Breakthrough Credit Analytical Technology
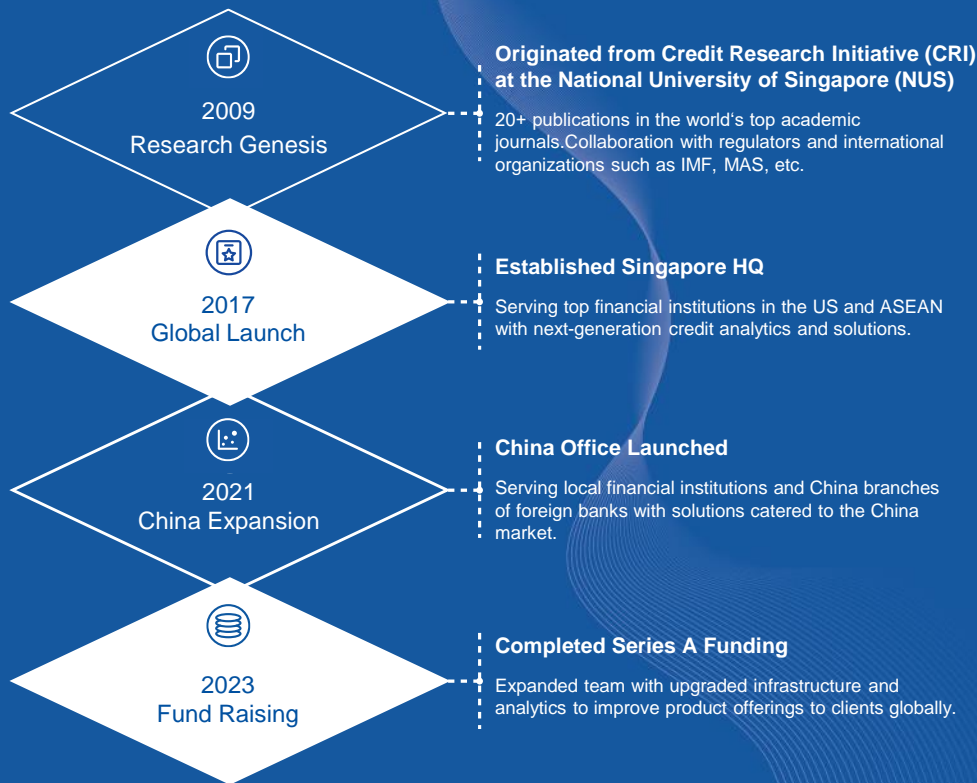
Revolutionize Risk & Investment Management

Criat

The world's leading provider of credit analytics and solutions

Company Brochure

Introduction

Criat is at the forefront of a revolutionary era in data-driven credit analytics. Harnessing the power of our cutting-edge analytical technologies, we deliver daily-updated, forward-looking credit assessments and valuations that empower financial institutions to proactively navigate and mitigate risks. Our use-case-driven applications extract invaluable insights and facilitate informed and strategic credit decisions. Stay ahead of the curve with Criat, where innovation meets subject-matter expertise in the realm of credit-risk analytics.

Risk Domain Expert

Specialists in Financial Econometrics

Analytics innovation using Big Data, AI and ML

2009 Research Genesis

Originated from Credit Research Initiative (CRI) at the National University of Singapore (NUS)

20+ publications in the world's top academic journals.Collaboration with regulators and international organizations such as IMF, MAS, etc.

2017 Global Launch

Established Singapore HQ

Serving top financial institutions in the US and ASEAN with next-generation credit analytics and solutions.

2021 China Expansion

China Office Launched

Serving local financial institutions and China branches of foreign banks with solutions catered to the China market.

2023 Fund Raising

Completed Series A Funding

Expanded team with upgraded infrastructure and analytics to improve product offerings to clients globally.

Founders & Core Team

Long-term commitment to create economic and social value through innovation in deep credit analytics

Prof DUAN Jin-Chuan   Co-founder & Chairman

Pioneer in New-Age Credit Analytics
- Founder & ex-Project Lead of NUS-CRI
- Former Head of NUS Risk Management Institute (2007-2014)
- IACPM Advisor Council Member

Thought Leader in Fintech
- Executive Director, Asian Institute of Digital Finance (founded by MAS, NRF and NUS) (2021-2023)

Globally-recognized Scientific Authority
- Emeritus Professor of NUS Business School
- Fellow of the Society for Financial Econometrics
- World's TOP 2% Scientist by Stanford

The core team members come from a diverse range of global leading financial institutions and universities

MOODY'S · VISA · 招商银行 CHINA MERCHANTS BANK
S&P Global · Win.d · 兴业银行 INDUSTRIAL BANK CO.,LTD.
Bloomberg · NUS National University of Singapore · 浦发银行 SPD BANK

Dr MIAO Weimin   Co-founder & CEO

Seasoned Credit Analysis Specialist
- Former Senior Research Fellow at NUS
- Visiting Scholar at the International Monetary Fund
- Bachelor from PKU, Master's from CAS, PhD from NUS

Team Leader with Proven Track Record
- Former Operation Lead of NUS-CRI, Led a team of 40+ staff
- Oversee collaborations with IMF, World Bank, etc.

CNA Casting: Innovating for the Future S1E6: Finance, 8 Jun 2022

Keynote Speech at World Bank CRO Risk Forum 2019

Deep Credit Analytics

Deep in Technology, Deep in Application

Move the Credit Frontier Forward

Criat provides forward-looking, accurate and timely **credit assessments** and **valuations.** These include **default prediction, risk pricing, stress testing,** and **portfolio analysis**.

Technology

Application

Extracting Insights to Meet Decision-making Needs

Criat provides workflow-driven dynamic reports, tools and services to facilitate **risk early warning, portfolio monitoring** and **market surveillance**.

Solving the "Too much information, Too little intelligence" challenge

Global comprehensive and curated data

Proprietary analytics technology

Next–gen credit assessment and valuation

&

Innovative credit analytical tools and reports

Signals and insights for faster and smarter decision-making

Big Data

Smart Data

Actionable Data

Criat

Beyond Credit Analytics

Wider Application, Broader Coverage

Deeper Analytics

- Scenario Analysis
- Pricing & Valuation
- Default Correlation
- Asset Allocation
- Default Prediction
- **Wider Application**
- Early Warning
- News Sentiment
- Portfolio Monitoring
- China Bond Issuer
- Global Public Firms
- Credit Assessment
- ASEAN Bond Issuer
- **Broader Coverage**

SME Credit

Singapore's 1st SME Credit Analytics Consortium supported by MAS

Green Credit

Asia's 1st digital service of green credential of agriculture sector under MAS Greenprint

NUS — Asian Institute of Digital Finance — MUFG

CriAT — iAPPS — FundON

"GreenON" is Asia's first digital service that lists green credentials of agri-producers under development

Platform to enhance transparency of sustainability reporting and support Singapore's development as regional sustainability hub

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Federated Learning

World's 1st Credit Analytics Sharing System that realizes calibration of large-scale credit models over multiple privacy-protected distributed data sites.

Global Clients/Partners

Criat serves top-tier financial institutions (incl. banks, insurance, asset management firms etc.) and provides them with forward-looking credit measures, models, analytical tools, and market-driven insights. This helps them embrace new technologies and improve their risk and investment capabilities.


Southeast Asia

ADB ASIAN DEVELOPMENT BANK

DBS

eastspring investments

MAS Monetary Authority of Singapore

SGX

China

招商银行 CHINA MERCHANTS BANK

中国民生银行 CHINA MINSHENG BANKING CORP.,LTD.

浦发银行 SPD BANK

North America

International Monetary Fund

AIG

THE WORLD BANK

*Selected names displayed

Global Recognition and Cooperation

International Monetary Fund
Financial Sector Assessment Program (FSAP) stress testing since 2016
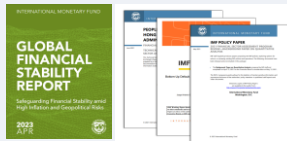
American Academy of Actuaries
Credit assessments for US and European insurance companies 2023

Monetary Authority of Singapore
Financial Stability Review corporate credit risk monitoring Since 2021

Abu Dhabi Global Market Academy
Leveraging AI to enhance the SME Ecosystem in the UAE 2022

Core Technical Advantages

Your Pain Points

Our Solutions

Data

- Inadequate coverage
- Laborious integration
- Poor comparability
- Tedious Cleaning

Broader

Coverage

- Full coverage of the global market, with 30-year history
- Cross-platform field matching and standardization
- Integration of multiple data sources
- Meticulous cleaning and stringent quality control

Model

- Credit events scarcity
- Lack of foresight
- No forward-looking term structure
- Poor Interpretability

Cutting-edge

Model

- Incorporate bond and equity market information
- Proprietary model with high accuracy
- Dynamic modeling produces a forward PD term structure of 1-60 months
- Factor transparency provides clear Intelligibility

Application

- Incomplete monitoring
- Untimely alerts
- Contradictory signals
- Tough decision-making

Efficient

Workflow

- Full-market/full-exposure visual monitoring
- Timely early warning to mitigate losses
- One-stop in-depth analysis make investigations easier
- Actionable signals aid decision-making processes

Forward Intensity Model – Our building blocks

The Forward Intensity Model was developed by Criat co-founder Prof Duan Jin-Chuan and was published in Journal of Econometrics in 2012. It has been used by NUS-CRI for PD production to serve global clients for more than 10+ years.
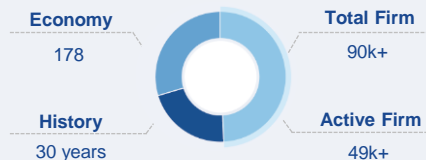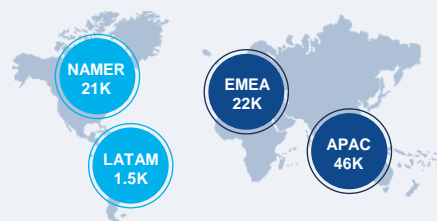
The Forward Intensity Model forms the building blocks of all the products at Criat. In essence, it depicts a firm's default as the First Jump of a Double Stochastic Poisson Process. The likelihood of the "jump" is established by measuring the relationship between economic, capital market and corporate credit-related variables, and the occurrence of future default events. This allows us to publish a term-structure of future default probabilities at different horizons.

Intensity stands for default intensity, i.e., the default probability of a unit time.

Forward means the prediction of a firm's default intensity over a future period is based on its current risk profile.

Thriving at the forefront of scientific progress

1st Generation -- Discriminant Model
Altman (1968)
Z-score model

2nd Generation -- Binary Response Model
Ohlson (1980)   Zmijewski (1984)   Campbell (2008)
Logit (O-score)   Probit   Multi-period Logit

3rd Generation -- Intensity Model
Shumway (2001)   Duffie et al. (2007)   **Duan et al. (2012)**
Discrete duration   Intensity model   **Forward intensity**

Forecast credit quality at different future time points

Predict credit quality of different horizon

Learning
Learn from big data of firms' historical credit information such as defaults, macros, FS, prices, etc.

Build
Build a sophisticated mapping from a firm's current risk profile to its future default dynamics.

Produce
Produce a forward-looking point-in-time default prediction over multiple periods (i.e., PD term structure).

Criat

Flagship Product *iRAP*

Coverage

Economy 178	**Total Firm** 90k+
History 30 years	**Active Firm** 49k+

Global Coverage

- NAMER 21K
- LATAM 1.5K
- EMEA 22K
- APAC 46K

China Coverage

Corporate + Financial + LGFV

	Corporate	Financial	LGFV
Onshore issuer	5,100+	1,000+	3,900+
Offshore issuer	710+	160+	450+

Key Features

User-Specified Portfolio Split

- ➢ Sector
- ➢ Entity
- ➢ Watchlist

Flexi Credit Models

- ➢ Model Factors: Macro + FS + Stock market + Bond market information
- ➢ 15 global and China models
- ➢ Dynamic back-testing
- ➢ User tuning allowed

Operation Management

- ➢ Cross-team collaboration
- ➢ Permission management

Comprehensive Assessment

- ➢ PD term structure
- ➢ PD implied rating
- ➢ Historical series
- ➢ Peer rankings
- ➢ Benchmarking
- ➢ Top movers
- ➢ Early Warning Signal

In-depth Analysis

- ➢ Risk attribution
- ➢ Trend breakdown
- ➢ Factor time series
- ➢ Data traceability
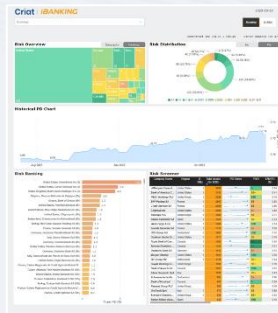- ➢ Peer comparison
- ➢ Sensitivity analysis

Our Solutions at a Glance

Global market Surveillance

Covering 178 economies, more than 30 industries, and 90,000+ firms

Intelligent early warning signals

Provides risk warning signals based on risk level, peer position, and momentum

Bond selection

Discover high-yield, low-risk corporate bonds based on user-specified criterion

Insights

Credit insights and research on trending topics to facilitate credit decisions and idea-generation

Corporate Credit Early Warning

Financial Counterparty Risk Monitoring

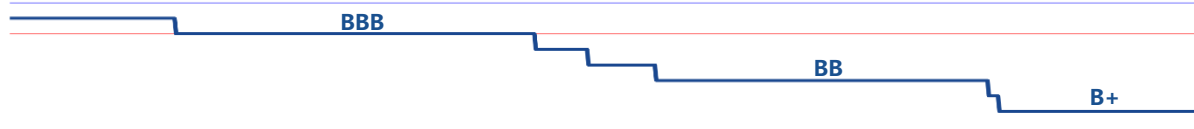## Forward-looking and Timely Update Provide Effective Early Warning

Criat PD suggests the credit risk of SVB has been on the rise since the beginning of 2021. According to the **PD-derived early warning signal**, SVB entered into the yellow zone in the second half of 2021 and gradually moved into the orange and red zone in 2022.

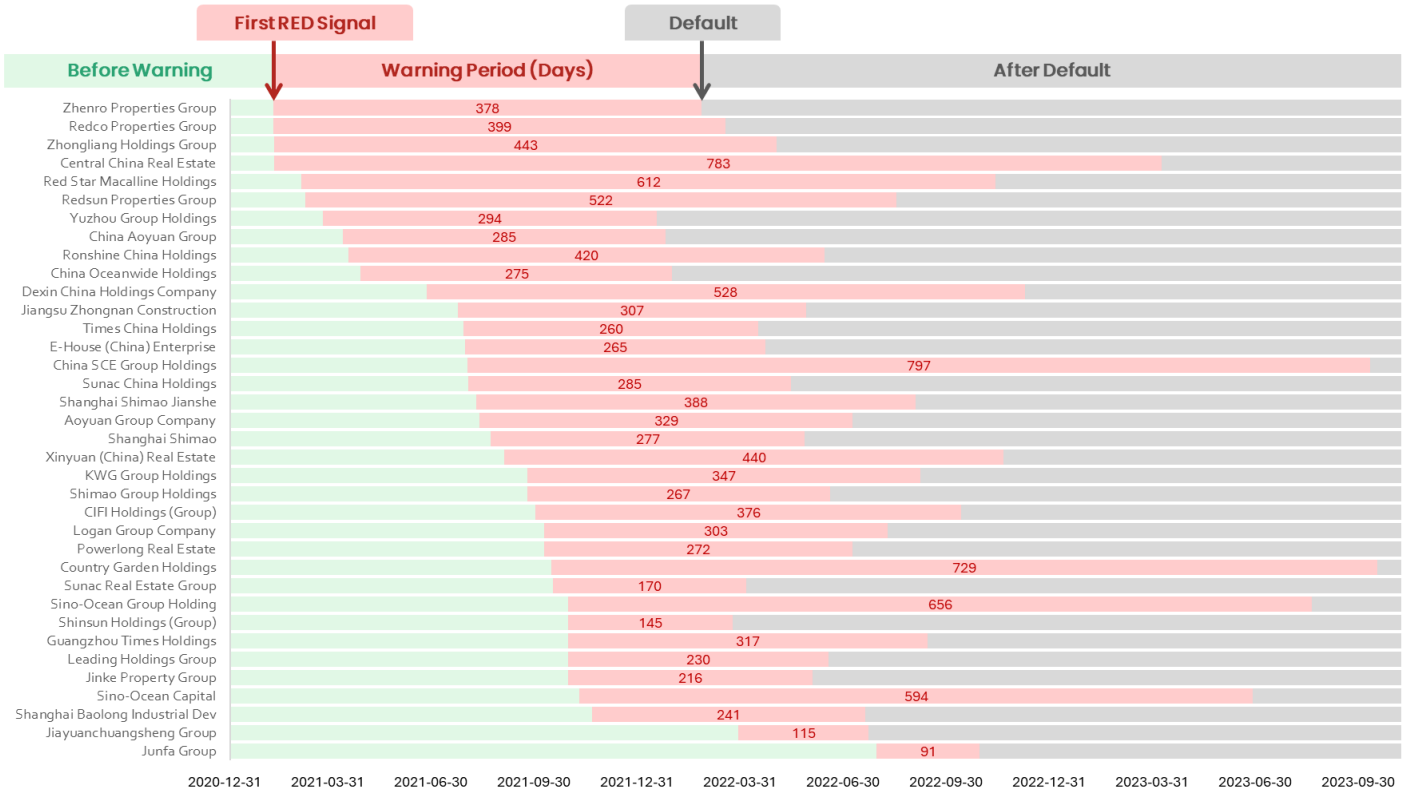**svb > Silicon Valley Bank**

Defaulted on 2023-03-10

SVB Share price

SVB 1-year PD

10.0%
5.0%
2.5%
0.4%

700
600
500
400
300
200
100
0

Jan Apr Jul Oct Jan Apr Jul Oct Jan

BBB

BB

B+

Moody's INVESTORS SERVICE
S&P Global
Criat

Criat PD implied rating (PDiR) suggest that SVB's credit rating deteriorated from the beginning of 2022, from investment-grade BBB to speculative-grade B+ at the end of the year. However, during the same period, the ratings of S&P and Moody's remained unchanged at BBB.

High-profile Default Cases and Early Warning Performance

	First RED Signal	Default	
Before Warning	**Warning Period (Days)**		**After Default**

Company	Warning Period (Days)
Zhenro Properties Group	378
Redco Properties Group	399
Zhongliang Holdings Group	443
Central China Real Estate	783
Red Star Macalline Holdings	612
Redsun Properties Group	522
Yuzhou Group Holdings	294
China Aoyuan Group	285
Ronshine China Holdings	420
China Oceanwide Holdings	275
Dexin China Holdings Company	528
Jiangsu Zhongnan Construction	307
Times China Holdings	260
E-House (China) Enterprise	265
China SCE Group Holdings	797
Sunac China Holdings	285
Shanghai Shimao Jianshe	388
Aoyuan Group Company	329
Shanghai Shimao	277
Xinyuan (China) Real Estate	440
KWG Group Holdings	347
Shimao Group Holdings	267
CIFI Holdings (Group)	376
Logan Group Company	303
Powerlong Real Estate	272
Country Garden Holdings	729
Sunac Real Estate Group	170
Sino-Ocean Group Holding	656
Shinsun Holdings (Group)	145
Guangzhou Times Holdings	317
Leading Holdings Group	230
Jinke Property Group	216
Sino-Ocean Capital	594
Shanghai Baolong Industrial Dev	241
Jiayuanchuangsheng Group	115
Junfa Group	91

2020-12-31 | 2021-03-31 | 2021-06-30 | 2021-09-30 | 2021-12-31 | 2022-03-31 | 2022-06-30 | 2022-09-30 | 2022-12-31 | 2023-03-31 | 2023-06-30 | 2023-09-30

Collaborations

CASE   A Multilateral Development Bank

Business Challenges

Our client relied on analysts' opinion to assess counterparty credit risk prior to approaching Criat. Their analysts examine financial statements, external ratings, and capital market performance to arrive at a comprehensive assessment, but face the following challenges:

- Multi-dimensional qualitative and quantitative considerations are difficult to aggregate, making granular assessment and insights even more difficult to procure.
- In fast-changing financial environment, past trends in credit/counterparty assessment do not guarantee forward-looking accuracy in risk prediction.
- Discontinuous and incomplete coverage makes it difficult to do an apple-to-apple comparison between entities and across history. This problem is further accentuated due to difficulty in interpreting the impact of idiosyncratic capital market fluctuations on credit risk.

Our Solution

- Provides forward-looking risk measure for global financial institutions as an important metric for cross-validation.
- Our quantitative model calibrated using historical defaults provides a high-precision default probability prediction between 0 -100.00%, which is comparable and rank-able across different histories and entities.
- The model is dynamically calibrated and adapts to the rapidly changing macro and policy environment in a timely manner . The model also quantifies the impact of capital market dynamics to provide early warnings pertaining to an uptick in credit risk, with model outputs updated on a daily basis.

CASE   An American Multinational Insurance Corporation

Business Challenges

- In bond investment risk management, the original tool uses outdated methodology and few risk factor dimension. It delivers poor early warning performance, which led to investment losses during the 2015-2016 oil and gas crisis.

Our Solution

- Our methodology is more advanced and delivers better prediction results. Our model incorporates more risk factors, coupled with a dynamic structure that makes the PD term structure more accurate.
- Criat has the core capability to build customized model that utilize institutions' internal data. The tailor-made risk models take into account the client's market understanding and investment expertise.
- Criat empowers client the ability to fine-tune and recalibrate the models to give complete autonomy to model output.

Value

- Our model is robust and performs well even during times of stress. It has helped our clients discover risks pertaining to Credit Suisse 7 months in advance to avoid losses. Having a dedicated team to service client requests and provide timely insights make transition from traditional vendor easier.
- Further value-add services such as portfolio monitoring dashboard and daily email alert improve work efficiency and aid in proactive risk management.

CASE   One of the Largest Retail Bank in Indonesia

Business Challenges

- Lack of capability to accurately assess the credit risk profile of their lending portfolio and generate actionable warning signal on risky names.
- Unable to conduct sensitivity analysis makes understanding corporate distress and default dynamics in their loan book difficult, especially when lending to a segment that is exposed to similar exogenous shocks
- Sourcing from other data vendors did not provide the coverage, the expertise and the accuracy they require.

Our Solution

- Criat built customized default prediction models using the bank's internal data, which provide accurate risk assessment and daily-updated early warning signal. Criat helped in building the entire infrastructure including data pipeline, risk factor construction and PD calculation engine.
- Built an on-site platform for comprehensive credit analysis which helps client interpret the highly-granular PD and its movement. The bank has complete ownership and management on the platform. The credit measures generated are also used for a plethora of analysis, including stress-testing and portfolio-specific risk ranking.

Value

- Criat is able to holistically cater to our clients' needs and requirements to build a custom risk model. We have strong capability to deploy analytics and platform on premise and help to integrate with banks' internal system so that they have our complete solution on their fingertips. We are also present to provide any hands-on training on model and platform usage, in an effort to best address their pain points in day-to-day work.

CASE   A Leading Joint-stock Bank in China

Business Challenges

- Risk warning on bond investment relies on internal ratings, which are updated infrequently and lag behind market movements. Our client attempted to use bond price as warning signals, but it turned out to be too volatile and noisy. Consolidation of multiple, sometimes conflicting, signals is a difficult task.
- Our client also struggled with incomplete coverage on risk exposure, lacking data for Chinese dollar bonds issuers.
- Scattered information across multiple sources make manual integration a time-consuming and error-prone task. There is a lack of automated process.

Our Solution

- High-frequency market information is combined with traditional financial statement to form a comprehensive risk factor set used to produce accurate and forward-looking default predictions. Incorporating characteristics of Chinese issuers, we built industrial, financial and LGFV risk models, and introduced special factors based on experts' opinions to enhance the prediction accuracy.
- Full coverage for domestic and foreign bond issuers.
- On-premise system development to enable automated and intelligent credit bond monitoring and early warning.

Value

- Currently, the system has been used in many departments in the banks, including Investment Banking, Private Banking, Counterparty Credit Risk, Wealth Management, and some domestic and foreign branches. The output data has been integrated into the risk monitoring system across multiple risk divisions, becoming a vital part of the bank's bond investment risk management practice.

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