

Topics@CreditEdge Webinar

Dealing with Fallen Angel Risk

Sam Malone, Ph.D, Senior Director, Quantitative Research
Yukyung Choi, Associate Director, Quantitative Research

June 2019

Speakers



Presenter

Samuel Malone, Ph.D

Senior Director – Quantitative Research



Presenter

Yukyung Choi

Associate Director – Quantitative Research

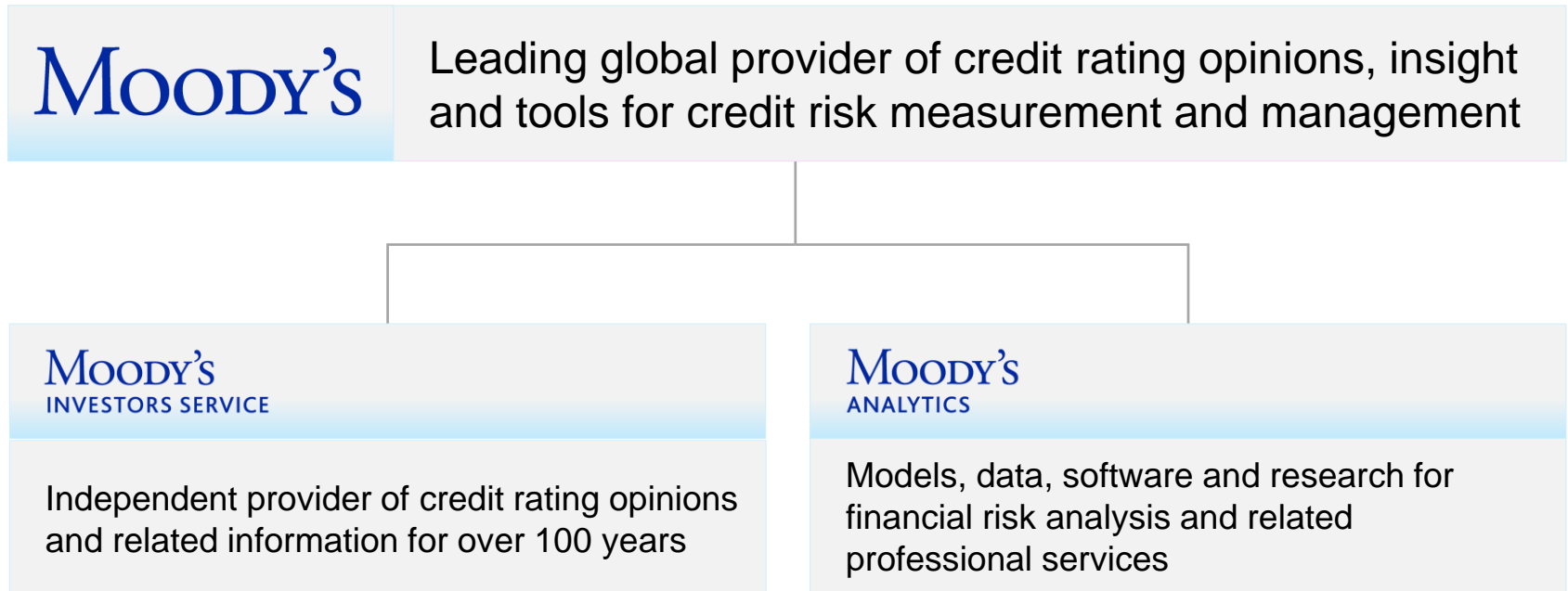


Moderator

Ryan Donahue

Assistant Director – Product Strategy

About Moody's Analytics



CreditEdge by the Numbers

50

Years of default data

1989

*When the first EDF measure was
calculated*

60,000+

*EDF measure for publicly traded
firms*

250+

Data fields

11,700+

Defaults in our global data base

76,000+

Active CUSIPs in our database

New Topics @CreditEdge



Topic@CreditEdge

MAY, 2019

Credit Risk Analytics Group

Author

Samuel W. Malone, Ph.D.

Senior Director-Quantitative Research

+1 (212) 553-2107

Samuel.Malone@Moody's.com

Yukyung Choi

Associate Director-Quantitative Research

+1 (212) 553-0906

Yukyung.Choi@Moody's.com

Dealing with Fallen Angel Risk

Fallen Angel risk results from the possibility and price impact of bond downgrades from investment grade (IG) into high yield (HY). We find that the price deterioration experienced by bonds of future Fallen Angels is significantly greater than the price deterioration experienced by bonds of future IG downgrades on average. As of Q1 2019, over 50% of investment grade bonds in the US and globally by amount outstanding are rated Baa, so that a near-term recession could cause the incidence of Fallen Angels to rise substantially. In light of these circumstances, we test the early warning power of the CreditEdge Deterioration Probability (DP) metric for Fallen Angel downgrades, and find it well-suited for this purpose. DP quintile portfolios exhibit monotonically increasing rates of Fallen Angel downgrades, and we find that historical underperformance by high DP versus low DP bond portfolios is exacerbated during market downturns.

Agenda

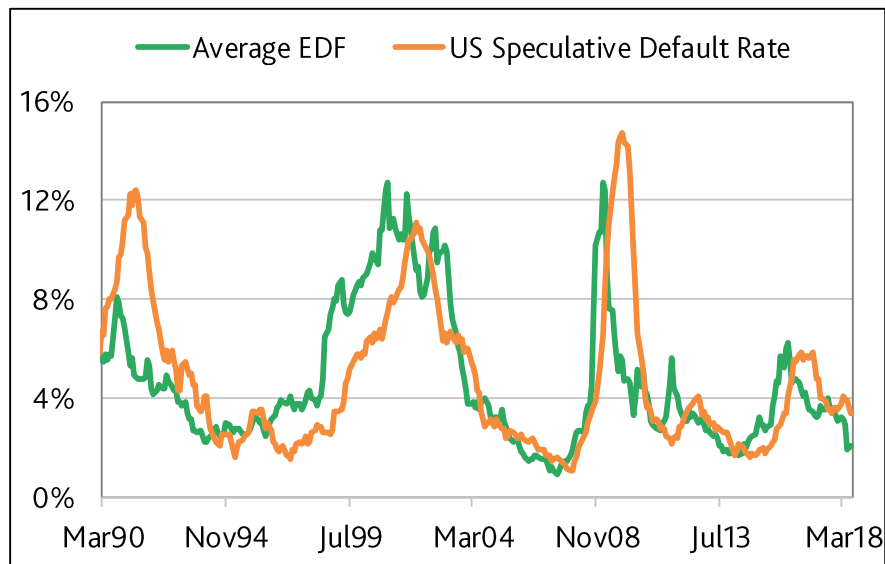
1. Leading metrics
2. Case studies
3. Fallen Angels
4. Rising Stars
5. Q&A

1

Leading metrics
EDF and the DP

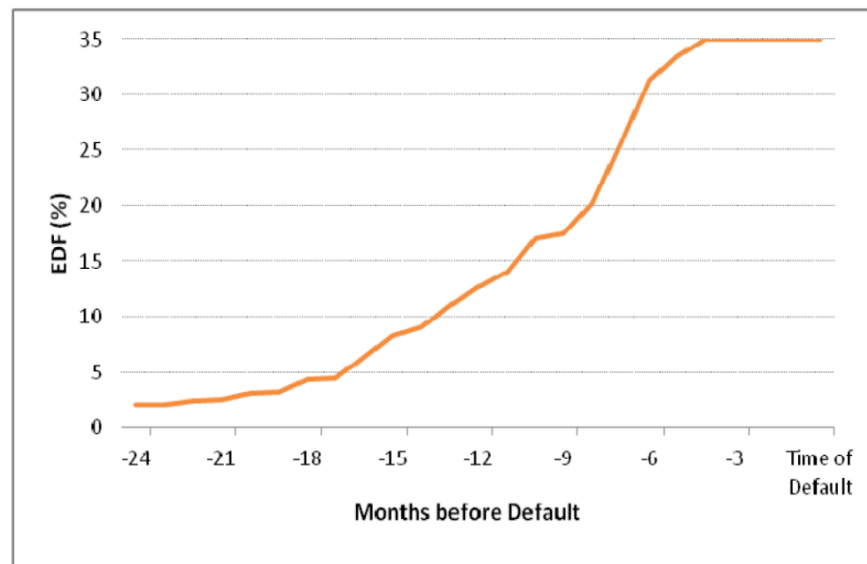
The CreditEdge public firm EDF model predicts default with accuracy and high degree of advance warning

Average EDF for high-yield firms vs.
Moody's high-yield default rate



- » CreditEdge **accurately** and **timely** predicted the level of high-yield default rate

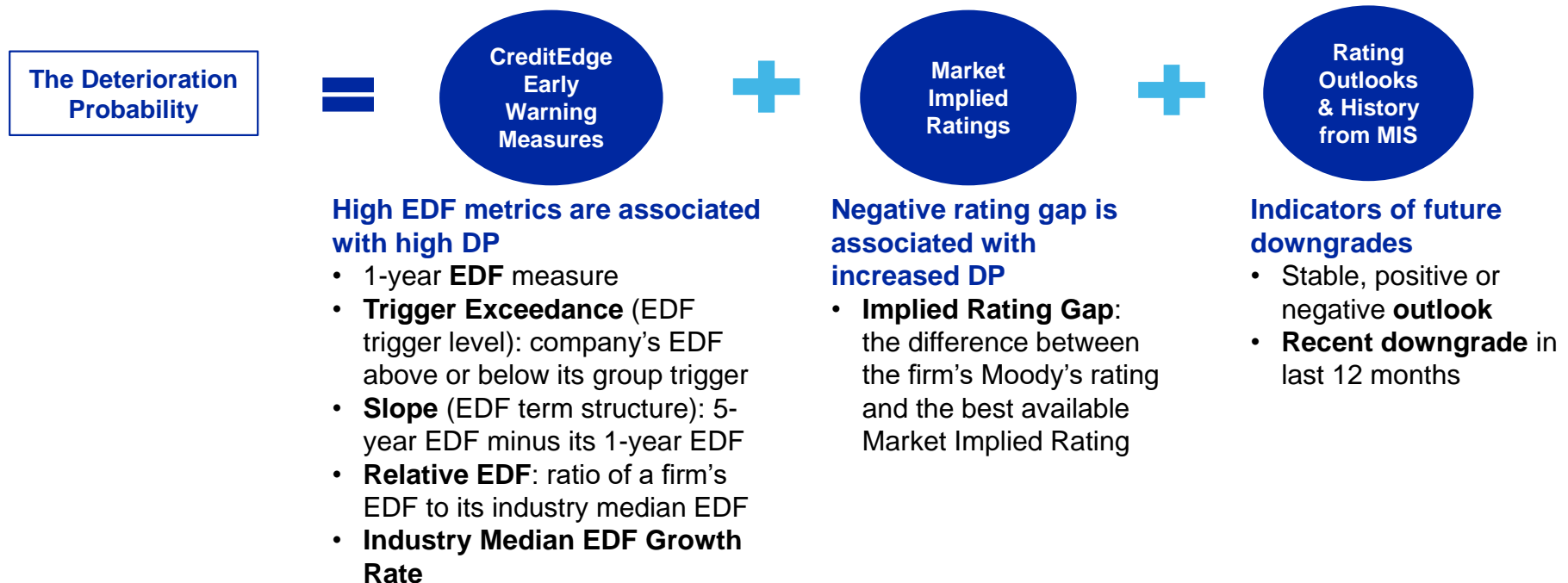
Median EDF for North American firms
that defaulted between 2008-2010



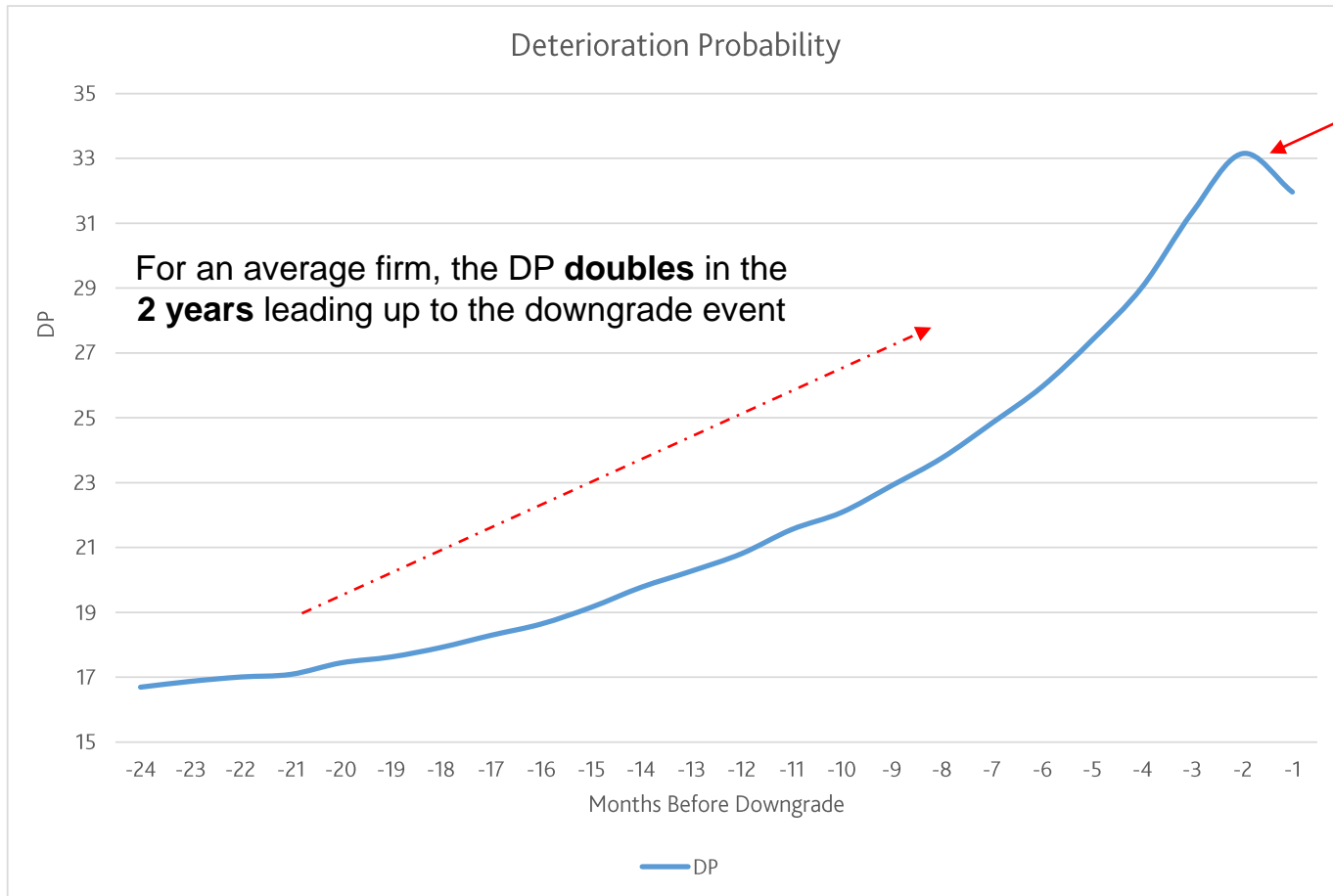
- » The EDFs of the North American credit crisis casualties increased many months before default

The Deterioration Probability (DP) measures the risk of downgrade of issuers

Deterioration Probability (DP) is a metric ranging from 1-70% that estimates probability of downgrade for rated firms in the next 12 months – DP does not measure the probability of upgrade



The validation shows Deterioration Probability provides a strong signal for downgrade events



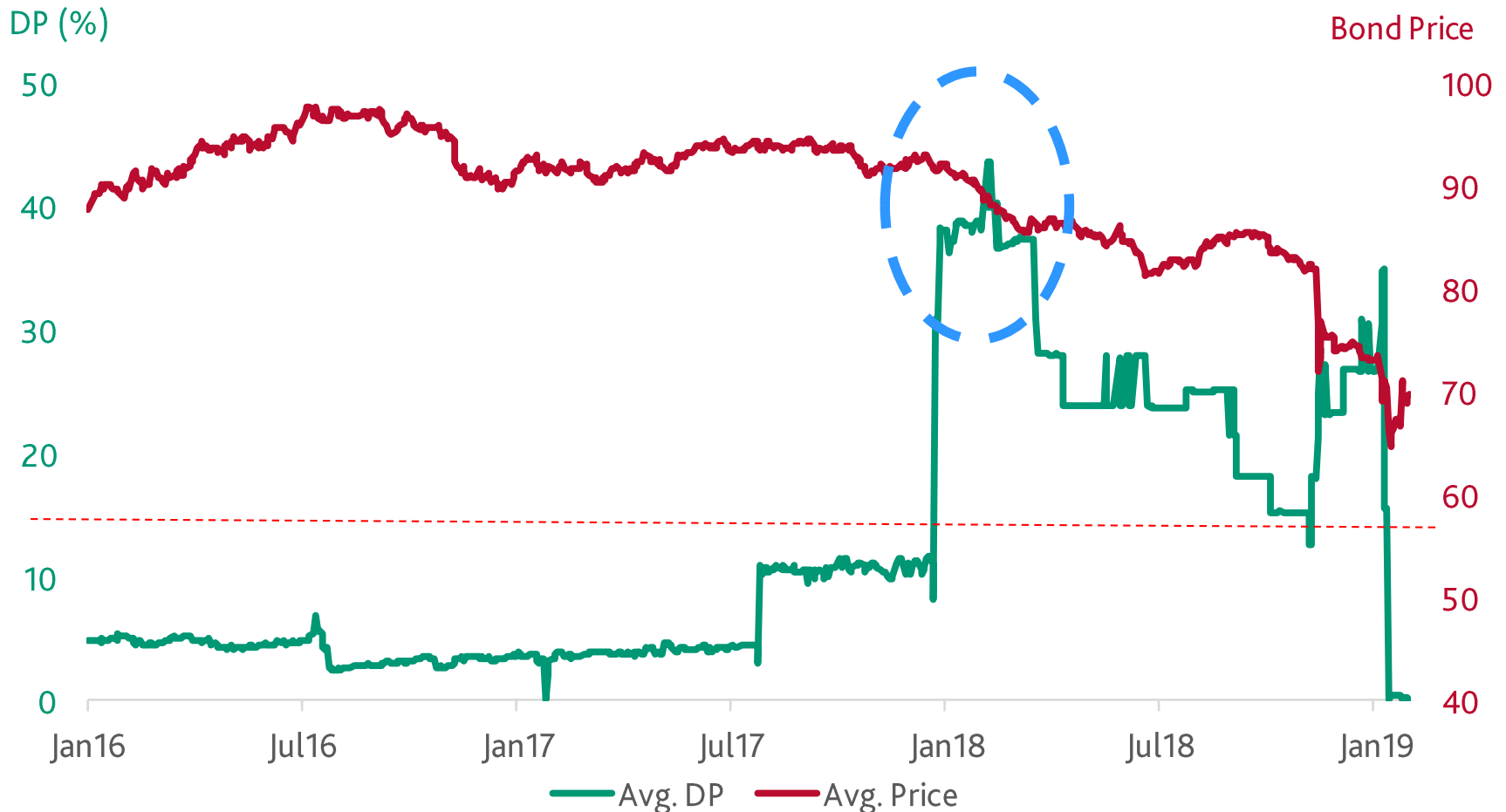
2

Case studies

PG&E and Xerox

Pacific Gas & Electric

DP vs time, avg. bond price vs. time



Xerox

DP and Moody's Rating

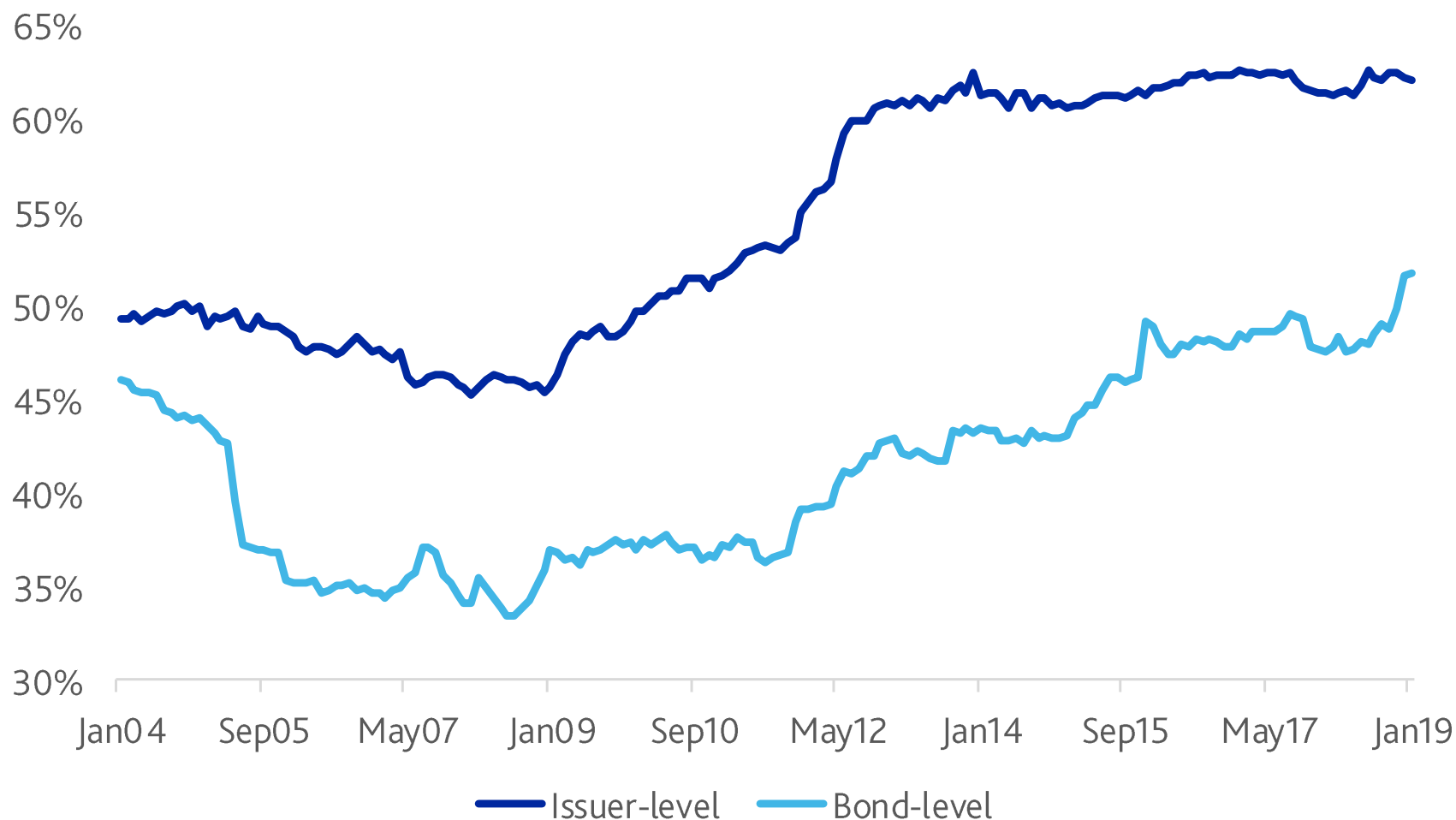


3

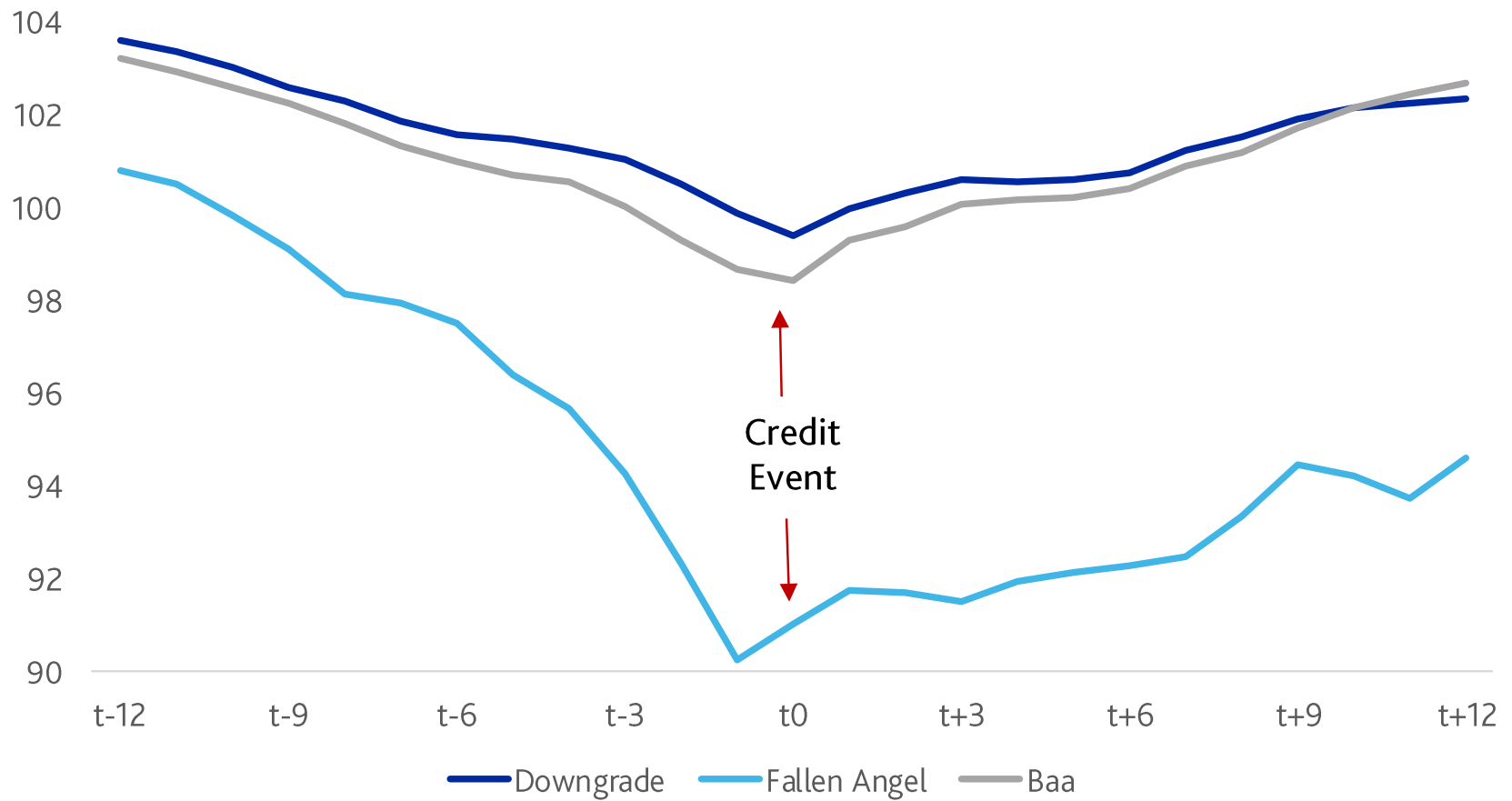
Fallen Angels

Preparing for a turn
in the credit cycle
with CreditEdge

Baa-rated debt as fraction of investment grade debt

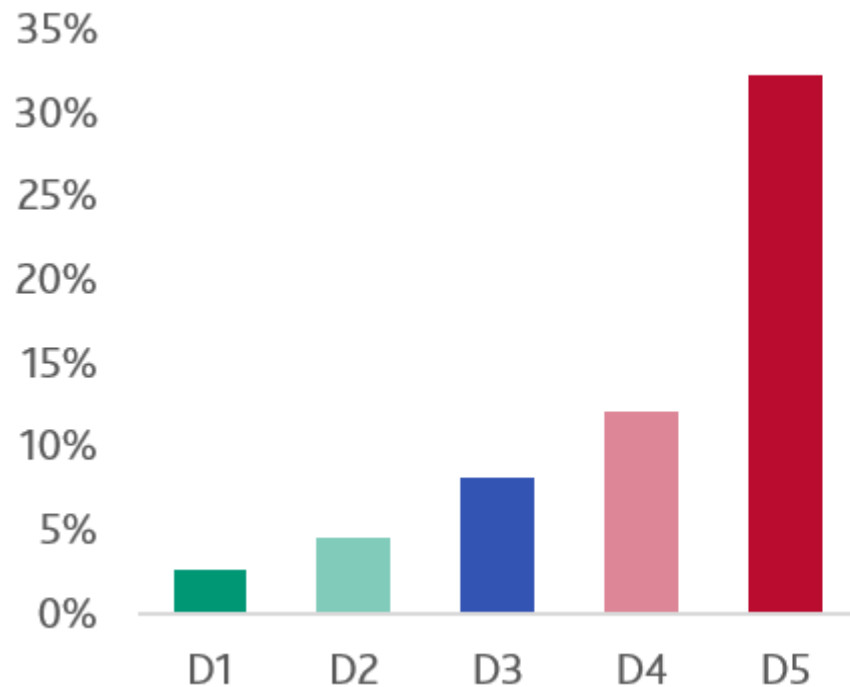


Mean bond bid price path around downgrade and FA events

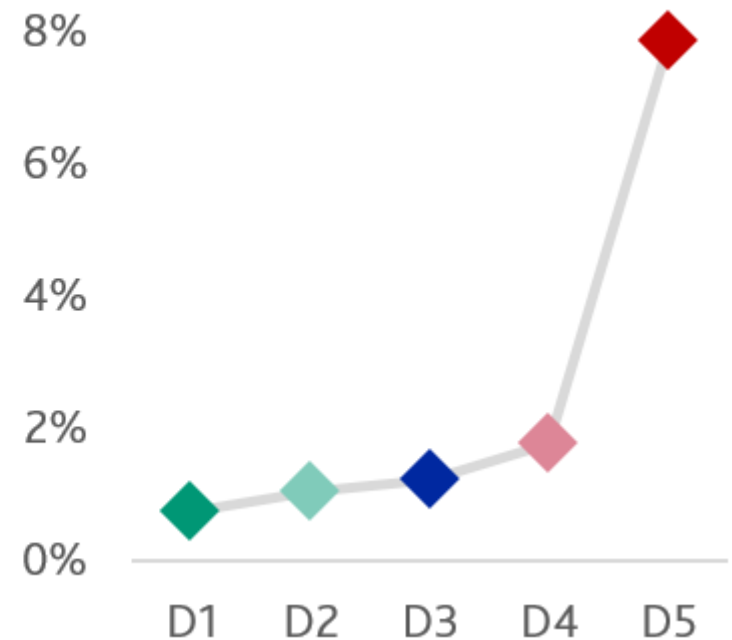


12-month downgrade and Fallen Angel frequencies by DP quintile

Downgrade Frequency by DP

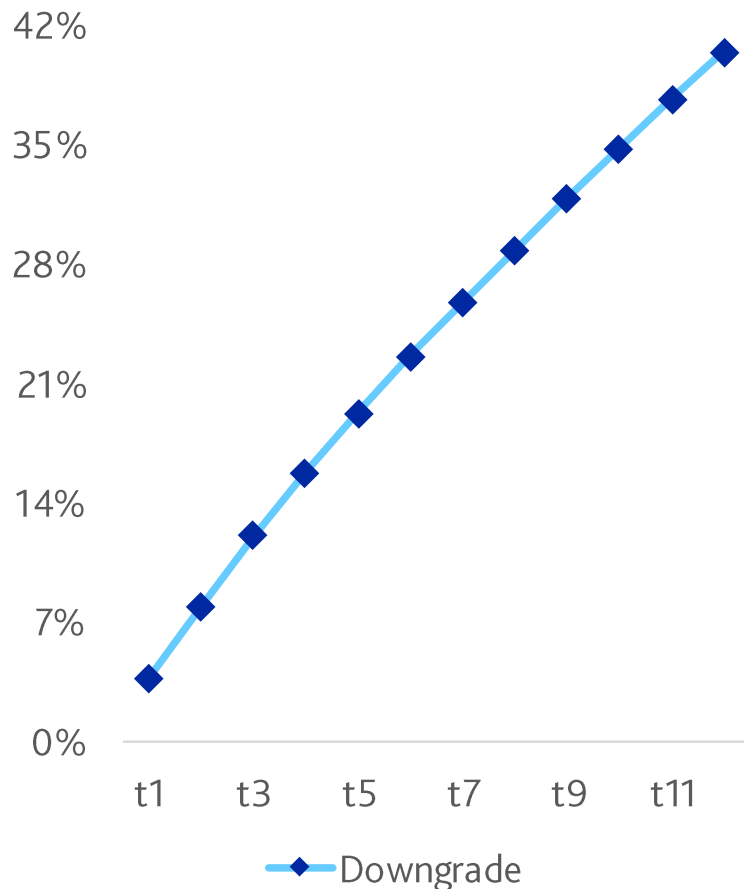


Fallen Angel Frequency by DP

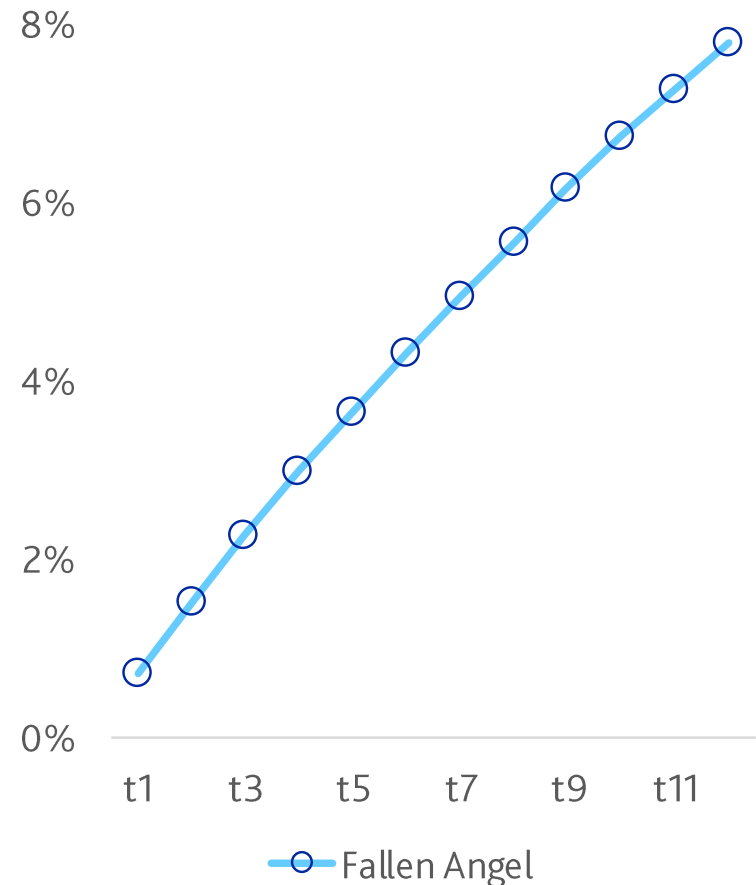


Cumulative downgrade and Fallen Angel frequencies for the highest DP Quintile – Global IG

Cumulative Downgrade Frequency



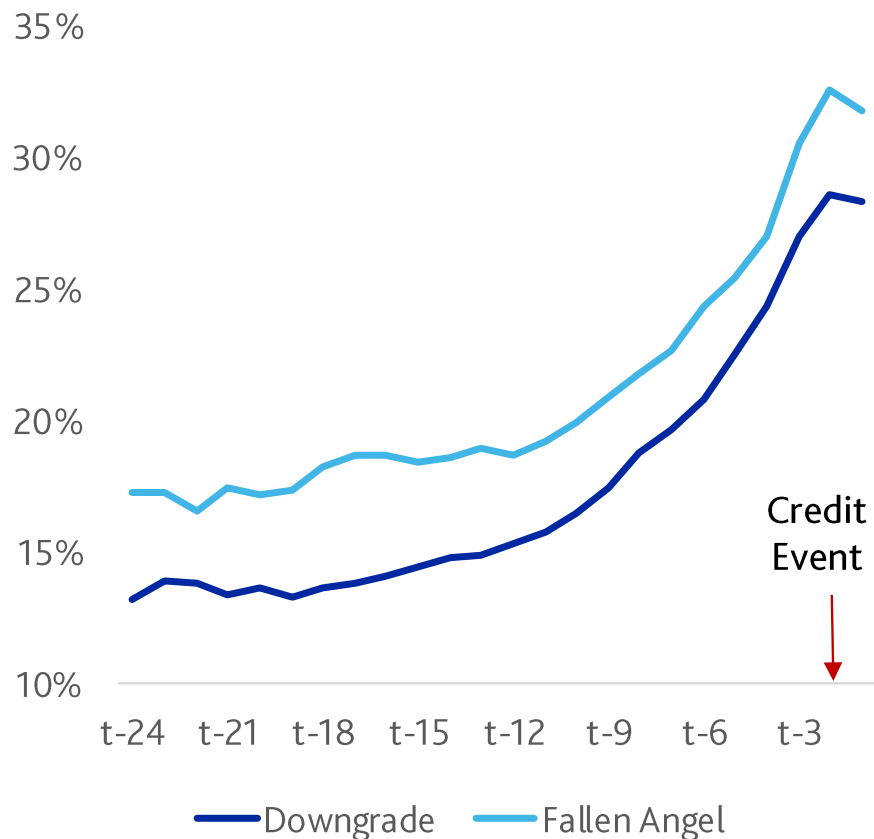
Cumulative Fallen Angel Frequency



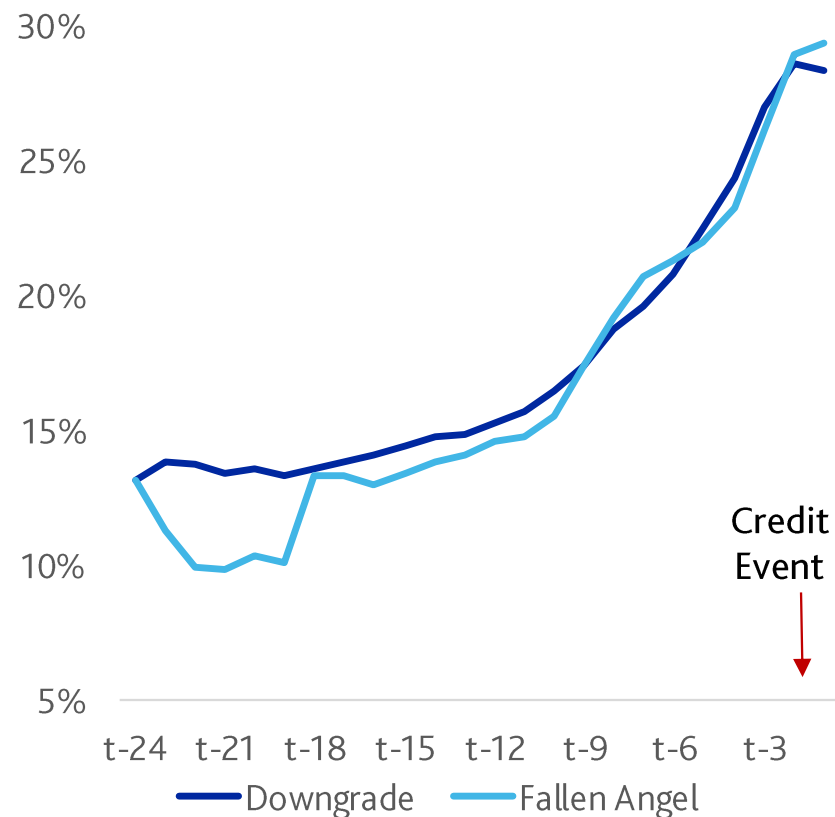
Run-up to Credit Event

– DP level versus time for global IG issuers

Average



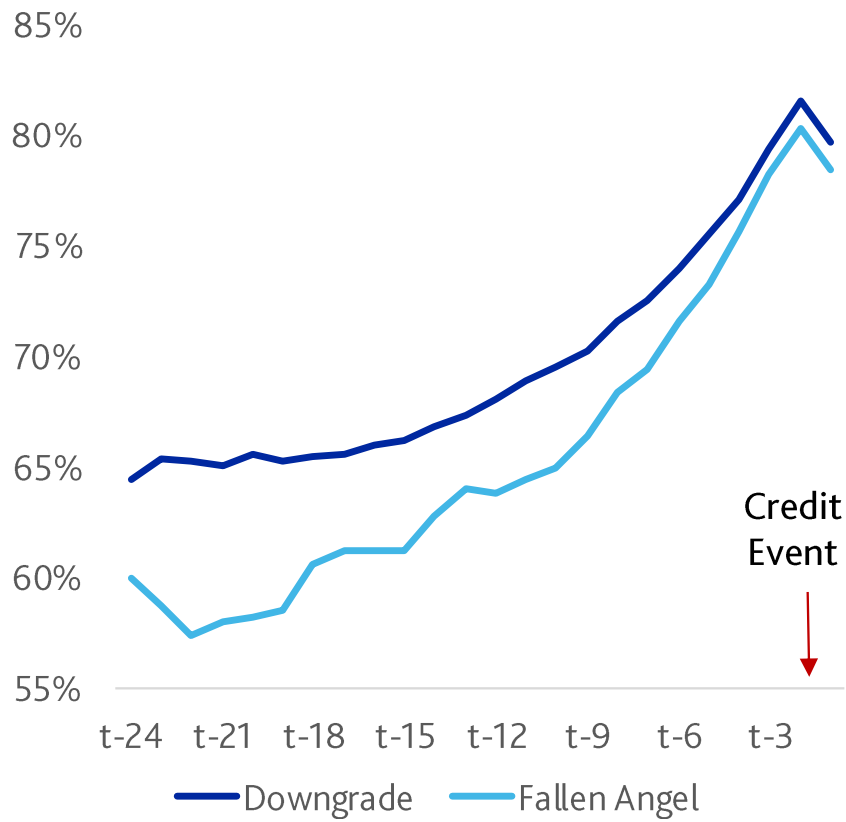
Median



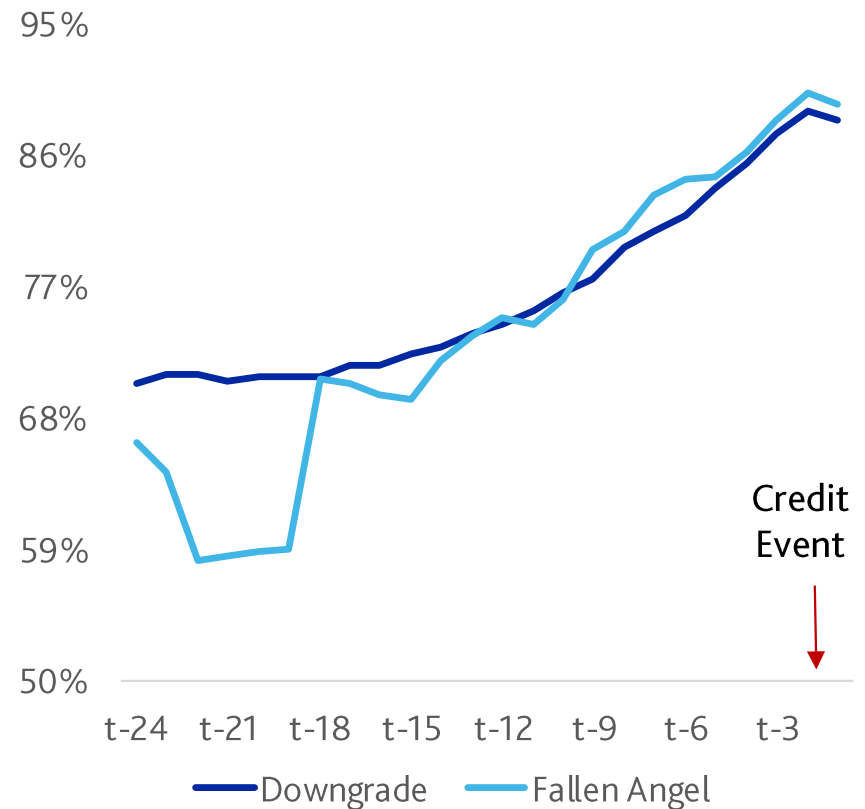
Run-up to Credit Event

– DP percentile in cohort versus time for global IG issuers

Average

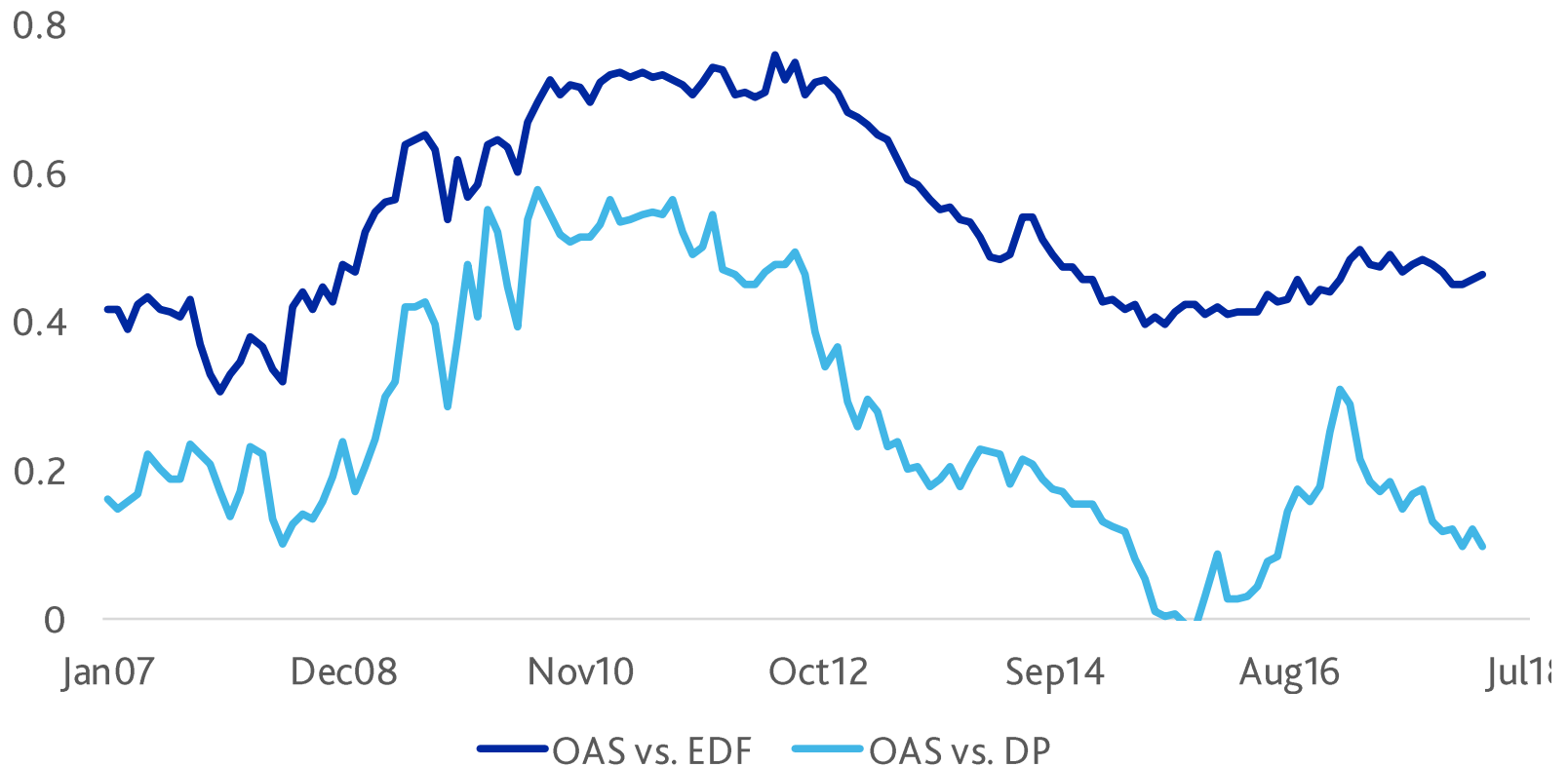


Median

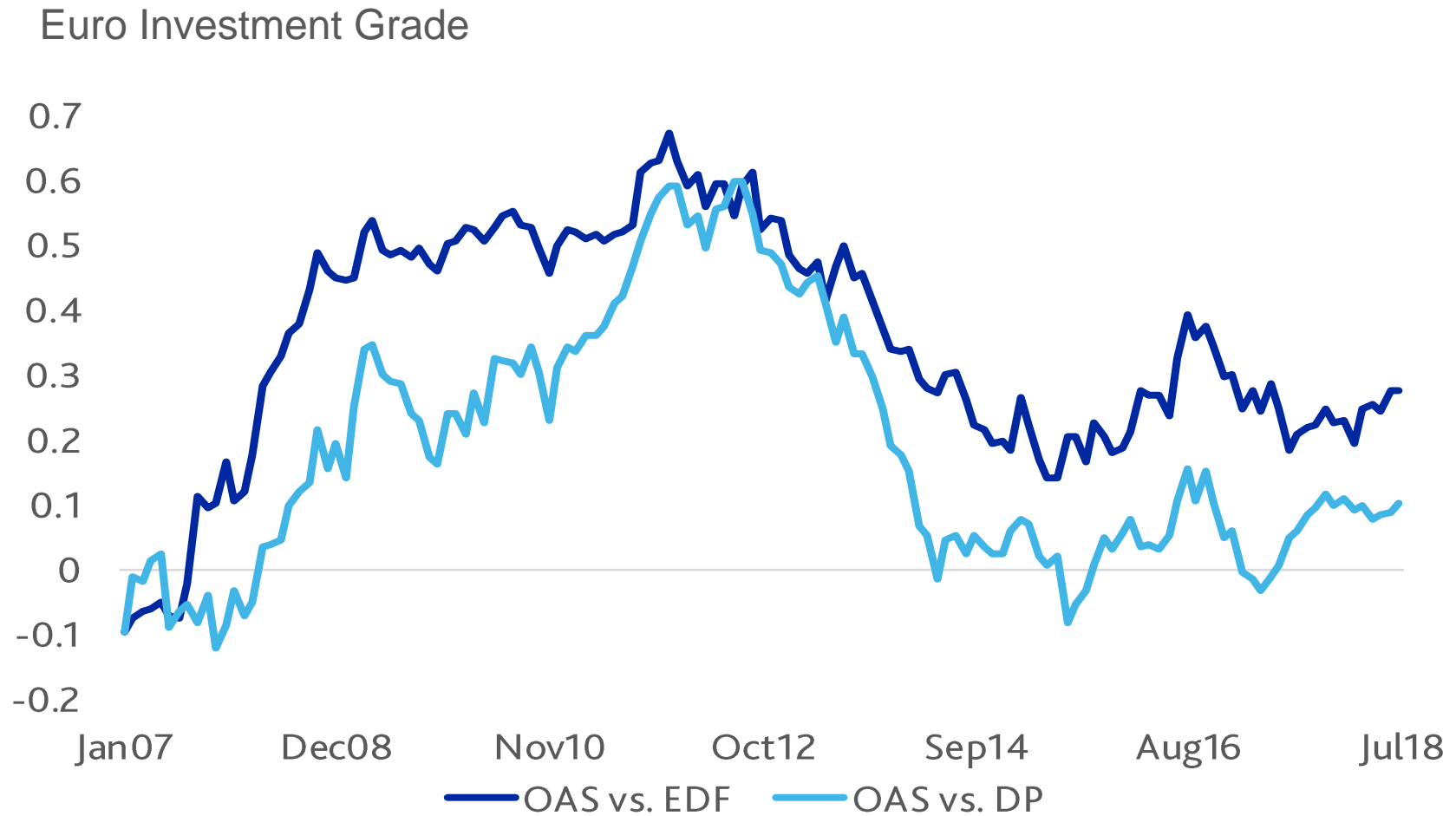


Spearman correlations: OAS with EDF and OAS with DP

US Investment Grade



Spearman correlations: OAS with EDF and OAS with DP

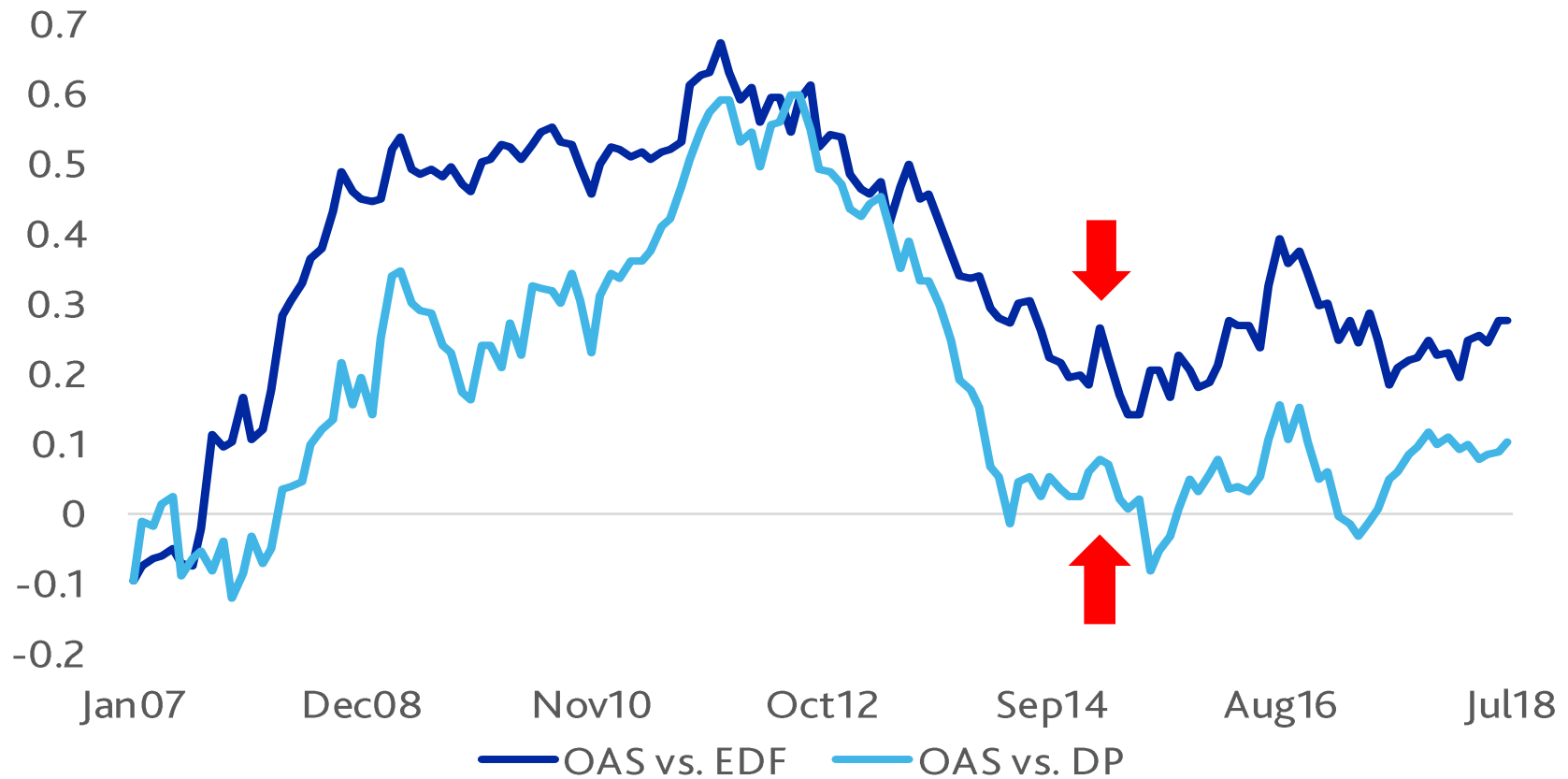


Spearman correlations: OAS with EDF and OAS with DP

Lower correlation for DP



Less yield slippage from DP sort than EDF sort



Confusion Matrices

		Outcome				
		6M		12M		
		FA	NFA	FA	NFA	
Signal	FA	4.3%	95.7%	7.8%	92.2%	→ Sum to 100%
	NFA	0.5%	99.5%	1.2%	98.8%	
	FA	69.9%	19.4%	62.5%	18.9%	↓ Sum to 100%
	NFA	30.1%	80.6%	37.5%	81.1%	

Yield slippage math

Computing the net benefit of the DP screen

USIG ex-top 20 vs. benchmark

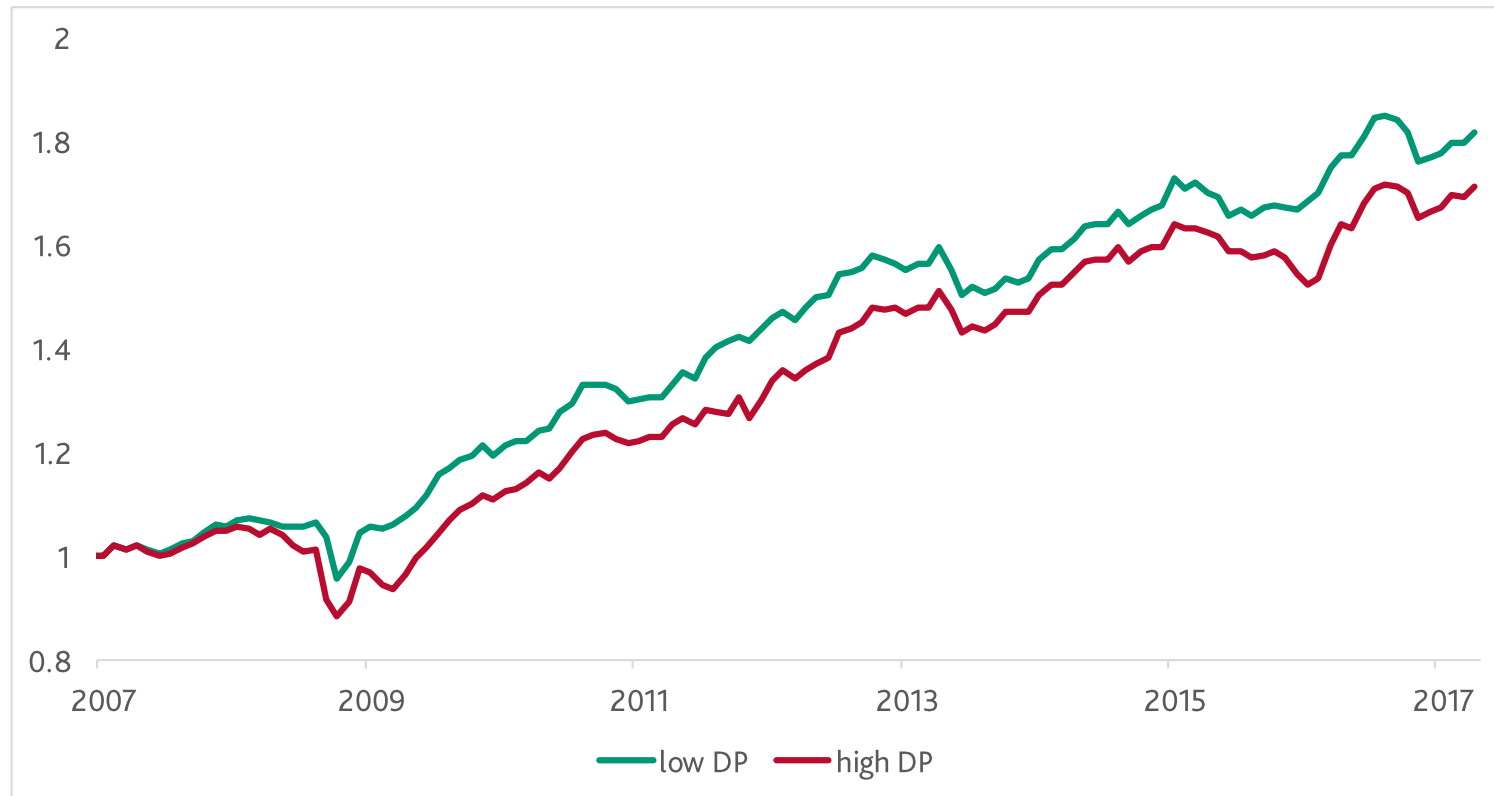
$$\begin{aligned} & -1\text{bp} \\ & + \\ & ((1.0) * (1.2\%) - ((0.80) * (1.2\%) + (0.20) * (7.8\%))) * (-990\text{bps}) \\ & = \mathbf{12\text{bps}} \end{aligned}$$

USIG ex-top 20 vs. top 20

$$\begin{aligned} & -7\text{bps} \\ & + \\ & (-990\text{bps}) * (1.2\% - 7.8\%) \\ & = \mathbf{58\text{bps}} \end{aligned}$$

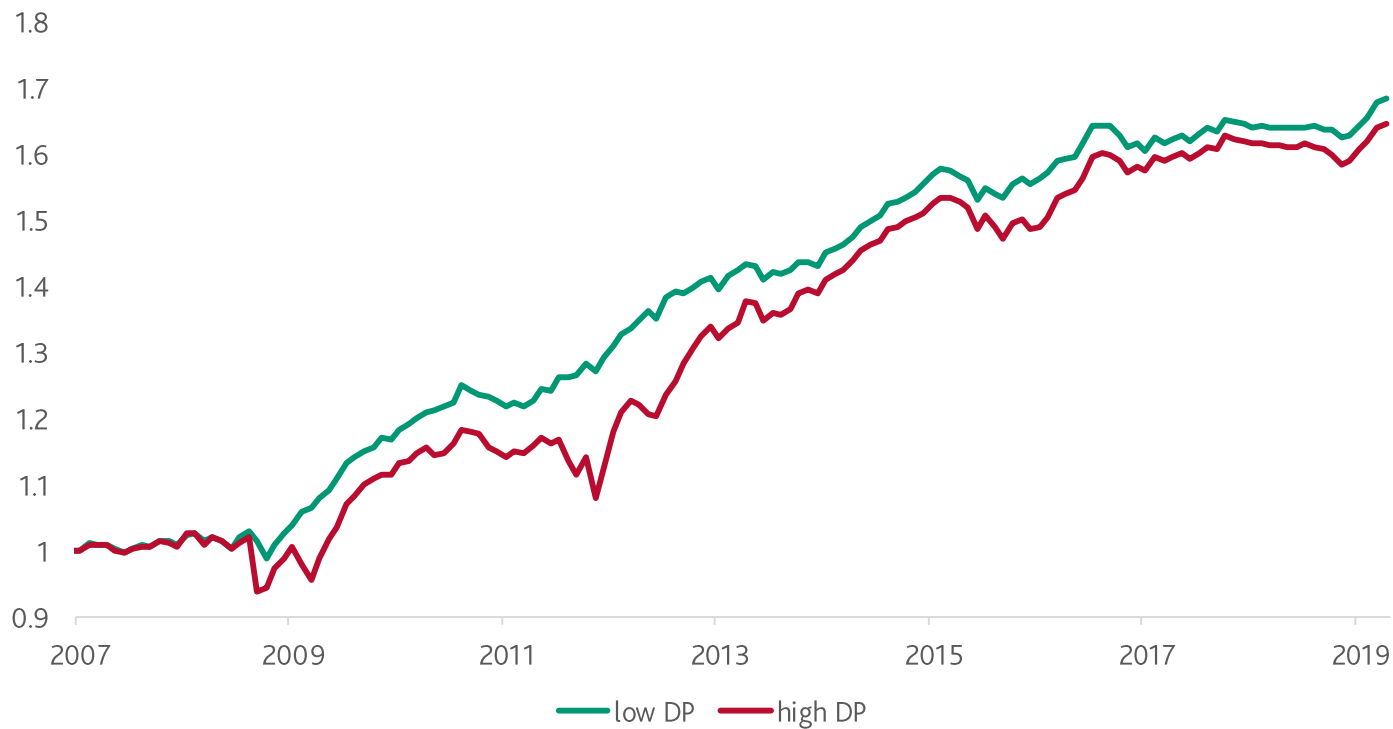
Cumulative total returns, high DP vs. low DP

US Investment Grade



Cumulative total returns, high DP vs. low DP

Euro Investment Grade

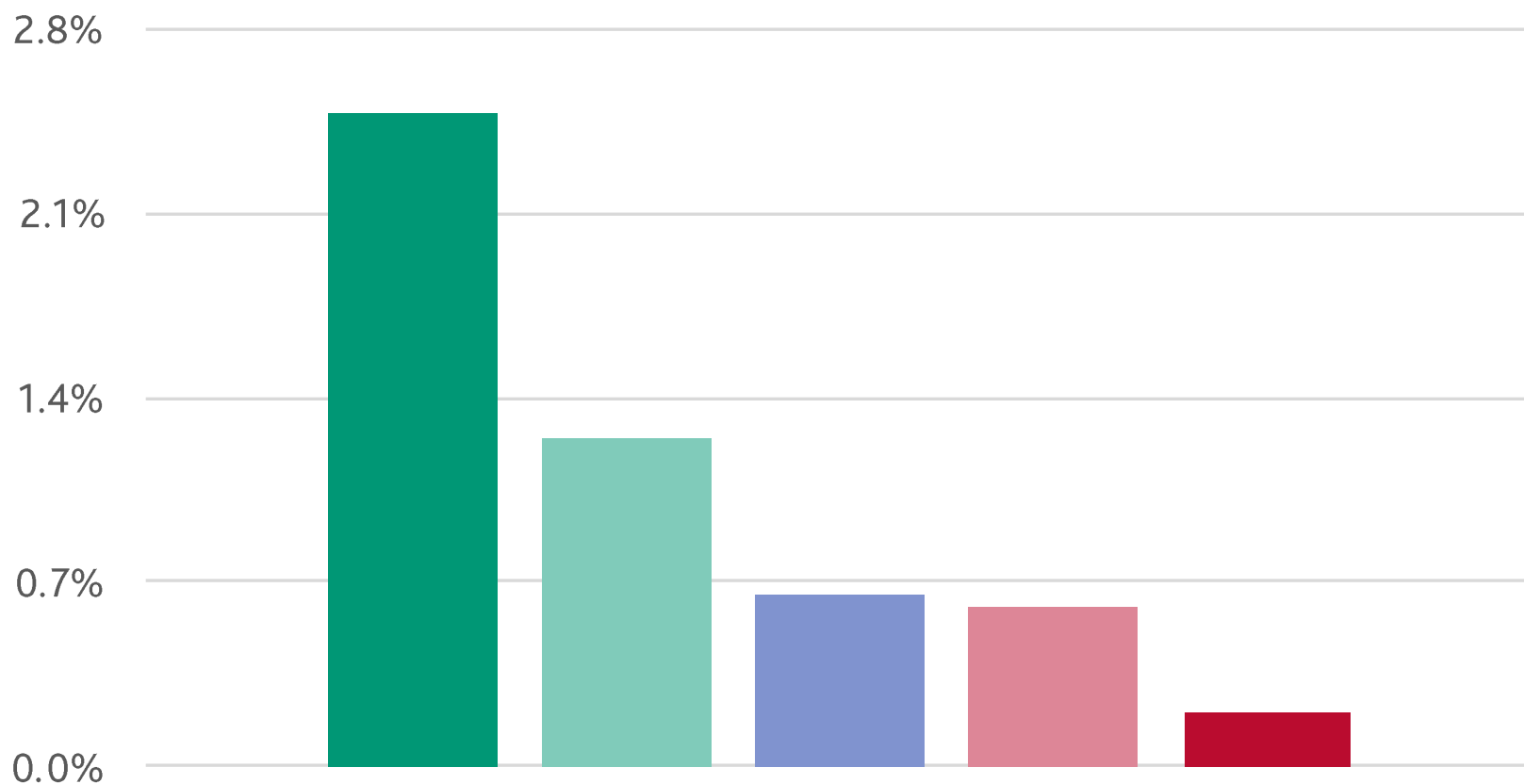


4

Rising Stars

Finding Value in Fallen
Angels

12-month rising star frequencies by DP quintile: Global HY



Bucket D1 corresponds to issuers with the lowest 20% of DP levels, whereas bucket D5 contains the top quintile of issuers by DP.

Alpha Factor

A Bond's Alpha Factor = OAS/Fair Value Spread

The FVS is a bond-level model output

When ranked by Alpha Factor, the most undervalued Fallen Angel issues (**high AF 20%**) outperformed the most overvalued FA bonds (**low AF 20%**)

USHY Fallen Angel: Performance of High AF/Low AF Strategies

Trading Frequency: Monthly



Dealing with Fallen Angels

- Fallen Angel risk is high and rising in global bond markets
- Unanticipated Fallen Angel downgrades are material events for bondholders, even compared to the garden-variety downgrade in IG.
- CreditEdge contains a metric, the DP, for predicting credit deterioration at the issuer level
- We have validated the DP for measuring Fallen Angel risk, and found it to be useful for IG bond investors
- The value premium in fixed income appears to be larger within the Fallen Angel asset class than in HY as a whole

5

Q&A

Thank you

Questions welcome!

MOODY'S

ANALYTICS

Samuel Malone, Ph.D.
Senior Director
Quantitative Research
212.553.2107 tel
Samuel.Malone@moodys.com

Yukyung Choi
Associate Director
Quantitative Research
212.553.0906 tel
Yukyung.Choi@moodys.com

Client Services

Americas: +1.212.553.1653
clientservices@moodys.com

EMEA: +44.207.772.5454
clientservices.emea@moodys.com

APAC: +852.3551.3077
clientservices.asia@moodys.com

Japan: +81.3.5408.4100
clientservices.japan@moodys.com

© 2019 Moody's Corporation, Moody's Investors Service, Inc., Moody's Analytics, Inc. and/or their licensors and affiliates (collectively, "MOODY'S"). All rights reserved.

CREDIT RATINGS ISSUED BY MOODY'S INVESTORS SERVICE, INC. AND ITS RATINGS AFFILIATES ("MIS") ARE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES, AND MOODY'S PUBLICATIONS MAY INCLUDE MOODY'S CURRENT OPINIONS OF THE RELATIVE FUTURE CREDIT RISK OF ENTITIES, CREDIT COMMITMENTS, OR DEBT OR DEBT-LIKE SECURITIES. MOODY'S DEFINES CREDIT RISK AS THE RISK THAT AN ENTITY MAY NOT MEET ITS CONTRACTUAL, FINANCIAL OBLIGATIONS AS THEY COME DUE AND ANY ESTIMATED FINANCIAL LOSS IN THE EVENT OF DEFAULT. CREDIT RATINGS DO NOT ADDRESS ANY OTHER RISK, INCLUDING BUT NOT LIMITED TO: LIQUIDITY RISK, MARKET VALUE RISK, OR PRICE VOLATILITY. CREDIT RATINGS AND MOODY'S OPINIONS INCLUDED IN MOODY'S PUBLICATIONS ARE NOT STATEMENTS OF CURRENT OR HISTORICAL FACT. MOODY'S PUBLICATIONS MAY ALSO INCLUDE QUANTITATIVE MODEL-BASED ESTIMATES OF CREDIT RISK AND RELATED OPINIONS OR COMMENTARY PUBLISHED BY MOODY'S ANALYTICS, INC. CREDIT RATINGS AND MOODY'S PUBLICATIONS DO NOT CONSTITUTE OR PROVIDE INVESTMENT OR FINANCIAL ADVICE, AND CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT AND DO NOT PROVIDE RECOMMENDATIONS TO PURCHASE, SELL, OR HOLD PARTICULAR SECURITIES. NEITHER CREDIT RATINGS NOR MOODY'S PUBLICATIONS COMMENT ON THE SUITABILITY OF AN INVESTMENT FOR ANY PARTICULAR INVESTOR. MOODY'S ISSUES ITS CREDIT RATINGS AND PUBLISHES MOODY'S PUBLICATIONS WITH THE EXPECTATION AND UNDERSTANDING THAT EACH INVESTOR WILL, WITH DUE CARE, MAKE ITS OWN STUDY AND EVALUATION OF EACH SECURITY THAT IS UNDER CONSIDERATION FOR PURCHASE, HOLDING, OR SALE.

MOODY'S CREDIT RATINGS AND MOODY'S PUBLICATIONS ARE NOT INTENDED FOR USE BY RETAIL INVESTORS AND IT WOULD BE RECKLESS AND INAPPROPRIATE FOR RETAIL INVESTORS TO USE MOODY'S CREDIT RATINGS OR MOODY'S PUBLICATIONS WHEN MAKING AN INVESTMENT DECISION. IF IN DOUBT YOU SHOULD CONTACT YOUR FINANCIAL OR OTHER PROFESSIONAL ADVISER.

ALL INFORMATION CONTAINED HEREIN IS PROTECTED BY LAW, INCLUDING BUT NOT LIMITED TO, COPYRIGHT LAW, AND NONE OF SUCH INFORMATION MAY BE COPIED OR OTHERWISE REPRODUCED, REPACKAGED, FURTHER TRANSMITTED, TRANSFERRED, DISSEMINATED, REDISTRIBUTED OR RESOLD, OR STORED FOR SUBSEQUENT USE FOR ANY SUCH PURPOSE, IN WHOLE OR IN PART, IN ANY FORM OR MANNER OR BY ANY MEANS WHATSOEVER, BY ANY PERSON WITHOUT MOODY'S PRIOR WRITTEN CONSENT.

All information contained herein is obtained by MOODY'S from sources believed by it to be accurate and reliable. Because of the possibility of human or mechanical error as well as other factors, however, all information contained herein is provided "AS IS" without warranty of any kind. MOODY'S adopts all necessary measures so that the information it uses in assigning a credit rating is of sufficient quality and from sources MOODY'S considers to be reliable including, when appropriate, independent third-party sources. However, MOODY'S is not an auditor and cannot in every instance independently verify or validate information received in the rating process or in preparing the Moody's publications.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability to any person or entity for any indirect, special, consequential, or incidental losses or damages whatsoever arising from or in connection with the information contained herein or the use of or inability to use any such information, even if MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers is advised in advance of the possibility of such losses or damages, including but not limited to: (a) any loss of present or prospective profits or (b) any loss or damage arising where the relevant financial instrument is not the subject of a particular credit rating assigned by MOODY'S.

To the extent permitted by law, MOODY'S and its directors, officers, employees, agents, representatives, licensors and suppliers disclaim liability for any direct or compensatory losses or damages caused to any person or entity, including but not limited to by any negligence (but excluding fraud, willful misconduct or any other type of liability that, for the avoidance of doubt, by law cannot be excluded) on the part of, or any contingency within or beyond the control of, MOODY'S or any of its directors, officers, employees, agents, representatives, licensors or suppliers, arising from or in connection with the information contained herein or the use of or inability to use any such information.

NO WARRANTY, EXPRESS OR IMPLIED, AS TO THE ACCURACY, TIMELINESS, COMPLETENESS, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY SUCH RATING OR OTHER OPINION OR INFORMATION IS GIVEN OR MADE BY MOODY'S IN ANY FORM OR MANNER WHATSOEVER.

Moody's Investors Service, Inc., a wholly-owned credit rating agency subsidiary of Moody's Corporation ("MCO"), hereby discloses that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by Moody's Investors Service, Inc. have, prior to assignment of any rating, agreed to pay to Moody's Investors Service, Inc. for appraisal and rating services rendered by it fees ranging from \$1,500 to approximately \$2,500,000. MCO and MIS also maintain policies and procedures to address the independence of MIS's ratings and rating processes. Information regarding certain affiliations that may exist between directors of MCO and rated entities, and between entities who hold ratings from MIS and have also publicly reported to the SEC an ownership interest in MCO of more than 5%, is posted annually at www.moody's.com under the heading "Investor Relations — Corporate Governance — Director and Shareholder Affiliation Policy."

Additional terms for Australia only: Any publication into Australia of this document is pursuant to the Australian Financial Services License of MOODY'S affiliate, Moody's Investors Service Pty Limited ABN 61 003 399 657 AFSL 336969 and/or Moody's Analytics Australia Pty Ltd ABN 94 105 136 972 AFSL 383569 (as applicable). This document is intended to be provided only to "wholesale clients" within the meaning of section 761G of the Corporations Act 2001. By continuing to access this document from within Australia, you represent to MOODY'S that you are, or are accessing the document as a representative of, a "wholesale client" and that neither you nor the entity you represent will directly or indirectly disseminate this document or its contents to "retail clients" within the meaning of section 761G of the Corporations Act 2001. MOODY'S credit rating is an opinion as to the creditworthiness of a debt obligation of the issuer, not on the equity securities of the issuer or any form of security that is available to retail investors. It would be reckless and inappropriate for retail investors to use MOODY'S credit ratings or publications when making an investment decision. If in doubt you should contact your financial or other professional adviser.

Additional terms for Japan only: Moody's Japan K.K. ("MJKK") is a wholly-owned credit rating agency subsidiary of Moody's Group Japan G.K., which is wholly-owned by Moody's Overseas Holdings Inc., a wholly-owned subsidiary of MCO. Moody's SF Japan K.K. ("MSFJ") is a wholly-owned credit rating agency subsidiary of MJKK. MSFJ is not a Nationally Recognized Statistical Rating Organization ("NRSRO"). Therefore, credit ratings assigned by MSFJ are Non-NRSRO Credit Ratings. Non-NRSRO Credit Ratings are assigned by an entity that is not a NRSRO and, consequently, the rated obligation will not qualify for certain types of treatment under U.S. laws. MJKK and MSFJ are credit rating agencies registered with the Japan Financial Services Agency and their registration numbers are FSA Commissioner (Ratings) No. 2 and 3 respectively.

MJKK or MSFJ (as applicable) hereby disclose that most issuers of debt securities (including corporate and municipal bonds, debentures, notes and commercial paper) and preferred stock rated by MJKK or MSFJ (as applicable) have, prior to assignment of any rating, agreed to pay to MJKK or MSFJ (as applicable) for appraisal and rating services rendered by it fees ranging from JPY200,000 to approximately JPY350,000,000.

MJKK and MSFJ also maintain policies and procedures to address Japanese regulatory requirements.