

Mortgage Banking

U P D A T E

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The Top Ten Challenges in 1998 for Leading Mortgage Bankers

In general, 1997 proved to be a good year for the top companies in the mortgage banking industry. Low interest rates led to lower loan subsidies and loan production volumes that were close to budgeted amounts. Furthermore, continued focus on origination and servicing efficiencies led to margin improvements at several companies.

While these factors appear as if they will continue in the first part of 1998, the industry will face many business challenges as 1998 progresses. In this article, the challenges that executives at leading mortgage banking companies are likely to face in 1998 and beyond are discussed. While it is impossible to list every challenge, we have identified the "top ten" challenges that leaders in the industry are likely to face. These challenges are separated into two components: tactical and strategic. Executives may wish to consider using this list as a reference point in their ongoing review of their 1998 plans.

Tactical Challenges

Tactical challenges or "blocking and tackling" as some refer to it, relate to everyday business activities. Some of the top tactical challenges facing industry leaders are:

- **MSR valuation and hedging.** Most large companies have between \$500 million and \$3 billion of MSR assets on their balance sheets. At the time of writing, interest rates are at or near historical lows. Another 10 to 25 basis point drop could pose impairment problems to many in the industry. In addition, several leading economists are predicting even lower interest rates in 1998, due in part to the impact of Asia's weakened financial

The objective of this semi-annual newsletter is simple: we want to keep our clients and contacts in the industry informed of both the business and financial reporting issues taking place in mortgage banking today. The Price Waterhouse Mortgage Banking Services Group is growing rapidly and responding to the dynamic pace of the industry. Our goal is to provide you with real value by sharing our insights on new business and financial reporting developments, best practices, regulatory changes, conferences, and other information you will find useful.

We look forward to this continuing communication with you in the future. If you, or someone you know, would like to be added to our mailing list, please send an e-mail to Beverly Callender at beverly_callender@notes.pw.com or call Tara Crosson in New York at (212) 596-5613.

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Establishing a Value-at-Risk Framework

OVER THE PAST FEW YEARS, WIDELY PUBLISHED trading-related losses, particularly those involving derivatives, have raised the risk-management concerns of boards of directors, management, investors, security analysts, industry groups and regulators. While a number of non-market-related factors—particularly poor management controls—have contributed to these losses, market-risk management has come under the spotlight. This has been the case as these constituencies become more focused on managing market-induced volatility in earning streams and asset values.

While there continues to be debate on whether the losses could have been avoided altogether, there is collective agreement on the need to introduce greater transparency around an institution's risk profile. This can be done through consistent and comprehensive measurement, aggregation and management of risk.

For mortgage companies, the challenges of risk aggregation and management are particularly thorny. Market risk arises in each of the different mortgage-related activities (i.e., origination, secondary marketing, securitization, investment, and servicing). These activities typically involve disparate, and in many instances nonstandard, asset classes (e.g., whole-loan mortgages, agency and private label mortgage-backed securities [MBS], collateralized mortgage obligations [CMOs], strips, mortgage servicing rights, etc.). Mortgage-related instruments can be among the most risky

financial instruments and are affected by diverse and complex risk factors.

Also contributing to the risk-management challenge is the highly autonomous and often fragmented risk-management practices (including risk measurement, management reporting and information systems) that mortgage companies have typically established. As financial risk management gains prominence with the management and boards of mortgage companies, however, there is increasing desire to identify, measure and communicate an institution's aggregate market-risk profile in a consistent, easy-to-understand framework.

Value-at-Risk (VaR) is a conceptual framework that has gained recognition in recent years as a consistent and statistically driven method for estimating market risk. VaR has become part of the financial risk-management lexicon at leading banking institutions worldwide. In many instances, it is the preferred method of risk measurement and has evolved to a standard that regulatory agencies are increasingly requiring of both financial and nonfinancial corporations for market-risk disclosures.

VaR provides a framework for aggregating market exposures across disparate asset classes and calculating a portfolio-level summary measure of market risk. Under one of the more commonly accepted definitions of VaR, this measure can be defined as the maximum expected loss of a portfolio within a given time horizon for a given confidence interval

**A new approach to evaluating the market risk faced by companies may be helpful
in guiding mortgage company CEOs.**

BY SHYAM VENKAT AND SATYAN MALHOTRA

(level of probability). The time horizon and confidence interval reflect both the holding period and liquidity of the portfolio. As such, VaR is an estimate of the amount that a company can lose in a defined period under normal market conditions.

It is important to note that while VaR is a mechanism that communicates the aggregate risk in an easy-to-understand framework, no single measure can capture all financial risks and replace experience and sound professional judgment in managing these risks.

From a strategic standpoint, as mortgage companies move toward implementing capital allocation schemes and risk-adjusted performance metrics to support corporate decision-making, implementing VaR becomes a necessity. The application of a VaR framework reaches beyond portfolio-level market-risk measurement; it provides critical input to economic capital attribution, risk-based pricing and risk-adjusted performance measurement. Collectively, these decision-support tools help direct management's attention to maximizing risk-adjusted returns to enhance shareholder value.

This article explores the application of VaR as a tool to acknowledge and communicate the market-risk profile of a mortgage company. It explains why senior management must consider implementing VaR as an enterprise-wide risk-management tool and describes alternative implementation approaches. The article addresses the following key questions:

- How do mortgage companies measure and communicate risk?
- How do we implement VaR at a mortgage company?
- Is VaR the final word?

The article also presents a comparison of alternative approaches to implementing VaR.

How do mortgage companies measure and communicate market risk?

Mortgage companies use a variety of risk-measurement techniques to assess, manage and communicate the sensitivity of their balance sheets to various risk factors (interest rates usually being the dominant risk factor). Current risk-measurement tools used by these companies include duration (both modified and effective), basis point value, convexity, scenario analysis under interest rate shocks, and option-adjusted spread (OAS).

Duration and basis point value are incomplete measures of market risk, particularly for large market moves where prepayment speeds change dramatically and alter the risk profile of a mortgage portfolio. Scenario-based measures are useful at the trading desk-levels for analyzing and managing balance sheet sensitivity to individual risk factors. Neither scenario-based measures nor OAS, however, allows for consistent aggregation of market-risk exposures across portfolios. In addition, the scenarios used can often be arbitrary and nonintuitive in conveying likelihood of occurrence, while OAS is a tool more suited for pricing and valuation than for communicating risk to senior management and boards of directors.

As such, mortgage companies exhibit varying

approaches, degrees of sophistication and technological capabilities in measuring and managing the market risks posed by their disparate, nonstandard asset classes. While these approaches have been tailored to meet the needs of specific trading activities, there remains a need to implement standardized frameworks that can help quantify and report the magnitude and direction of market risk in various asset classes consistently within and across the asset classes.

VaR provides this summary measure of market risk; it facilitates risk measurement and aggregation across diverse asset classes and enhances a corporation's ability to acknowledge, communicate and understand its market-risk exposures. Some mortgage companies—notably mortgage subsidiaries of banks—are embracing proactive enterprise-wide risk-measurement techniques such as VaR to manage the risks in their balance sheets.

A corporate-wide VaR framework should supplement, rather than substitute for or replace, the risk-management practices of individual business units. An effective implementation of VaR requires leveraging the strengths of the individual risk-measurement tools at the desk levels and establishes a portfolio approach toward risk management and communication, rather than replacing such tools. The VaR process should not force a "corporate" viewpoint on the risk-taking activities of any given division. Rather, it should be intended to provide senior management with appropriate risk information and context for risk-based decision-making.

As such, VaR for mortgage companies should be complemented by the other risk-measurement techniques mentioned earlier, and particularly stress testing, to develop an effective enterprise-wide approach toward the management of market risks.

How do we implement value-at-risk?

Mortgage companies that are subsidiaries of banks have implemented VaR in response to the corporate risk-management function's mandate (which, in turn, has been driven by regulatory pressures) to establish enterprise-wide market-risk measurement. The subsidiaries have implemented VaR by building off the risk-management methods the parent bank is already using. In most other institutions, the selection of a particular VaR methodology has usually depended on the portfolio-level valuation and risk-measurement capabilities of each institution.

Although the selection of a particular VaR implementation approach is institution- and asset class-specific, the selected approach should address the individual market-risk factors, (i.e., interest rates [level and volatility], spreads, prepayments and fall-out). In addition, the selected approach should provide enough flexibility to compute VaR across different asset classes, divisions or both. The approach should also be extendible to capture the market risk associated with nontrading functions such as warehouse lending and building/development financing. As such, the approach should provide a comprehensive framework for assessing and quantifying the market risk across both standard and nonstandard asset classes.

Figure 1

Comparison of VaR Approaches

Category	Risk Factor	Variance/Covariance	Monte Carlo	Historical Simulation
<i>Parameter requirements</i> (e.g., greeks, volatility, correlations, etc.)	Risk factor standard deviation moves and correlations	Greeks, variance/covariance metrics	Risk factor: standard deviation moves and correlations	Not required
<i>Mapping</i>	Not required	Cash flows	Not required	Not required ¹
<i>Optionality</i>	At prespecified scenario levels	By approximating delta/gamma/theta/kappa	By simulating multiple paths	By using actual values
<i>Model requirements</i>	Valuation and simulation	Valuation	Valuation and simulation	Valuation
<i>Use of proxies²</i>	No	Yes	No	Yes
<i>Ability to address a dynamic environment</i>	High	Medium	High	Low
<i>Industry implementation</i>	Banks	Banks, thrifts, corporate treasuries	Banks	Banks
<i>Development effort</i>	Medium	Medium	High	High
<i>Communication</i>	Easy to explain to senior management	Somewhat difficult to explain to senior management	Intermediate complexity for senior management	Easy to explain to senior management
<i>Benefits</i>	<p>Is robust in terms of its applicability to complex/diverse product structures</p> <p>Captures risks in an easy-to-understand framework and allows risks to be isolated or aggregated</p> <p>Expands on the sensitivity approach used at the desk levels—thereby leveraging readily available and acceptable mortgage banking risk-management techniques</p> <p>Allows integration of nontrading functions (e.g., warehouse lending and builder/developer financings)</p>	<p>Is the most well-known and accepted of the VaR methodologies</p> <p>J.P. Morgan data sets can be used for standard products</p>	<p>Is applicable to all price types and can accurately capture gamma, kappa, spread and multivariate correlation risk effects</p> <p>Is the most robust method in terms of accuracy and its applicability to complex/diverse product structures</p> <p>Allows risks to be isolated, aggregated or both</p>	<p>Captures risks in an easy-to-understand framework</p> <p>Is applicable to all price types and can accurately capture gamma, kappa, spread and multivariate correlation risk effects</p> <p>Avoids problems associated with modeling the evolution of market prices (e.g., market prices tend to have fatter tails are more skewed than predicted by a normal distribution and volatilities/correlations vary over time)</p>
<i>Major drawbacks</i>	<p>Gamma risk is captured only at the prespecified scenario levels</p> <p>Introduces model risk, and the risk-factor coverage can be limited</p>	<p>Introduces model risk, and the data requirements can be quite extensive</p> <p>Use of proxy securities for nonstandard issuances and new products</p> <p>Does not handle extreme events</p>	<p>Introduces model risk, and the risk-factor coverage can be limited</p> <p>Computationally intensive and time consuming</p>	<p>Does not account for time variation of risk and extreme events</p> <p>Use of proxy securities for nonstandard issuances and new products</p> <p>Data requirements can be quite extensive</p>

¹Requires mapping if the proxy security methodology is used.

²Use substitute securities in place of the original security/loan to address lack of data, valuation capabilities, etc.

SOURCE: PRICE WATERHOUSE LLP

Because implementing VaR is a continuing process of refining a particular methodology, it is important to understand the features and trade-offs of the alternative VaR methodologies. Some commonly used implementation techniques include the variance/covariance method, Monte Carlo simulation method, historical simulation method and risk factor method. An important element of choosing a particular methodology is the associated trade-off between ease of implementation and accuracy. Figure 1 provides a comparison of the various approaches to implementing VaR for mortgage companies.

An example

The following example applies the variance/covariance and historical simulation approaches to estimate VaR for a hypothetical portfolio (using 100 days of historical data for all calculations). Figure 2 provides a sample portfolio comprising mortgage-backed security and Treasury security open positions.

Using the variance/covariance and historical simulation approaches, we can estimate the amount the individual secu-

rities, or the portfolio, could lose given a prespecified holding period and confidence level. Figure 3 provides the VaR results for the sample portfolio assuming a one-day holding period and a 95 percent confidence level.

As illustrated in Figure 3, the final results could vary given the methodology and its underlying assumptions. As with any financial modeling effort, it is imperative to understand the strengths and weaknesses of a particular methodology to correctly interpret the results and gain maximum risk-management benefit from the exercise.

The illustrated analysis can be expanded to incorporate a mortgage company's entire balance sheet, with the various asset classes (e.g., lending, secondary marketing, servicing) to estimate market risk in risk-dollar terms. By infusing such transparency into the balance sheet and quantifying the exposures in comparable risk-dollar terms, VaR aids strategic decision-making on matters of economic capital attribution, risk-based pricing, risk-adjusted performance measurement and shareholder value.

Is value-at-risk the final word?

VaR provides a proactive risk-measurement tool that can help senior management make strategic risk-based decisions to enhance shareholder value. However, it is not a substitute for sound risk management judgment and appropriate risk controls. Senior management should understand the limitations of VaR and advocate its use as a means for both tactical and strategic risk management rather than an end.

There is no universally accepted methodology for estimating VaR, and each of the advocated approaches has its limitations. One of the fundamental limitations of any VaR methodology is that it reflects the decision-maker's subjective assumptions underlying the methodology. These limitations could arise from the technique applied, the data used, the assumptions used or simply the extent of risk-factor coverage. Further, as with any macro measure or risk strategy, there are implementation trade-offs in incorporating the characteristics of individual asset classes and the corresponding level of granularity.

The greatest risk in using VaR arises when its limitations are not understood. The danger comes in treating it as the Holy Grail. VaR is just one tool for communicating the risks of the portfolio and is by no means the final word on market-risk measurement and management. VaR should be complemented by other risk-measurement techniques to develop a portfolio approach to risk measurement and communication. These techniques include sensitivity analysis, hedge exposure equivalent assessments and stress testing, among others.

What VaR provides is an effective communication tool that allows its users to aggregate market risk across the balance sheet. The advantage of such a statement is that this quantitative measure is reported in units that anyone can understand ("risk dollars"). VaR allows market risk inherent in the different nonstandard mortgage-backed asset classes to be aggregated and conveyed to a nontechnical audience. **MB**

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Holding	Security	Bloomberg™ Ticker	Value (02-10-98)
Long	Fannie Mae 30-year	FNCL 7	\$1,010,780
Long	Fannie Mae Balloon	FNCX 6	\$995,630
Long	Fannie Mae 15-year	FNCI 6	\$986,880
Long	Ginnie Mae 30-year	GNSF 7	\$1,011,720
Long	Freddie Mac 30-year	FGLMC6	\$969,060
Short	10-year Treasury	T6 1/8 08/15/07	(\$1,036,410)
Short	5-year Treasury	T6 07/31/02	(\$1,010,000)
Total			\$2,927,660

SOURCE: PRICE WATERHOUSE LLP

