6

known as the "haircut." The lower the haircut, the more that can be borrowed for a given value of collateral.

In its contingency plan, Fannie Mae assumes that it can enter into repos with haircuts of 25 percent. In other words, Fannie Mae assumes it can obtain a loan for 75 percent of the value of each MBS in a repo transaction. To see how conservative this assumption is, the typical haircut for liquid MBS pass-throughs is 0.5 to 1.0 percent. In August 1998, Fannie Mae reported that the typical haircut for Agency MBS was 3-5 percent.⁴¹ Even during the turbulent and volatile time period of August – October 1998, haircuts on pass through MBS never were more than 25 percent. For example, MBS hedge fund managers discussing this time period state that margin requirements (that is, haircuts) were not above 20 percent, and as agency pass-throughs are among the safest MBS, one would expect haircuts on these securities to be the lowest among MBS.⁴²

As of June 30, 2003, Fannie Mae's single-family MBS totaled approximately \$590 billion. By repoing predominantly its liquid pass-through single-family MBS at an assumed haircut of 25 percent, in conjunction with cash provided by its LIP, Fannie Mae could meet its liquidity needs assuming no other funding source is available for three months.⁴³

³⁹ While duration is a better measure of a security's sensitivity to interest rates, for bonds with a standard coupon structure, weighted average maturity gives a reasonable indication of the security's interest rate risk.

⁴⁰ Thus, the LIP is consistent with the recommendation of William Poole, who stated in his March 2003 OFHEO speech that "the only way for financial institutions to insure stability in the event of nonquantifiable shocks is for them to maintain a...capital cushion invested in highly liquid, short-term assets not subject to depreciation..."

⁴¹ Fannie Mae Funding Notes, Volume 3, Issue 6, August 1998.

⁴² See "The Great Hedge Fund Rebound of '99," *Hedge Funds*, June 1999, available from Bloomberg.

⁴³ Under its contingency plan, Fannie Mae relies only on using its liquid pass-throughs in repo transactions. However, it should be noted that Fannie Mae could potentially borrow against its total mortgage asset portfolio of over \$800 billion as of June 30, 2003.

The repo market is large and could likely support this volume. The General Collateral Finance (GCF) market is a centralized repo market operated by the Fixed Income Clearing Corporation (FICC) in which Fannie Mae is a participant.⁴⁴ During the period January through June 2003, approximately \$122.2 trillion in repo trades were submitted by participants in the Government Securities Division of the FICC, with the daily volume averaging approximately \$985 billion. Transactions involving federal agency securities were second in volume to Treasury notes, accounting for 14.1 percent of repo volume over this period. Therefore, over January to June 2003, the average daily volume of agency repos was approximately \$140 billion. Over a three month period, this corresponds to a volume of approximately \$8.6 trillion, an amount vastly larger than the amount Fannie Mae assumes it can repo in its three month contingency plan. In addition to the GCF, there is an active over-the-counter market for repos which Fannie Mae can and does access. The average volume of total outstanding repo and reverse repo contracts (which includes both the GCF and the over-the-counter markets) was \$3.9 trillion for the first half of 2003.^{45,46}

Fannie Mae's Disclosures and Independent Review

Fannie Mae discloses substantial information about its liquidity program to the public. In addition to its 10-K filed with the SEC, which contains detailed descriptions of its risk management practices, its frequent press releases, and appearances before congressional committees, Fannie Mae makes available a wealth of materials on its website. Its website includes, for example, quarterly and annual reports

and earnings, monthly summaries, and Funding Notes, a monthly publication for Fannie Mae's Investors and Dealers. In addition, Fannie Mae is currently subject to regulatory scrutiny and supervision by the Office of Federal Housing Enterprise Oversight (OFHEO). In fact, OFHEO has confirmed that it believes Fannie Mae's liquidity management program to be effective.⁴⁷

As this discussion makes clear, Fannie Mae has adopted the guidelines for sound liquidity management established by the Basel Committee. **Exhibit 7** summarizes the foregoing discussion regarding Fannie Mae's adoption of the Basel liquidity management principles. In the following section, I discuss Fannie Mae's performance during some periods of market turmoil.

Fannie Mae's Performance During Periods of Financial Market Turmoil

The robustness of Fannie Mae's risk management and liquidity practices has been illustrated during the turbulent periods of the international financial crisis of August 1998 and the aftermath of September 11, 2001. During the fall of 1998, financial crises in Asia and Russia combined with huge losses at certain hedge funds precipitated a period of market instability. In many markets, the cost of borrowings surged—if, indeed, borrowing was possible at all. For example, the spread of BB corporate bonds above Treasuries increased approximately 150 basis points from August 17, 1998 to October 16, 1998. The turmoil of the period is illustrated by the implied volatility on the S&P 100, which reached 46 percent on October 8, 1998, its peak in 1998.⁴⁸ The conforming mortgage market, however, did not experience comparable volatility. Because its debt market benefited from a “flight to

EXHIBIT 7

| Basel Principles for Sound Liquidity Management | | |
|--|--|---|
| | Basel Principle | Fannie Mae Implementation |
| Principles 2, 3, 4 | Inclusion of liquidity management in the overall managerial process of the firm | <ul style="list-style-type: none"> Plans liquidity management in the broader context of asset/liability risk management, as per guidelines issued by the Board of Directors Coordinates liquidity management through the “Market Room,” where many vice presidents are located Informs management of any interruption or unusual events that could affect access to debt market, and of any failure to meet the contingency plan's 90-day test |
| Principles 1, 5, 10, 11 | Measuring and monitoring | <ul style="list-style-type: none"> Forecasts each day the day-to-day cash needs three months into the future Establishes daily cash need forecasts through the Cash Management Group, based on processes followed by the entire firm |
| Principles 6, 8, 9 | Contingency planning and market access * | <ul style="list-style-type: none"> Regularly develops new funding markets and products to widen and diversify access to financial markets Maintains a contingency plan that can meet 90-day funding needs through a liquid investment portfolio and access to the repo market |
| Principles 7, 12, 13, 14 | Supervision, review and assessment of liquidity management | <ul style="list-style-type: none"> Periodically reviews and assesses models and systems effectiveness and systematically investigates non-consistent forecasts Conducts financial and operation audits through its Office of Auditing Publicly discloses the results of its liquidity contingency efforts each quarter on a pass/fail basis, as well as general guidelines of liquidity management in the 10-K Undergoes complete and successful audits by the Office of Federal Housing Enterprise Oversight |

⁴⁴ The FICC, an SEC registered clearing agency, is a non-profit industry service organization that ensures orderly and anonymous settlement of repos. (See Michael Fleming and Kenneth Garbade, “The Repurchase Agreement Refined: GCF Repo,” Current Issues in Economics and Finance: Federal Reserve Bank of New York, V9, N6 (June 2003)).

⁴⁵ Bond Market Association Research Quarterly, August 2003.

⁴⁶ The GCF Repo market was recently estimated to account for 54 percent of inter-dealer repo transactions on Treasury collateral. (Jeffrey Bockian, “General Collateral Financing”, 2002 (paper presented at Bond Market Association Fixed-Income Securities Operations Conference)).

⁴⁷ OFHEO's Report to Congress, June 2003, page 34.

⁴⁸ As measured by the CBOE index of implied volatilities on S&P 100 options.

Fannie Mae's Performance During Periods of Market Turmoil

August - October 1998

Market

- Russian Crisis
- LTCM Collapses
- "Flight to Quality" - e.g. BB Corporate bond spreads increase approx. 150 bp from 8/17/98 to 10/16/98
- Stock market volatility as measured by CBOE S&P 100 volatility index peaks for 1998 at 46% on 10/8/98

Fannie Mae

- Purchases record number of mortgages
- Issues \$10.7 Billion in debt in October 1998

September 11, 2001 and Aftermath

Market

- Stock markets close September 11 - September 17
- Stock market volatility as measured by CBOE S&P 100 volatility index peaks for 2001 at 44% on 9/20/01
- On 9/11/01, number of Fed wire transfers down more than 40% and total value down more than 25%
- "Banks were collectively growing short of liquidity"(FRB Vice Chairman Roger Ferguson, 2/5/03)
- On 9/17/01, Fed announces 50 bp decrease in fed funds target rate to 3% to increase liquidity

Fannie Mae

- Open for business on September 11
- Provides liquidity to small and medium sized lenders by buying mortgages
- Resumes trading MBS on September 13.
- Issues \$51 Billion in short-term funding over period September 11-September 14

EXHIBIT 8

quality," Fannie Mae was able to access funds and respond to market needs by purchasing a record volume of mortgages and MBS for its portfolio. At the height of the crisis, Fannie Mae was able to issue \$10.7 billion in long-term debt in October 1998. In contrast, during the crisis time period, the spread between jumbo and conforming mortgage rates, for instance, widened substantially. On August 7, 1998, this spread was 23 basis points; by November 13, 1998, it had widened to 49 basis points.

On September 11, 2001, Fannie Mae remained open for business, buying mortgage loans through its cash window and its automated underwriting system, using prices based upon those posted on September 10. Although there were very low volumes, these purchases were a key service for small and medium-sized lenders as "banks were collectively growing short of liquidity."⁴⁹ On September 12, Fannie Mae resumed purchases of MBS, and it began work with the Bond Market Association to increase interim flexibilities of the settlement process. On September 13, the company resumed trading MBS, and announced mortgage forbearance policies. In the aftermath of September 11, the stock market was closed until September 17. When it reopened, stock market volatility spiked, with the S&P 100 implied volatility reaching 44 percent on September 20, 2001, its highest level in 2001. However, during the week of September 11-14, Fannie Mae was able to issue \$51 billion in short-term and overnight funding. Beginning September 19, Fannie Mae resumed its weekly short-term Benchmark Bills auctions.

Exhibit 8 summarizes the above discussion of Fannie Mae's performance during these time periods and contrasts its performance with what was occurring in the markets. Fannie Mae's performance during these crisis periods as well as during the run-up in mortgage rates during the summer of 2003, as I described earlier in Section II, are a demonstration of the effectiveness of Fannie Mae's management of the risks of its business.

Overall Assessment of Fannie Mae's Liquidity Management Practices

Fannie Mae manages its liquidity risks in a manner consistent with the Basel Committee Recommendations for Sound Liquidity Management. Its liquidity management program is coordinated and communicated throughout the organization, and ongoing monitoring ensures liquidity events can be immediately identified and communicated to senior management. Fannie Mae also has a contingency plan detailing procedures to be followed in the case of a liquidity event. This plan is tested daily to ensure that Fannie Mae has the resources in place to meet its ongoing funding needs for a three month period during which it cannot rely on its normal short-term borrowings. Fannie Mae also follows the Basel Recommendations by disclosing detailed information about its liquidity management program both to the public and to its oversight authority, OFHEO.

⁴⁹ Remarks by Federal Reserve Board Vice Chairman Roger Ferguson, February 5, 2003 available at <http://www.federalreserve.gov/boarddocs/speeches/2003/20030205/default.htm>.