

Kamakura  
Corporation

# KAMAKURA RISK MANAGER

VERSION 7.0

## Limits Manager

Limits Management featuring Complete Integration with  
Risk Management for ALM, Credit Risk, Market Risk, Basel II,  
FAS 157 and FAS

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## Introduction

In the credit risk crisis of 2007-2008, an over exposure to home price risk led to the failure of a wide range of financial institutions, from IndyMac to Bear Stearns to Lehman Brothers. In every case, senior management had no knowledge of its exposure to home price risk and no effective monitoring of exposure versus a pre-approved risk limit. Similarly, other institutions suffered large losses from their counterparty credit exposure to the firms who suffered most from the crisis. KRM-lm, the Kamakura Risk Manager Limits Manager, is a web-based add on to the integrated Kamakura Risk Manager system that allows an institution to set both counterparty and macro-factor limits that are constantly updated with inputs from the Kamakura Risk Manager system. KRM-lm, designed and built by Kamakura developers with more than 40 man years in dealing systems, takes advantage of state-of-the-art web design and the transaction and counterparty risk analytics of the Kamakura Risk Manager system.

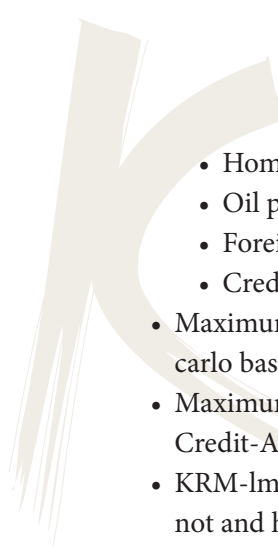
## KRM-lm: Defining the Limits Process

Risk limits are defined in a unique way at every firm with counterparty credit exposure. Limits can be based on notional values of exposure, market-value based exposure, netted exposure, gross exposure, exposure by industry or traditional credit rating, exposure by default probability level, and exposure by sensitivity to specific macro economic factors. Kamakura works with clients on a consulting basis to help define the state of the art limits policy. Given the firm's limits policies, KRM-lm is updated to monitor the risk exposure "rules" of the organization with whatever frequency is appropriate, given the nature of the limit policies.

KRM-lm is extensively linked with the Kamakura Risk Manager enterprise-wide risk management system. Kamakura Risk Manager's valuation functionality, for example, can determine the economic (market) value of individual financial instruments at any time, so decreases in economic value over time are observed by performing a current valuation at a previous date and a current valuation at the current date. If a threshold limit level for the economic value of an instrument or sub-portfolio is specified, a test for the value declining below the threshold can be implemented using KRM-lm.

KRM-lm allows limits to be defined at either the counterparty (firm) level or for specific sub portfolios of an institution's portfolio, which is stored in KRM. The sub-portfolios can be selected in terms of industry sectors, credit rating categories, geographical locations, and other criteria. Selected sample limits include the following:

- Maximum counterparty credit exposure, market value basis, by firm
- Maximum counterparty credit exposure, notional value basis, by firm
- Maximum counterparty credit exposure by internal rating level
- Maximum counterparty credit exposure by third party rating level
- Maximum counterparty credit exposure by default probability level
- Maximum change in market value with respect to changes in
  - Interest rates

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- Home prices
  - Oil prices
  - Foreign exchange rates
  - Credit spreads
  - Maximum risk exposure as measured by Value at Risk (historical, parametric, or monte carlo based)
  - Maximum risk exposure as measured by Credit-Adjusted Value at Risk and multi-period Credit-Adjusted Value at Risk
  - KRM-lm can measure both existing and proposed transactions to insure that limits will not and have not been breached.
  - Limits by client size
  - Limits by geographical region
  - Limits by industry
  - Limits by maturity
  - Limits by collateral type
  - Limits by type of transaction

Because of the flexibility of KRM-lm, it can embed any of the standard risk limit methodologies judged as best practice or common practice at major corporations and financial institutions. Because KRM-lm is fully integrated with Kamakura Risk Manager, KRM-lm users must license Kamakura Risk Manager.

## About Kamakura Risk Manager, Version 7.0

Kamakura Risk Manager, first offered commercially in 1993, has been under continuous expansion and improvement since the first lines of code were written in 1990. The KRM system is written in modern C++ class libraries totaling more than 300,000 lines of code. KRM comes with a rich data base architecture that is Open Data Base Connectivity compliant with proper security. KRM runs on both Windows and Unix, and relational data bases like MS SQL Server, Oracle, and Sybase can all be used with KRM. Kamakura Risk Manager is designed as a multiple-models risk management system, featuring a rich array of interest rate simulation techniques, default modeling approaches, prepayment simulation alternatives, and embedded options valuation methodologies. Kamakura Risk Manager is delivered with an optional set of Java-based web tools including the KRM-Risk Portal (rp) for wide dissemination of risk reports around the organization, KRM-Data Manager (dm) for easy data loading to KRM tables, KRM-Limits Manager (lm) for state of the art risk limits monitoring, and KRM-Loan Pricing (lp) for modern risk-adjusted return on capital loan pricing. KRM produces cash flows, financial accruals, and valuations at all user-defined forward time periods for the full range of financial instruments, from collateralized debt obligation tranches to mortgage backed securities to simpler instruments like bonds, deposits, loans, credit default swaps, options, interest rate swaps, life insurance policies, non-maturity deposits, foreign exchange transactions, and so on.



## About Default Probabilities in Kamakura Risk Manager, Version 7.0

Kamakura Risk Manager allows users to specify default probabilities and related formulas for retail, small business, corporate and sovereign counterparties using either a traditional ratings-based transition matrix approach, the legacy Merton-style approach, or the state of the art reduced form modeling approach. KRM can seamlessly load default probabilities updated daily from the Kamakura Risk Information Services public firm and sovereign default probability data bases.

## About Kamakura Corporation Risk Technology and Innovation

Kamakura is the leader in modern integrated risk management because of the 1995 insights of Kamakura's Managing Director for Research, Professor Robert Jarrow. Professor Jarrow, who also serves as senior research fellow at the Federal Deposit Insurance Corporation and Professor at Cornell University, linked credit risk with a random interest rates framework in his seminal paper with Stuart Turnbull. From that point in time, Kamakura has been dedicated to a completely integrated approach to risk management software design. Professor Jarrow is assisted in research efforts by Kamakura founder Dr. Donald R. van Deventer, named to the RISK Hall of Fame with Prof. Jarrow in 2002, and Professor Jens Hilscher, named senior research fellow in 2008. More than ten Kamakura staff members have contributed to 7 risk management books and over 140 published research papers.

## About Kamakura Corporation

Founded in 1990, Kamakura Corporation is a leading provider of risk management information, processing and software. Kamakura has been a provider of daily default probabilities and default correlations for listed companies since November, 2002. Kamakura launched its collateralized debt obligation (CDO) pricing service KRIS-CDO in April 2007. Kamakura is also the first company in the world to develop and install a fully integrated enterprise risk management system that analyzes credit risk, market risk, asset and liability management, transfer pricing, and capital allocation. Kamakura has served more than 185 clients ranging in size from \$3 billion in assets to \$1.6 trillion in assets. Kamakura's risk management products are currently used in 27 countries.

Kamakura has world-wide distribution alliances with Fiserv ([www.fiserv.com](http://www.fiserv.com)), Unisys ([www.unisys.com](http://www.unisys.com)), and Zylog Systems ([www.zylog.co.in](http://www.zylog.co.in)) making Kamakura products available in almost every major city around the globe.

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