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Topic in High-Yield: Private vs. Public Issuers

Updates on Fallen Angels and Empirical Duration

June 11, 2015

Revisiting the Performance Dynamics of Fallen Angels

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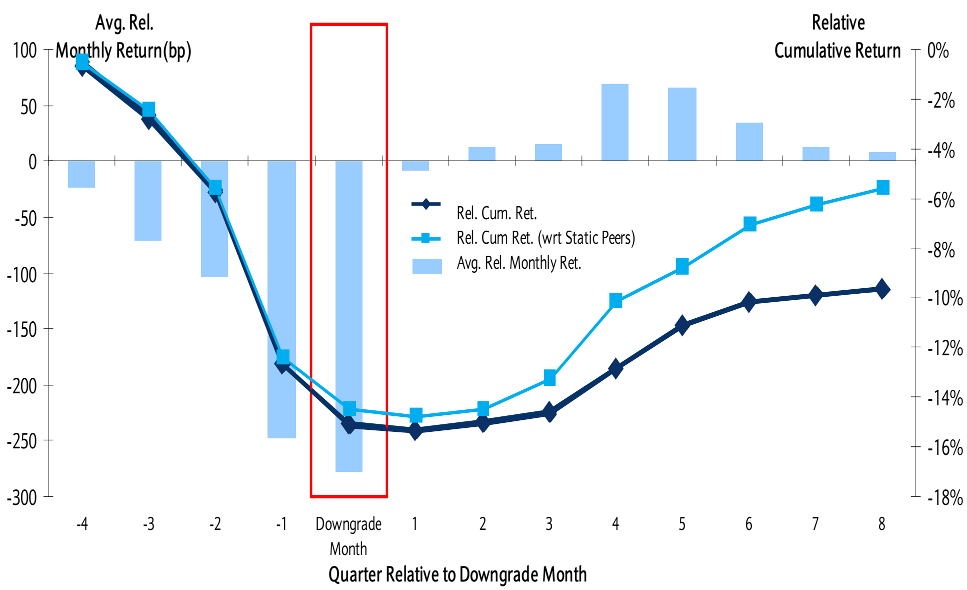
Recap: Fallen Angels Exhibit Strong Recovery Post Downgrade

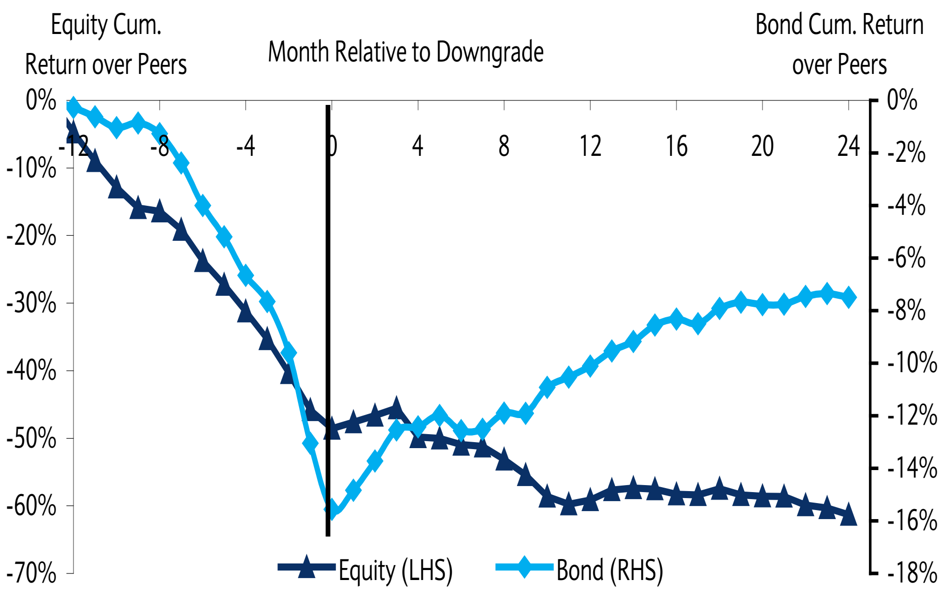
Ben Dor and Xu (2010)

- FA underperformed IG peers by 15.1% in the downgrade month and preceding year
- Outperformed IG and HY peers by 10.2% and 6.3% over the next two years, respectively
- Reversal is limited to bonds. FA equities continue to underperform

FA Performance Around Downgrade Month | **FA Performance: Bonds Vs. Equities**

Based on Monthly Observations January 1990 – June 2010

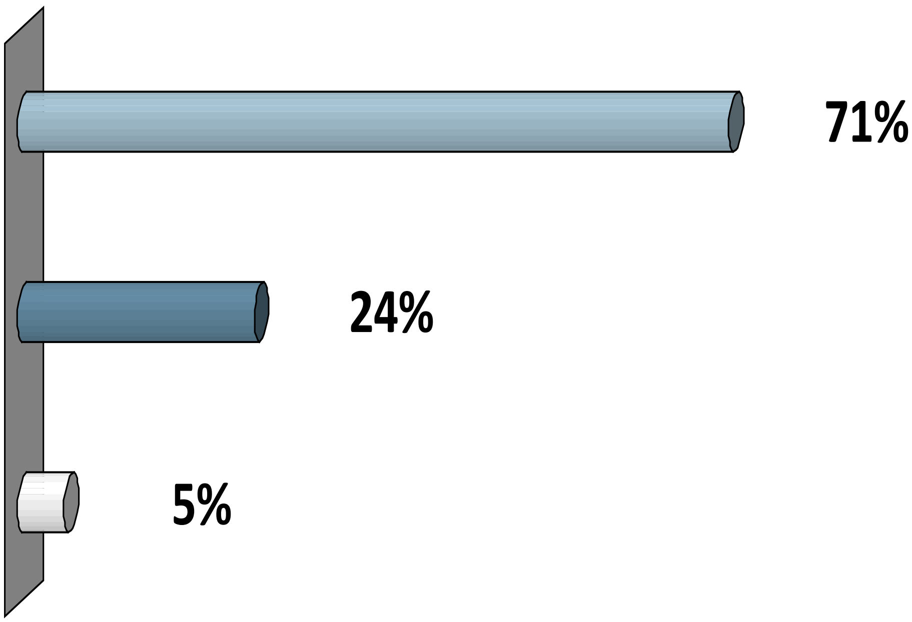




Note: Returns computed using value weighting. Source: Barclays Research

Investors Expected the Outperformance to Persist

AAC – 2012: Do you believe fallen angels will continue to experience a similar degree of forced selling?

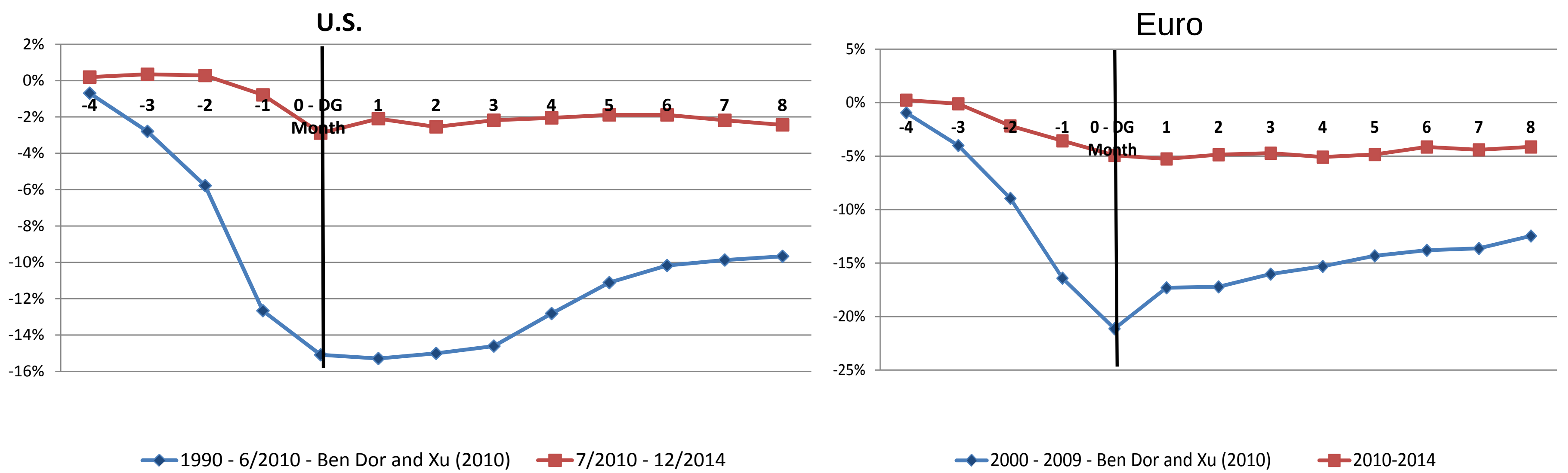


1. Yes
2. Yes, but they will not continue to exhibit the same performance dynamics
3. No. The formulation of IG mandates will change

But the Price Dynamics of Fallen Angels Changed Recently…

- Historically FA underperformed peers by 15.09% (downgrade month + preceding year) with a sharp reversal in the next two years outperforming HY peers by 6.38%
- Since 2010, they exhibited very mild mean reversion, declining by a total of 2.89%, and performance remaining flat afterwards
- Results for the Euro market show a similar weakening of the mean-reversion pattern
- *What is the reason for the change?*

Cum. Performance of Fallen Angels over Peers by Quarter



Note: The return of each issuer is over the contemporaneous return of a peer group with similar characteristics based on industry (financials, industrials, and utilities), credit quality (A and higher, Baa, Ba, B, and Caa and lower), and maturity (up to ten years and above ten years). Cumulative relative returns were calculated by first averaging issuers' relative returns by month and then cumulating them since the beginning of the analysis window. Source: Barclays Research

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Recent Dynamics in HY Market May Have Affected Fallen Angels

- *Decline in **Relative** Supply*: Ann. volume of fallen angels since 2010 was 1.4% to 3.4% of HY market, vs. 8% in 1990 – 2009. Mostly due to the increase in overall market size

- *Increase in Demand for HY*: as a result of low rate environment. Led to unprecedented issuance of high yield debt (x3 the average in earlier years)

➢ Combined effect: *Market capacity to absorb the supply of fallen angels has improved*

Supply of Fallen Angels and Demand for High Yield Securities

Year	Number of Fallen Angels Issuers	Market Value of FA Bonds ($Bln)	Market Value of FA as % of High-Yield Index	Primary High-Yield Issuance ($Bln)
Ben Dor and Xu (2010): Annual Results 1990 - 2009				
Average	22.1	26.7	8.0%	99.1
Median	16.5	16.3	6.1%	102.1
2010	7.0	16.1	2.0%	263.7
2011	9.0	13.0	1.4%	226.2
2012	14.0	27.3	2.7%	329.6
2013	12.0	40.1	3.4%	334.1
2014	16.0	29.3	2.2%	311.7

Note: The data on primary issuance of high-yield debt is based on SIFMA (Securities Industry and Financial Markets Association) figures. Source: SIFMA, Barclays Research

Supply/Demand Dynamics Only Provide a Partial Explanation

- The dif. between long-term and recent supply (8% vs. 2-3%) decreased the initial price decline by 1.6-2%. Market OAS and downgrade severity accounted for another 2-2.5%
- *Over half of the change in recent underperformance remained unexplained*
- Post-downgrade performance is negatively linked to the initial price decline (t-stat. 6.59)
- A 10% increase in issuance led to a 170bp decline over the six months after the DG

The Determinants of Fallen Angels Pre- and Post Downgrade Performance

Dep. Variables	Cum. RelRet		Cum. RelRet	
	Coef.	*t-stats*	Coef.	*t-stats*
Intercept	2.31	*0.27*	4.49	*1.73*
FA Supply (% of HY market over trailing 12m)	-0.34	*-2.80*		
HY OAS (avg. trailing 12m)	-0.57	*-1.96*		
MV of DG Issuer (in log)	0.08	*0.14*		
Notch of DG	-3.36	*-6.68*		
Financial Issuers?	-1.23	*-0.60*		
Utility Issuers?	1.44	*0.71*		
Cum. RelRet (month -5 to 0)			-0.39	*-6.59*
HY Issuance (% of HY market over trailing 12m)			-0.17	*-2.13*
# of Obs	492		492	
Adj. RSq	11%		9%	

Note: Based on data between 1990 and 2014. Source: Barclays Research

So What Caused the Change in Fallen Angels Performance?

- Regression results are consistent with increased demand for HY alongside the decline in (relative) supply of FA limiting the price declines

- This in turn led to a muted reversal in subsequent quarters

- Some of the change may reflect a change in the formulation of investment mandates

- Does this necessarily imply that investing in fallen angels is no longer attractive?

Rule-based Investing in Fallen Angels – A Recap

- Three portfolios: Buy All, 3-Month Reversal and Flexible Reversal - all invest solely in fallen angels

Bond Inclusion / Exclusion Criteria by Portfolio

Portfolio		Buy All	3-Month Reversal	Flexible Reversal
Buy Conditions (if all are satisified)	Timing	Downgrade Month	Month 3	Month 1 - 6
	Min.Relative Spread	N/A	≥ 40 bps	≥ 40 bps
	Min. Price	N/A	N/A	≥ $40
	Chg. In Relative Spread	N/A	N/A	Tighten
Sell Triggers (if any one is satisified)	Technical	Yes	Yes	Yes
	Timing	Month 24	Month 24	Month 24
	Relative Spread	N/A	Negative	Negative

* Technical sell trigger - bonds that matured, defaulted or were called. Source: Barclays Research

- Fully seeded with cash at inception, rebalanced monthly
- One bond per issuer with a 10% issuer limit
- Unallocated capital invested in “Cash” earning 1-Month Libor
- Equally weighted positions

Example

- June 2009: Portfolio has eight bonds with 10% weight each, 20% cash
- July 2009: Two bonds are sold and five bought

⇨Total number of bonds is now 11, each bond has a weight of 9.09% of portfolio total value

Selective Investing in Fallen Angels Is Still Attractive

- In recent period FA in aggregate did not differ from originally issued HY in terms of performance/risk
- 'Buy All' port. return declined from 1.07% to 0.78%/month, while peer group return was unchanged
- '3-Month Reversal' still outperformed peers (1.11% vs. 0.80%/month) but outperformance was only half compared with the initial study period (1990 – 6/2010)
- The S.R of the '3-Month Reversal' and the peers doubled because of the large decline in market vol.
- The difference between the 'Buy All' and '3-Month Reversal' reflects the fact that the '3-Month Reversal' does not invest in FA indiscriminately but employs time and price criteria

The Performance of Fallen Angels Strategy Portfolios

	'Buy All'			'3-Month Reversal'			High-Yield Index
	Portfolio	Peer Group	Ret. over Peer Group	Portfolio	Peer Group	Ret. over Peer Group	
Jan. 1991 - Jun. 2010 (Ben Dor and Xu 2010 study)							
Average (Monthly)	1.07%	0.76%	0.31%	1.62%	0.84%	0.78%	0.81%
Volatility (Monthly)	2.79%	2.16%	1.68%	3.99%	2.31%	2.63%	2.68%
Sharpe/Inf. Ratio (Ann.)	0.90	0.68	0.64	1.12	0.76	1.03	0.61
% of Positive Ret. Months	73%	75%	58%	75%	76%	63%	76%
% Invested in Fallen Angels	98%			69%			
Jul. 2010 - Dec. 2014							
Average (Monthly)	0.78%	0.75%	0.03%	1.11%	0.80%	0.31%	0.74%
Volatility (Monthly)	1.67%	1.65%	0.84%	1.85%	1.62%	0.88%	1.78%
Sharpe/Inf. Ratio (Ann.)	1.59	1.54	0.14	2.06	1.67	1.23	1.40
% of Positive Ret. Months	76%	74%	59%	74%	74%	65%	74%
% Invested in Fallen Angels	100%			55%			

Note: The returns for the portfolios' peer group were computed as the equal–weighted performances of the individual bonds' peer groups . Sharpe Ratio was calculated using 1m Libor. Inf. ratio is the ratio of average and standard deviation of relative returns. Source: Barclays Research

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Summary

- Over the past several years fallen angels no longer experienced strong mean reversion following their downgrade to High Yield
- Only part of the change in their performance dynamics can be attributed to the increased demand for HY and decline in their relative supply
- However, the ‘3-Month Reversal’ strategy was able to deliver strong outperformance vs. HY peers, albeit not to the same extent as before

An Empirical Analysis of the Difference between Public and Private Issuers of High Yield Bonds

Motivation

- Many HY issuers are private companies with no publicly traded equity

- **Some investors believe private HY issuers trade at higher spreads and offer better returns….**

Why would public and private HY issuers differ?

- Firm-specific Information -- public issuers must release fundamental information periodically unlike private issuers

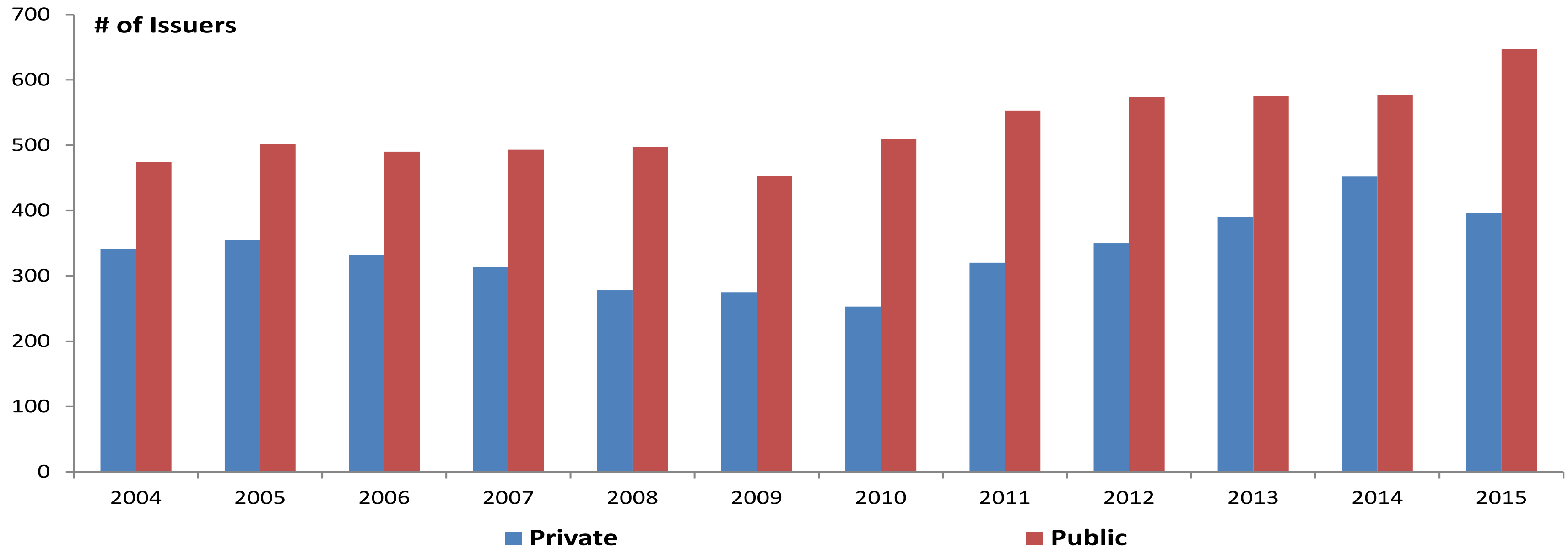
- Ownership structure -- private issuers tend to have more concentrated ownership. This may be positive (i.e., less agency problem) or negative (equity shareholders benefit at the expense of debt holders)

Do private issuers outperform public issuers or are higher spreads just compensation for higher risk?

Sample Construction

- Limited to HY issuers as IG issuers are almost entirely public firms
- All HY issuers not mapped to Compustat equity data are designated as 'private'
- Mapping based on methodology used in BEAM (Bonds in Equity Asset Momentum)*
- Over the past decade number of public issuers was twice that of private issuers
- As of Jan. 2015, the sample included 647 and 396 public/private issuers, respectively

Population of HY Issuers by Type and Year



Note: The number of issuers reflects beginning-of-year (January) values. Sources: Barclays Research

* See Ben Dor, A., and J. Xu., "BEAM (Bonds in Equity Asset Momentum). Value of Bond Market Information in Equity Momentum Strategies", Barclays Research, June 5, 2014

Issuers Characteristics

- Private issuers had lower maturity and amount outstanding, and higher spread, coupon, and liquidity cost scores compared with public issuers
- The differences in characteristics are all consistent with private issuers having higher credit risk

Issuer Characteristics: Public vs. Private (Year End)

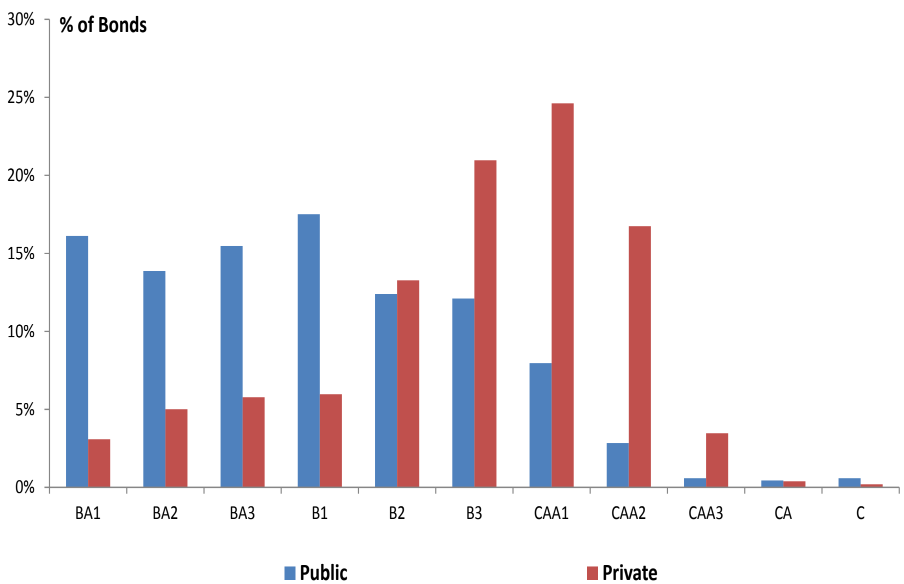
	Maturity (Year)		Coupon (%)		Amount Outstanding ($m)		Price		OAS (bp)		LCS (%)	
Year	Private	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private	Public
2004	6.54	6.83	9.50	8.13	230	285	105.00	105.50	430	302		
2005	6.75	6.92	9.00	7.88	225	300	105.25	106.50	329	209		
2006	6.46	6.67	8.88	7.75	223	300	100.00	101.13	379	247		
2007	6.50	6.62	9.00	7.63	250	300	101.50	101.00	333	213		
2008	6.62	6.29	9.00	7.50	293	300	94.00	97.00	633	427	2.80	2.45
2009	5.87	5.83	9.00	7.50	300	300	58.76	69.09	1986	1404	10.59	7.57
2010	5.23	5.75	9.38	7.63	302	310	97.50	100.00	685	483	2.76	2.13
2011	5.33	6.17	9.38	7.75	333	350	102.63	103.00	605	427	2.14	1.57
2012	5.62	6.21	9.75	7.63	350	400	98.75	102.50	874	543	3.21	2.25
2013	5.62	6.29	9.16	7.50	378	400	104.38	107.13	645	400	2.03	1.41
2014	5.37	6.37	8.50	7.00	385	450	104.50	105.57	461	297	1.68	1.36
2015	5.02	6.08	8.25	6.50	400	500	100.50	101.75	590	365	2.22	1.46
Average	**5.99**	**6.36**	**9.14**	**7.63**	**297**	**336**	**97.48**	**99.86**	**669**	**450**	**3.60**	**2.68**

Note: All statistics represent median values and reflect beginning-of-year (January) values. Sources: Barclays Research

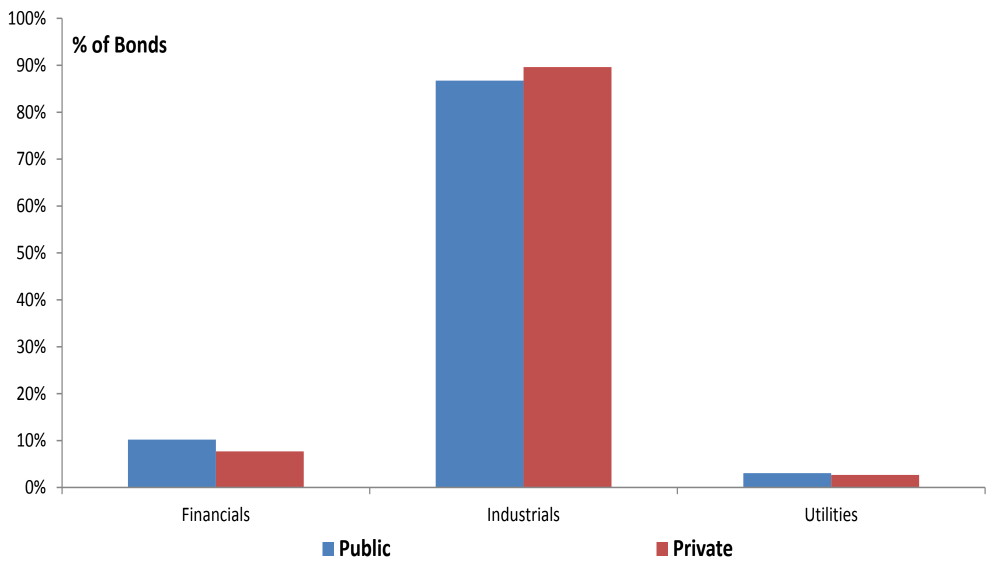
Credit Rating and Industry Differences

- ❑ Private issuers had lower credit ratings
  - The median/mode was B3/Caa1 vs. B1/Ba2 for public issuers
  - Explains the large spread differential
- ❑ No difference in industry representation
  - A finer industry partition is needed to control for industry effects

Credit Rating Distribution



Industry Distribution



Sources: Barclays Research

Private Issuers Trade at Higher Spreads

After controlling for bond characteristics, do private issuer bonds still offer higher carry?

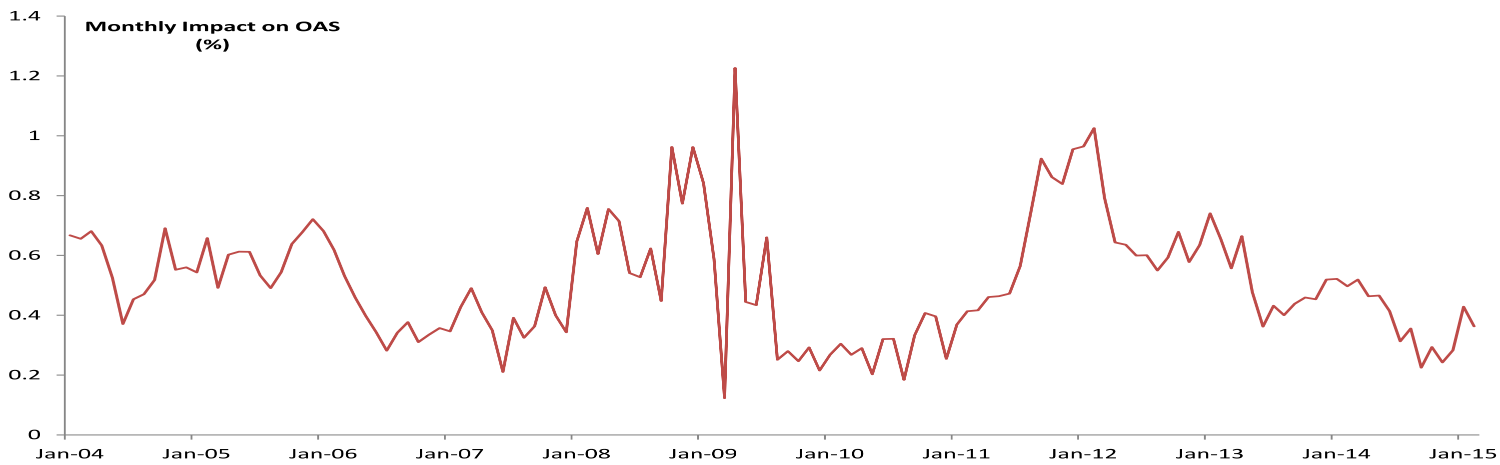
- To see the effect of issuer type, we regress OAS on a set of bond characteristics (rating, amount out., maturity, coupon, industry) and a dummy variable for issuer type
  - In the pooled regression, private issuer spreads were 57bp higher on avg. after controlling for ratings, maturity, industry, issue size, etc.

Pooled Regression on Spread

Model		Intercept	Credit Rating	Amt. Outstanding	Maturity	Coupon	Private	Financials	Utilities	Adj. R-Sq	# of Obs.
1	Coeff.	0.05	0.85	-0.14	-0.02	0.21		1.62	0.10		
	t-Stat.	*0.28*	*238.36*	*-11.21*	*-16.62*	*48.73*		*54.96*	*3.99*	48%	201,819
2	Coeff.	0.08	0.82	-0.13	-0.02	0.18	0.57	1.58	0.09		
	t-Stat.	*0.45*	*220.50*	*-10.18*	*-16.05*	*41.76*	32.47	*53.62*	*3.32*	49%	201,819

  - In the monthly regressions, the coefficient on the private issuer dummy was mostly positive except a short period during the financial crisis

Time-Variation in effect of Issuer Category

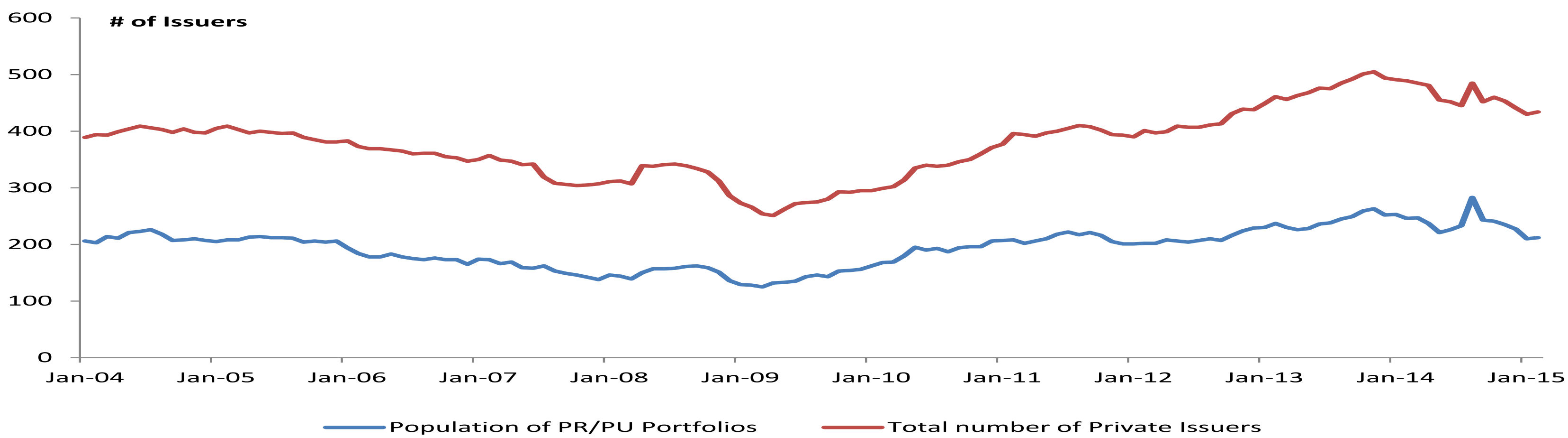


Source: Compustat, Barclays Research

Do Private Issuers Outperform Public Issuers?

- To control for differences in characteristics, we construct issuer-matched portfolios
  1. Each private issuer was paired monthly to a public issuer with the same **credit rating** (11 notches) and **sub-industry** (59 sub-industry groups)
  2. When more than one matching public issuer was available, the one with the smallest difference in **duration** or **issue size** was selected
  3. The pairing of public and private issuers was one to one (No public issuer is matched to two or more different private issuers)
  4. A private issuer with no match was dropped
- The two portfolios have the same number of issuers with roughly 60% of private issuers included in the matched sample (avg. of 200 issuers)

Population of Issuer-Matched Portfolios and Overall Sample

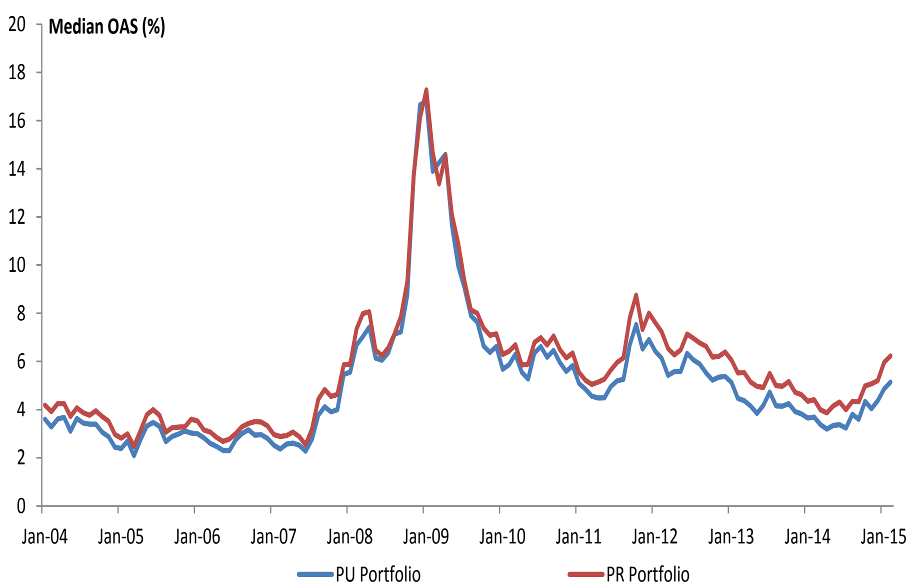


Source: Compustat, Barclays Research

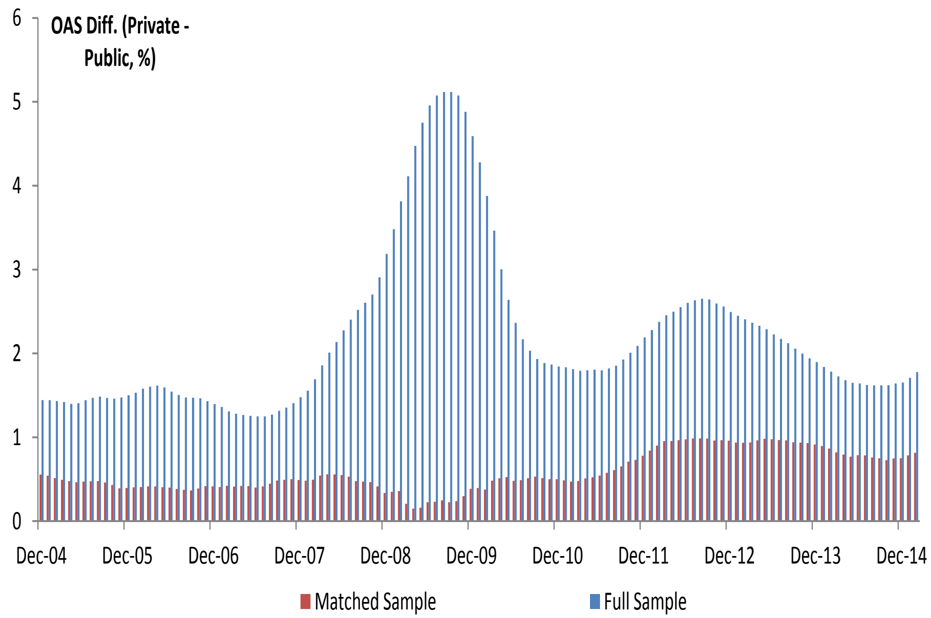
Public vs. Private Spread Over Time

- Spread difference between private and public issuers was always positive
- Pattern still persisted in the matched sample but with a smaller magnitude
- Time variation of private/public spread difference was driven by overall HY market
  - Spread difference widened during crisis (2008 financial crisis and 2011 European crisis), and gradually tightened afterwards

Median Issuer OAS in *PR* and *PU* Portfolios



12-month Rolling Dif. in Issuers' Spread by Sample



Sources: Barclays Research

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Portfolios Performance

- During the 2005-15 period, private and public issuers had similar return 44bp/mo vs. 43bp/mo despite a 260bp average spread advantage
- In the matched sample, the avg. spread difference was only 68bp, with the private underperforming the public portfolio by 5-7bp/mo (excess ret.)
- We see a similar pattern for risk-adj. performance (I.R. of 0.40 vs. 0.42~0.45)
- Results suggest that spread advantage did not lead to outperformance of private issuers

Performance Statistics: Public vs. Private (Jan. 2005 – Feb. 2015) – EW

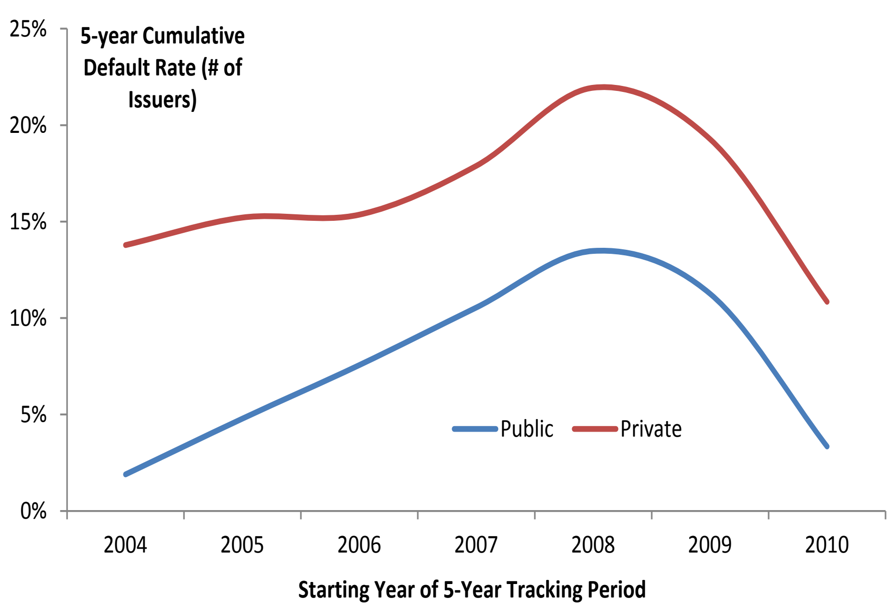
	Unmatched Sample		Issuer Matched Sample		
	All Private	All Public	PR Port.	PU Portfolio (min. Duration dif.)	PU Portfolio (min. Size dif.)
Avg Tot. Ret. (%/mo)	0.72	0.71	0.66	0.69	0.70
Avg Ex. Ret. (%/mo)	0.40	0.38	0.34	0.37	0.37
Std. Tot. Ret (%/mo)	3.15	2.67	2.82	3.04	3.04
Std. Ex. Ret (%/mo)	3.57	3.08	3.25	3.44	3.45
Inf. Ratio	0.39	0.42	0.36	0.37	0.38
Avg. OAS (%)	7.87	5.22	6.57	5.96	5.95
Avg. Duration	3.73	4.24	3.82	4.00	4.04
Avg. DTS	29.37	22.14	25.13	23.83	24.04

Sources: Barclays Research

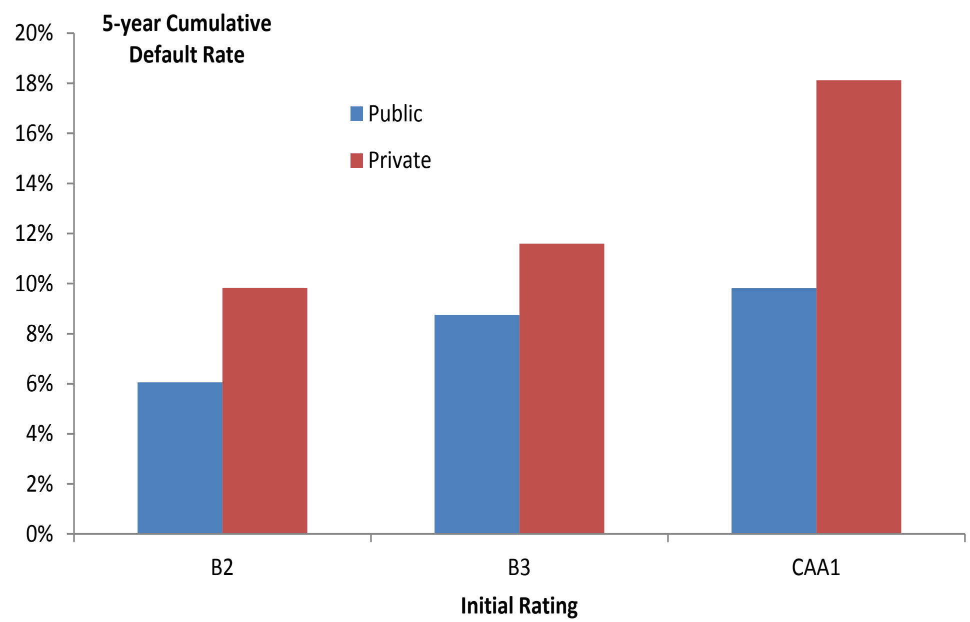
What Accounts for the Higher Spread of Private Issuers

- **Were private issuers spreads wider as a compensation for higher default risk?**
- We look at 5-year default rate of issuers within a cohort (all issuers existing at the start of a 5-year window with a certain initial credit rating)
- Private issuers experienced higher default rate even after controlling for initial rating
- Over 20% of Caa1-rated private issuers defaulted within five years vs. only 10% of public issuers

5-Year Default Rate by Cohort Year



Avg. 5-Year Default Rate by Initial Rating



Sources: Barclays Research

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Summary

- Private issuers trade at wider spreads compared with public issuers even after controlling for differences in issuers' characteristics
- The spreads differential varied over time and was related to the overall HY market OAS
- Despite the carry advantage, private issuers did not outperform similar public issuers
- This is at least in part due to higher default rates
- Private issuers exhibited lower correlation with the equity market

High-Yield Empirical Duration – An Update

What Is the Empirical Duration of a Core+ Portfolio?

- Credit-Gov benchmark and portfolio have both a duration of 5
- Manager shifts 10% into HY, with (analytical) duration of 5
- Portfolio target duration is 4.8
- Manager would like to adjust the Treasury component of the portfolio to hit this target

What should the manager do?

The Relation Between Analytical and Empirical Duration

- Returns to credit securities can be largely captured by a two-factor model (using the notion of DTS)

$$R \cong -D \times \Delta y - (D \times s) \times \Delta s_{rel}$$

- Using (historical) correlations, spread changes can be approximated as a function of yield changes

$$\frac{\partial s_{rel}}{\partial y} \cong \frac{\operatorname{cov}(\Delta y, \Delta s_{rel})}{\operatorname{var}(\Delta y)} = \frac{\rho_{y,s}\sigma_y\sigma_s}{\sigma_y^2} = \rho_{y,s}\frac{\sigma_s}{\sigma_y}$$

- Resulting in the following regression

$$R = \beta \cdot D \cdot \Delta y + \gamma \cdot D \cdot s \cdot \Delta y + \varepsilon$$

- Which provides a linear approximation for the empirical hedge ratio as function of spread

$$H^{emp}(S) = \beta + \gamma \cdot s$$

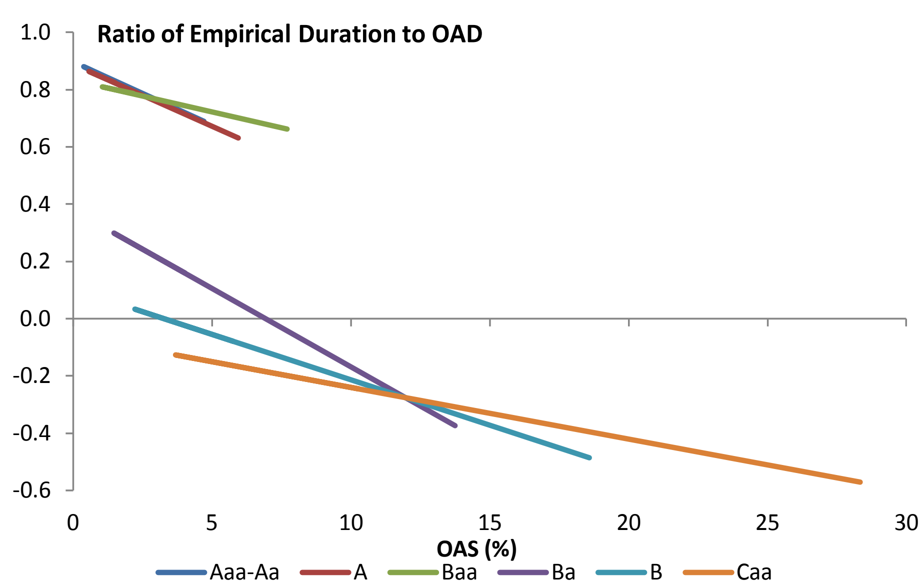
Spread Dependence of Yield Sensitivity

- Since 2004, we published a series of papers showing the dependence of yield sensitivity on spread for various credit instruments
- Update results are very similar to those published in the original study
    - Significant drop in yield sensitivity between IG and HY
    - Large variation in HY's hedge ratio (**HR**) due to the wide dispersion in its spread
    - Estimated HR for Ba becomes **positive** for low spread levels

Regression Results (Aug. 1998 – June 2015)

Coefficients	Aaa/Aa	A	Baa	Ba	B	Caa
β: hedge ratio limit	0.89	0.89	0.84	0.36	0.10	-0.04
t-stat	87.48	72.00	61.04	12.04	2.31	-0.63
γ: spread slope	-0.04	-0.04	-0.02	-0.05	-0.03	-0.02
t-stat	-6.96	-7.92	-4.88	-9.13	-5.30	-3.35
R^2	0.82	0.77	0.76	0.04	0.01	0.02
OAS range						
Min	0.37	0.56	1.05	1.46	2.21	3.68
Average	1.01	1.45	2.08	3.88	5.54	9.83
Max	4.71	5.95	7.70	13.75	18.58	28.33
Hedge ratios at:						
Min OAS	0.87	0.86	0.81	0.28	0.03	-0.12
Average OAS	0.85	0.83	0.79	0.16	-0.07	-0.23
Max OAS	0.69	0.63	0.66	-0.36	-0.49	-0.58

Estimated Hedge Ratio



Sources: Barclays Research

Implementing a "Short" Empirical Duration Strategy

- Strategy is "long" Ba and A-rated bonds and "short" Baa in each sector, with no credit or rates exposure, but a "short" empirical duration position
- Strategy earns positive returns when rates rise and vice versa
- The pattern is stronger when changes in rates exceed one standard deviation with positive (negative) returns in 70% of months with rising (declining) rates

Summary Statistics for "Short" Empirical Duration Strategy

	Positive/Negative Monthly Change in Rates		Monthly Change in Rates > 1 Std. Deviation	
	Rising Rates	**Declining Rates**	**Rising Rates**	**Declining Rates**
Average Return (%/mo)	0.10	(0.04)	0.25	(0.14)
Volatility (%/mo)	0.40	0.45	0.44	0.63
Number of Months	101	112	36	37
t-stat	**2.49**	(0.89)	**3.39**	(1.37)
Best Month	1.62	2.26	1.62	2.26
Worst Month	(1.47)	(2.06)	(0.57)	(2.06)
% Up Months	61%	48%	69%	30%

Sources: Barclays Research

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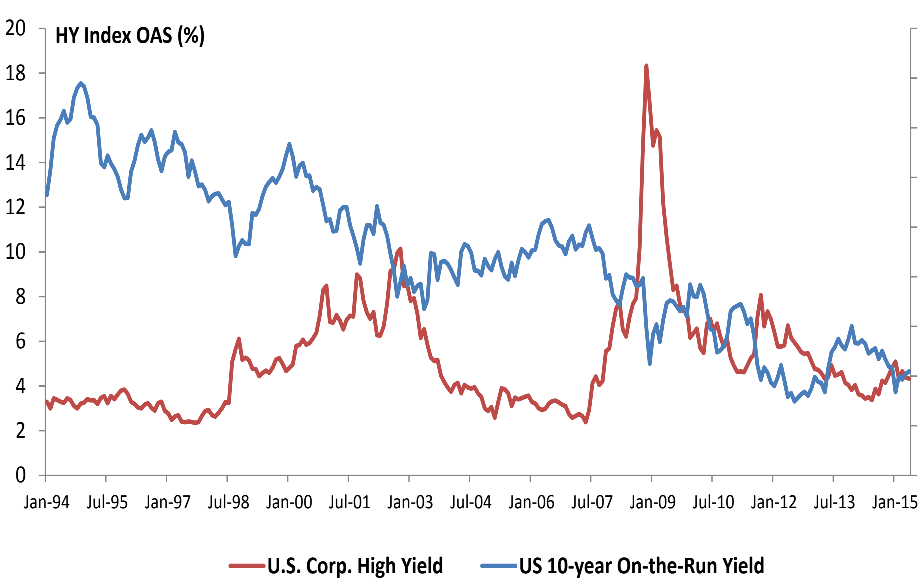
Projection based on Current OAS Level

- At current OAS level (2.87bp as of June 2015), the projected hedge ratio for the Ba Index is 0.21 based on Aug. 98 – May 2015 estimates

- A 100bp tightening in the OAS of the Ba Index would increase the projected hedge ratio to 0.26 from 0.21

US High Yield OAS



Projected HR under Different Scenario

Sources: Barclays Research

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Analyst Certification

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