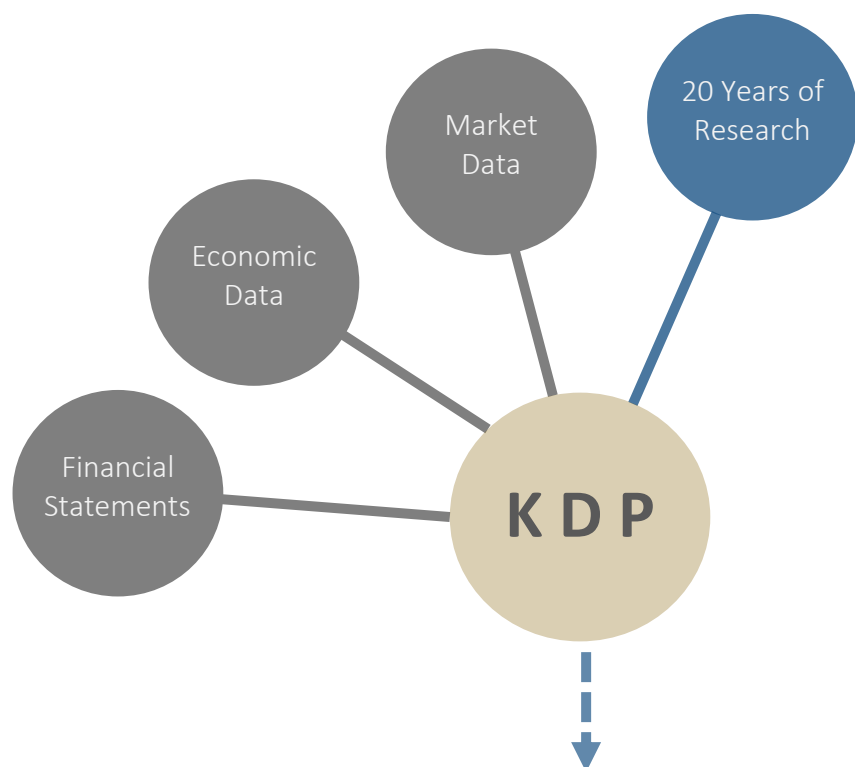


# K R I S

## Unparalleled Accuracy in Default Risk

IFRS 9 Modelling | IRB Modelling | Active Portfolio Management

# K D P Kamakura Default Probability



## Regulatory Benchmark

Preferred benchmark solution for PD models of the leading regulators in the American and European Financial Markets

## Active Risk Management

Highly reactive and accurate default risk assessment for large banking, insurance and asset management client base

## IFRS 9 & CECL Compliance

Flexible and advanced default risk modelling framework allows seamless integration in IFRS 9 frameworks

## K R I S Web Interface

### Corporate, Financial and Sovereign PDs

The Chava-Jarrow PD model offers unrivalled accuracy in default risk estimation for

- Listed corporates
- Financial Institutions
- Sovereigns

A reliable private firm model is also available and can be tailored to the client's needs.

### Macro-Economic Conditioning

The Chava-Jarrow PD relies on full integration of statistically significant macroeconomic data.

Forward looking macro-economic conditioning, as required by IFRS 9 or stress testing regimes is thus a native feature of the PD model and can be performed in K R I S.

### Powerful Portfolio Management

The K R I S (Kamakura Risk Information Service) Credit Portfolio management add-on provides the ability to evaluate the market value and the loss distribution for individual portfolios and portfolio tranches.

### Detailed Statistics and Benchmarks

K R I S provides a wealth of data and graphs on issue level, single name or portfolio default risk term structures, correlations, spreads, ratings and market implied or benchmark implied ratings that can be tailored to user requirements

## Taking Default Risk Modelling One Step Further

### Chava-Jarrow Reduced Form Model

Using a sophisticated combination of financial ratios, market data, and macro-economic factors. Covering data from 1990 to 2014. Default probabilities based on 2.2 million observations and more than 2,700 defaults.

### Merton Model

Popular model using stock market and financial statement data in a structural option pricing style framework. K R I S employs significant model enhancements to produce far superior results than the original Merton approach.

### Chava-Jarrow Merton Model

Combining the reduced form model with the Merton default probability as an incremental explanatory variable. Close in accuracy to the superior Chava-Jarrow model.

### Sovereign Model

Daily PD for almost every country worldwide. Logistic regression techniques from a number of refined factors are used to produce a model sensitive to changes in macro-economic circumstances and default history.

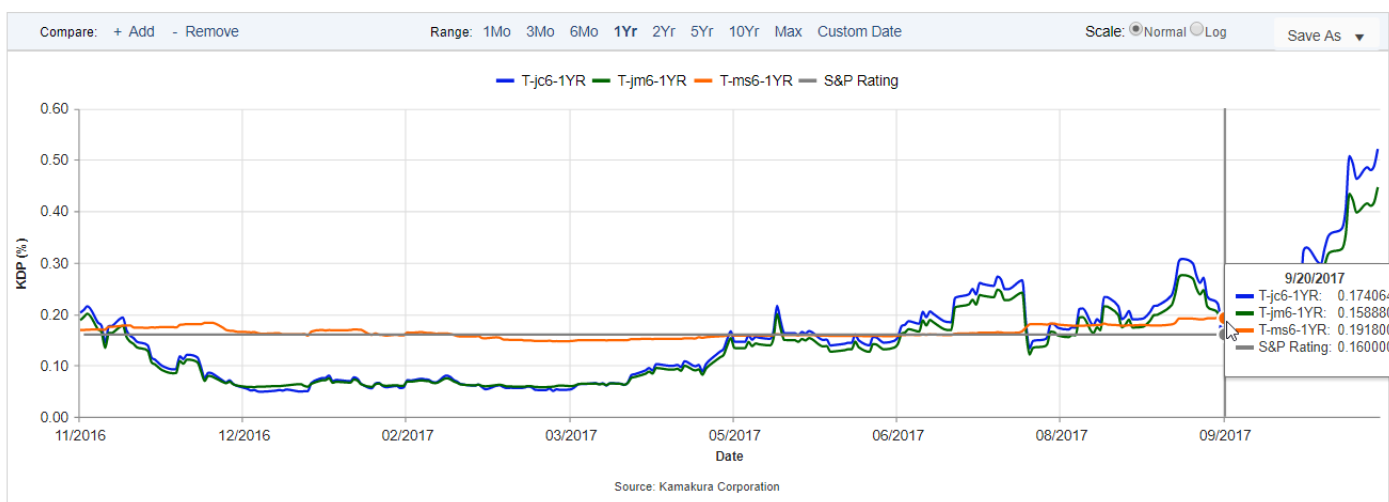
### Non-Public Firm Model

The Non-public firm model uses similar logistic regression techniques to the Chava-Jarrow model. Based on 1,000,000+ private companies with more than 10,000,000 observations and 49,000 defaults.

### Implied Ratings Model

Provides the ability to imply the correct rating of each counterparty given the rating history of all counterparties in the dataset. This can often show some disparity with the actual rating.

Model	KDP (%)	1 Day Change	1 Month Change	3 Month Change	6 Month Change	1 Year Change
KDP-jc6	0.52	+0.03	+0.37	+0.34	+0.39	+0.32
KDP-jm6	0.45	+0.03	+0.31	+0.28	+0.33	+0.26
KDP-ms6	0.23	0.00	+0.04	+0.05	+0.07	+0.06



## A Wealth of Information at Your Fingertips

### Single Name Risk Data

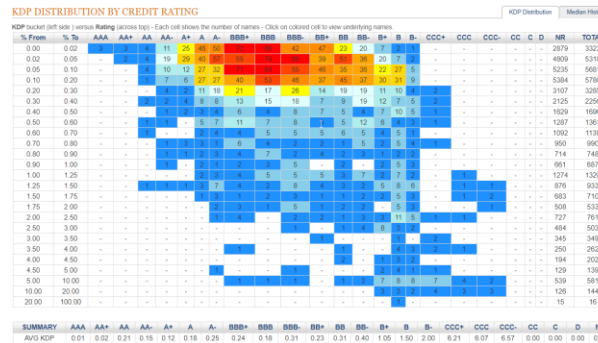
- Daily data for 38,000+ publicly companies
- Information on 2,700+ defaulted, merged or acquired companies.
- KDP history provided going back to 1990
- Full 10-year KDP term structure
- Current and stressed KDPs
- Macro Factor Sensitivities
- Company fundamentals implied rating

### Portfolio Risk Data

- Percentile based benchmarks vs country, regional and sector default risk patterns
- Pairwise default correlations
- Rating vs KDP bucket heat map
- KDP changes notification service
- Implied CDS spreads

### Market Data

- Bond arbitrage opportunity identification based on data for 7 million issues
- Bond volumes, prices, spreads and spread term structure
- CDS spreads and volumes
- Daily KDPs of Credit Indices such as iTraxx
- Troubled Company Index
- Historic rating implied KDP mapping



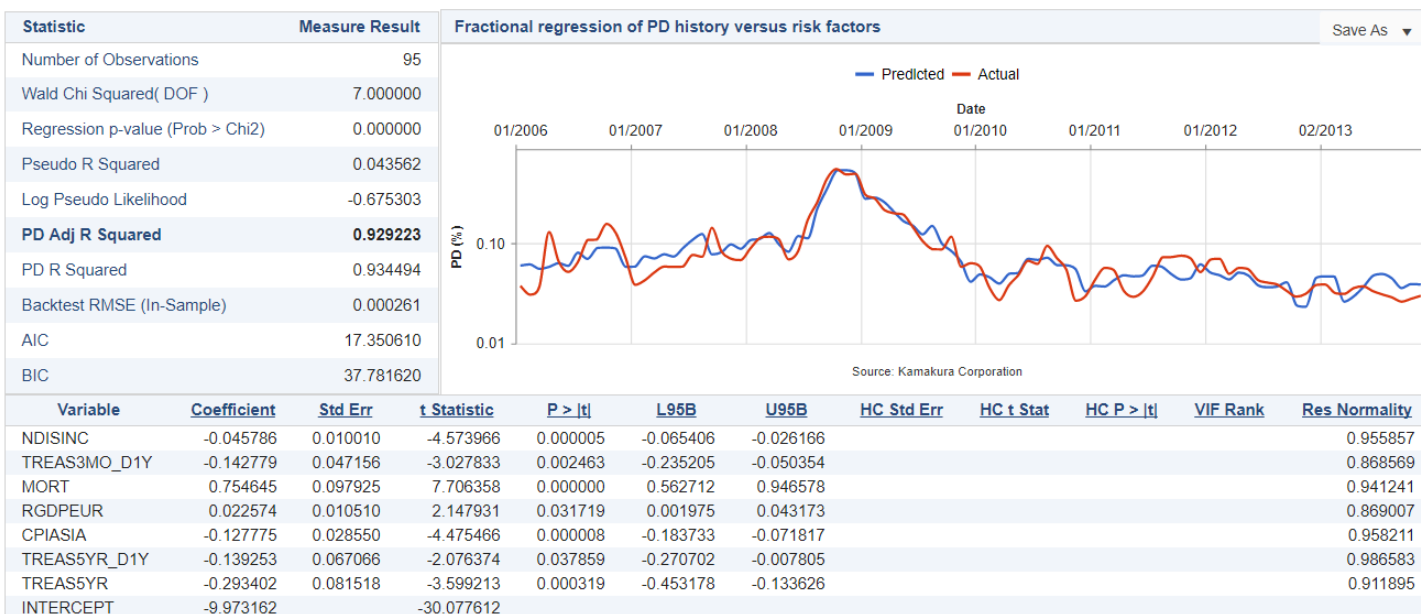
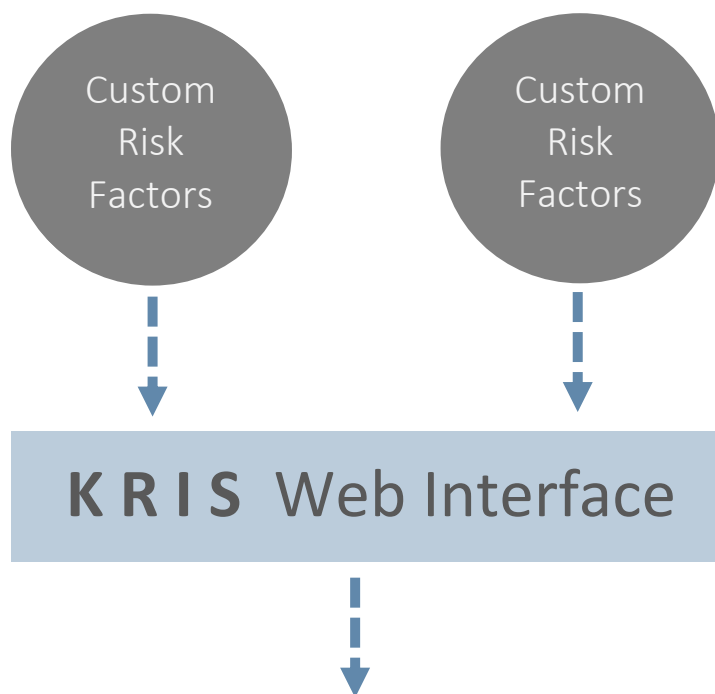
Filter by	Seniority	ALL	Restructure	ALL	Currency	ALL	
Ticker	Country	Entity	Seniority	Restructure	Currency	Bid	Offer
ANZ	AUS	Australia & New Zealand Banking Group Limited	Senior	MR	USD	0.4027	0.5064
CSCO	USA	Cisco Systems Inc	Senior	XR	USD	0.2556	0.3059
C	USA	Citigroup Inc	Senior	MR	USD	0.4410	0.4807
CBA	AUS	Commonwealth Bank of Australia	Senior	MR	USD	0.5057	0.5303
CBA	AUS	Commonwealth Bank of Australia	Subordinated	MR	USD	0.8700	0.9533
CDS	SGP	DBS Bank Ltd	Subordinated	CR	USD	0.8179	0.7179
GE	USA	General Electric Company	Senior	XR	USD	0.4549	0.5048
GA110	KOR	Industrial Bank of Korea	Senior	CR	USD	0.6917	0.7874
IBM	USA	International Business Machines Corp	Senior	XR	USD	0.2750	0.3200
KOBEFG	KOR	Kookmin Bank	Senior	CR	USD	0.7884	0.8885
MBSL	AUS	Macquarie Bank Limited	Senior	MR	USD	0.9556	0.9303
MBSL	AUS	Macquarie Bank Limited	Subordinated	MR	USD	1.0398	1.1953
NAB	AUS	National Australia Bank Limited	Senior	MR	USD	0.4833	0.5000
CSB	SGP	Oversea-Chinese Banking Corp	Subordinated	CR	USD	0.6454	0.7454
SWE	SOV	Sweden	Senior	CR	USD	0.1317	0.1701
SWE	SOV	Sweden	Senior	CR03	USD	0.1117	0.1501
MBSL	AUS	Techem GmbH	Senior	MMR	EUR	1.0891	1.2055
UTI	SGP	United Overseas Bank Ltd	Subordinated	CR	USD	0.6479	0.7479
WBC	AUS	Westpac Banking Corporation	Senior	MR	USD	0.4833	0.5000



## IFRS 9 / CECL and Stress Testing Models Built with Ease

### IFRS 9 & CECL Compliance

K R I S includes a built-in PD modelling framework allowing for ad-hoc estimation of macro conditioned models based on various regression frameworks. All regression statistics are provided such that model performance can be assessed in a rigorous manner. Model functional form and coefficients can be exported.



# K R I S Kamakura Risk Information Service

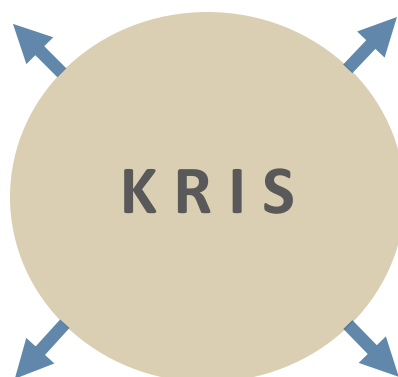
## Access and Connectivity

### K R I S Web Interface

Convenient web interface for ad-hoc risk analyses, setting up portfolios and alerts, exporting graphs and data, building PD model and stress testing

### K R I S Data Service

Customizable data service for daily delivery or collection of updated risk data for the client's portfolio or the entire data set.



### K R M Web Interface

Web interface that allows K R I S and K R M (Kamakura Risk Manager) customers to perform portfolio level analyses such as Monte Carlo VaR, stress testing, portfolio valuation and CVA/XVA calculations from the K R I S web interface.

### K R M Data Interface

Data interface that allows K R I S and K R M customers use updated to data K R I S data in K R M for level analyses such as fully risk integrated VaR, stress testing, valuation, credit adjusted ALM and business planning.

The world's  
best performing  
quantitative  
credit modeling technology



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