Criat

intelligent Early Warning Signal (iEWS)

Product Brochure

Version 1.0

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Introduction

Criat's intelligent early warning solution (iEWS) is the **first of its kind** that centred its entire development process around **minimizing institutions' credit-related investment losses**. The iEWS is designed to provide effective early warning against not only defaults, but **a wider range of credit events** such of rating downgrade, and bond price plummet which usually happen a few months prior to defaults and impose significant investment losses.

At the very core of the iEWS is Criat's **forward-looking probability of default** (PD) measure, which provides accurate point-in-time credit assessment for over 78,000+ global listed firms and 10,000+ China bond issuers on a daily basis. In addition to the **PD level** which depict current default risk of an entity, the iEWS takes into account two auxiliary signals – the **relative position trigger** and **momentum trigger**. The position trigger measures the entity's relative riskiness within its sector and its vulnerability under sector deterioration whereas the momentum trigger measures the entity's recent risk trend and reflects its future possibility of credit deterioration.

The iEWS synthesizes the PD level, relative position and momentum trigger into one **actionable signal in 4-color scheme** (green, yellow, amber, and red) to provide **effective warning for credit deterioration**. All triggering thresholds are determined through rigorous calibration process to optimize early warning power while minimizing false alarms. Nevertheless, the decision rules are customizable to accommodate clients' risk appetites.

On top of the highly effective early warning signal, the iEWS features an **insightful and workflow-driven user interface (UI)** and **daily email alert services**. The interactive user interface allows users to **visualize and monitor their portfolio risk** and keep up with the changing credit profile of their exposures effortlessly. Moreover, the dashboard UI is seamlessly linked to Criat's flagship credit analysis platform – iRAP, which provides **in-depth credit analysis** at entity level. The daily email alert further **streamline daily workflow and boost productivity**.

In summary, Criat iEWS provides accurate, timely and actionable signals for credit deterioration, so that appropriate actions can be taken beforehand to mitigate potential losses. The workflow-driven UI and daily email alert facilitate risk identification and monitoring, and offer complete transparency to empower decision-making. The purpose is to help banks, insurance company, asset managers, corporates, and government agencies staying ahead of credit risk and making informed investment decisions during credit downturns.

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Key features

Global Coverage & Full History

70k+ global listed firms spanning 133 economies. History since 1990.

10k+ Chinese bond issuers since 2010.

Wide Range of Credit Events

Effective warning against a wide range of credit events including defaults, rating downgrades, and bond price plummets.

Accurate, Timely and Actionable Signals

Primary signal based on highly accurate forward-looking PD.

Combine with relative position within industry and momentum trigger to form a warning signal in 4-color scheme with corresponding recommended actions.

Best-in-class Performance

98%+ success rate in predicting Chinese issuer defaults in 2021 & 2022.

Red flags appear 4 months ahead of price plummets, 5 months before downgrades, and 11 months before defaults.

Daily Update & Email Alerts

Daily updated signal for timely warning and intervention.

Daily email alerts to flag names needing immediate attention.

All-encompassing & Workflow-driven User Interface

Portfolio-based risk distribution and monitoring. Highlights of top movers and signal interpretation. Risk-vs-return chart for mispricing identification

Entity in-depth analyses with bond details and financial numbers

Wide Range of Credit Events

Criat iEWS provides effective early warning against the following 3 types of credit events.

Storm Events	Category	Definitions
Investors in capital market often suffer from credit deterioration of bond issuers. Criat defines these severe credit-related events as "**Storm Events**" and **iEWS** functioned as **barometer** to alert ahead.	Defaults	➢ Bankruptcy filings ➢ A missed or delayed payment of interest and/or principal ➢ Debt restructuring
	Downward Rating Moody's S&P Global Ratings FitchRatings	➢ **Downgrade:** Big3 rating drops to BB+ ➢ **Negative outlook:** rating < BB+ & outlook is negative / negative observation
	Price Plummet	➢ **Price Drop:** Bond valuation drops 10% in 10 trading days ➢ **Risky Price :** Price drop to 80 and below

Accurate, Timely and Actionable Signals

Criat iEWS combines 3 types of trigger into one actionable signal. The 3 triggers are (1) PD level trigger, which measures the entity's current default risk; (2) Position trigger, which measures the entity's relative risk within its sector and its vulnerability under sector deterioration; (3) Momentum trigger, which measures the entity's past risk trend and its possible future pattern.

Signal Interpretation	Trigger Type	Trigger Criteria	
Primary Signal Current default risk	PD Level Trigger	**Corporate firms** **Red** if PD > 10% **Amber** if PD > 5.0% **Yellow** if PD > 0.8% **Green** otherwise	**Financial firms** **Red** if PD > 5.0% **Amber** if PD > 2.5% **Yellow** if PD > 0.4% **Green** otherwise
Auxiliary Signals Possibility/vulnerability of future risk deterioration	Position Trigger	Triggered if PD > 90th percentile in its economy-sector peer group	
	Momentum Trigger	Triggered if PDiR downgraded >=3 notches within 3 months	

The warning signal uses PD level trigger as the primary signal, and will adjust to a more severe signal bucket if any of the Position or Momentum trigger is activated. The signal classification and corresponding recommended actions are demonstrated in the table below.

| Final iEWS Signal	Primary Signal - PD Level Trigger			
	Green	**Yellow**	**Amber**	**Red**
No Position or Momentum Trigger	Green	Yellow	Amber	Red
+ Position or Momentum Trigger	Green	Amber	Red	Red
+ Position and Momentum Trigger	Green	Red	Red	Red

Low Risk: no action needed

Moderate Risk: close monitoring

High Risk: thorough investigation and preparation of contingent plans

Extremely High Risk: immediate action to reduce exposure

## All-encompassing & Workflow-driven User Interface
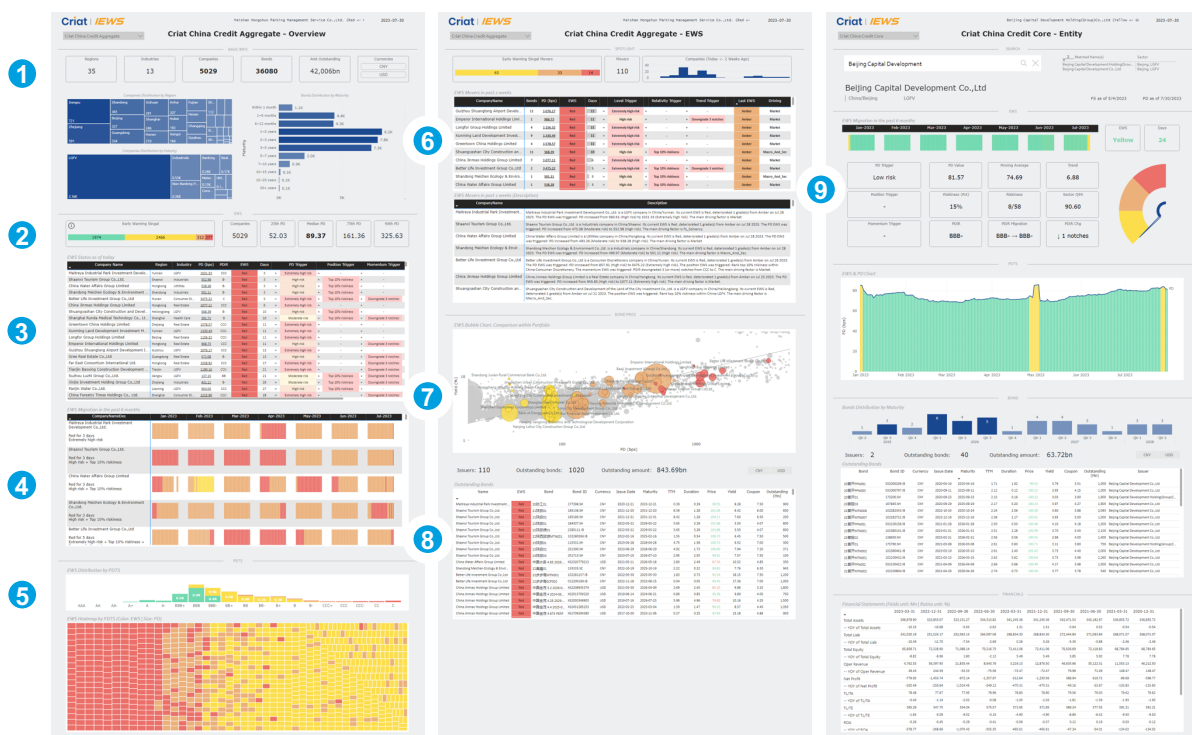
1. Overview of client portfolio including company/exposure distribution by region and by industry, and bond distribution by maturity.
2. Warning signal distribution and aggregate risk for the portfolio.
3. Entity-level EWS including current signals, lasting days and activated triggers.
4. Entity-level daily signal migration history over the past 6 months.
5. Portfolio-specific warning signal distribution grouped by PD implied rating (PDiR) and signal heatmap. It helps identify concentrations of exposures, such as excessive exposure to specific signal or rating.
6. List of top movers with deteriorating signals over the past 2 weeks. It helps to flag out entities with worsening credit profile and point out the direction for future investigation.
7. Risk-versus-return chart helps investors and risk managers spot mispricing and make informed decision when shifting/cutting exposures.
8. Detailed bond information for comparison and selection.
9. Entity in-depth analysis offer comprehensive information on early warning signals, financial numbers, bond information and maturity distribution, etc.

Performance

Exceptionally good performance on China market

We evaluate the performance of the warning signal on a mixed portfolio of our banking clients, which consists of 1500+ Chinese bond issuers. This is a representative portfolio with a good mixture of issuers from various industry and rating categories. From 2021 till today, 60% of the entities experienced some types of credit events after a red signal is observed, among which more than half suffered significant bond price drop before other events.

STORM EVENTS OBSERVED 0-12M AFTER RED SIGNAL
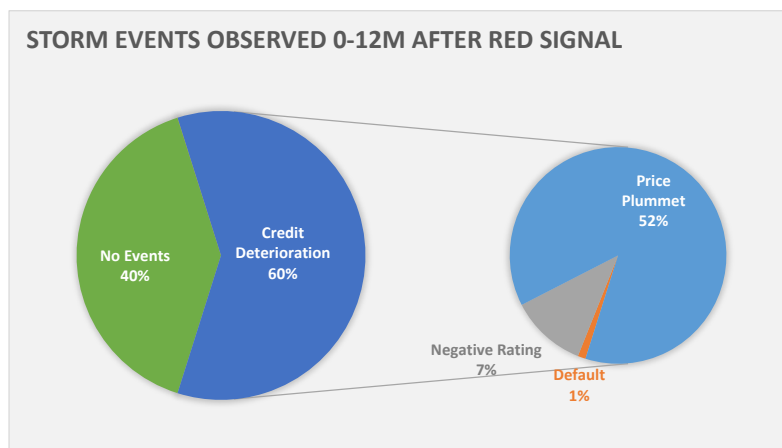
Red Signal Occurred

**132** days prior to price plummet

139 days prior to negative rating actions

315 days prior to defaults

Out of the 109 first defaults by Chines bond issuers in 2021-2022, Criat iEWS successfully flagged 98% of them with red signal prior to their defaults, with 90% flagged 3 months earlier, 80% 6 months earlier, and 56% 12 months earlier.

Best-in-class global performance

Criat iEWS strikes to optimize early warning power while minimizing false predictions, i.e. capture as many defaults as possible (higher recall) while minimizing type I (FPR: false alarm rate) and type II errors (FNR: miss rate). The chart below shows the statistical performance[1] of the iEWS signal on the full sample of global public firms from January 1991 to May 2023. In total, we cover 70,514 entities with 11,071,931 monthly observations.

Criat iEWS captures more defaults with lower positive signal rate
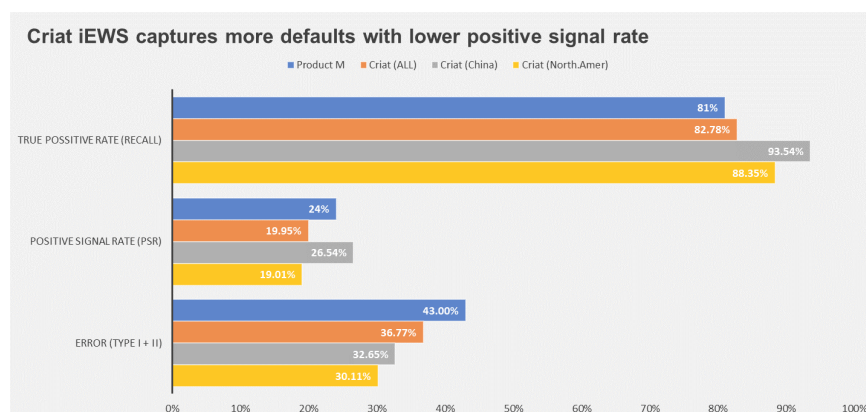
Compare with Product M from a prestigious rating agency, Criat iEWS

Captured more defaults with **less positive alarms** and **significantly lower error rate** (type I + type II).

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[1] More detailed performance evaluation and case studies available upon request.

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About Criat

We are a Singapore-based company providing Data-Driven Credit Analytics to banks, insurance companies, asset managers, etc. for risk and investment management globally.

Criat specializes in forward-looking credit assessment and valuation to enable smarter credit decisions. Our comprehensive suite of data, models, tools, dashboards and reports serve as a key differentiator to navigate financial institutions through the credit cycle downturn.

Criat spun off from the National University of Singapore. Our proprietary, new-generation credit analytics are backed by decade-long world-leading research and collaborations with top-tier financial institutions across the US and Asia.

Disclaimer

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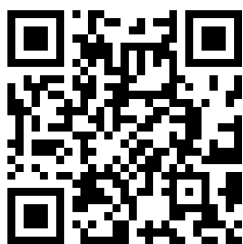
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