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Fallen Angel Strategy Performance – An Update

Americas Advisory Council
June 2018

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The Downgrade Dynamics of IG to HY Bonds (Fallen Angels)

❖ Most investors are required to sell

❖ Selling takes place over a short window

❖ HY market << IG market

❖ IG bonds are larger than HY bonds, on average

The selling imbalance leads to excessive declines in fallen angels' bond prices followed by strong mean-reversion

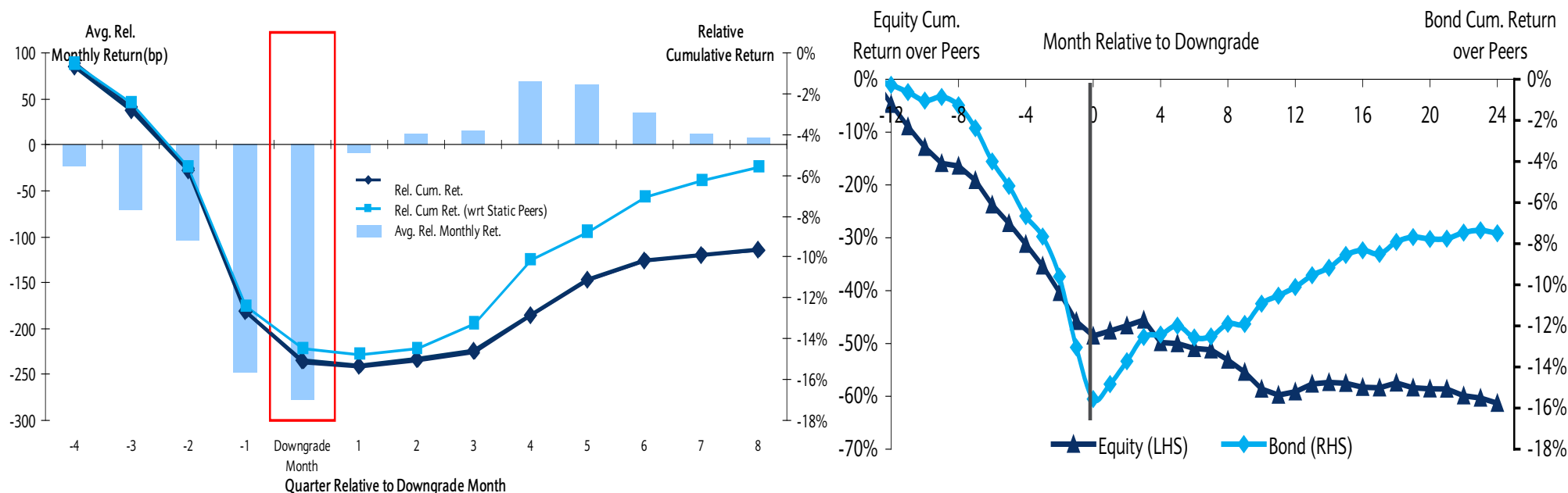
Excessive Declines Followed by Mean-Reversion in Prices

- Ben Dor and Xu (2010 [Link to report](#))
- Fallen angels (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: Compustat, Barclays Research

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Performance Update

Fallen Angel Reversal (FAR): Rule-based Fallen Angel Strategy

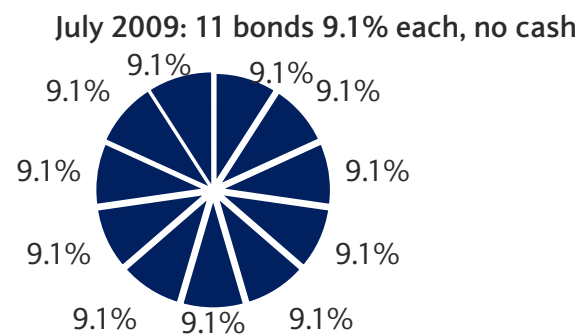
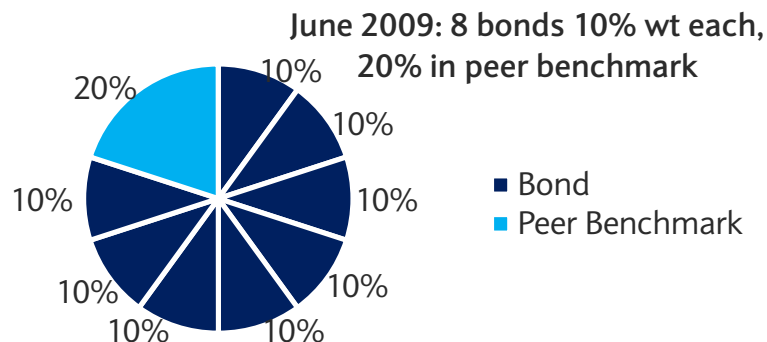
Original study has two portfolios: 'Buy All' and '3-Month Reversal' - all invest solely in fallen angels

FA Strategy Bond Inclusion/Exclusion Criteria			
		Buy All	3-Month Reversal (FAR)
Buy Conditions (if all are satisfied)	Timing	Downgrade Month	Month 3
	Spread relative to Peers	N/A	≥ 40 bps
	Bond Price	N/A	≥ 40
Sell Triggers (if any one is satisfied)	Timing	Month 24	Month 24
	Spread relative to Peers	N/A	Negative
	Technical	Bonds 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 peer benchmark
- Equally weighted positions

Example



Source: Barclays Research

FAR Stayed Profitable Over Time

- FAR strategy still outperformed peers and had similar inf. ratios over the peer group in the recent period (January 2015 to April 2018)

The Performance of FAR Portfolios ('3-Month Reversal')					
	FAR Portfolio	Peer Group	Ret. over Peer Group	High-Yield Index	Ret. over HY Index
Jan. 1991 - Jun. 2010 (Ben Dor and Xu 2010 study)					
Average (Monthly)	1.62%	0.84%	0.78%	0.81%	0.82%
Volatility (Monthly)	3.99%	2.31%	2.63%	2.68%	2.56%
Sharpe/Inf. Ratio (Ann.)	1.12	0.76	1.03	0.61	1.11
% of Positive Ret. Months	75%	76%	63%	76%	64%
% Invested in Fallen Angels	69%				
Jul. 2010 - Dec. 2014 (Ben Dor and Xu 2015 update)					
Average (Monthly)	1.11%	0.80%	0.31%	0.74%	0.38%
Volatility (Monthly)	1.85%	1.62%	0.88%	1.78%	0.92%
Sharpe/Inf. Ratio (Ann.)	2.06	1.67	1.23	1.40	1.42
% of Positive Ret. Months	74%	74%	65%	74%	70%
% Invested in Fallen Angels	55%				
Jan. 2015 - Apr. 2018					
Average (Monthly)	1.02%	0.42%	0.60%	0.47%	0.55%
Volatility (Monthly)	2.97%	1.59%	1.75%	1.57%	1.68%
Sharpe/Inf. Ratio (Ann.)	1.12	0.80	1.19	0.91	1.14
% of Positive Ret. Months	63%	70%	63%	65%	60%
% Invested in Fallen Angels	91%				

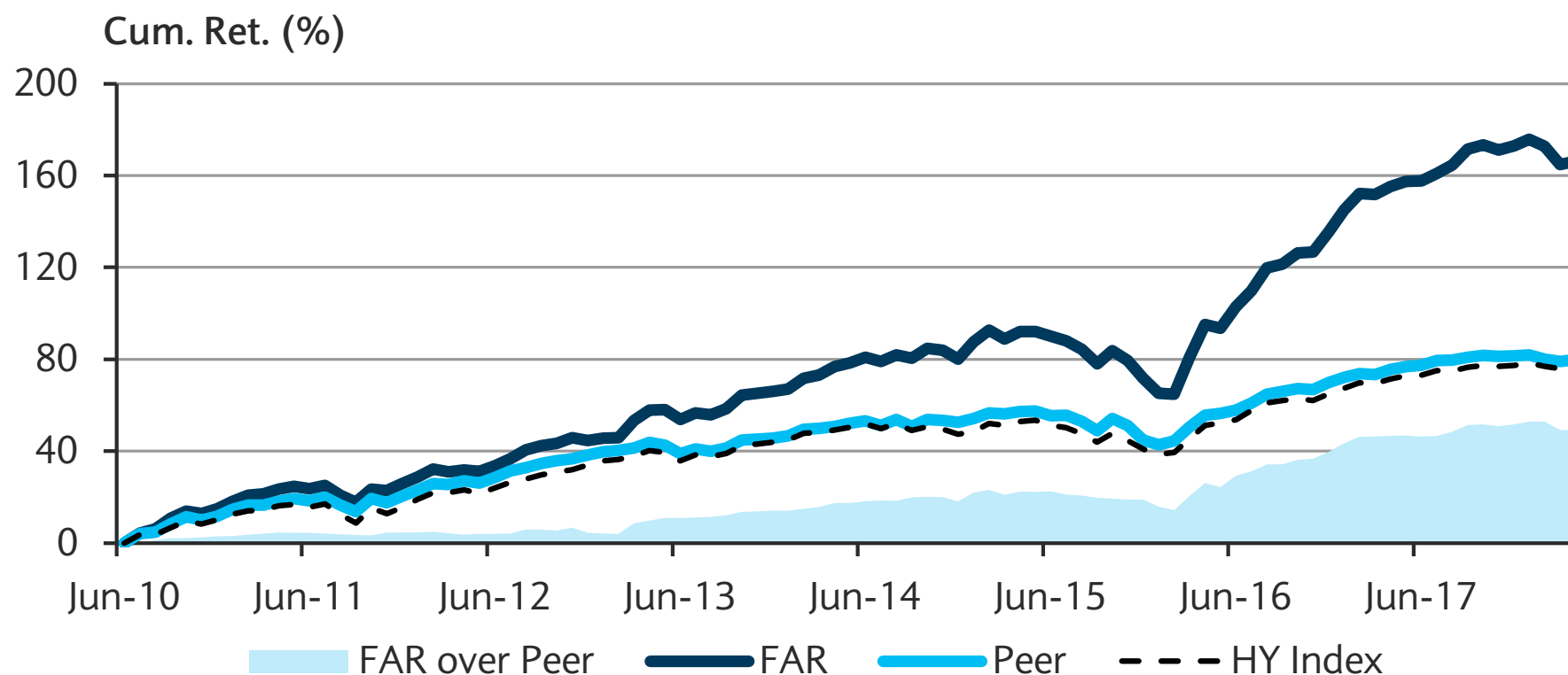
Note: The returns for the portfolios' peer group were computed as the equal-weighted performances of the individual bonds' peer groups. Sharpe Ratio was calculated using 1m Libor. Inf. ratio is the ratio of average and standard deviation of relative returns. Source: Barclays Research

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FAR Delivered Persistent Outperformance Over Time

- Since the publication of our original study in 2010, FAR has consistently delivered outperformed over peers and HY indices
- There is no decaying of outperformance in recent years

Cumulative Returns of FAR Portfolios (June 2010 – April 2018)



Source: Barclays Research

FAR Had Persistent Outperformance in European Markets

- FAR strategy had persistent returns in European markets, even after publication of our 2010 paper and 2015 update

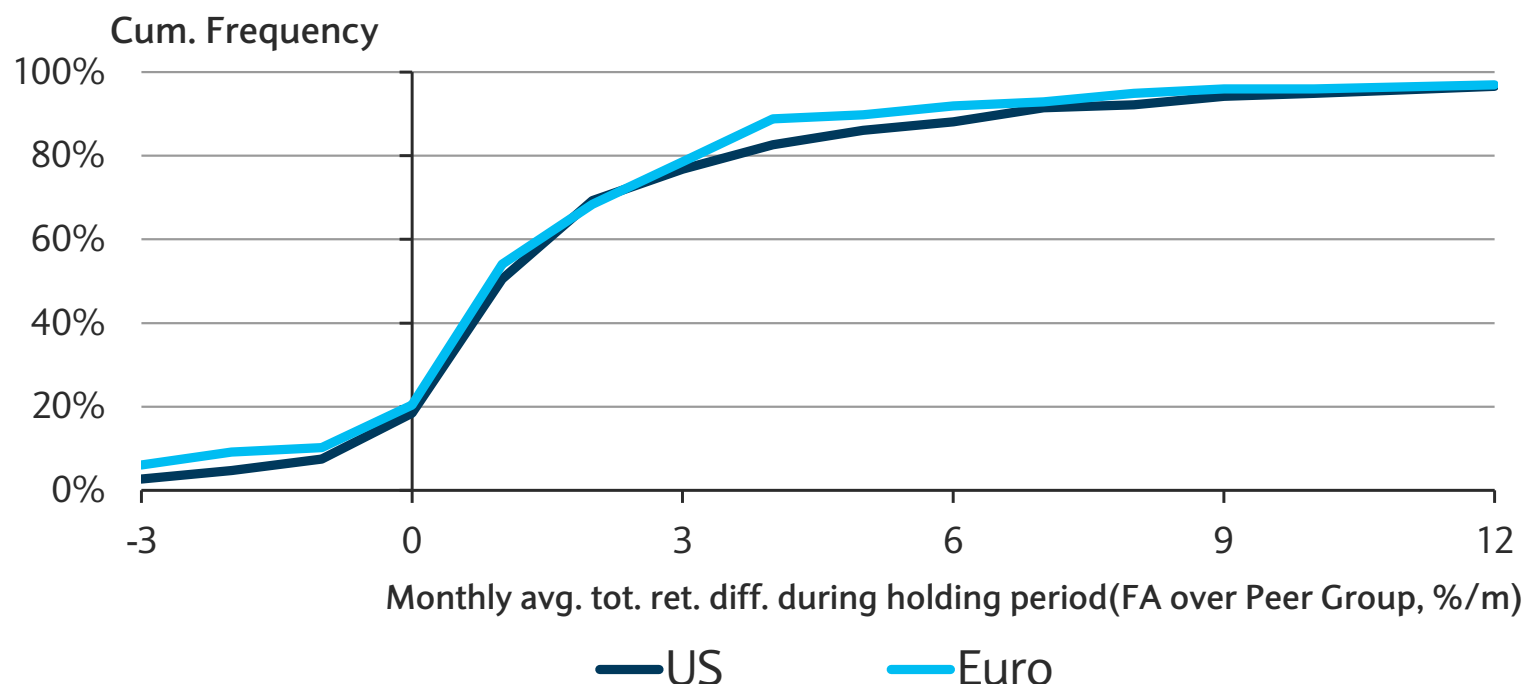
Performance of FAR strategy in European Markets					
	FAR Portfolio	Peer Group	Ret. over Peer Group	High-Yield Index	FAR - HY Index
Jan. 1999 - Jun. 2010 (Original Ben Dor and Xu 2010)					
Average (Monthly)	0.73%	0.33%	0.40%	0.48%	0.25%
Volatility (Monthly)	4.63%	3.89%	1.86%	4.01%	1.90%
Sharpe/Inf. Ratio (Ann.)	0.34	0.05	0.74	0.18	0.46
% of Positive Ret. Months	63%	66%	46%	67%	47%
% Invested in Fallen Angels	21.16%				
Jul. 2010 - Dec. 2014 (Ben Dor and Xu 2015 update)					
Average (Monthly)	1.36%	0.80%	0.56%	0.85%	0.51%
Volatility (Monthly)	5.20%	3.25%	2.89%	2.44%	3.31%
Sharpe/Inf. Ratio (Ann.)	0.89	0.84	0.67	1.18	0.53
% of Positive Ret. Months	78%	78%	70%	76%	72%
% Invested in Fallen Angels	85.19%				
Jan. 2015 - Apr. 2018					
Average (Monthly)	0.68%	0.38%	0.30%	0.42%	0.26%
Volatility (Monthly)	1.75%	1.00%	0.92%	1.27%	0.74%
Sharpe/Inf. Ratio (Ann.)	1.24	1.12	1.13	0.99	1.22
% of Positive Ret. Months	68%	60%	60%	63%	60%
% Invested in Fallen Angels	46.75%				

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

More than 80% of FAR Bonds Outperformed Peers

- In the cross-section, more than 80% of the FAR constituents had higher returns over their peer groups during their holding period
- Similar distribution in the US and Europe

Cumulative Distribution of Pair-Wise FAR Return over Peer Group (US: Jan. 1991 – Apr. 2018; Euro: Jan. 1999 – Apr. 2018)



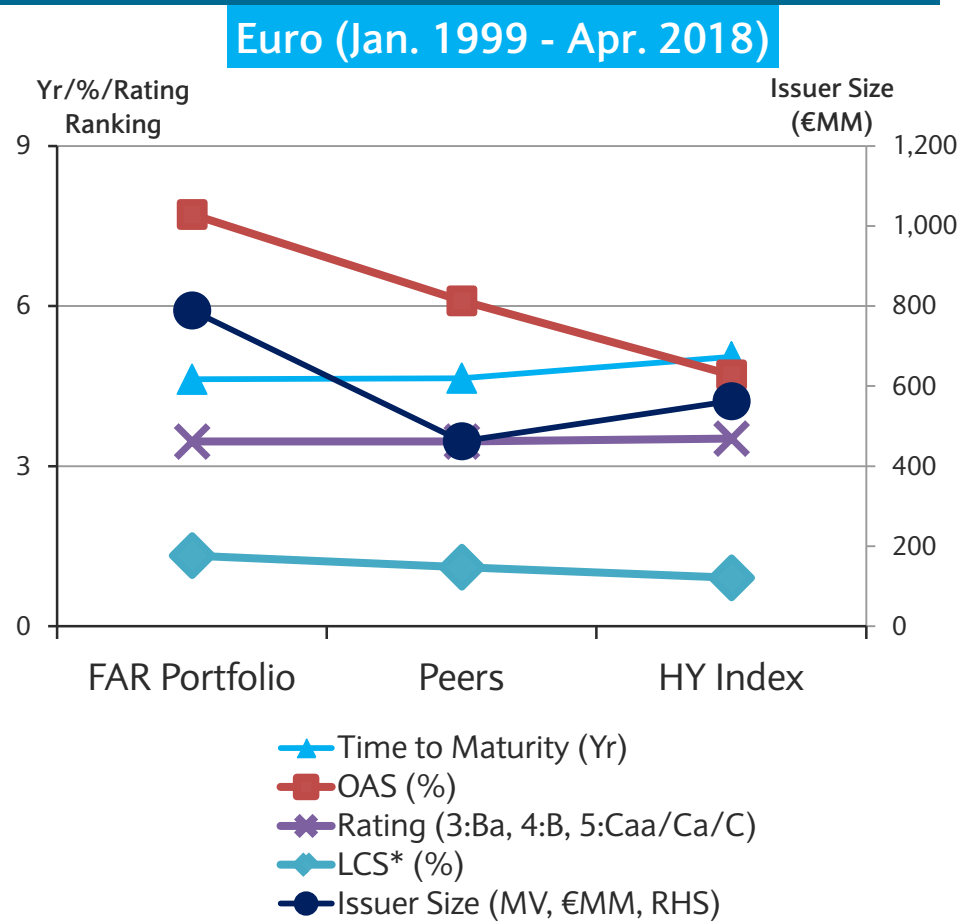
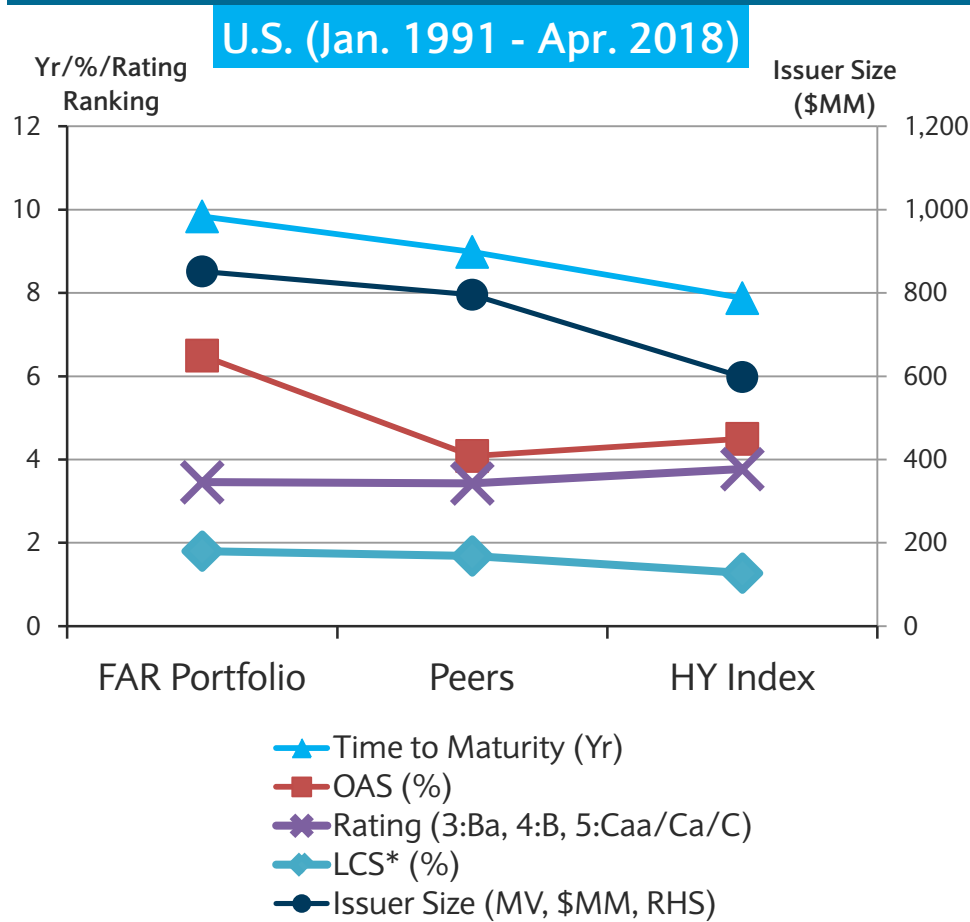
Source: Barclays Research

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FAR Portfolio Had Similar Characteristics vs. Peers

- FAR Constituents had very similar size, maturity, rating, and LCS as peers, indicating that FAR's outperformance was not driven by difference in characteristics
- European FAR constituents also had similar characteristics as peers and indices

Characteristics of FAR Portfolios

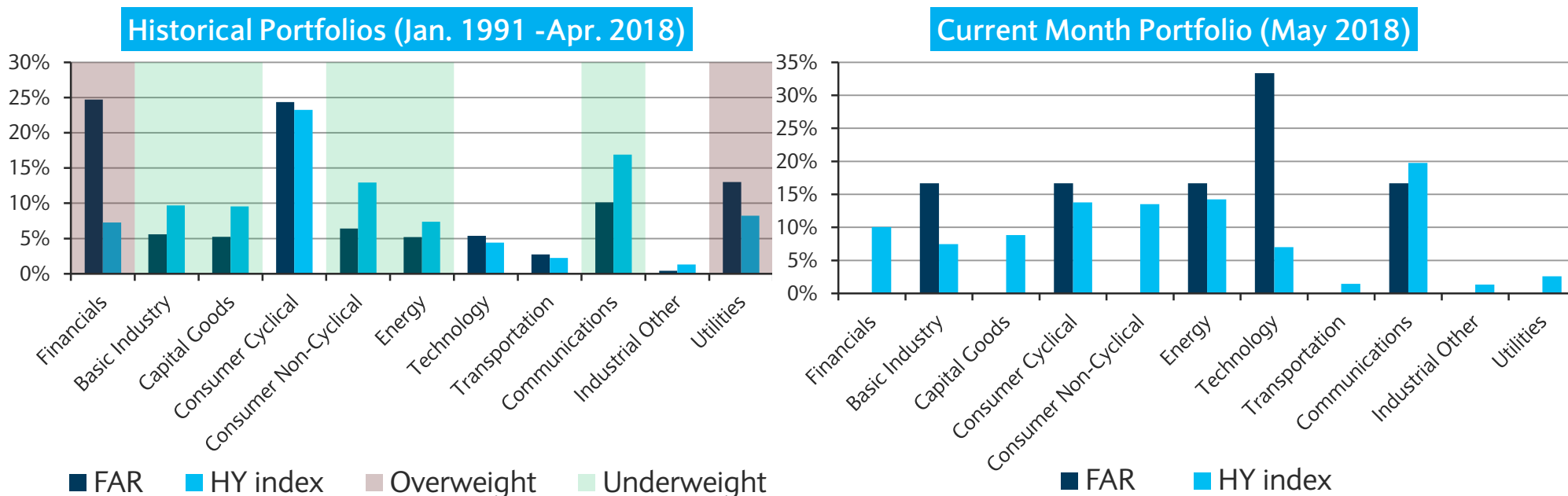


Note: * LCS data have been available since January 2007 in the US and since May 2010 in Europe. Source: Barclays Research

FAR Industry Composition Different from Index's

- Historically, FAR portfolios were weighted more heavily in financials and utilities compared with the HY index, and underweighted in some other industries
- The overweight/underweight was due to these industries having more/fewer downgrades, and not because of any systematic bias in the strategy (the spread triggers are relative to peers in the same industry)
- The overweight/underweight could change drastically from month to month as new fallen angels enter the FAR portfolio

Industry Composition of FAR Portfolios (US)



Source: Barclays Research

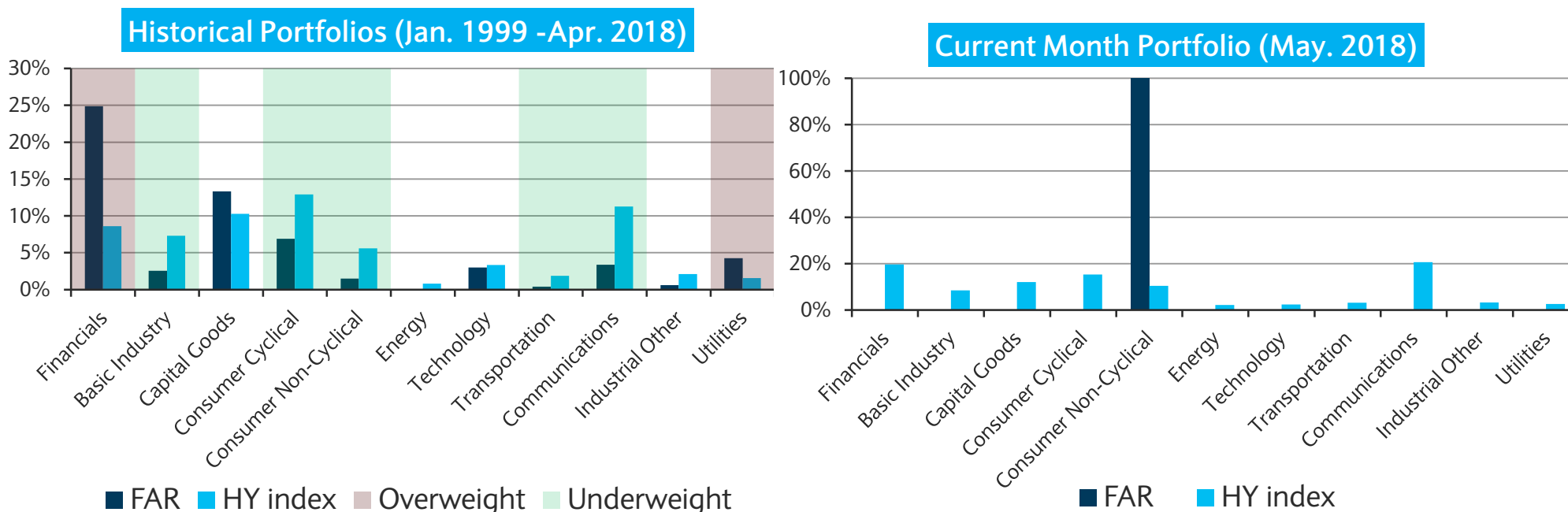


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Similar Industry Pattern in Euro FAR Historically

- Historically, Euro FAR industry composition had similar patterns vs. the index
- The overweight/underweight also changed drastically from month to month

Industry Composition of FAR Portfolios (Euro)



Source: Barclays Research

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Additional Aspects of Fallen Angel Strategies

How did 'Buy All' Strategy do Out-of-Sample?

- Since original publication in 2010, 'Buy All' strategy fared poorly from 2010-14, and very well since 2015 (but still did not outperform '3m Reversal' strategy)
- 'Buy All' did not display the same consistent performance as '3m Reversal'

Performance of Fallen Angel '3m Reversal' vs. 'Buy All' Strategies										
3m Reversal (FAR)						Buy All				
	FAR Portfolio	Peer Group	Ret. over Peer Group	High-Yield Index	Ret. over HY Index	FAR Portfolio	Peer Group	Ret. over Peer Group	High-Yield Index	Ret. over HY Index
Jan. 1991 - Jun. 2010 (Ben Dor and Xu 2010 study)										
Average (Monthly)	1.62%	0.84%	0.78%	0.81%	0.82%	1.07%	0.76%	0.31%	0.81%	0.26%
Volatility (Monthly)	3.99%	2.31%	2.63%	2.68%	2.56%	2.79%	2.16%	1.68%	2.68%	1.84%
Sharpe/Inf. Ratio (Ann.)	1.12	0.76	1.03	0.61	1.11	0.90	0.68	0.64	0.61	0.50
% of Positive Ret. Months	75%	76%	63%	76%	64%	73%	75%	58%	76%	57%
% Invested in Fallen Angels	69%					98%				
Jul. 2010 - Dec. 2014 (Ben Dor and Xu 2015 update)										
Average (Monthly)	1.11%	0.80%	0.31%	0.74%	0.38%	0.78%	0.75%	0.03%	0.74%	0.05%
Volatility (Monthly)	1.85%	1.62%	0.88%	1.78%	0.92%	1.67%	1.65%	0.84%	1.78%	0.90%
Sharpe/Inf. Ratio (Ann.)	2.06	1.67	1.23	1.40	1.42	1.59	1.54	0.14	1.40	0.18
% of Positive Ret. Months	74%	74%	65%	74%	70%	76%	74%	59%	74%	61%
% Invested in Fallen Angels	55%					100%				
Jan. 2015 - Apr. 2018										
Average (Monthly)	1.02%	0.42%	0.60%	0.47%	0.55%	0.96%	0.49%	0.47%	0.47%	0.49%
Volatility (Monthly)	2.97%	1.59%	1.75%	1.57%	1.68%	3.08%	1.69%	1.78%	1.57%	1.94%
Sharpe/Inf. Ratio (Ann.)	1.12	0.80	1.19	0.91	1.14	1.01	0.88	0.91	0.91	0.87
% of Positive Ret. Months	63%	70%	63%	65%	60%	65%	68%	58%	65%	60%
% Invested in Fallen Angels	91%					96%				

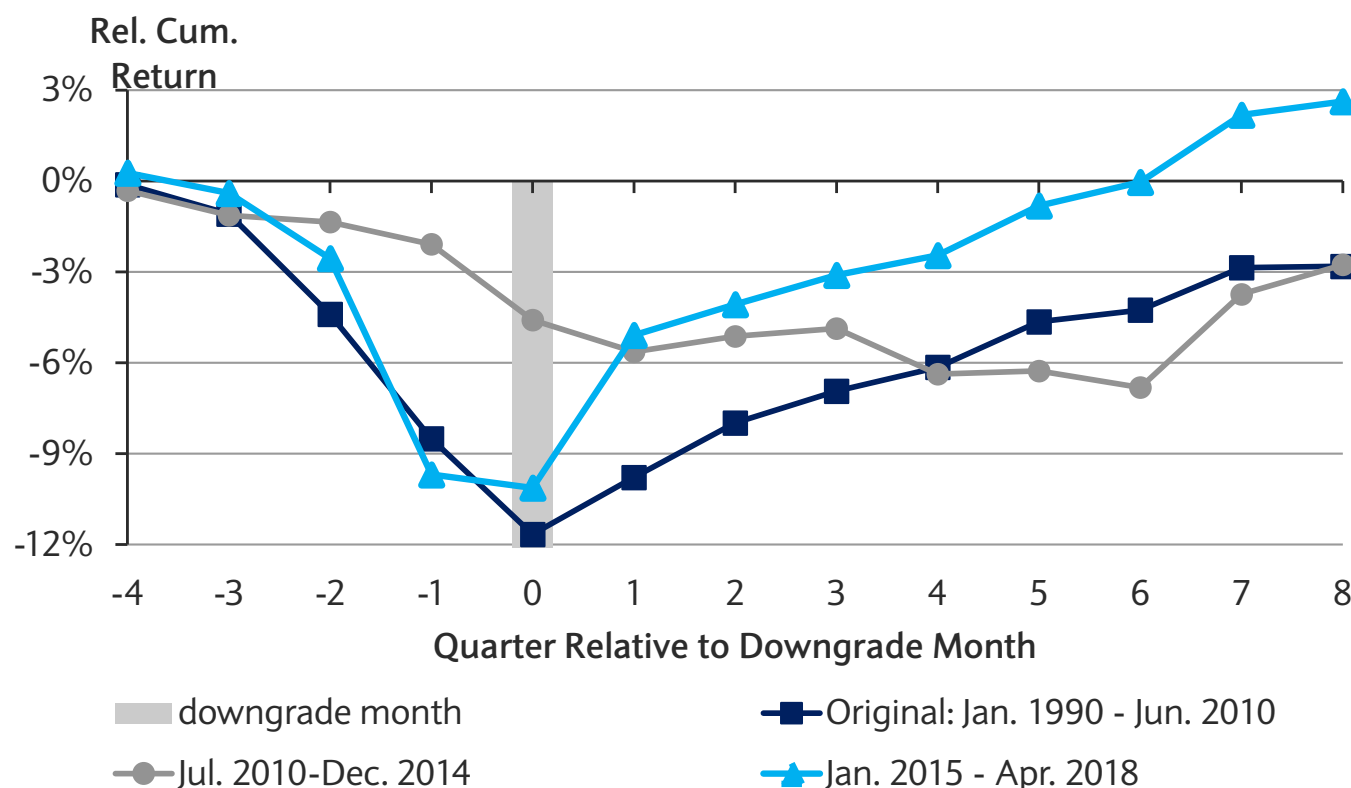
Source: Barclays Research

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Why did 'Buy All' Strategy Do Well since 2015?

- In recent years, fallen angel price reversal happened at a much faster speed than historically
- 'Buy All' strategy included fallen angels into the portfolio immediately after their downgrades. Capturing the initial price reversal improved its performance

Cumulative Ret. vs. Peers around Downgrade Month (EW)

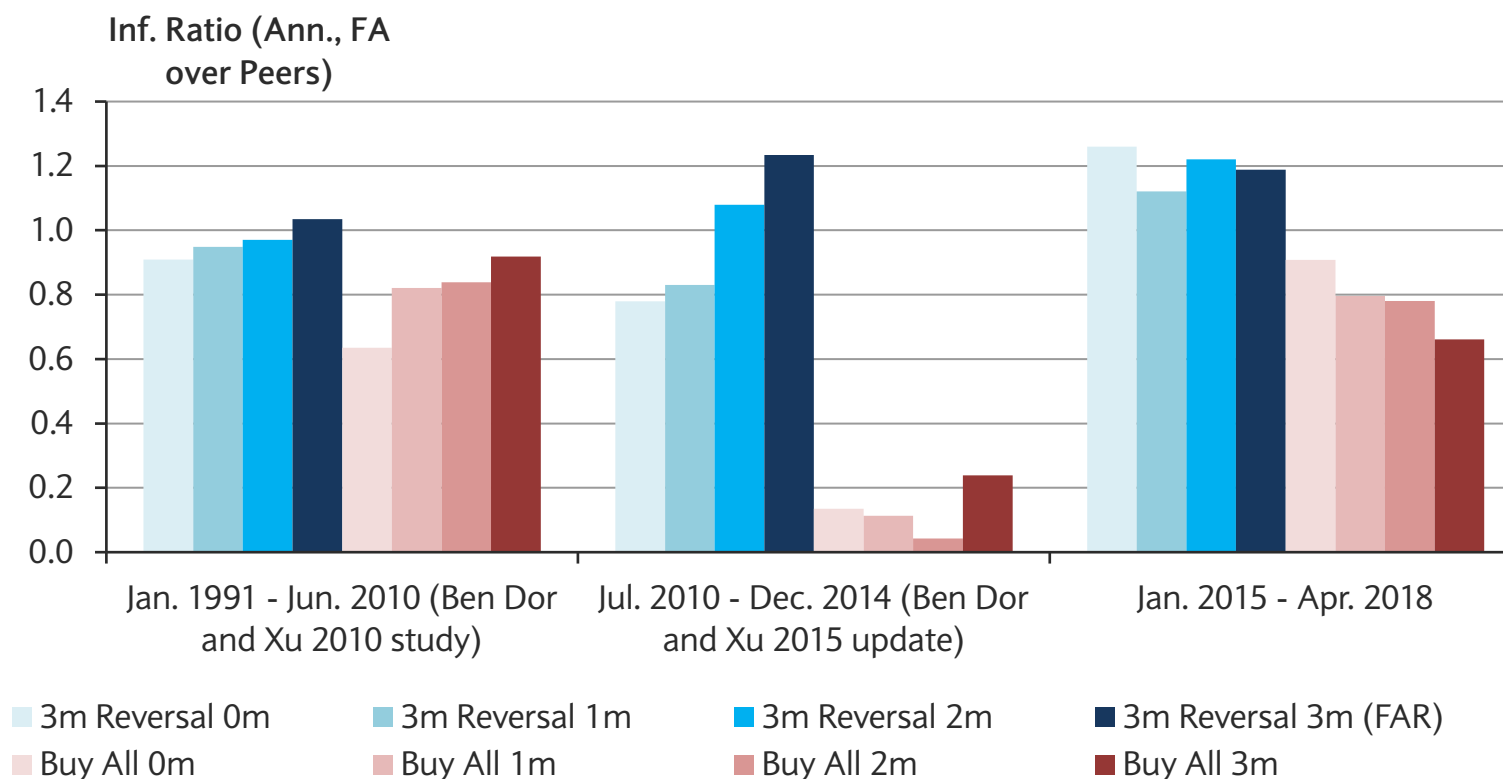


Source: Barclays Research

FAR Demonstrates Stability over Choice of Inclusion Months

- For 'Buy All' strategy, it was optimal to wait three months historically, but optimal to include immediately in recent periods
- As a comparison, FAR strategy demonstrates stability over different periods regarding inclusion month

Inf. Ratio of FA over Peer Ret. with diff. Inclusion Months, '3m Reversal' vs. 'Buy All'



Source: Barclays Research

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Additional Aspects on Fallen Angel Strategies

Profits insensitive to changes in key parameters

Changing the position limit from 10% to 5% and min. relative spreads from 40bp to 20bp had very limited effect on strategy performance

FAR Strategy is a fallen angel strategy, not a general mean-reversion strategy

The “3M Reversal” strategy using HY bonds that are not fallen angels underperformed the FA “3m Reversal” strategy

Default rate of fallen angels is not higher than other HY bonds

Net performance remains attractive after using LCS as estimates of transaction cost

FAR S.R. remains strong even for large portfolios

The decline in performance is partially offset by lower risk as cash position increases

Key Takeaways

Summary

▪ Key takeaways

- ✓ FAR continued to deliver similar outperformance after initial publication
- ✓ FAR strategy works in Europe as well
- ✓ The outperformance of fallen angels over peers is present in more than 80% of the sample
- ✓ FAR had similar characteristics as peers – not a source of its outperformance
- ✓ FAR strategy demonstrates stability in terms of choice of inclusion months and other key parameters

▪ Extensions

- ❑ Using initial price decline as trigger for inclusion, and subsequent outperformance as signal to close the trade
- ❑ Using LCS and bond turnover as additional signal for trade
- ❑ Using cash/CDS basis as selection criteria

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