

A photograph of the Shanghai skyline at sunset, featuring the Oriental Pearl Tower and other skyscrapers. The sun is low on the horizon, creating a warm orange glow. The buildings are silhouetted against the sky. A blue horizontal band is overlaid across the middle of the image, containing the title text. The bottom of the image shows the reflection of the skyline in water.

Preparing for a Turn in the Chinese Credit Cycle

Glenn Levine, Associate Director
David Hamilton, Managing Director

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Speakers



Glenn Levine

Corporate Stress Testing
Model Lead, Credit Risk
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David Hamilton, PhD

Managing Director
Credit Risk Analytics, Asia-Pacific

Singapore

Agenda

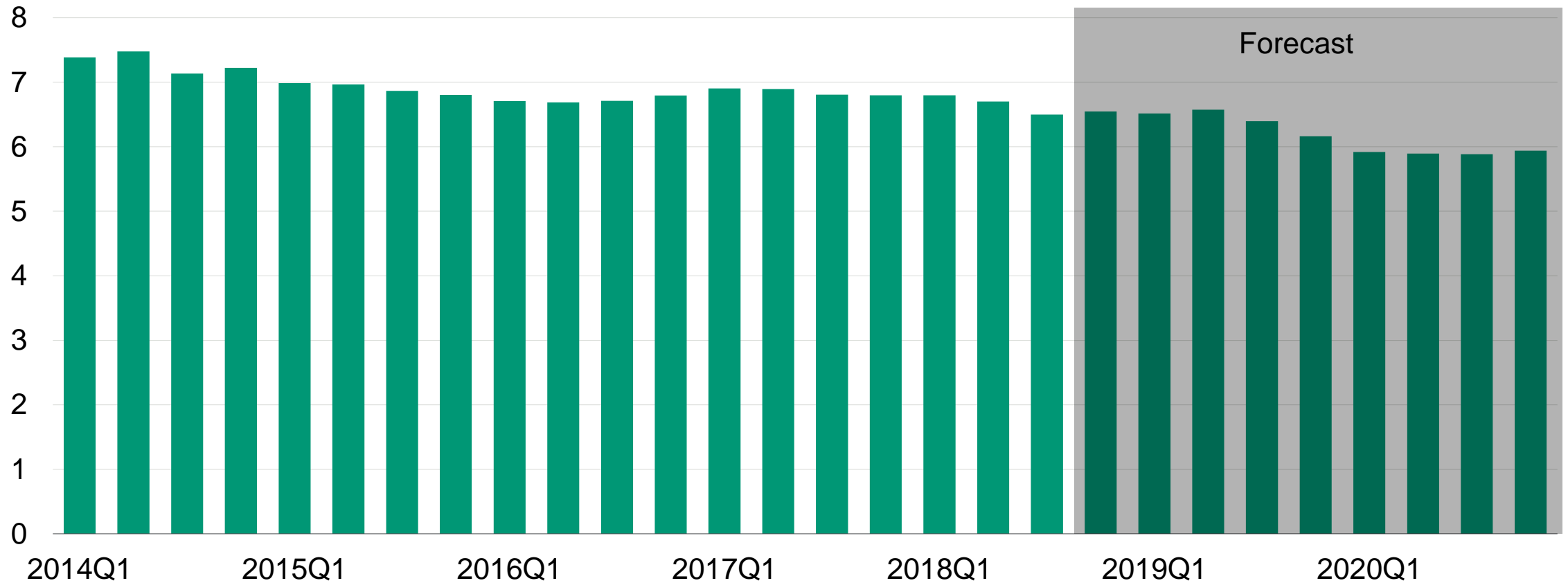
1. Recent performance and outlook for the Chinese economy
2. Using an equity-based model to analyze Chinese corporate credit risk
3. Early warning and monitoring strategies for corporate credit exposures
4. Stress testing your corporate loan book
5. Q&A

1

Recent performance and
outlook for the Chinese
economy

China's Economy Has Been Growing Strongly...

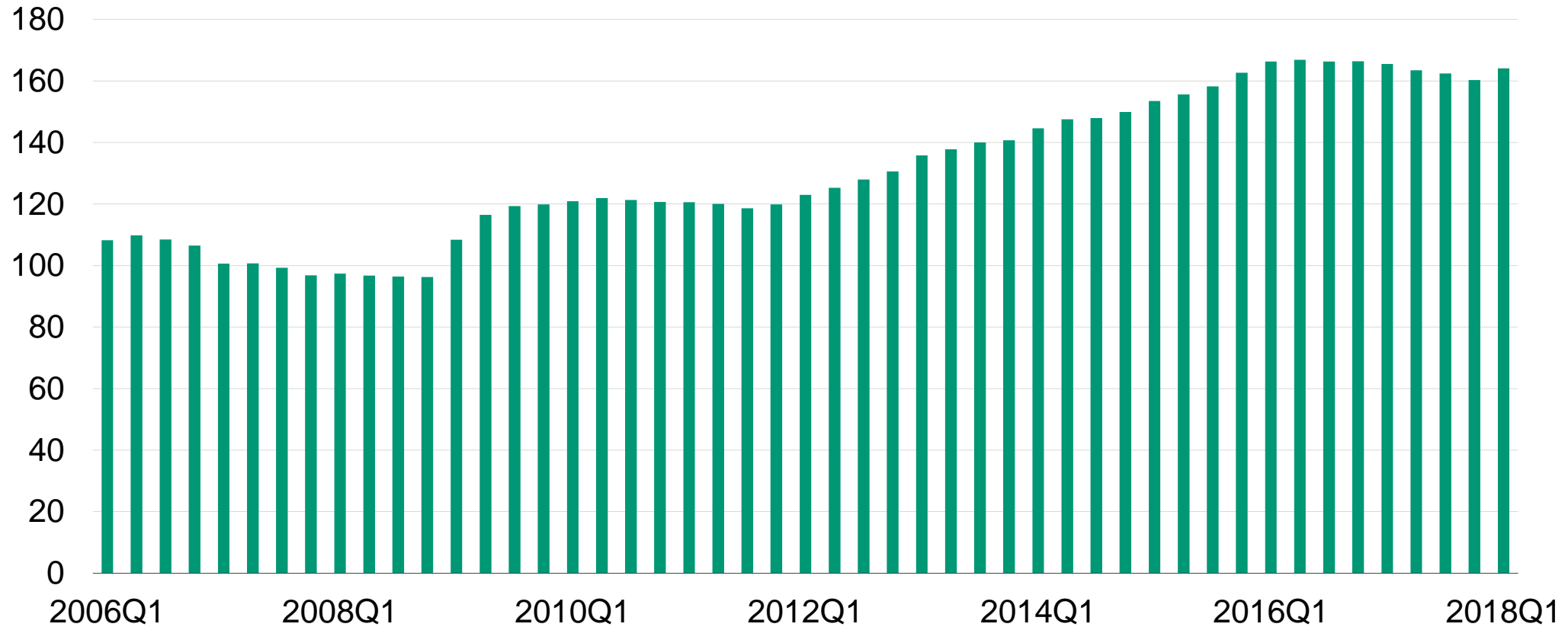
Chinese GDP growth, % year-over-year



Source: Moody's Analytics

...But This is Partly Due to Higher Leverage

Chinese lending to non-financial corporates, % of GDP



Source: Bank of International Settlements

Is China's High Corporate Leverage a Problem?

- » China's corporate debt ratio (160% of GDP) looks dangerous compared to the US (74%), Japan (99% currently; 150% in 1999), and its own recent history
- » But:
 - Most debt is in RMB (which removes currency risk)
 - The government has considerable control over lending and interest rates

“Canada, China, and Hong Kong SAR stand out, with both the credit-to-GDP gap and the DSR (debt service ratio) flashing red”,
Bank of International Settlements, March 2018 Quarterly Review

2

Using an equity-based model to analyze Chinese corporate credit risk

The EDF Model Can Signal Rising Risk Well Ahead of Eventual Default

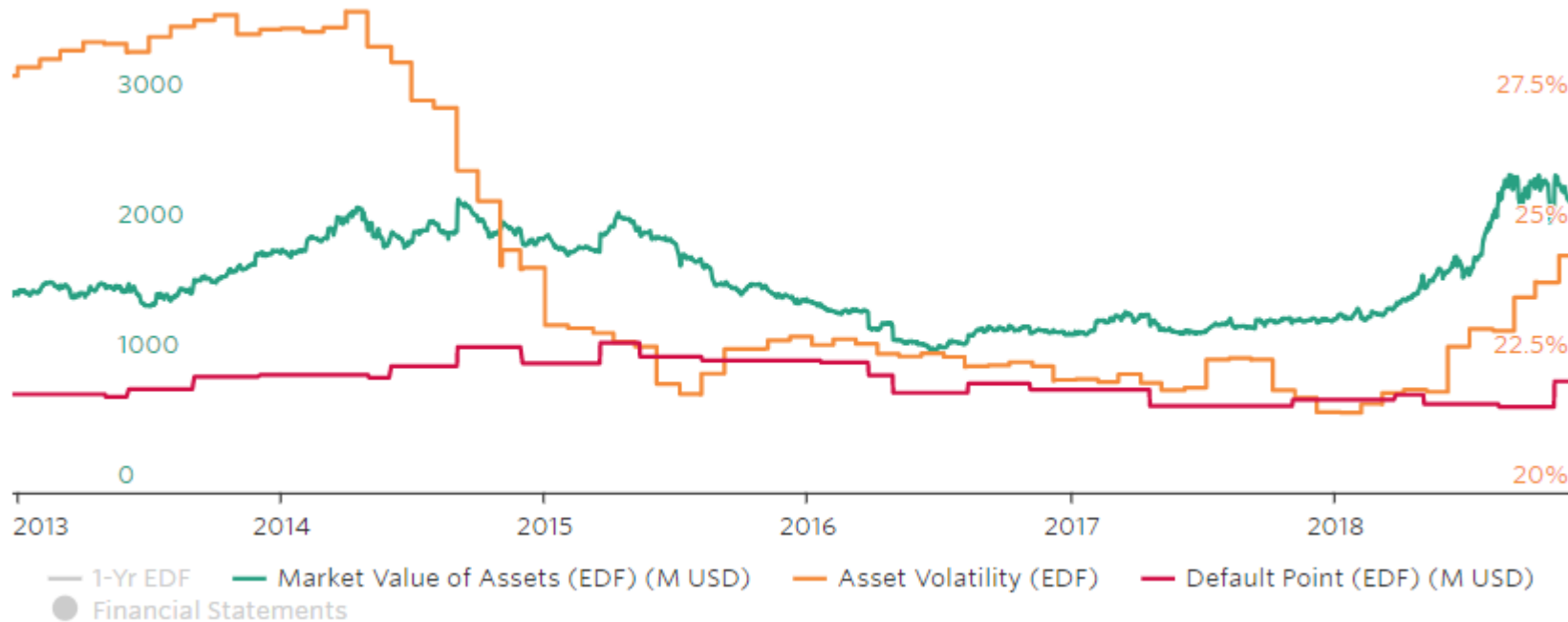
Fushun Special Steel, Expected Default Frequency (%)



Overview of Moody's Analytics' EDF model

ASIA CEMENT (CHINA) HOLDINGS CORPORATION

PID W44924 TICKER HKG - 743 TYPE CORP COUNTRY CHINA INDUSTRY CONSTRUCTION MATERIALS



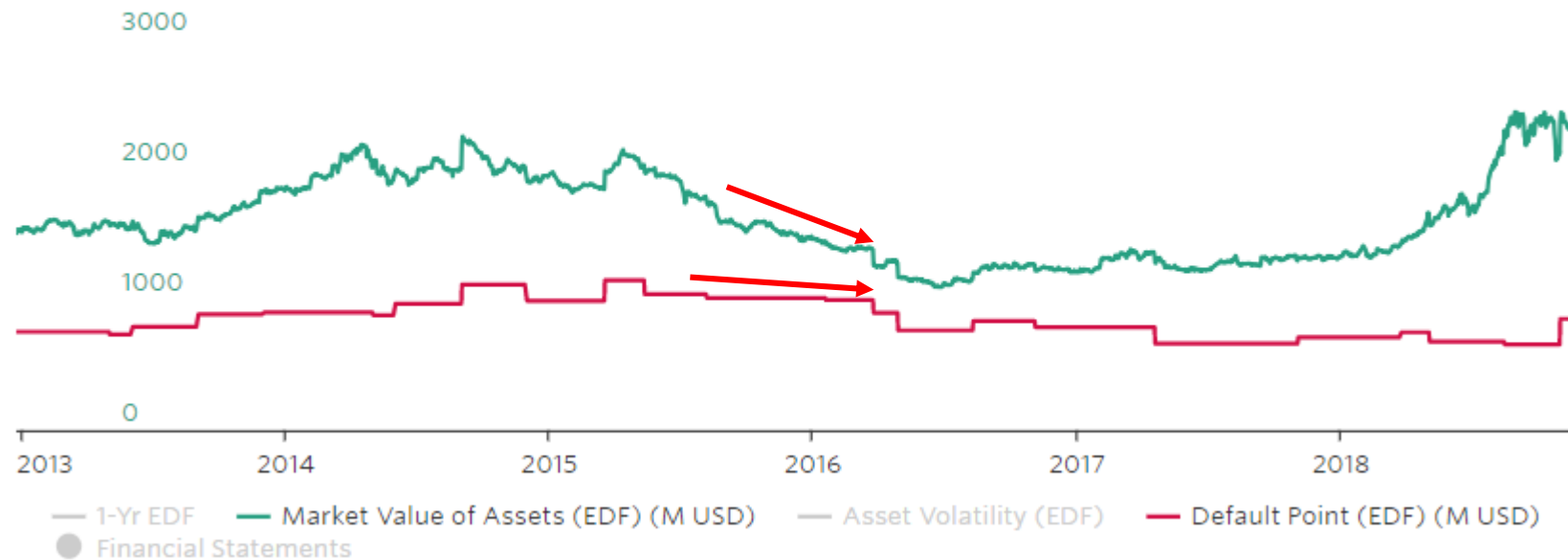
$$DD \approx \frac{\ln\left(\frac{A}{X}\right)}{\sigma_A}$$

DD = distance-to-default
 A = market value of assets
 X = default point
 σ_A = asset volatility

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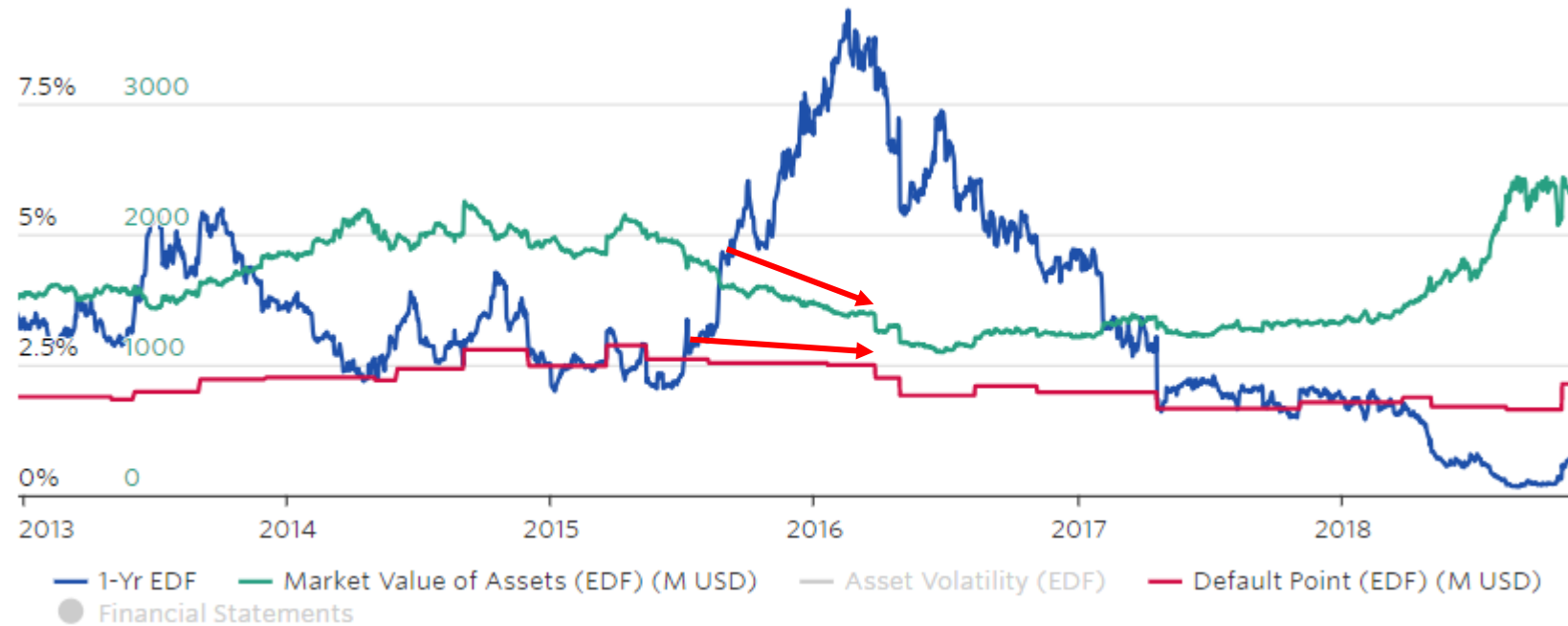
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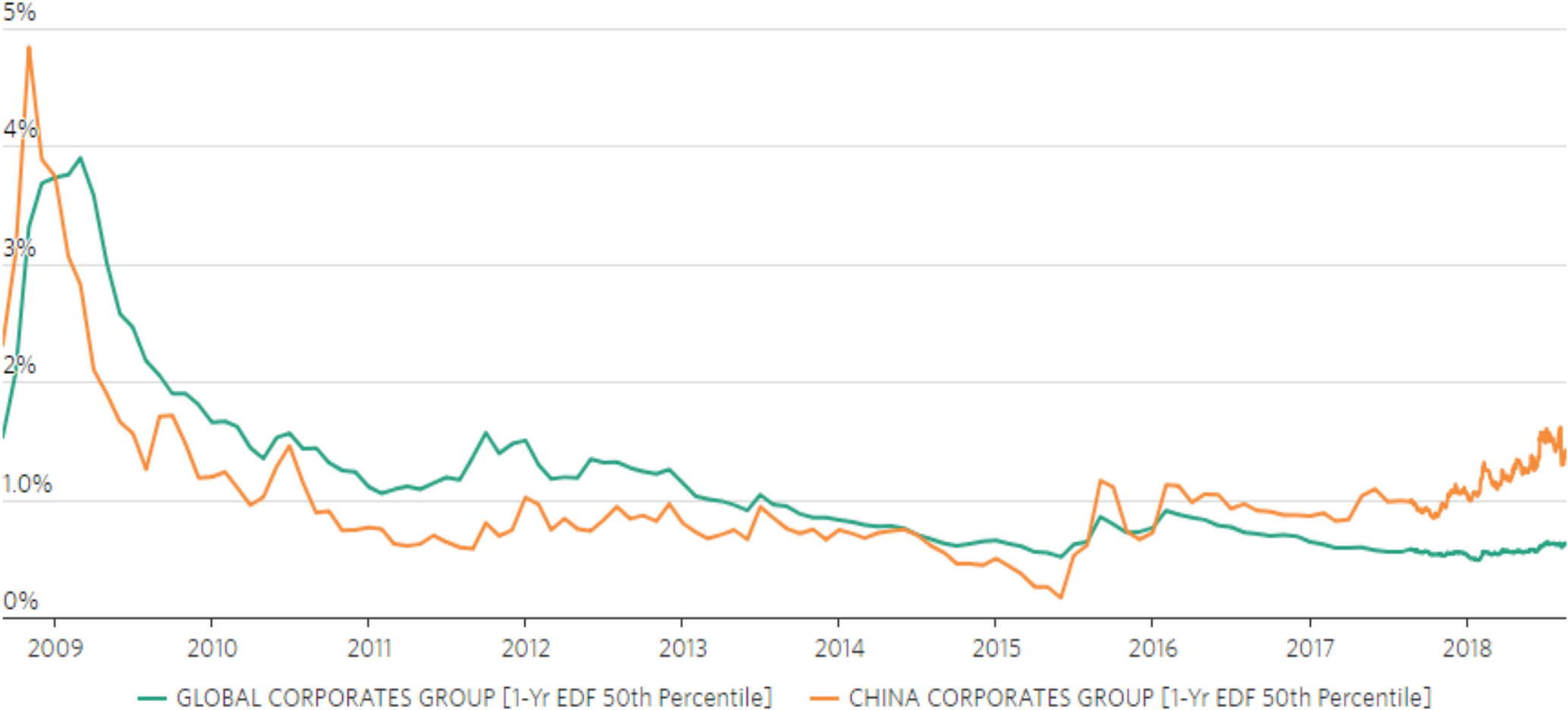
How Well Does the EDF Perform in China?

Accuracy Ratio of the EDF model in China vs other regions, 2007-2015

	1-Year Accuracy Ratio	# Firms	# Defaults
China	62.6%	3724	77
Japan	77.9%	4558	93
Australia	70.1%	2525	171
USA	78.1%	9243	1126
W. Europe	68.4%	7459	509

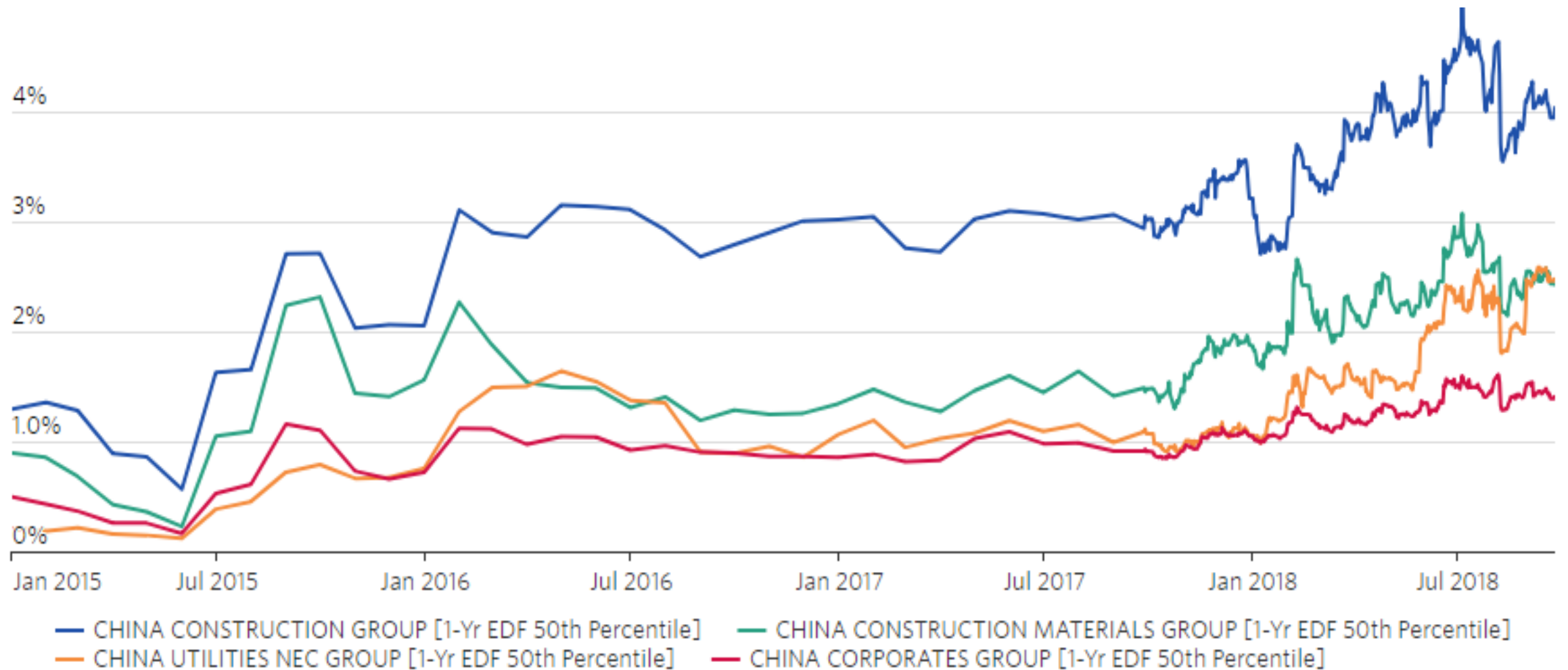
Aggregate Credit Trends in China

Median EDF for Chinese and Global corporates



Drilling Down to China's Riskiest Industries

Median EDF of China's 3 riskiest corporate industries vs overall median

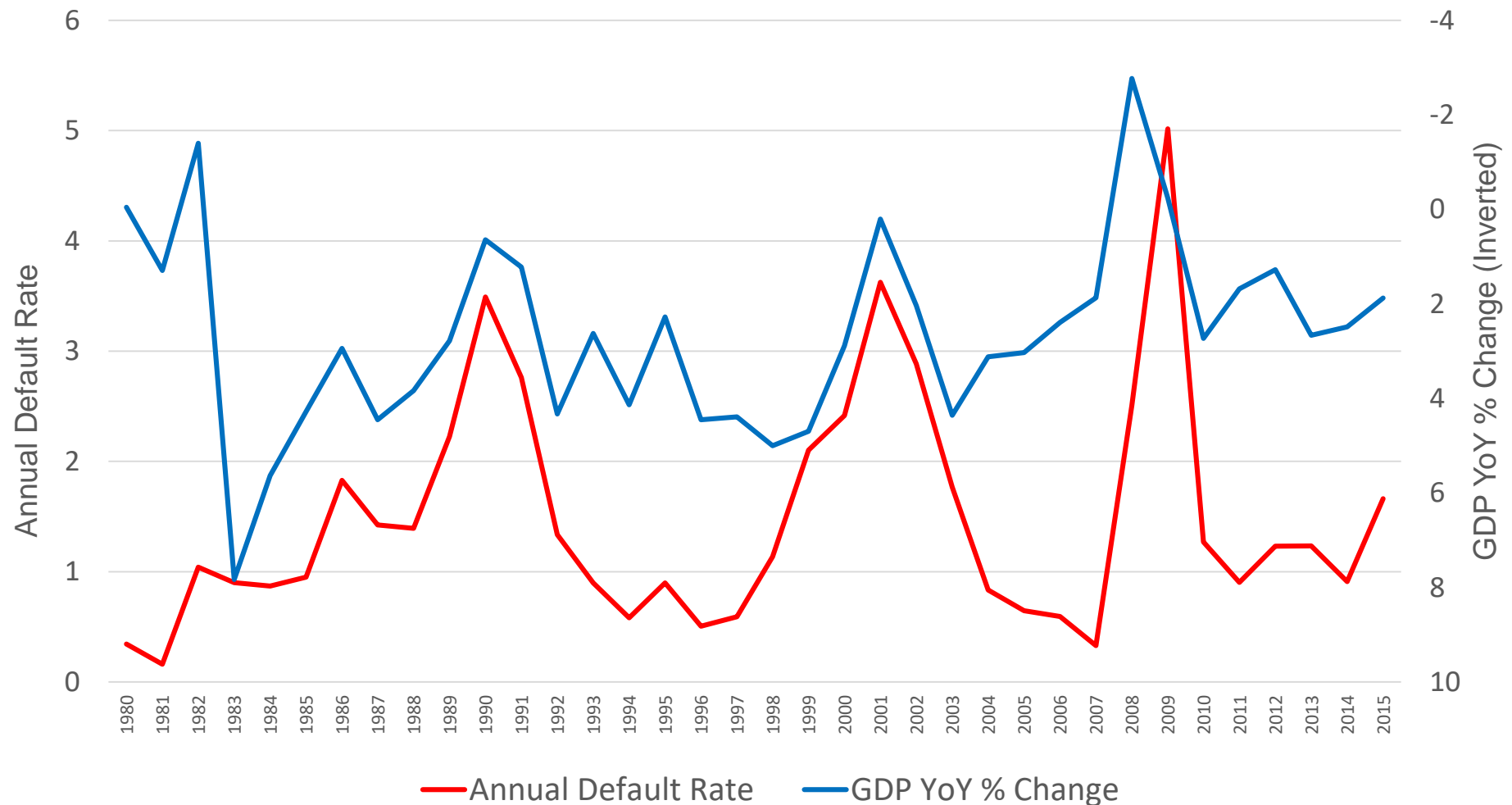


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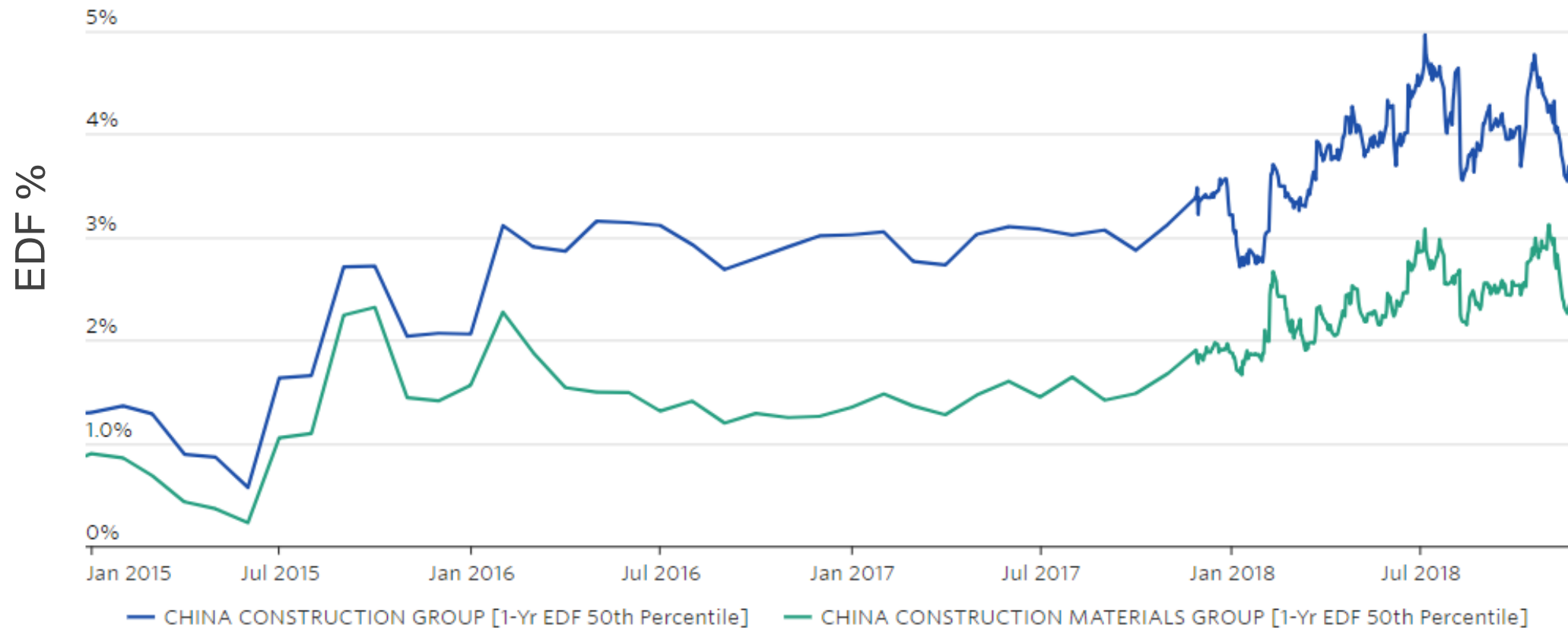
Early warning and
monitoring strategies for
corporate credit exposures

Defaults Rise When Economic Growth Slows

Year-Over-Year Change in US GDP vs. US Corporate Default Rate, 1980-2015

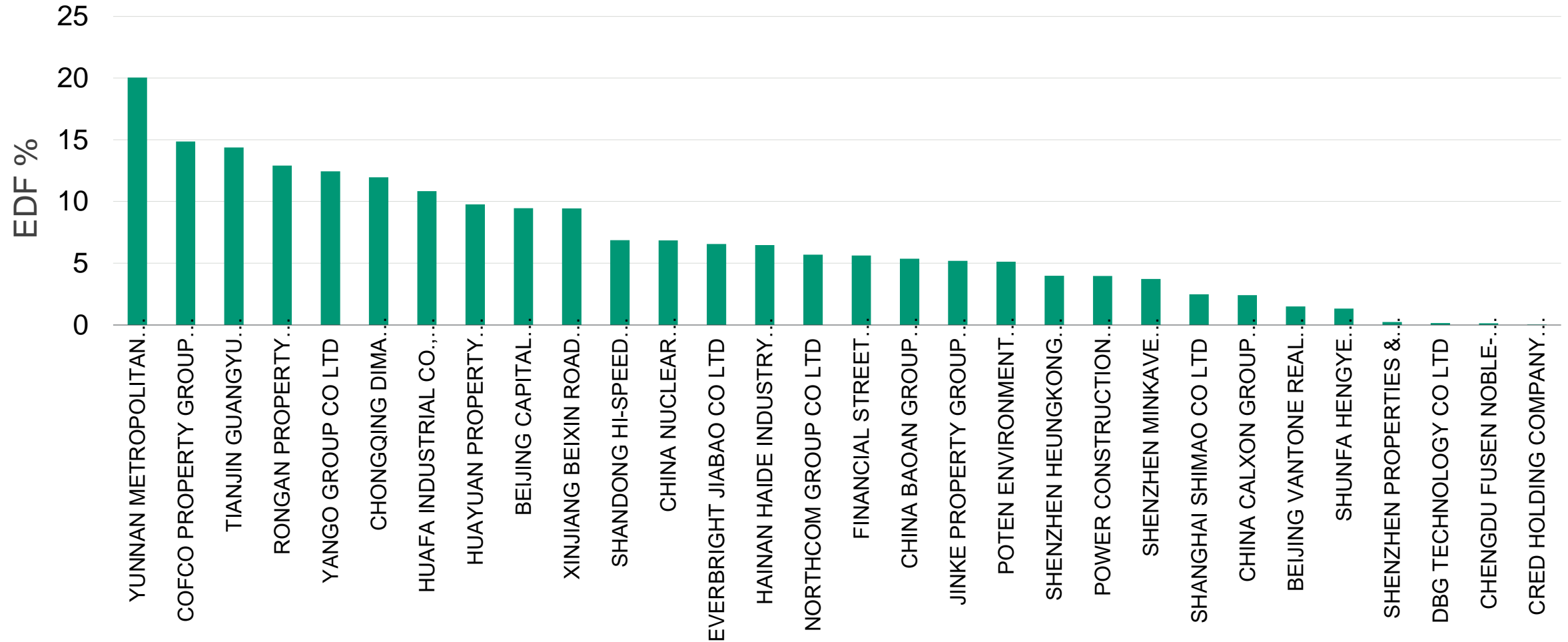


In A Sector-Wide Downturn, How Can We Identify Firms Most At Risk?



Which Firms Stand Out As Most Risky?

Firm-Level EDFs for China Construction Group (selected companies)



“When Should I Get Worried?”

- » Which firms in a portfolio should be considered relatively more risky, and merit deeper investigation?
- » Moody’s Analytics research has identified several strategies for monitoring early warning signals:
 1. EDF level versus an industry threshold → EDF “trigger level”
 2. Relative EDF level vs. industry group → Under- / out-performance
 3. EDF level change → Momentum
 4. Relative EDF change vs. peer group → Under- / out-performance
 5. Slope of EDF term structure → Expectation of risk

Setting Sector-Level Early Warning Trigger Levels

EDF Early Warning Trigger Levels Balance True Pos/Neg Signals vs. False Pos/Neg Signals

Optimal EDF Warning Level for All Firms Globally, 1999-2014

t^*	Median	25 th %	75 th %
3.04%	0.70%	0.17%	3.00%

Optimal EDF Warning Level for Selected Industry Sectors, 1999-2014

Sector	t^* (Pctile)
Banks	0.281% (75.5%)
Consumer Products	4.406% (79.0%)
High Tech	13.715% (95.5%)
Transportation	4.344% (83.9%)

Monitor EDF vs Industry Trigger Levels to Identify Potential Credit Events

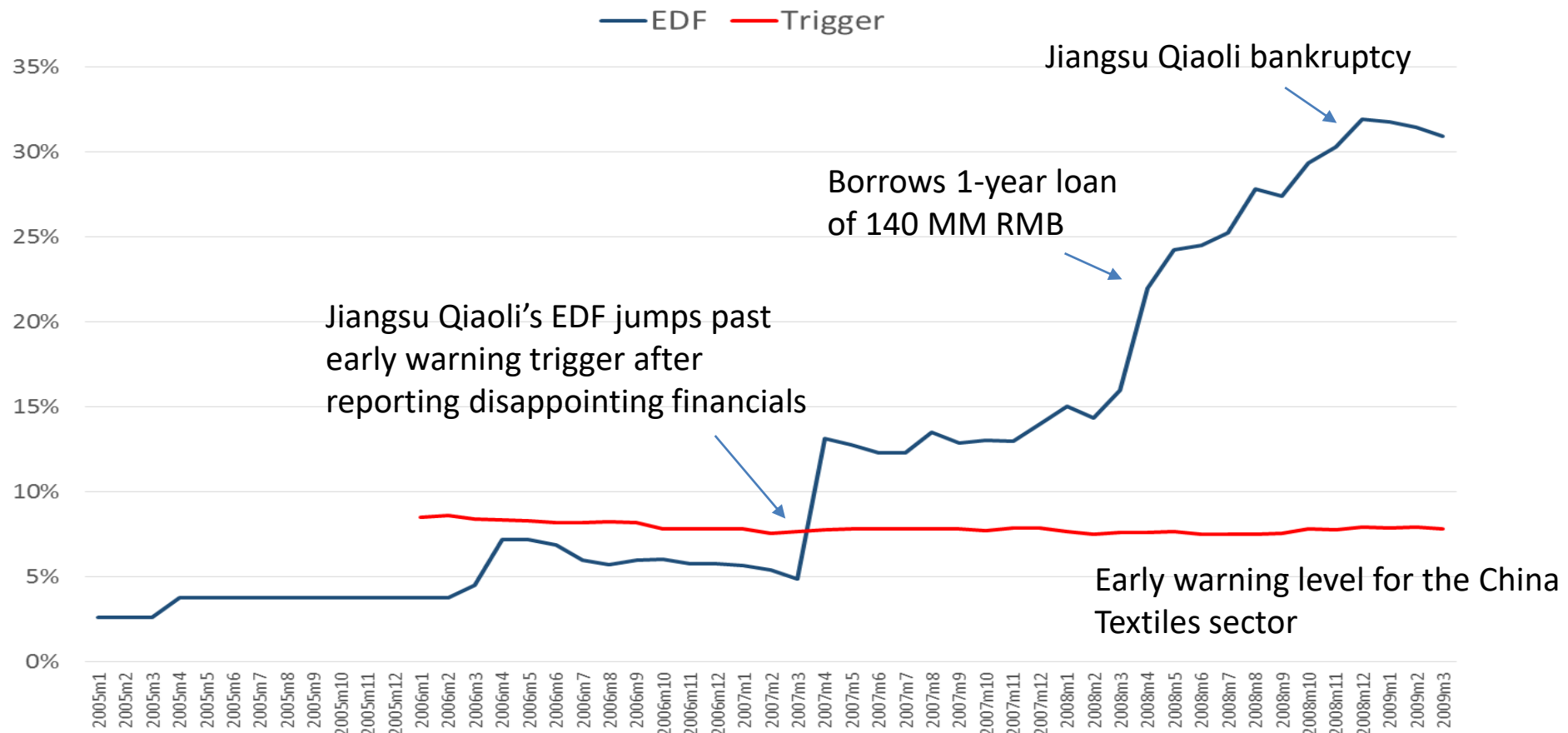
Fushun Special Steel's EDF Triggered a Warning 3 Years Prior to Default



Historically, 92% of corporate defaulters breached their trigger level during the 12 months prior to default

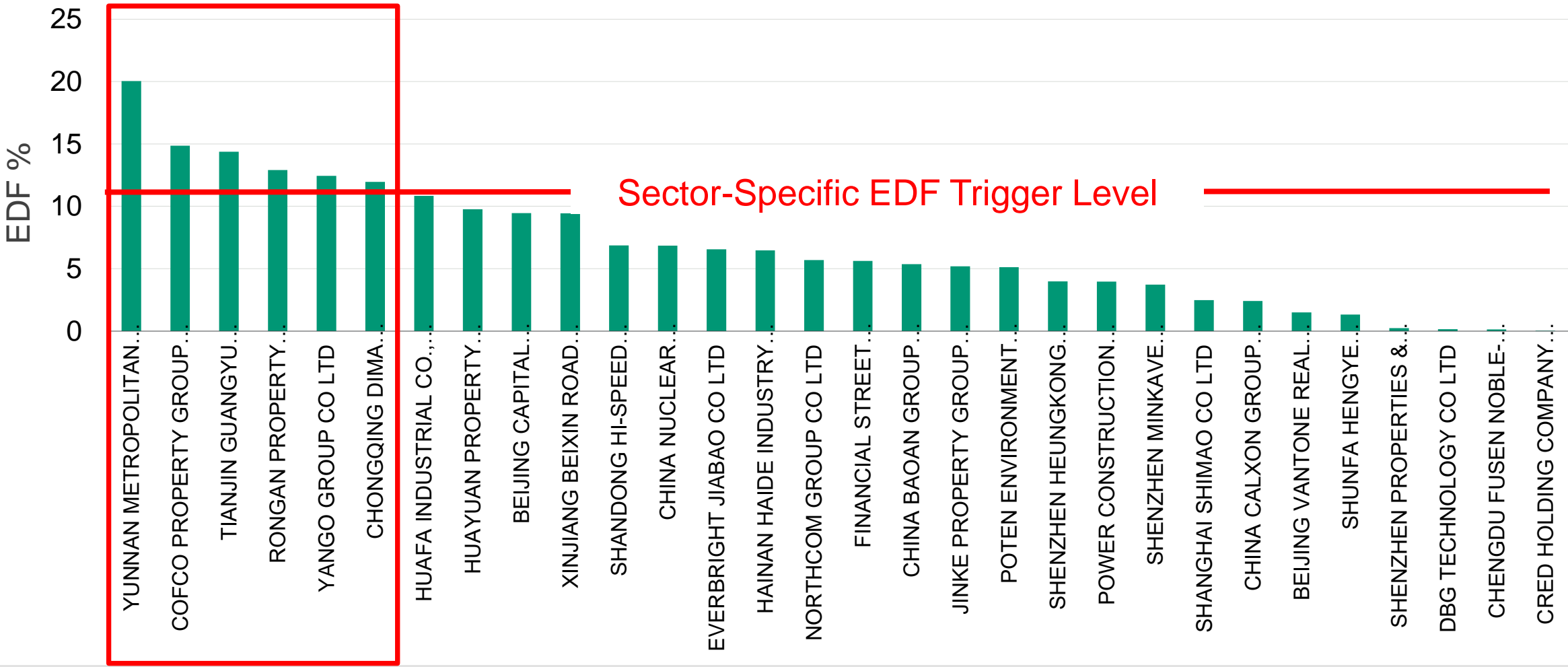
EDF-Based Early Warning Signals Also Work for Private Firms

Jiangsu Qiaoli Textile Products Co. CCA-EDF vs. Industry Trigger Level



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Firm-Level EDFs for China Construction Group (selected companies)



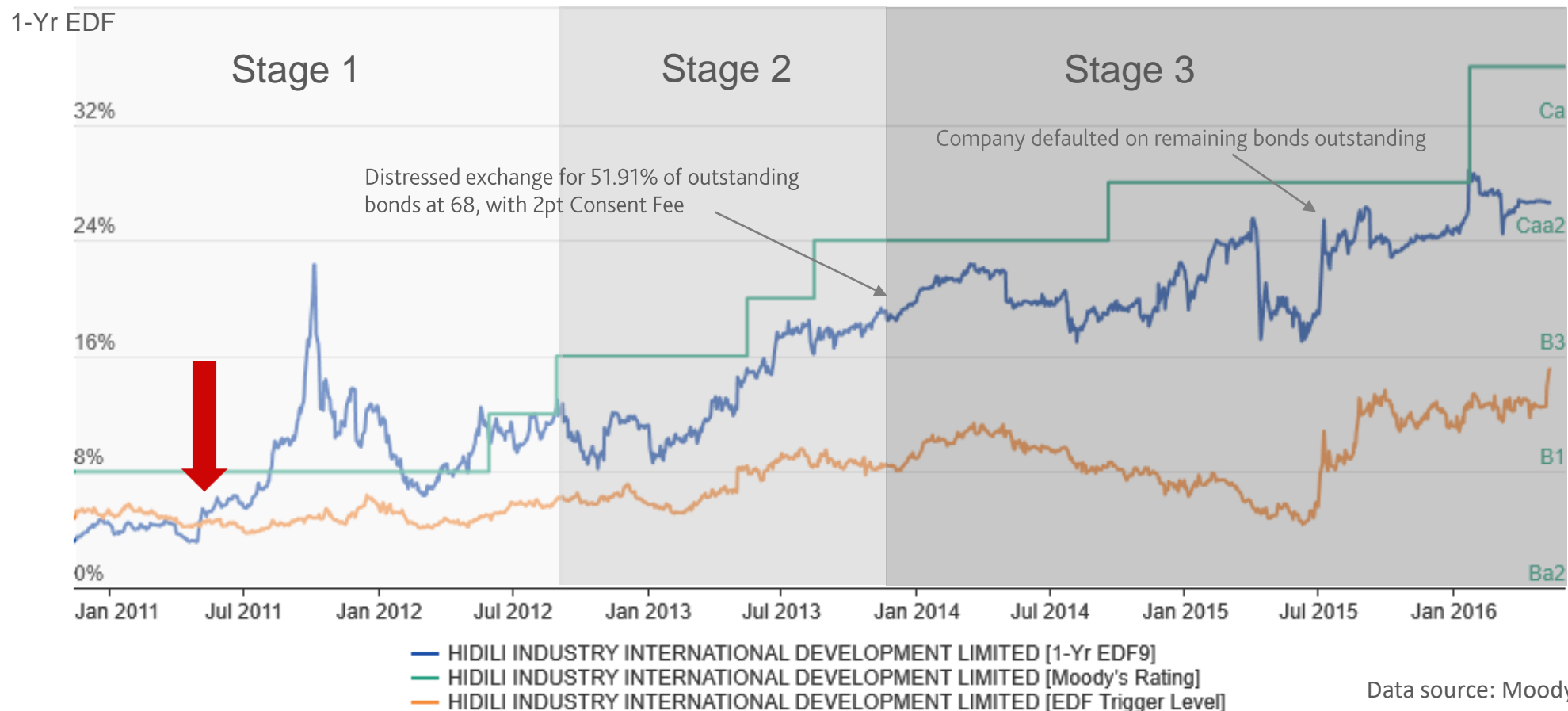
Monitor EDF Against Industry Peer Groups to Identify Firm-Level Credit Deterioration

Fushun Special Steel's EDF Was High 2 Years Prior to Default



Early Warning of Credit Risk is Also Critical for Managing ECL Under IFRS 9

Hidili Industry International Development (China)



The Business Case for a Strong Monitoring and Early Warning System



- » Pre-qualification assessments
- » Loan loss provisioning



- » Inputs into internal risk ratings
- » Challenger model
- » Benchmark



- » Early warning of credit deterioration
- » Peer comparison of relative risk



- » Timely and actionable information
- » A more effective watch list

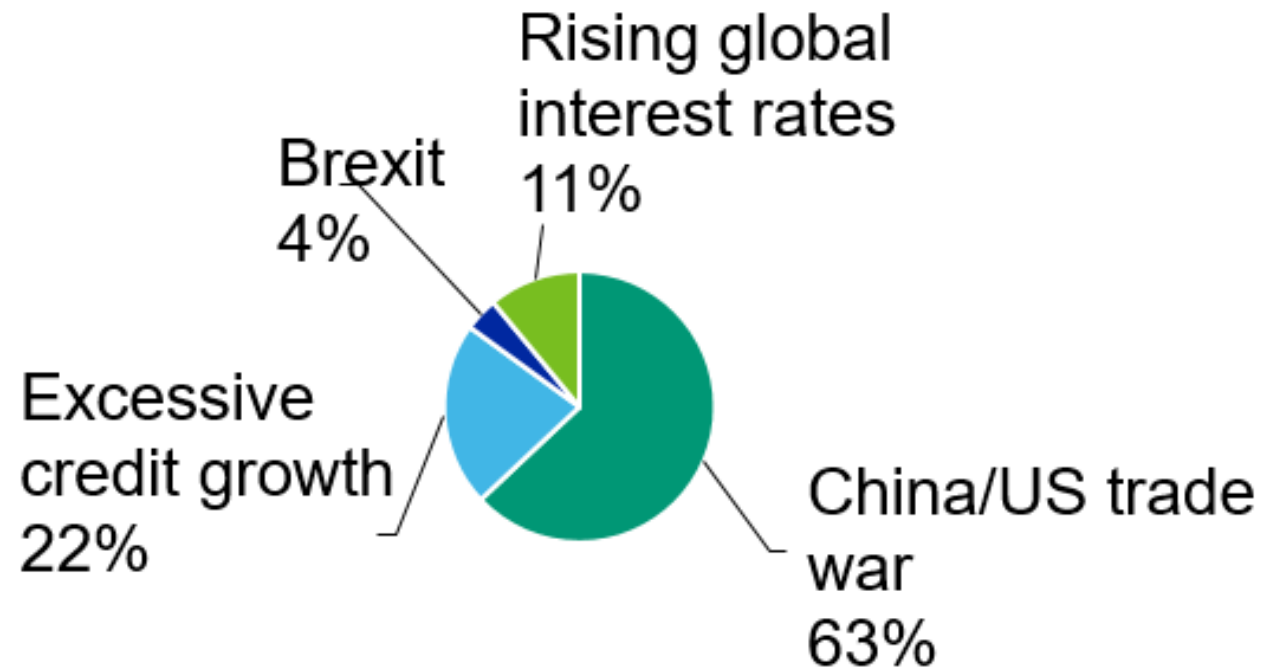


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Stress testing your
corporate loan book

What Could Cause the Credit Cycle to Turn?

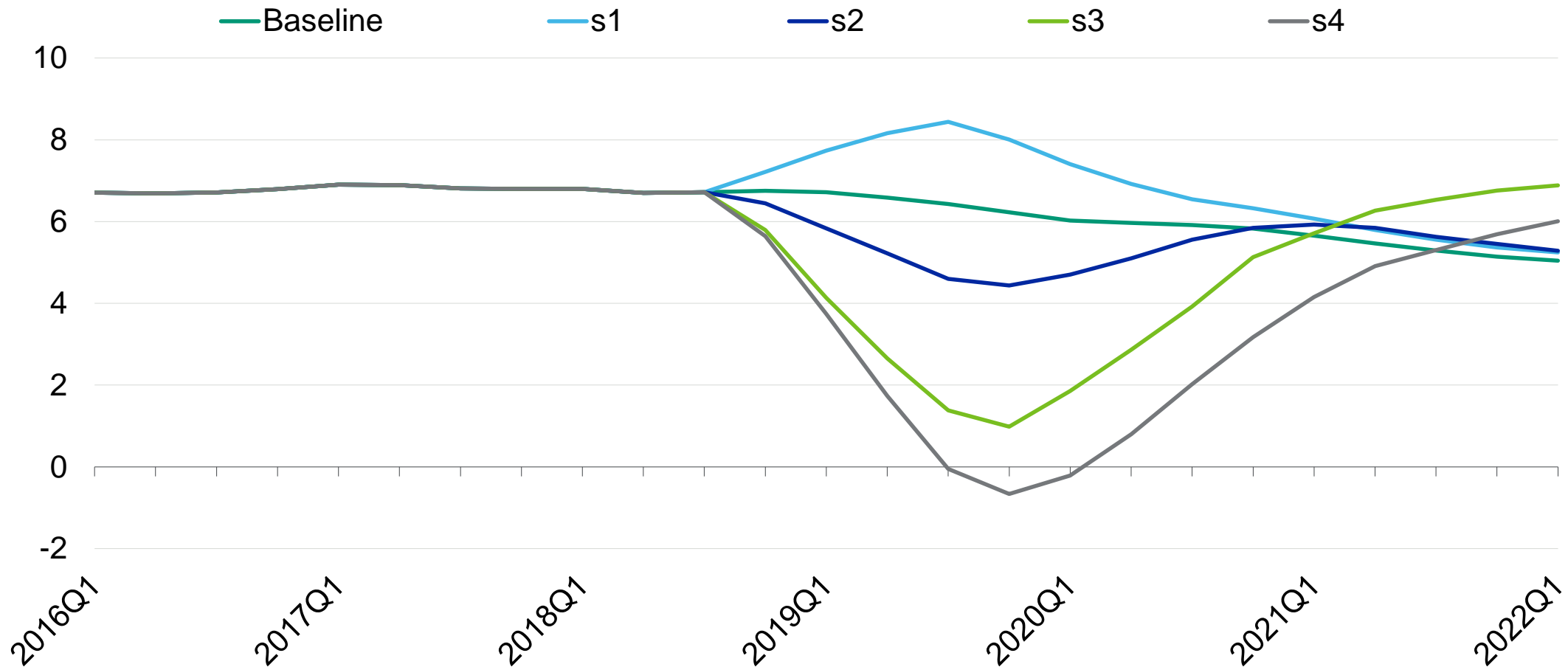
What is your biggest economic concern at the moment?



Results of Moody's Analytics Singapore and Kuala Lumpur conference surveys, November 20/21, 2018

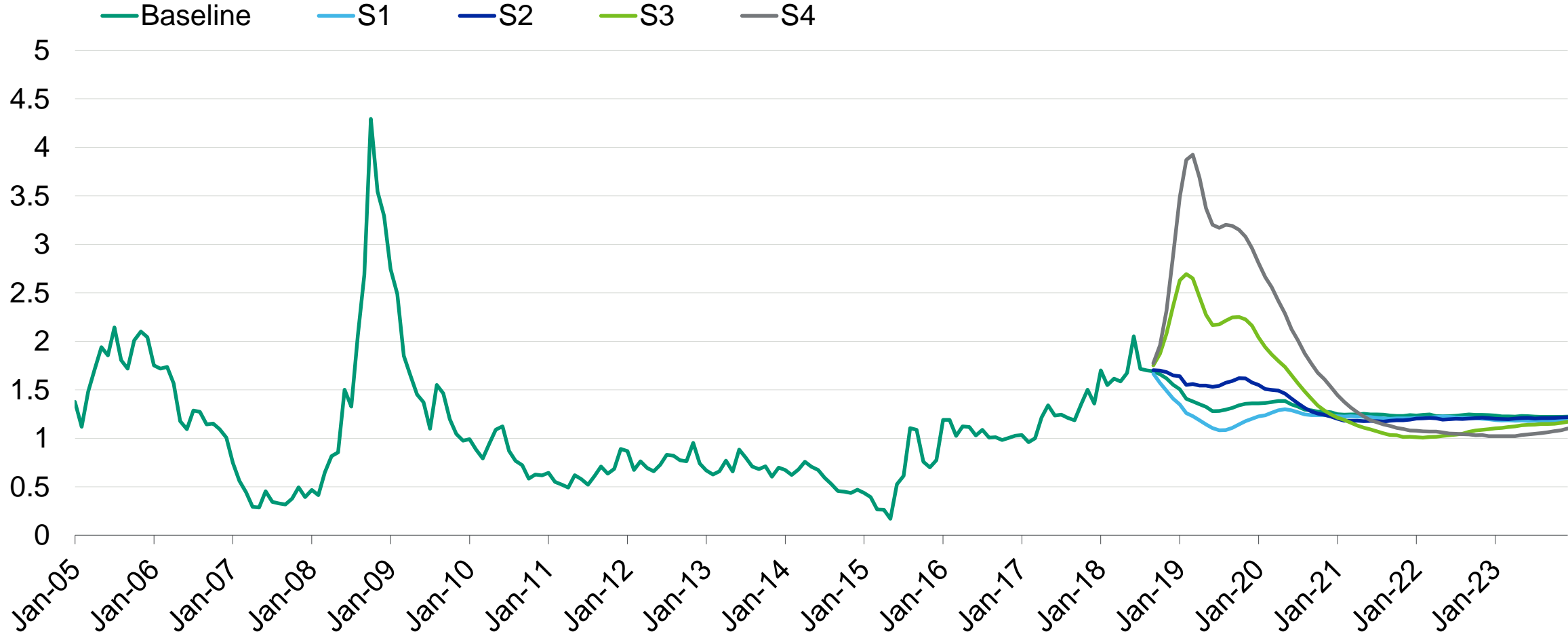
China's Economy Under Alternative Scenarios

Chinese GDP growth %y/y under five economic scenarios



Chinese Credit Risk Under Alternative Scenarios

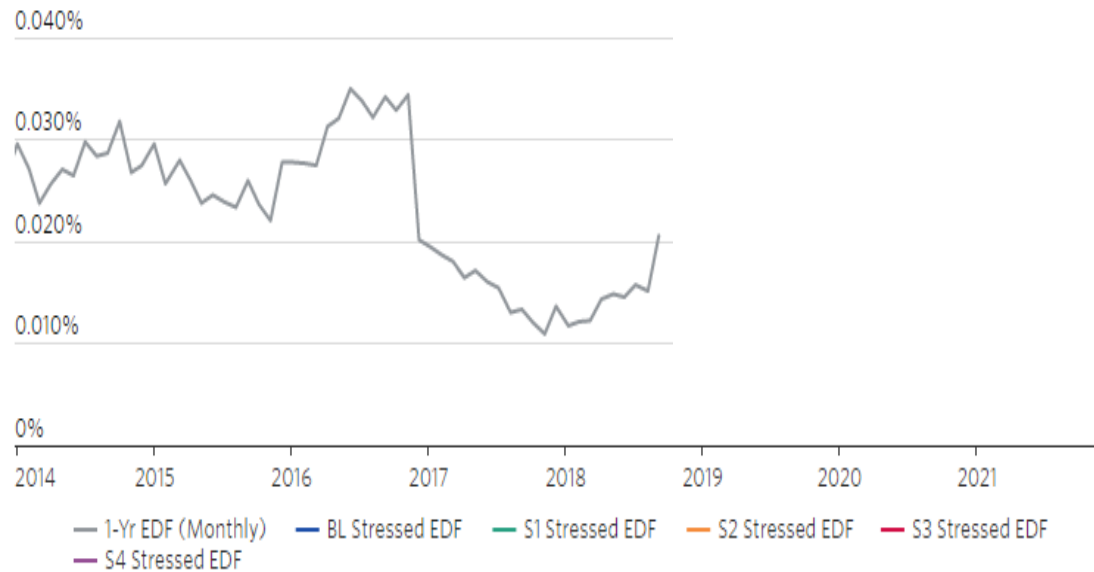
Median Chinese EDF under five economic scenarios



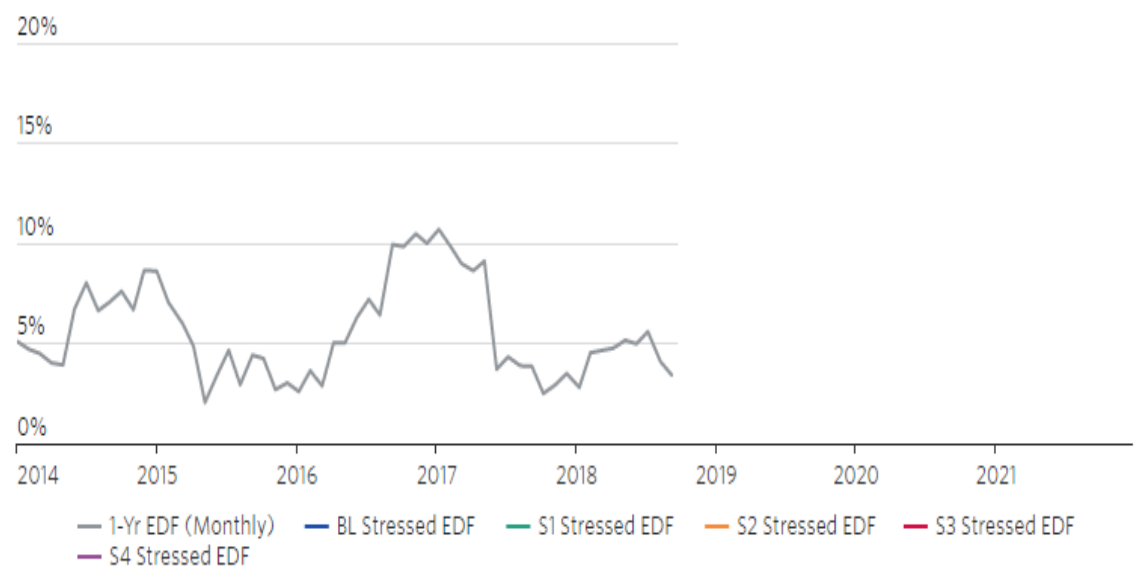
High Risk Firms are Vulnerable to Recession

Stressed EDF under different economic scenarios

Tencent Holdings Ltd



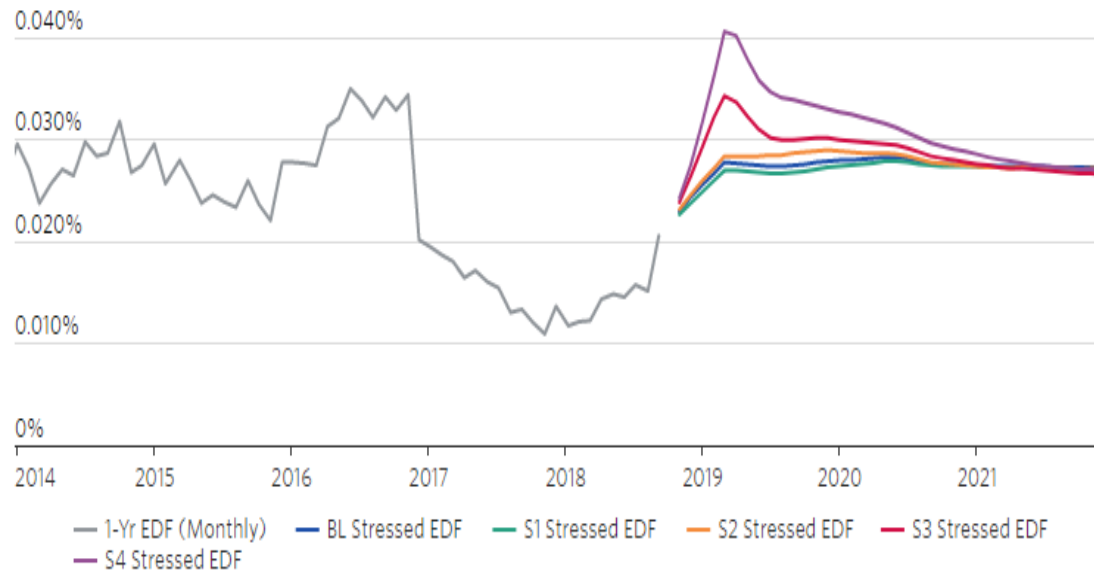
Evergrande Group



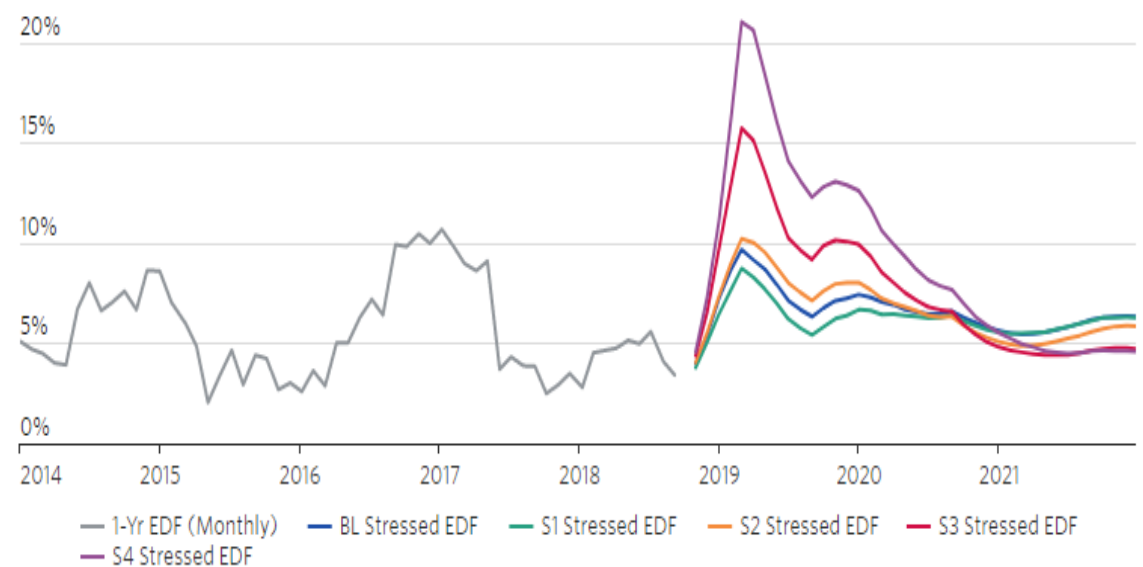
High Risk Firms are Vulnerable to Recession

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Q&A