Quantitative Portfolio Strategy

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Revisiting the Performance Dynamics of Fallen Angels

- **We revisit the performance dynamics of fallen angels over the past five years given two important dynamics in the high yield market: the 'hunt for yield' by investors as a result of the low rate environment and the decline in the relative supply of fallen angels.**
- **We find that the increased demand for high yield bonds and simultaneous decline in the supply of fallen angels have had a pronounced effect on the pattern of mean reversion in performance that we have documented previously.**
- **The magnitude of the underperformance experienced by fallen angels since 2010 prior to the downgrade announcement was about one fifth of the underperformance found in earlier years, and consequently on average they have exhibited essentially no mean reversion following their downgrade.**
- **Despite the change in fallen angels' dynamics in recent years, the simple rule-based strategy we developed in 2010 in order to capitalize on the fallen angels phenomenon ('3-Month Reversal') continued to outperform a portfolio of high yield peer bonds by about 3.5%/year.**
- **The difference between the behaviour of fallen angels in aggregate and the performance of the '3-Month Reversal' strategy reflects the fact that the strategy does not invest in fallen angels indiscriminately but employs time and price criteria.**

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Do Fallen Angels Still Exhibit Mean Reversion?

Several years ago, we conducted a detailed analysis of the characteristics and price dynamics of fallen angels using a comprehensive sample spanning more than 20 years and 1,400 bonds that migrated from investment grade to non-investment grade status.[1] We found that investors began to liquidate the soon-to-become fallen angels prior to the actual rating change, a process that peaked about three months after the downgrade. As the selling intensity dissipated, price declines reversed, and fallen angels outperformed high yield peers with similar characteristics for up to two years after the downgrade. Furthermore, the price recovery by an individual issuer was inversely related to the magnitude of its initial underperformance. We presented a simple rule-based strategy that total-return managers could employ to exploit these price patterns, which generated an average outperformance of 8.5%/year over high yield peers with information ratios in excess of one. The outperformance was not confined to a specific period but was evident throughout the sample. However, the study, as well as a follow-up analysis of fallen angels in the Euro-market, showed that the degree of initial price drop and the subsequent mean reversion was affected by the imbalance between supply (the volume of fallen angels) and demand (the capital available to acquire them).[2]

Over the past several years, U.S. credit markets have experienced two important dynamics related to the potential demand-supply imbalance. First, as Figure 1 shows, the annual volume of fallen angels since 2010 represented only 1.4% to 3.4% of the total size of the high yield market, as opposed to an average of 8% (median of 6.1%) in the earlier period (1990 – 2009) as reported in Ben Dor and Xu (2010). The sharp decline mostly reflected the increase in the overall size of the high yield market as opposed to a drop in the market value of downgraded issuers.[3] Hence, the market capacity to absorb the supply of fallen angels has improved. Furthermore, the low rate environment resulted in a hunt for yield by investors and increased demand for high yield securities. This demand resulted in an unprecedented issuance of high yield debt totalling about three times the average in earlier years (last column) but may have also spilled over to fallen angels as a secondary source of supply.

FIGURE 1

Supply of Fallen Angels and Demand for High Yield Securities

Year	Number of Fallen Angels Issuers	Market Value of FA Bonds ($bn)	Market Value of FA as % of High-Yield Index	Primary High-Yield Issuance ($bn)
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

[1] Ben Dor, A. and J. Xu., *Fallen Angels: Characteristics, Performance, and Implications for Investors*, Barclays Capital, December 2010.

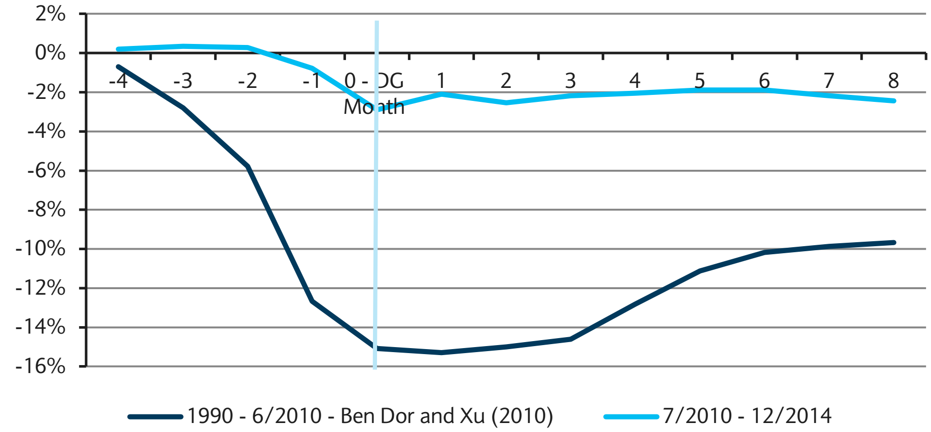
[2] See Ben Dor, Eisenthal-Berkovitz, and Xu (2012), which examined the performance stability of fallen angels over time and across geographical markets, and addressed various implementation issues resulting from the unique characteristics of fallen angels.

[3] The size of the high yield market (bonds included in the Barclays High Yield Index) was one-tenth of the size of the investment grade universe in 1990 ($52bn vs. $520bn, respectively) whereas in 2014 the ratio increased to 34% ($1.3trn vs. $3.9trn, respectively).

To what extent did the patterns documented in Figure 1 affect the price dynamics of fallen angels? Figure 2 plots the cumulative relative return (over issuer-matched peer groups) of fallen angels during a three-year window starting four quarters prior to the downgrade to high yield status. The chart shows that in the period covered in the study in Ben Dor and Xu (2010), fallen angels underperformed peers by 15.09% in the downgrade month and preceding year, followed by a sharp reversal in the next two years when they outperformed high yield peers by 6.38% on average. In contrast, over the past few years, fallen angels exhibited very mild mean reversion, declining only by a total of 2.89%, (of which 2.12% occurred in the rating change month), and then essentially remaining flat (outperforming peers by only 47bp over the following 24 months).

FIGURE 2

Cumulative Performance of Fallen Angels over Peers around Downgrade Month



Note: The figure reports the performance of issuers by quarter relative to the downgrade month (defined as quarter zero). The return of each issuer is over the contemporaneous return of a peer group with similar characteristics ('Relative returns') 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. Cumulative relative returns are reported as of the end of each quarter. Source: Barclays Research

The results in Figure 2 are consistent with the idea that the increased demand for high yield securities alongside the decline in the (relative) supply of fallen angels substantially limited the scope of the price decline until the downgrade to high yield, which in turn led to a muted reversal in subsequent quarters.

To formally test this explanation, the cumulative (relative) return of each issuer over the twelve-month window centred on the downgrade is separated into two parts, (from five months prior to the downgrade month until the end of the rating change month, and the six months following the downgrade month) representing the initial decline and subsequent reversal. This allows us to capture the relation we posit between the degree of initial price drop and magnitude of price reversal. Figure 3 presents the results of two regressions linking the performance in the first period to the aggregate supply of fallen angels and other market-wide, and issuer specific characteristics, and performance in the second period with the market-wide demand for high-yield debt in addition to the cumulative return in the first period.

FIGURE 3

The Determinants of Fallen Angels Pre- and Post Downgrade Performance

Dep. Variables	Cum. RelRet (month -5 to 0)		Cum. RelRet (month 1 to 6)	
	Coef.	*t-stats*	Coef.	*t-stats*
Intercept	2.31	*0.27*	4.49	*1.73*
FA Supply (% of HY 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 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

The results of the first regression confirm that the initial price decline is affected by the overall supply of fallen angels in addition to the state of the high yield market (proxied by its OAS level) and the bond characteristics (such as severity of the downgrade and industry). The estimated coefficient for FA supply suggests that the difference between the long-term average supply (8%) and that in recent years (2-3%) should have decreased the initial underperformance by 1.6-2% with the decline in market spread and severity of downgrades accounting for another 2-2.5%. Hence, over half of the change in the recent underperformance of fallen angles was not due to the systematic factors we controlled for.

The second regression illustrates the mean reversion pattern as the post-downgrade period performance is negatively linked to the size of the performance in the first period with a significant t-statistic of 6.59. In addition, it shows the effect of the demand for high yield securities. An increase of 10% in primary issuance was associated with a decline of 170bp in overall performance over the first six months after the downgrade. Collectively, the results in Figure 3 are consistent with the notion that the effect of the decline in fallen angels supply and simultaneous increase in demand for high yield securities limited both the initial price decline and the ensuing recovery.

How did the change in performance pattern documented in Figure 2 affect the profitability of the rule-based strategies we presented in the past in order to benefit from fallen angels' behaviour? Figure 4 compares the performances of the 'Buy All' and '3-Month Reversal' strategies during the period covered in Ben Dor and Xu (2010) to those between 2010 and 2014. The "Buy All" portfolio was meant to capture the collective performance of fallen angels, and therefore acquired all bonds at the end of the downgrade month and held them for up to 24 months.[4] Since 2010, the "Buy All" portfolio included over 120 individual issuers (notice that some were downgraded in 2009 or 2008). In contrast, the "3-Month Reversal" purchased only the subset of bonds that were trading at spreads of at least 40bp

[4] See Ben Dor and Xu (2010) for a detailed description of the 'Buy All' and '3-Month Reversal'.

over high yield peers three months after downgrade (once forced selling had on average subsided). In addition, bonds were sold from this portfolio prior to the end of the holding period if their relative spread to peers declined to zero. Since 2010, the "3-Month Reversal" portfolio included 33 individual issuers.

Looking first at the 'Buy All' portfolio (which includes all fallen angels once they transition to high yield and up to two years thereafter) reveals a sharp decline in the profitability of the strategy consistent with the results in Figure 2. The portfolio generated an average return of 1.07%/month in the first period compared with only 0.78%/month recently, while the performance of the peer benchmark was unchanged (0.75% and 0.76%/month respectively). Thus, over the past couple of years, fallen angels *in aggregate* did not materially differ from originally issued high yield bonds in terms of performance (and risk).

FIGURE 4

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 (as explained in Figure 2). Sharpe Ratio was calculated using 1m Libor. Information ratio is the ratio of average and standard deviation of relative returns. Source: Barclays Research

In contrast, the results for the '3-Month Reversal' strategy (which only buys into fallen angels three months after the downgrade and only if they widened sufficiently) indicate that the strategy still generated significant outperformance over the peer group (1.11% vs. 0.80%/month, respectively). However, the decline in the mean-reversion dynamic of fallen angels is apparent as the outperformance was cut by more than half compared with the initial study period (1990 – 6/2010) when the difference was 0.78%/month. Notice that the percentage of the portfolio that was actually invested in fallen angels decreased as well from 69% to 55% but this actually decreased the outperformance gap between the two periods, since the long-term performance of fallen angels was higher than in recent years.[5] Notice also that because of the large decline in market volatility, the Sharpe ratios of both the '3-Month Reversal' portfolio and portfolio of peers (as well as the high-yield Index) almost doubled.

[5] In order to maintain portfolio diversification, the maximum weight to any individual bond was capped at 10%. As a result, the portfolio was not fully invested in fallen angels anytime there were fewer than 20 eligible bonds (representing 20 individual issuers), and the reminder was allocated to the peer benchmark.

Conclusions

The performance of fallen angles over the past several years has been substantially different compared with their long-term behaviour during the period 1990–2009. The large underperformance prior to the downgrade, which was followed by a strong reversal starting about three months after the rating change as the selling abated, all but disappeared. While a significant part of the change can be attributed to the combined effect of the increased demand for high yield securities and decline in the *relative* supply of fallen angels, it did not seem to fully explain the new dynamic. However, the '3-Month Reversal' strategy we first introduced in Ben Dor and Xu (2010) still generated superior performance relative to peer high yield bonds as a result of its bond selection criteria as opposed to investing in all fallen angels indiscriminately. Specifically, the 'Buy All' portfolio included more than 120 issuers since 2010, the '3-Month Reversal' included only 33.

References

Ben Dor, A. and J. Xu., *Fallen Angels: Characteristics, Performance, and Implications for Investors*, Barclays Capital, December 14, 2010.

Ben Dor, A., Y. Eisenthal-Berkovitz, and J. Xu., *Fallen Angels: Capacity, Transaction Costs, and the Bond-CDS Basis*, Barclays Capital, February 29, 2012.

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