



Quantitative Strategy
**The Quant View:
Small Cap Edition**

Date
4 June 2013

Updating our best quant ideas for small caps

Quantitative macro and micro forecasts for this month

In this report we present our latest small cap quantitative forecasts for the coming month. Our models are designed to generate both bottom-up stock selection ideas as well sector rotation and market timing calls.

Gaining exposure to low risk strategies within small caps

We analyze in detail the long-term efficacy of low volatility strategies within the small cap universe. We show that over the long-run, such strategies have a good track record, are easy to construct, and are worth consideration for managers looking for useful pre-screening tools.

Low risk strategies are useful even within the small cap universe

We investigate two simple low-risk strategies: minimum variance and low volatility. We find that, as is often the case, the simpler portfolio construction technique – low volatility – outperforms the more complex minimum variance strategy on an absolute and risk adjusted basis. In fact, the low volatility Sharpe ratio is almost twice that of the market.

Low volatility screening can be an effective tool for investment managers

Our results suggest that in small caps a simple strategy of buying the lowest volatility stocks (based on each stock's trailing volatility) can be a very effective tool in narrowing down stocks in the small cap space. In this report, we provide a screen that shows the lowest volatility names in the Russell 2000 currently. For the complete screen, please contact us.

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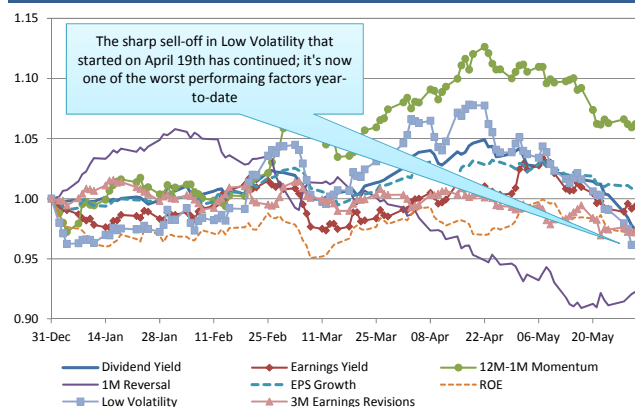


Low risk strategies in small caps?

Play it safe?

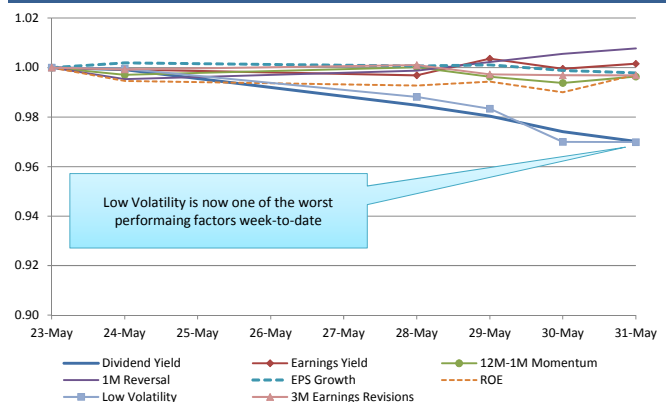
In last month's edition of The Quant View, we showed that in the wake of the recent market rally, several factors or style portfolios showed some signs of crowding.¹ In particular we found that for the first time since the financial crisis, low volatility strategies were showing evidence of crowding and suggest investors should be wary of elevated downside risk. It turns out that was a prescient call. Low Volatility strategies have sold off sharply within the Russell 2000 year-to-date and week-to-date was one of the worst performing factors (Figure 1 and Figure 2) over the month of May.

Figure 1: Factor performance within Russell 2000 YTD



Source: Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank, Bloomberg

Figure 2: Factor performance within the Russell 2000 during the last week of May



Source: Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank, Bloomberg

Of course, a sharp sell-off in any strategy can also be an opportunity. In this report we study in more detail the long-term efficacy of low volatility strategies within the small cap universe. We will show that over the long-run, such strategies have a good track record, are easily constructed, and are worth consideration for managers looking for useful pre-screening tools in the US small cap space.

Constructing simple low risk strategies

Two simple low risk strategies are minimum variance and low volatility portfolios.² The minimum variance method is a portfolio strategy that seeks to minimize overall portfolio risk. This is accomplished without taking on any particular view on expected stock returns; instead it completely focuses on risk and tries to build the basket of stocks with the lowest forecast risk. We build the minimum variance portfolio using the Axioma optimizer and risk models. One of the advantages of the minimum variance portfolio is that it takes into account the correlation between stock returns. Whereas other, more

¹ For more details, please see Cahan et al., 2013, "The Quant View", *Deutsche Bank Quantitative Strategy*, 3 May 2013.

² For more information on these and other portfolio construction techniques, please see Luo et al., 2013, "DB Handbook of Portfolio Construction: Part 1", *Deutsche Bank Quantitative Strategy*, 30 May 2013.



naïve portfolio construction techniques may penalize or down weight stocks based solely on various risk measures, the minimum variance strategy will consider including uncorrelated stocks that provide diversification benefit thereby reducing the overall portfolio risk.

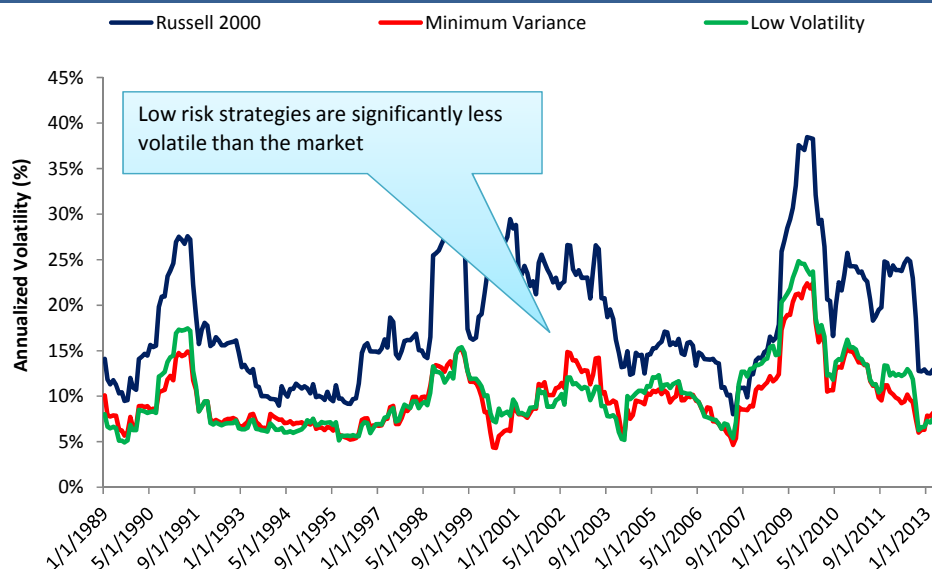
Low volatility portfolios are even easier to construct. We simply calculate the volatility of each stock within the Russell 2000 at each point in time using past daily returns. Next, we rank the stocks cross-sectionally based on their volatility measure. Finally, we form an equally-weighted portfolio based on the stocks that are ranked in the bottom decile of volatility. Essentially, we are forming an equally-weighted portfolio based on the least volatile stocks within the Russell 2000 universe. Note that our volatility measure is simply the standard deviation of daily stock returns over the past year.

We backtest both the minimum variance and low volatility long-only strategies on a monthly basis. Our backtesting commences in 1988 and covers a period of 26 years. We discuss the characteristics of these low risk strategies as well as performance results next.

Are low risk strategies protective or profitable in small caps?

To get a better flavor for low risk strategies, we want to initially point out something that is fairly obvious. Figure 3 shows the annualized portfolio volatility time series between the long-only, low risk strategies and the Russell 2000. As expected, we clearly see that the low risk portfolios are significantly less volatile than the Russell 2000. Interestingly, the minimum variance and low volatility strategies incur relatively similar levels of portfolio risk or volatility. However, the distinction between these two portfolio construction techniques can be observed when comparing their overall performance.

Figure 3: Comparison of annualized portfolio volatility



Source: Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank, Bloomberg

Figure 4 shows some rudimentary statistics comparing the minimum variance and low volatility portfolios as well as the market portfolio. Interestingly, as is the case with most financial strategies, the simpler portfolio construction technique – low volatility –



outperforms the more complex minimum variance strategy on an absolute and risk adjusted basis.

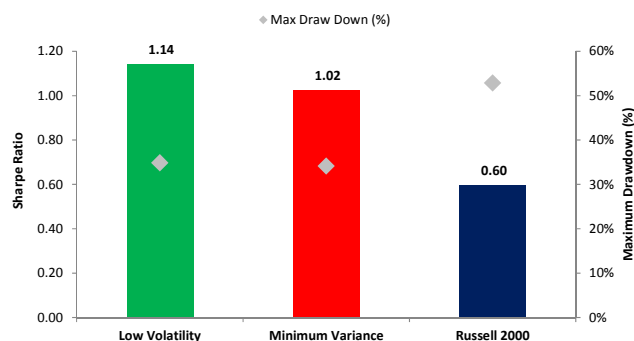
Figure 4: Portfolio statistics

	Low Volatility	Minimum Variance	Russell 2000
Annual Return (%)	12.64%	10.84%	11.36%
Annualized Volatility (%)	11.07%	10.60%	19.07%
Sharpe Ratio	1.14	1.02	0.60
Skewness	(0.88)	(0.78)	(0.54)
Kurtosis	2.15	1.58	1.10
Max Draw Down (%)	34.91%	34.17%	52.89%

Source: Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank, Bloomberg

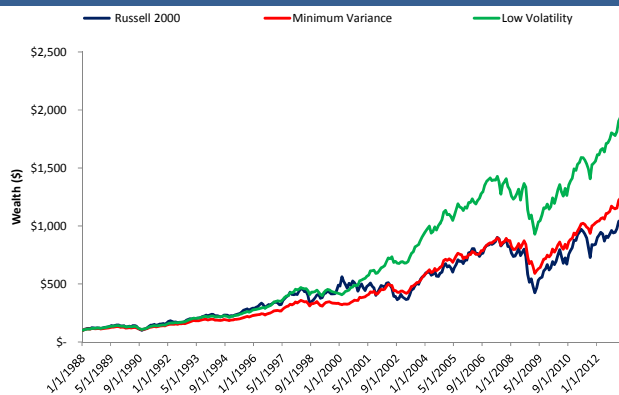
We can see this more clearly in Figure 5 and Figure 6. In terms of wealth, the low volatility portfolio clearly outperforms. Both low risk strategies also outperform the market from a wealth perspective and on a risk adjusted basis. In fact, the low volatility Sharpe ratio is almost twice that of the market. The maximum drawdown is also significantly reduced compared to the benchmark.

Figure 5: Comparison of portfolio Sharpe ratios and maximum drawdowns



Source: Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank, Bloomberg

Figure 6: Comparison of wealth curves



Source: Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank, Bloomberg

A useful screening tool in small caps

Our results suggest that low volatility strategies are useful even within small caps. This is quite interesting, because many managers focus on small caps precisely because they believe there is better opportunity to identify emerging, high growth firms with large upside potential. However, just like in the wider stock universe, investors often overpay for glamorous but risky high growth names, a behavioral bias that means a strategy of “buying boredom” can actually be quite effective.

Even more interesting, our results suggest that in small caps a simple strategy of buying the lowest volatility stocks actually does better than a more complicated strategy based on portfolio optimization (i.e. minimum variance). This means that simply screening the small caps universe based on each stock’s trailing volatility can be a very effective tool in narrowing down the small caps space. In Figure 7 we show the twenty five lowest volatility names in the Russell 2000 currently. Understandably, the majority of these stocks are Utilities and REITs. For a complete screen of the entire Russell 2000 universe, please contact us.



Figure 7: Lowest volatility companies in the Russell 2000

Company Name	Ticker	Sector	Industry	Market Cap (\$millions)
CH ENERGY GROUP INC	CHG	Utilities	Multi-Utilities	\$ 968.43
MVC CAPITAL INC	MVC	Financials	Capital Markets	\$ 304.22
RETAIL OPPORTUNITY INVTS CP	ROIC	Financials	Real Estate Investment Trusts (REITs)	\$ 933.07
PORTLAND GENERAL ELECTRIC CO	POR	Utilities	Electric Utilities	\$ 2,303.61
ALLETE INC	ALE	Utilities	Electric Utilities	\$ 1,889.11
CLECO CORP	CNL	Utilities	Electric Utilities	\$ 2,750.81
EMPIRE DISTRICT ELECTRIC CO	EDE	Utilities	Electric Utilities	\$ 926.70
ACADIA REALTY TRUST	AKR	Financials	Real Estate Investment Trusts (REITs)	\$ 1,413.00
UNITIL CORP	UTL	Utilities	Electric Utilities	\$ 388.01
NORTHWESTERN CORP	NWE	Utilities	Multi-Utilities	\$ 1,556.05
FIRST CONNECTICUT BANCORP	FBNK	Financials	Commercial Banks	\$ 233.95
AVISTA CORP	AVA	Utilities	Multi-Utilities	\$ 1,600.25
LACLEDE GROUP INC	LG	Utilities	Gas Utilities	\$ 1,071.74
UNS ENERGY CORP	UNS	Utilities	Electric Utilities	\$ 1,941.63
PS BUSINESS PARKS	PSB	Financials	Real Estate Investment Trusts (REITs)	\$ 1,857.00
UIL HOLDINGS CORP	UIL	Utilities	Electric Utilities	\$ 1,975.23
IDACORP INC	IDA	Utilities	Electric Utilities	\$ 2,372.46
HOMETRUST BANCSHARES INC	HTBI	Financials	Commercial Banks	\$ 337.77
HIGHWOODS PROPERTIES INC	HIW	Financials	Real Estate Investment Trusts (REITs)	\$ 2,991.21
SOUTH JERSEY INDUSTRIES INC	SJI	Utilities	Gas Utilities	\$ 1,861.79
SOUTHWEST GAS CORP	SWX	Utilities	Gas Utilities	\$ 2,193.54
EASTGROUP PROPERTIES	EGP	Financials	Real Estate Investment Trusts (REITs)	\$ 1,778.15
EL PASO ELECTRIC CO	EE	Utilities	Electric Utilities	\$ 1,434.93
NORTHWEST NATURAL GAS CO	NWN	Utilities	Gas Utilities	\$ 1,151.49
TCP CAPITAL CORP	TCPC	Financials	Capital Markets	\$ 343.66

Source: Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank, Bloomberg

Alternative vehicles for implementing low risk strategies

ETFs offer an additional investment vehicle for managers to gain exposure to low risk strategies. Newer, recently launched ETFs provide low volatility exposure to mid and small cap indices such as XSLV and SMLV.³

³ For more information on these and other low volatility ETFs, please see Martin et al., 2013, "Seeking Returns in Low Volatility", Deutsche Bank Quantitative Strategy, 3 May 2013.



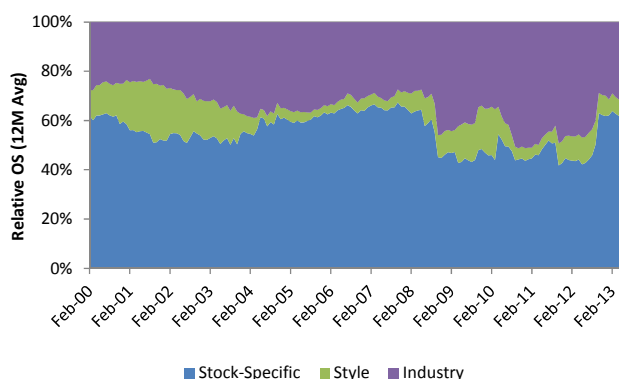
Small caps, big opportunity

In this month's "The Quant View: Small Cap Edition" we analyze various quantitative and fundamental models to show that there is greater stock level differentiation among smaller cap stocks, which presents alpha opportunities for investors. This monthly publication will also point out the various noteworthy observations from our models specifically for small cap stocks. For this report, we will use the Russell 2000 index to define our small caps universe. Where we compare to large caps, we will use the Russell 1000 as our proxy.

The small cap opportunity set

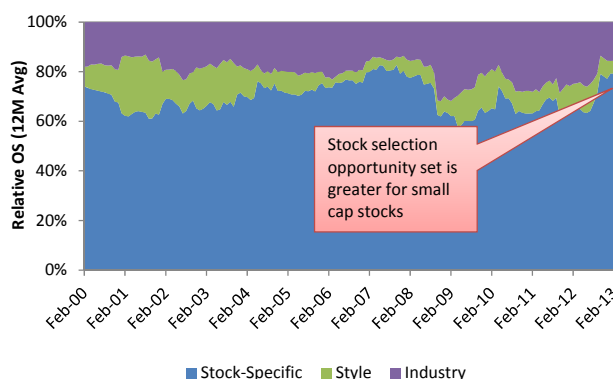
We think of the opportunity set as the total available alpha on the table. Our main interest is to understand what is driving that opportunity, because this can allow us to position our strategies to pick in the orchard with the juiciest fruit. In Figure 8 we show the opportunity set for the large cap universe, and in Figure 9 we show the opportunity set for the small cap universe.

Figure 8: Large cap opportunity set



Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 9: Small cap opportunity set



Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Both charts actually tell a similar story. The key result is the size of the blue portion relative to the other colors. The blue represents the opportunity explained by stock selection, whereas we can think of the other colors as representing the opportunity from top-down calls like picking industries and styles. When the financial crisis exploded in 2008, we moved into a much more macro-dominated world. As a result, the portion of overall opportunity that could be explained by individual company characteristics (e.g., valuation, growth profile, earnings quality, etc.) shrunk sharply; no one cared if a stock looked good on fundamentals if it was exposed to Europe for example. Needless to say, such an environment was challenging for quants and non-quants alike, since both camps tend to use stock specific information to differentiate between stocks.

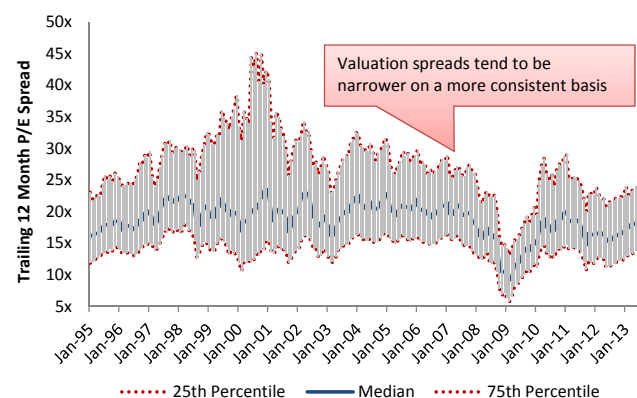
However, the good news is that both charts show that bottom-up stock picking is making a strong comeback. The blue area in both charts has reached levels last seen in 2007. The crucial observation is that the relative opportunity coming from stock selection is higher for small cap stocks. In other words, this universe is particularly fruitful for managers with skill in picking individual stocks. Note that the relative opportunity set has remained relatively steady during the past month for small caps.



Valuation spreads

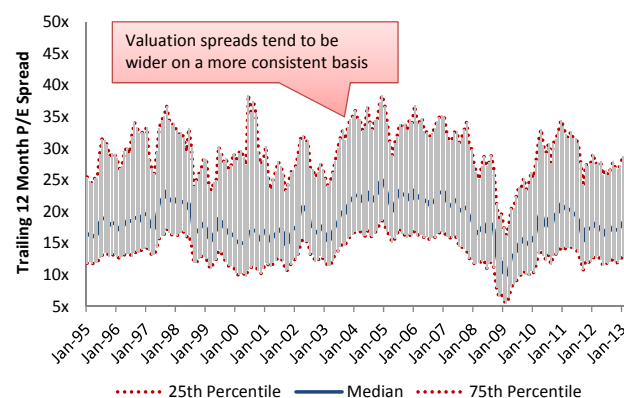
Similar to the opportunity set, valuation spreads allow investors to gauge the level of stock selection opportunity in the market. Widening valuation spreads typically indicate more stock-level differentiation and therefore a better environment for stock selection. On the other hand, narrowing valuation spreads are indicative of lower levels of stock differentiation. Figure 10 and Figure 11 show the median, 25th percentile, and 75th percentile of trailing price to earnings for the Russell 1000 and 2000 index constituents. Interestingly, we see that valuation spreads are wider on a more consistent basis for small cap stocks. This reinforces the earlier evidence we saw in the opportunity set; the small cap space is rich with opportunity for skilled stock pickers. Note that during the past month, valuation spreads have remained fairly consistent within small caps.

Figure 10: Large cap valuation spreads



Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 11: Small caps valuation spreads



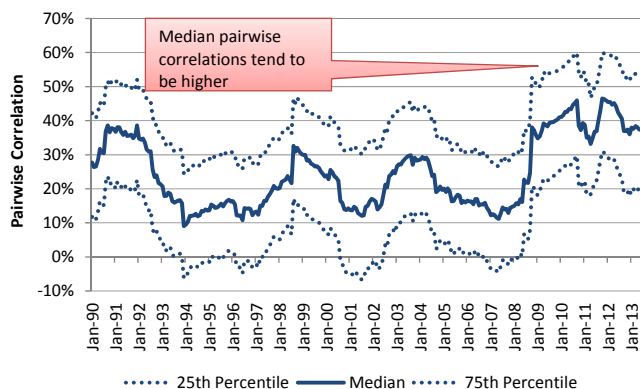
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Keeping an eye on correlations

Closely related to the opportunity set and valuation spreads is the median pairwise correlation among stocks in the market. This is calculated by taking every possible pair of stocks, and computing the correlation of their monthly returns based on the past 24 months of data, and then taking the median across all the pairs. Figure 12 shows the median pairwise correlation for large caps. While it has come down from the peak in the financial crisis, it is still relatively high compared to its long-term average, so investors are not yet completely out of the woods. Interestingly, in general median pairwise correlations for small cap stocks (Figure 13) tend to be lower when compared to large cap stocks. This tells us that small cap names tend to trade more on their own merits, rather than being driven by common factors. Note that during the past month, median pairwise correlations have remained relatively steady within small caps.

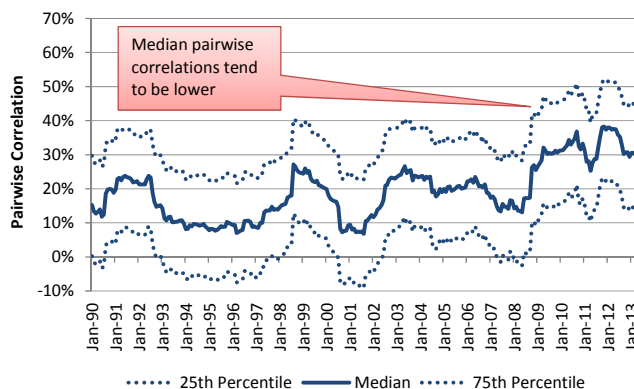


Figure 12: Median pairwise correlation for large caps



Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 13: Median pairwise correlation for small caps



Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Macro update

Our results so far indicate that the small cap world is a favorable environment for applying stock picking skill. But market timing is also important. Picking good stocks is nice, but when everything is falling even doing that is sometimes not enough. What kind of quant tools can we use to do market timing?

Our favorite market timing indicator

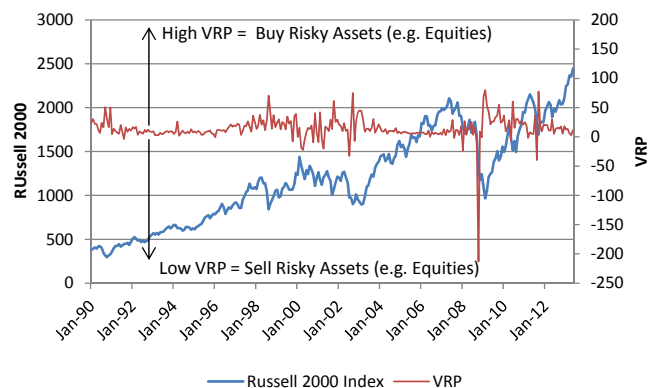
Our Variance Risk Premium (VRP) indicator is a contrarian indicator that measures market overreaction and underreaction to realized risk. In simple terms, VRP is the difference between options-implied risk (i.e., the VIX index) and realized risk (i.e., the actual risk in the market measured historically over the last month). If VRP is high, we see this as a buying opportunity for risky assets, like equities and high yield bonds. Why? The intuition is as follows. When VRP is high, VIX has typically shot up dramatically (i.e. the market is in panic mode). At the same time, realized risk has probably also risen, but not to the same extent. In other words, the market has overreacted relative to what the actual, realized data is telling us. Our research shows that such episodes are good buying opportunities for risky assets on about a three month horizon.⁴ On the other hand, when VRP is low, it tends to be a complacency indicator: investors are failing to price in rising realized risk in the market, and as a result we should be selling risky assets like equities.

So where do we sit today? Today our VRP indicator is reading 11, compared to a long-term average of 14.3. This indicates a fairly neutral position, i.e. investors appear to be pricing the realized risk in the market quite accurately right now. Generally we pay attention to the VRP when it hits extreme levels (like +/- 2 standard deviations); today's reading is only around 0.2 standard deviations below the long-term average.

⁴ For more details on the VRP, including our backtesting work, see: Luo et al., 2011, "Signal Processing: Quant Tactical Asset Allocation (QTAA)", *Deutsche Bank Quantitative Strategy*, 19 September 2011.

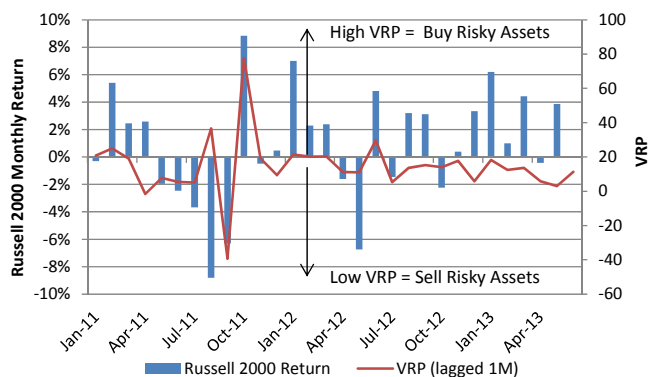


Figure 14: Variance Risk Premium (VRP)



Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 15: Recent VRP (lagged) and market returns



Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank



The Small Cap Dashboard

Which styles have been working in small caps?

This month we introduce the DB Small Cap Dashboard, an easy-to-use cheat sheet that shows which styles have been working within small cap stocks. We track cumulative factor performance year-to-date, and highlight what we think are the noteworthy observations. Figure 16 shows the results for small caps, and for comparison Figure 17 shows the same chart for large caps.

A few important themes emerge from the dashboard this month.

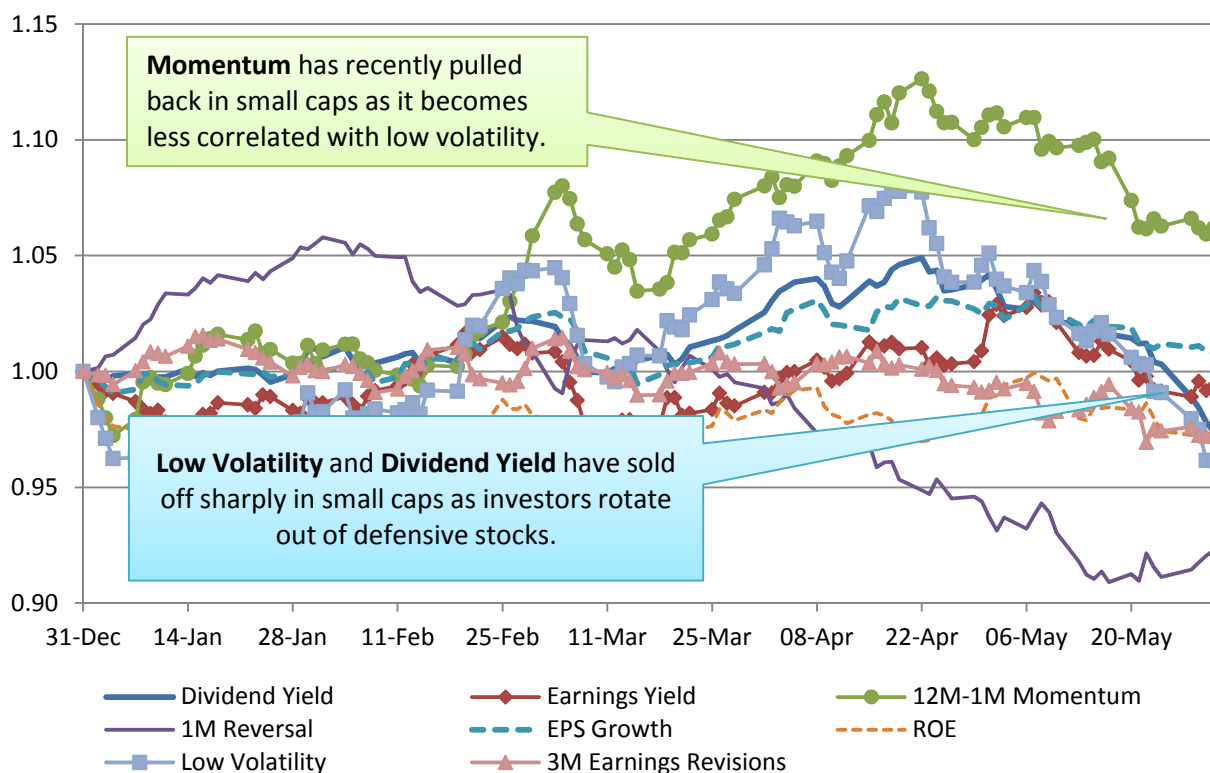
- In mid-April, low volatility was one of the best-performing factors. Now it is one of the worst performing factors as investors have rotated out of defensive stocks and moved into cyclical stocks.
- Price momentum had a strong run this year. This is in part because price momentum was a buildup of low volatility and high-yielding stocks. However, it has recently sold off as investors rotate away from low volatility and high yielding strategies into more cyclical stocks.

For more details see our website

For the most recent daily factor performance, as well as factor performance delineated by different universes (e.g., large cap, small cap) and regions, please see our Global Quantitative Strategy website at <https://eqindex.db.com/gqs/>. Note that you need a username and password to log on to this website. If you don't have login details, please contact us at DBEQS.Americas@db.com and we'd be happy to set you up.

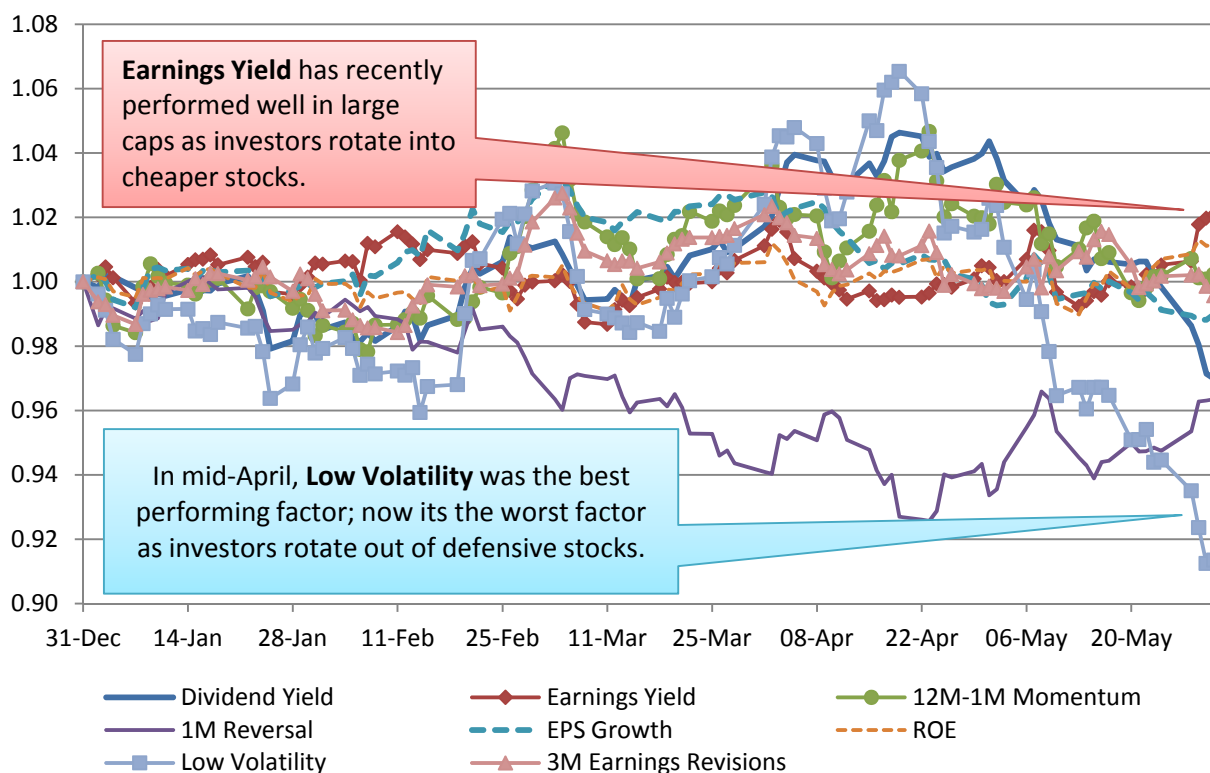


Figure 16: Small Caps (Russell 2000): YTD cumulative factor performance (Q10-Q1 return spread)



Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 17: Large Caps (Russell 1000): Latest month cumulative factor performance (Q10-Q1 return spread)



Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank



Bottom-up stock selection

Top stock picks from our QCD stock selection model

- The QCD model is our flagship stock selection model for U.S. small cap equities.
- The model incorporates a number of unique features including dynamic factor selection, a non-linear TREE component, and active style and sector rotation.
- For complete details on the model, please see Luo et al., "QCD Model: DB Quant Handbook", 22 July 2010.

Current stock recommendations

Figure 18 shows the best 20 buy ideas and sell ideas from today's model. Note that a complete ranking for all Russell 2000 stocks is available in spreadsheet format. If you would like to get a copy of the spreadsheet, please contact us at DBEQS.Americas@db.com.

Figure 18: Current QCD model stock recommendations fro Russell 2000 universe

BEST BUY IDEAS (SECTOR NEUTRAL)					BEST SELL IDEAS (SECTOR NEUTRAL)				
Ticker	Name	CUSIP	GICS Sector	QCD Score (higher is better long)	Ticker	Name	CUSIP	GICS Sector	QCD Score (lower is better short)
TREE	TREE.COM INC	894675107	Financials	15.1%	HNR	HARVEST NATURAL RESOURCES	41754V103	Energy	-34.1%
NFP	NATIONAL FINANCIAL PRTRNS CP	63607P208	Financials	14.9%	PRKR	PARKERVISION INC	701354102	Information Technology	-32.4%
UFI	UNIFI INC	904677200	Consumer Discretionary	13.7%	RBCN	RUBICON TECHNOLOGY INC	78112T107	Information Technology	-32.1%
LCUT	LIFETIME BRANDS INC	53222Q103	Consumer Discretionary	12.7%	GEVO	GEVO INC	374396109	Energy	-31.5%
PRXL	PAREXEL INTERNATIONAL CORP	699462107	Health Care	11.9%	ETRM	ENTEROMEDICS INC	29365M208	Health Care	-30.1%
USNA	USANA HEALTH SCIENCES INC	90328M107	Consumer Staples	11.3%	AUMN	GOLDEN MINERALS CO	381119106	Materials	-29.7%
SAIA	SAIA INC	78709Y105	Industrials	11.1%	PZG	PARAMOUNT GOLD AND SILVER	69924P102	Materials	-28.4%
BBSI	BARRETT BUSINESS SVCS INC	68463108	Industrials	10.3%	ZIOP	ZIOPHARM ONCOLOGY INC	98973P101	Health Care	-23.5%
PDLI	PDL BIOPHARMA INC	69329Y104	Health Care	9.2%	GNK	GENCO SHIPPING & TRADING	Y2685T107	Industrials	-21.9%
IDT	IDT CORP	448947507	Telecommunication Services	8.6%	AMSC	AMERICAN SUPERCONDUCTOR CP	301111108	Industrials	-21.4%
IPAR	INTER PARFUMS INC	458334109	Consumer Staples	7.9%	NGVC	NATURAL GROCERS VITAMIN CTGE	63888U108	Consumer Staples	-20.6%
VG	VONAGE HOLDINGS CORP	92886T201	Telecommunication Services	7.8%	MNTG	MTR GAMING GROUP INC	553769100	Consumer Discretionary	-19.9%
TTEC	TELETECH HOLDINGS INC	879939106	Information Technology	5.7%	TWER	TOWERSTREAM CORP	892000100	Telecommunication Services	-19.8%
LNDX	LANDEC CORP	514766104	Materials	5.4%	AT	ATLANTIC POWER CORP	04878Q863	Utilities	-19.5%
GPK	GRAPHIC PACKAGING HOLDING CO	388689101	Materials	4.9%	OEI	ORIENT-EXPRESS HOTELS	G67743107	Consumer Discretionary	-18.5%
OTTR	OTTER TAIL CORP	689648103	Utilities	4.6%	FMD	FIRST MARBLEHEAD CORP	320771108	Financials	-17.2%
EEFT	EURONET WORLDWIDE INC	298736109	Information Technology	3.9%	GSVC	GSV CAPITAL CORP	36191J101	Financials	-16.1%
LG	LACLEDE GROUP INC	505597104	Utilities	3.8%	PTGI	PRIMUS TELECOMM GROUP INC	741929301	Telecommunication Services	-16.0%
DK	DELEK US HOLDINGS INC	246647101	Energy	3.7%	HTSI	HARRIS TEETER SUPERMARKETS	414585109	Consumer Staples	-14.5%
WNR	WESTERN REFINING INC	959319104	Energy	2.6%	CDZI	CADIZ INC	127537207	Utilities	-14.0%

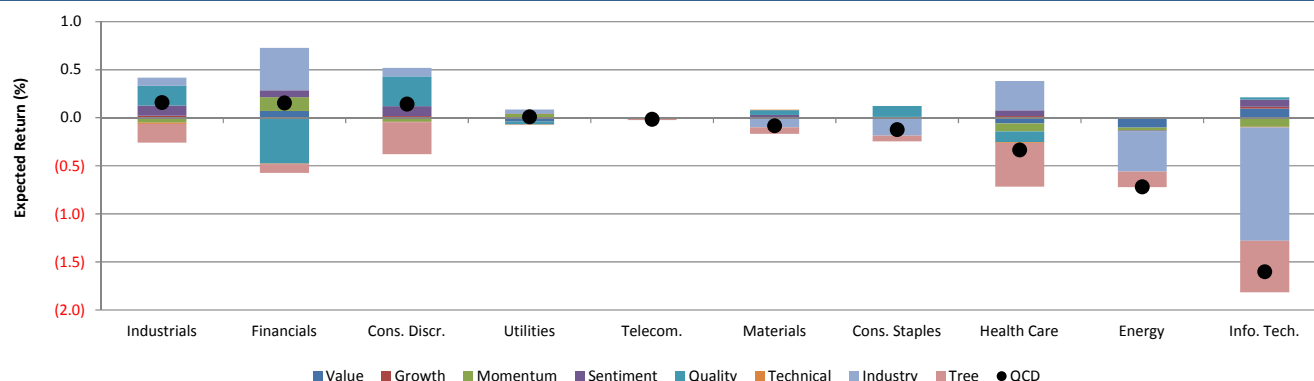
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Current sector recommendations

The QCD model also implicitly makes sector predictions. Figure 19 shows the current ranking of the 10 GICS Level 1 Sectors, ranked from best (most likely to outperform this month) to worse (least likely to outperform). The bars show the key drivers for each call.



Figure 19: Current QCD sector recommendations for Russell 2000 universe

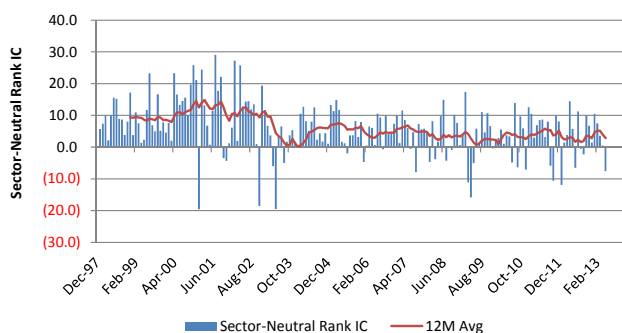


Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Small cap model performance

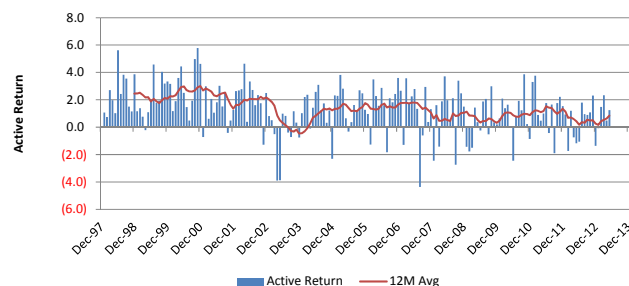
The QCD model has performed well since inception. Figure 20 shows the pure signal performance, measured as a monthly sector-neutral rank information coefficient (IC). Figure 21 shows the performance of an actual model portfolio, after costs, based on a realistically optimized market-neutral strategy.

Figure 20: Model performance, sector-neutral rank IC



Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 21: Model portfolio active return, after costs

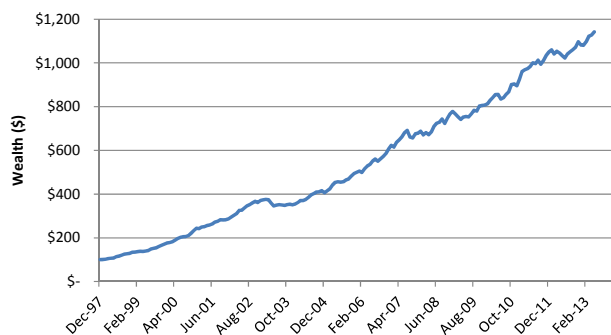


Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 22 shows the cumulative performance of the optimized strategy, and Figure 23 shows the annualized Sharpe ratio (after costs) by calendar year.

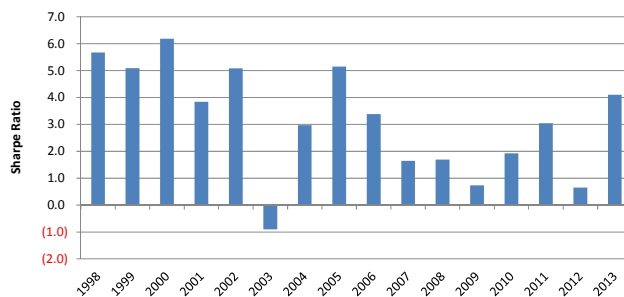


Figure 22: Model portfolio cumulative, after costs



Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 23: Annualized Sharpe ratio, after costs



Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank



Top stock picks from our N-LASR global stock selection model

- The N-LASR model is our flagship stock selection model for small cap equities.
- The model is based on a machine learning algorithm called AdaBoost, and is designed to adaptively learn which factors to use, often in a non-linear way.
- For complete details on the model, please see Wang et al., "Signal Processing: The Rise of the Machines", 5 June 2012.

Current stock recommendations

Figure 24 shows the best 20 buy ideas and sell ideas from today's model. Note that a complete ranking for all small cap stocks is available in spreadsheet format. If you would like to get a copy of the spreadsheet, please contact us at DBEQS.Americas@db.com.

Figure 24: Current N-LASR model stock recommendations for Russell 2000 universe

BEST BUY IDEAS					BEST SELL IDEAS				
Ticker	Name	SEDOL	Country	N-LASR Score (higher is better long)	Ticker	Name	SEDOL	Country	N-LASR Score (lower is better short)
CBZ	CBIZ INC	2730781	USA	1.99	AFFY	AFFYMAX INC	B1182G9	USA	-1.94
NRIM	NORTHTRIM BANCORP INC	2640277	USA	1.79	MHR	MAGNUM HUNTER RESOURCES COF	2850979	USA	-1.82
VPK	VISHAY PRECISION GROUP INC	B603LG3	USA	1.77	GEVO	GEVO INC	B558GV2	USA	-1.64
FIBK	FIRST INTERSTATE BANCOSYSTEM	B4RGHN0	USA	1.70	EQY	EQUITY ONE INC	2246329	USA	-1.63
UFCS	UNITED FIRE GROUP INC	B4WXG84	USA	1.69	NAT	NORDIC AMERICAN TANKERS LTD	2113876	USA	-1.60
IMKTA	INGLES MARKETS INC -CL A	2460550	USA	1.69	NHI	NATIONAL HEALTH INVESTORS	2626125	USA	-1.57
SPTN	SPARTAN STORES INC	2616126	USA	1.65	SUPN	SUPERMUS PHARMACEUTICALS INC	B722BG4	USA	-1.57
EFSC	ENTERPRISE FINL SERVICES CP	2768889	USA	1.60	AVEO	AVEO PHARMACEUTICALS INC	B52G992	USA	-1.56
LION	FIDELITY SOUTHERN CORP	2348429	USA	1.59	AREX	APPROACH RESOURCES INC	B28RSK2	USA	-1.49
KS	KAPSTONE PAPER & PACKAGING	B0L2NP0	USA	1.54	CRIS	CURIS INC	2615413	USA	-1.47
HCOT	HAWAIIAN TELCOM HOLDCO INC	B4ZDRV1	USA	1.54	SYUT	SYNUTRA INTERNATIONAL INC	2457530	USA	-1.43
FRF	FORTEGRA FINANCIAL CORP	B4VK051	USA	1.52	PKT	PROCERA NETWORKS INC	2021968	USA	-1.42
ICFI	ICF INTERNATIONAL INC	B1FP363	USA	1.50	HR	HEALTHCARE REALTY TRUST INC	2417921	USA	-1.42
LCUT	LIFETIME BRANDS INC	2515773	USA	1.47	FXEN	FX ENERGY INC	2328409	USA	-1.40
NNI	NELNET INC	2196190	USA	1.45	PDCE	PDC ENERGY INC	B89M5F2	USA	-1.38
VCI	VALASSIS COMMUNICATIONS INC	2913106	USA	1.42	GOV	GOVERNMENT PPTYS INCOME TR	B4ZG8D9	USA	-1.37
DEST	DESTINATION MATERNITY CORP	2605919	USA	1.41	ZUMZ	ZUMIEZ INC	B081QB7	USA	-1.36
PBY	PEP BOYS-MANNY MOE & JACK	2681447	USA	1.39	HIW	HIGHWOODS PROPERTIES INC	2420640	USA	-1.34
OME	OMEGA PROTEIN CORP	2232652	USA	1.38	ATRS	ANTARES PHARMA INC	2383163	USA	-1.33
MDCA	MDC PARTNERS INC	2574495	USA	1.35	FST	FOREST OIL CORP	2712121	USA	-1.30

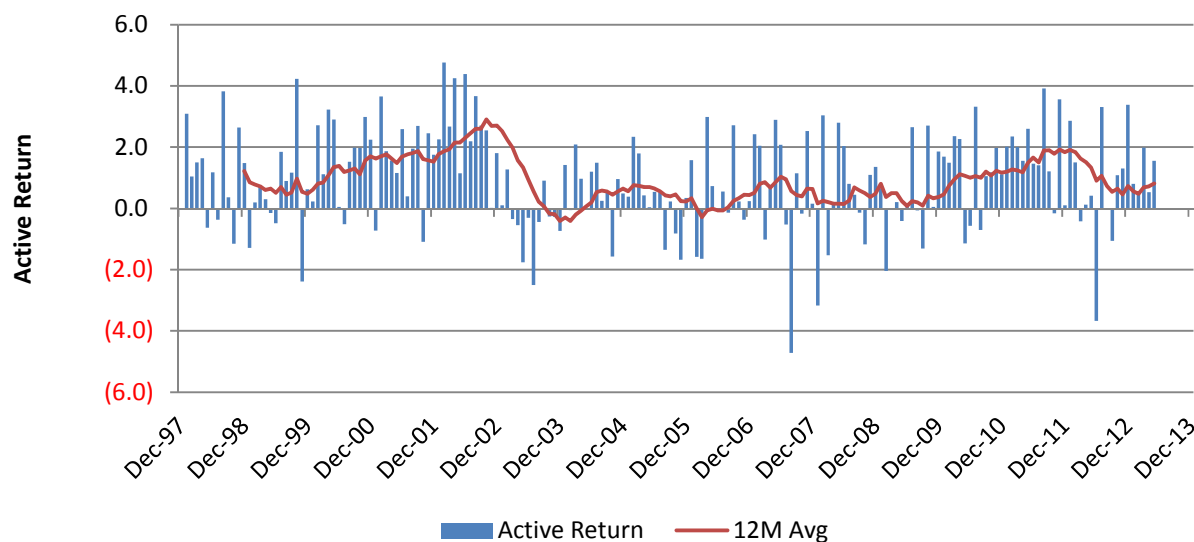
Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Small cap model performance

The N-LASR model has performed well since inception. Figure 25 shows the average pure signal performance, measured as a monthly rank information coefficient (IC).



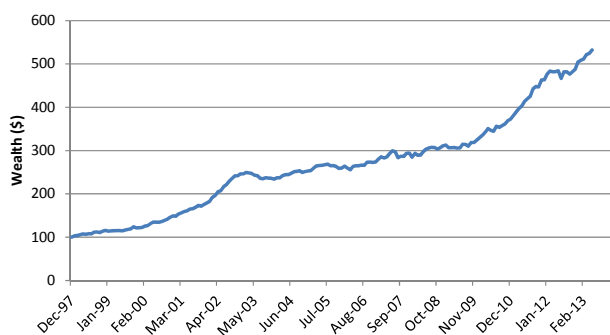
Figure 25: Model portfolio active return, after costs



Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

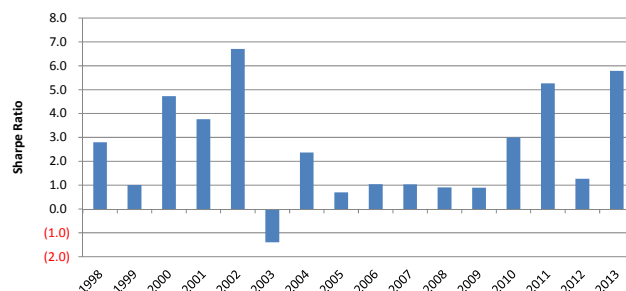
Figure 26 shows the cumulative performance of the optimized strategy, and Figure 27 shows the annualized Sharpe ratio (after costs) by calendar year.

Figure 26: Portfolio cumulative, after costs



Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank

Figure 27: Annualized Sharpe ratio, after costs



Source: Bloomberg Finance LP, Compustat, IBES, MSCI, Russell, S&P, Thomson Reuters, Worldscope, Deutsche Bank



Appendix 1

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