BARCLAYS

Rise of the Machines

Landscape and Recent Developments in Quantitative
Hedge Fund Strategies, Products and Managers

June 2017

Contents

I. Study overview

It was not so long ago that machines first started to surpass humans in challenges ranging from chess, checkers, the ancient game of Go, and (most recently) poker. The poker victory by Liberatus, an AI, was especially significant given that poker is a game in which decisions are necessarily made with imperfect information and the accurate deciphering of human behavior is arguably the most critical component. For these reasons, no one ever expected a machine to gain the upper hand. The hedge fund (HF) industry may be experiencing a similar transition from man to machine. Fundamentally driven managers have historically captured the focus, the flows and the glory. Additionally, the events of August 2007 (dubbed the 'Quant Crash'), where a number of systematic managers experienced unprecedented losses, did nothing to augment the popular image of systematic strategies.

But in the last few years, a resurgence of interest in the space has developed from both managers and investors. The mystique of Silicon Valley has spread to the HF industry, and managers and investors are increasingly making investments in the human capital and the tools to explore the role of technology in data and analytics, as applied to investment and alpha generation objectives. Now, questions are being asked of whether and when systematic HF management will reach an advanced stage to rival Liberatus' analogous reign, and whether indeed machines have surpassed humans in investing as well.

It was questions like these that prompted the Strategic Consulting team to examine systematic strategies. We wanted to outline the systematic landscape in terms of size, strategies and players, and understand the recent shifts in investor sentiment. We also wanted to examine how systematic HFs performed when compared to their discretionary counterparts, across a range of market conditions, as well as understand their effect on a typical portfolio. Finally, we focused on some of the major developments in the systematic HF space in terms of product offering and adoption of relevant tools and methods (Big Data, Machine Learning), including the adoption of such methods by discretionary managers.

The following are the key questions that we address in this study:

1. **Landscape and Evolution**
   a. What is the size of the systematic strategy universe within the HF industry?
   b. What does the systematic HF universe look like across products and asset classes?
   c. How have assets in systematic strategies evolved in the last 15 years, and what has been the level of flows?
   d. Which managers have been the biggest beneficiaries of flows?
   e. Is there a decline in 'algorithm aversion' among HF investors?
   f. What are some of the risk factors associated with systematic strategies?

2. **Historical Performance**
   a. How have systematic HFs performed in comparison to their discretionary counterparts?
   b. How does systematic and discretionary HFs perform in various market conditions?
   c. How do systematic strategies perform in a portfolio context?
   d. How have the flagship products of the largest systematic HFs performed in comparison to the broader systematic HF universe?

3. **Recent Developments**
   a. What are the most significant developments in the systematic HF space?
   b. What enhancements are systematic HF managers making to their alpha products, and what are the new tools they are using to do so?
   c. How are systematic managers building out their scalable product offerings?
   d. What are the tolerable fee levels that systematic HF managers can charge for their products?
   e. How should systematic HFs think about their business strategies going forward?

4. **'Quantamental'**
   a. How are discretionary managers incorporating systematic methods into their investment process?
   b. What are the key challenges for building a 'quantamental' business?

Methodology

With these questions in mind, the Strategic Consulting team sought input from about 65 HF managers, collectively managing $650 billion (bn) in assets under management (AUM) and 25 investors accounting for $240bn in HF Assets. More specifically, data inputs for the study included:

1. One-on-one interviews
   a. One-on-one interviews with 20 HFs
   b. One-on-one interviews with 25 investors with experience allocating to systematic strategies

2. Survey results
   a. Survey input from 44 HF managers
   b. Survey data from prior Strategic Consulting Publications, in particular the 2017 Hedge Fund Outlook – 'Turning the Tide'
   c. Survey results and commentary was also taken from panel discussions on 'Big Data' at the 2016 Barclays Hedge Fund Symposium

3. External research, publications, and filings
   a. Over 50 sources
   b. About 10,000 data points of HF returns from Hedge Fund Research (HFR) and Hedge Fund Intelligence (HFI)

4. Internal expertise from Barclays Prime Services and other teams with systematic strategy experience

Finally, the data described above was synthesized into the Strategic Consulting Systematic Proprietary Market Sizing Model to drive many of the analyses presented in this paper.

We begin by providing some insight into the profile of our interview and survey respondents. Figure 1 shows the distribution of the 64 HF managers that participated in this study across strategy type, AUM and region. Below that, we show the distribution of the investors who participated across investor type (channel) and region. Selected highlights:

- Of the 20 managers that we interviewed, 13 were purely systematic (only managed systematic strategies), 7 were hybrid (have exposure to systematic and discretionary strategies).

- The purely systematic managers were split across equity quant (6), multi-strategy (3) and managed futures (4).

- We also surveyed 44 discretionary managers with varying adoption rates of quantitative methods.

- The 25 investor firms in our study represent ~$240bn in HF AUM, or about 8% of the HF industry. They are well distributed by channel / type with our sample split approximately half institutional, half private / FoHF.

- About 80% of these investors have over $1bn AUM, with the majority having 10% – 40% of their HF allocation invested in systematic strategies – indicating a higher than average systematic allocation.

- The geographical breakdown of these investors shows that 68% are from North America, while the remaining 32% are from Europe.

II. Executive summary

The following are the high level takeaways from the study:

Landscape and evolution

- We estimate that systematic HF strategies account for ~$500bn in AUM (or almost 17% of HF industry assets). There are an additional ~$100bn in risk premia product offered by HFs and other asset managers. Finally, we should mention that there are >$500bn in premium long only quant products (excluding simple smart beta).

- Systematic HF AUM has almost tripled since 2005, but there have been alternating waves of growth / shrinkage in managed futures / multi-strat quant and equity quant within this period.

- In the pre-crisis period, discretionary managers took the lion's share of inflows, but more recently systematic HFs have taken almost twice their 'fair share' of net inflows, indicating increased investor enthusiasm for quant strategies.

- We have seen a decline in levels of 'algo aversion', with greater investor acceptance of systematic strategies, and we believe this is one of the key drivers of inflows to systematic managers right now.

- Scale appears to be a particular advantage in the systematic space, with the largest managers having seen the most rapid growth in the last five years, possibly as a result of inflows from new investors, who gravitate toward large managers.

- This growth has led to concerns around crowding in equity quant strategies in particular and the potential for another 2007-style 'quant crash', but our measures of risk (leverage, liquidity, portfolio overlap and intra-strategy correlation) suggest these concerns may be overblown.

FIGURE 1: Survey and Interview Respondents
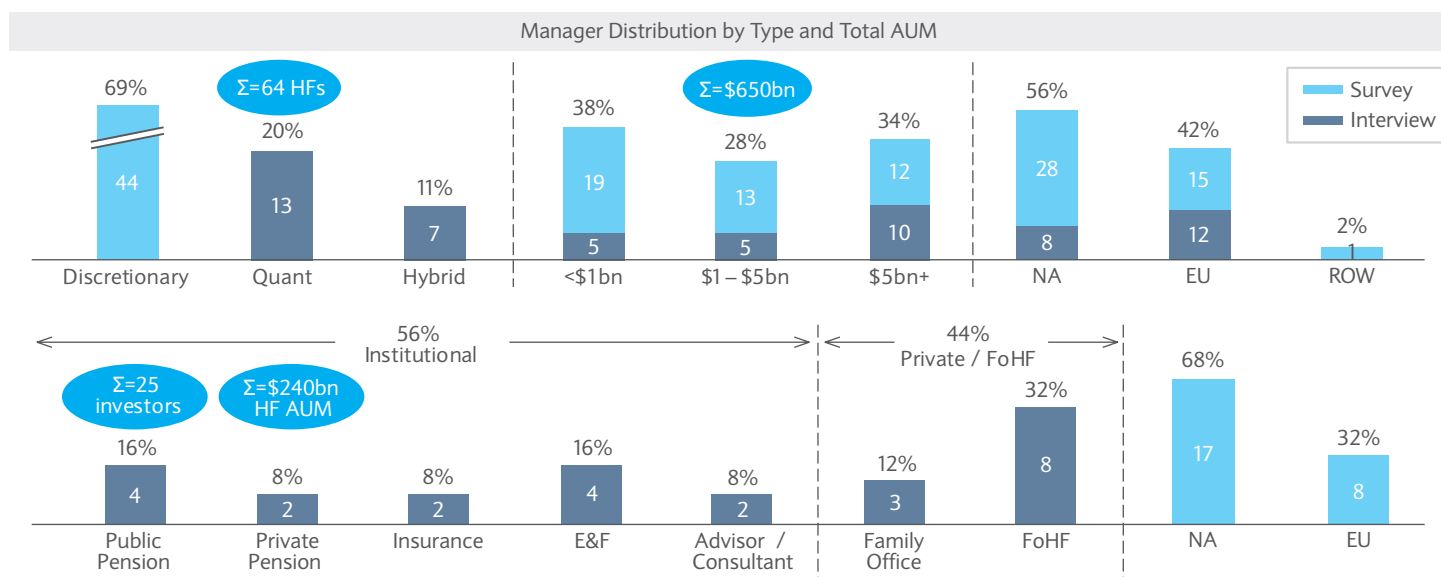
Note: The results presented are from a relatively small number of respondents and therefore are indicative only and not meant to reflect conclusive industry trends. Data and other information presented are derived directly from respondents and we cannot confirm the accuracy of such information. All figures refer to Strategic Consulting study results only

Historical performance

- Over the last decade, the performance disparity between corresponding systematic and discretionary strategies in the equity space has been small, although the difference appears to be larger in macro.

- Systematic and discretionary strategies tend to outperform in different times, and it appears that certain market conditions appear to suit some strategies better than others.

- The Sharpe ratio / correlation characteristics of systematic strategies make a strong case for portfolio inclusion.

- The flagship products of the largest quant managers appear to have significantly outperformed their strategies on average.

Recent developments

- On the 'alpha' side of things, systematic managers are investing in 'Big Data', Machine Learning, and, in the managed futures space, trading new markets and focusing on higher-Sharpe models.

- For the time being, 'Big Data' and Machine Learning, while an area of focus, have challenges that limit the implementation of these techniques as a core part of the investment process for systematic managers.

- Systematic managers have also been investing in developing scalable products, and half of the HFI 'Billion Dollar Club' quant managers now have some sort of scalable offering – either quant LO or risk premia.

- Systematic managers, despite their recent popularity, have not been immune from fee pressure. We see an increasing bifurcation of the fee model for systematic products into two camps – high-Sharpe strategies which command premium fees, and commoditized strategies with 'sub-HF' fees. The middle ground between these camps will likely be the most squeezed going forwards.

- Managers have a choice of going down the high-Sharpe, low-capacity route, or the low-Sharpe, high-capacity route – the most successful long-term strategy may be a 'barbell' product offering with a mixture of both.
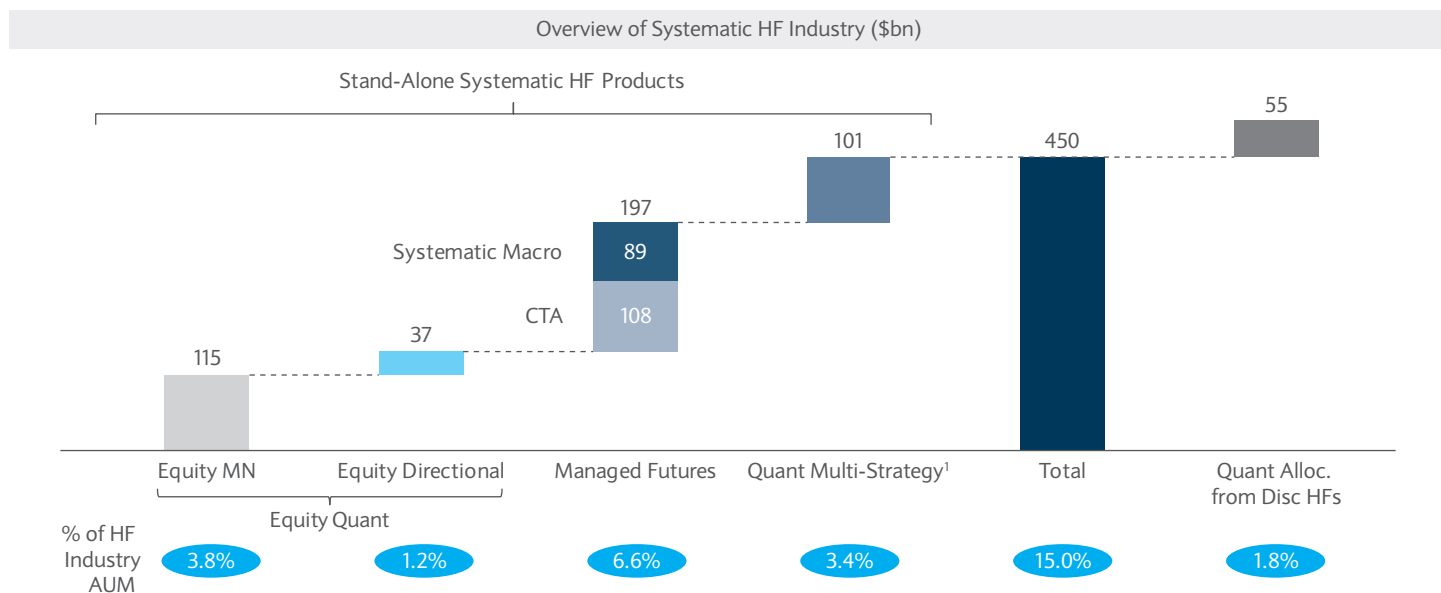
'Quantamental'

- Discretionary managers are investing in using quantitative techniques throughout their investment process, including incorporating 'alternative data' as part of their research process.

- Many investors and managers believe that this hybrid approach may prevail – although there are challenges associated with successfully implementing such strategies.

III. Landscape and evolution

Size of systematic strategies within the HF industry

We estimate that systematic HF strategies account for about $500bn in assets, or almost 17% of the total HF industry. Of the $500bn in assets, we believe there to be about $450bn in stand-alone systematic HF products and approximately $55bn of systematic assets managed within discretionary multi-strategy HFs. As shown in Figure 2, the assets within stand-alone systematic HF products are fairly evenly split across equity market neutral (EMN), commodity trading advisors (CTAs), systematic macro and quant multi-strategy, with equity quant directional accounting for a considerably smaller proportion of total systematic HF assets.

FIGURE 2: Size of Systematic Strategies within the HF Industry

Overview of Systematic HF Industry ($bn)

Source: HFI, HFR, review of manager marketing materials and publicly available documents, Strategic Consulting analysis
1. We estimate that 70% – 80% of these strategies are managed futures, with the remainder in EMN

Evolution of assets and flows to systematic HF strategies

While total assets in systematic HF strategies have continued to reach all-time peaks year-on-year since 2009, the last 10 years have not been all 'smooth sailing'. As depicted in Figure 3, we have identified clear periods of 'Boom' and 'Bust' for the overall systematic industry, as well as years where certain sub-strategies have been favored by investors.

During the pre-crisis period, both equity and managed futures / multi-strategy quant strategies grew steadily at about 29% compounded annual growth rate (CAGR), with total assets reaching $250bn by the end of 2007, although systematic funds at this point accounted for a relatively insignificant proportion of net flows into the overall HF industry (~5%).

However, during the 2007 quant crash, equity quant strategies were much more severely impacted and sustained a disproportionate share of industry outflows compared to both its share of the HF industry AUM as well as in absolute dollar amounts, and lost over half its assets in just two years. In the immediate post-crisis period, negativity around equity quant persisted and there was a 'mainstreaming of CTAs', where investors started to become more comfortable in investing in CTAs as a result of positive performance throughout the crisis. During this period, managed futures / multi-strategy received the lion's share of inflows and its assets grew at almost three times the rate of equity quant (29% CAGR). That said, since 2013, there has been somewhat of a 'resurgence of equity quant' as assets

FIGURE 3: Evolution of AUM in Systematic HF Strategies

Growth of Systematic HF AUM, 2000 – 2016 ($bn)

Source: HFR, HFI, Strategic Consulting analysis
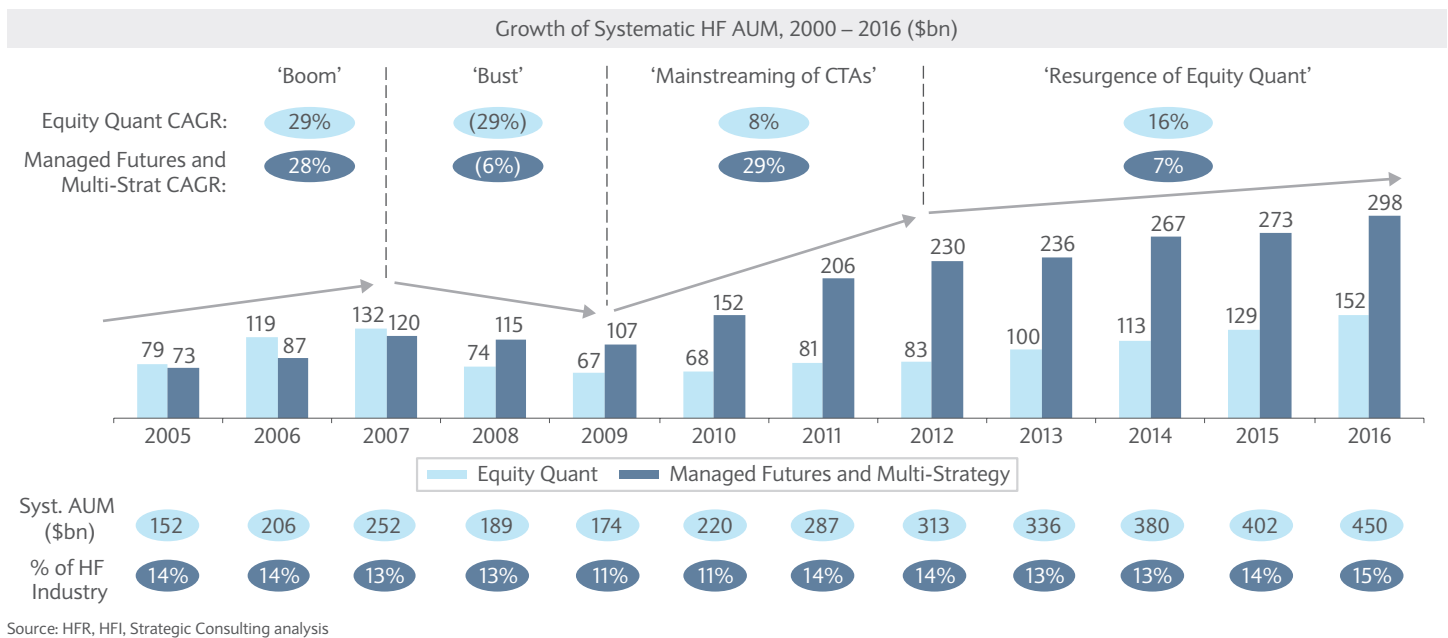
FIGURE 4: Evolution of Flows to Systematic HF Strategies

Cumulative Annual Net Flows, 2005 – 2016 ($bn), Systematic versus Discretionary Strategies

2005 – 2007	Total Flows
Systematic	$14bn (5%)
Discretionary	$268bn (95%)

2010 – 2016	Total Flows
Systematic	$114bn (29%)
Discretionary	$286bn (71%)

Source: HFR, HFI, Strategic Consulting analysis
1. Includes event driven, credit, relative value and discretionary multi-strategy
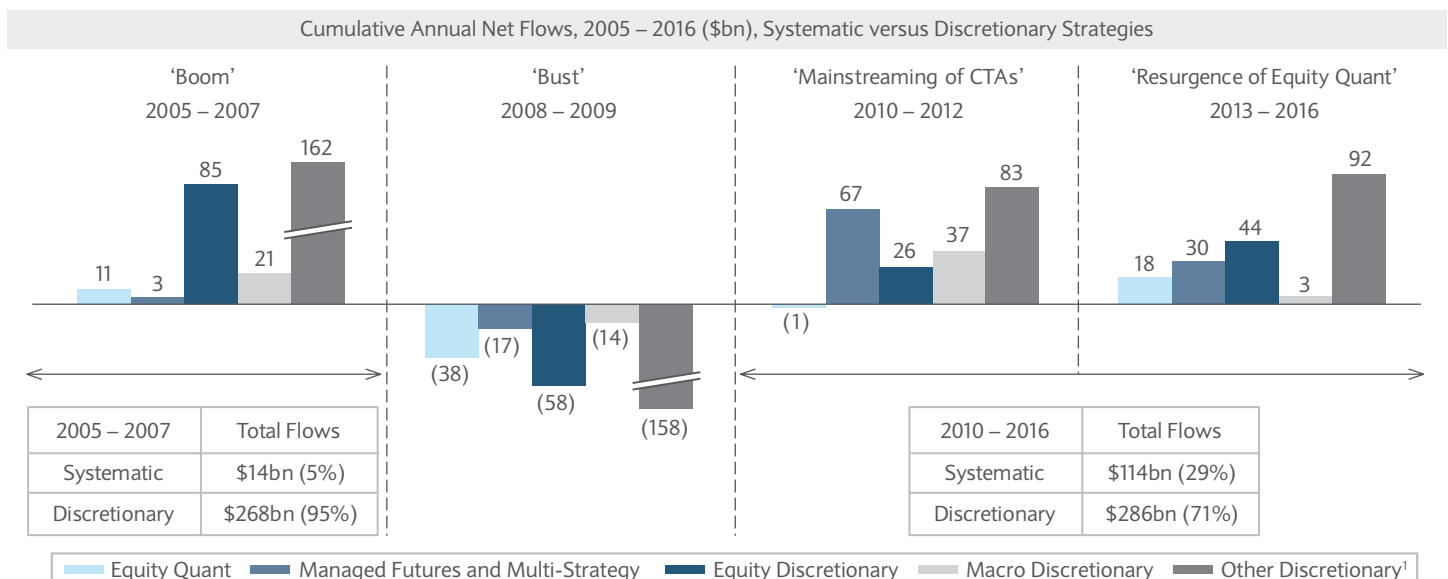
have grown at over double the rate of managed futures / multi-strategy, and in 2016, for the first time, exceeded their pre-crisis peak of $132bn.

While equity quant and managed futures / multi-strategy have both enjoyed their respective periods of favor, it is worth focusing on the evolution of systematic strategies as a whole. Although systematic HF assets still represent a similar proportion of total HF industry assets to 2005 (~15%), given the massive outflows post the quant crash, systematic strategies are finally starting to regain a respectable share of the market flows. Before the crisis, discretionary strategies were taking the vast majority of inflows (~95%); however, since 2010, systematic strategies have received

29% of inflows, which is approximately two times their share of total HF industry assets (see Figure 4).

'Algorithm aversion'

It would seem that one of the major reasons that systematic strategies have been able to gain traction in the last few years is a decline in what we call 'algo aversion'. Historically, many investors have been wary of investing in systematic strategies due to concerns about investing in a product they fundamentally do not understand. However, that aversion seems to be reversing slightly as more new investors have started to put money to work in systematic strategies. Figure 5 shows this to be an upward trend: investors with equity quant allocations increased significantly

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FIGURE 5: 'Algorithm Aversion'
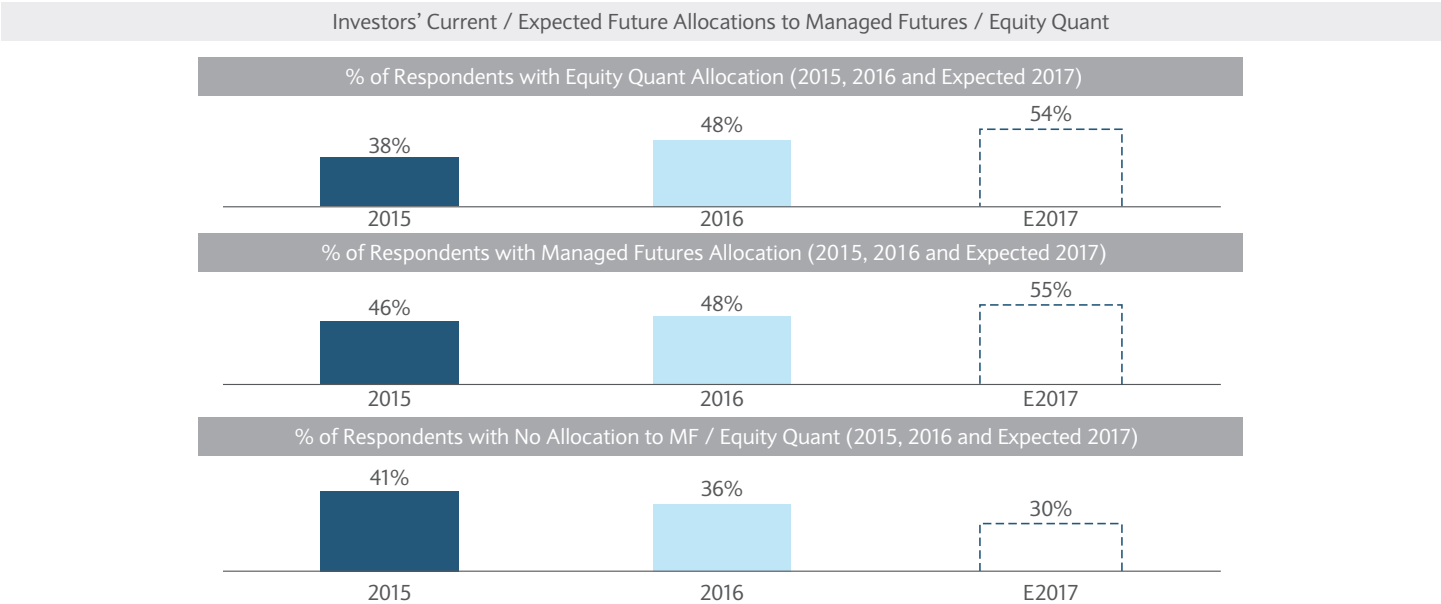
Source: Strategic Consulting analysis; 2015 data from Strategic Consulting Report "Bracing for Impact" and 2016 / expected 2017 data from Strategic Consulting report "Turning the Tide"

FIGURE 6: Growth of the Largest Systematic HF Managers
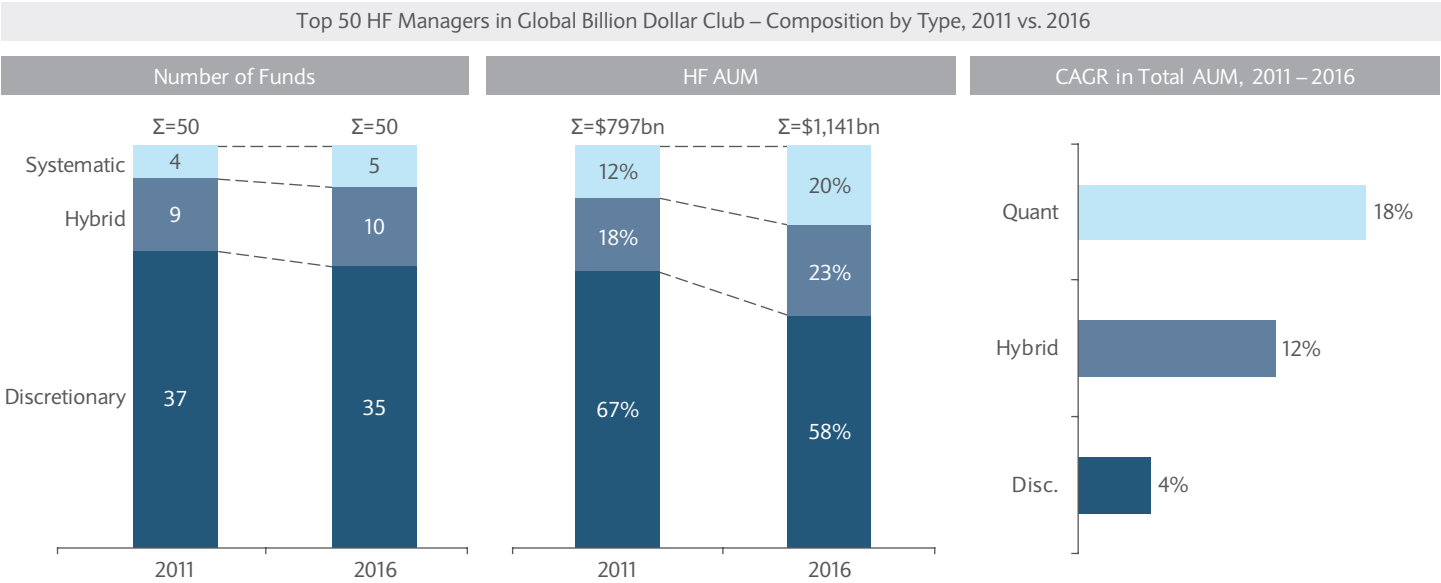
Source: HFI Global Billion Dollar Club, HFR, Strategic Consulting analysis

from 2015 – 2016 (38% – 48%) and this trend is expected to continue into 2017 as we predict about 54% of the investor base to be allocated to the strategy. Similarly, although at a slower rate, investors with managed futures allocations have been increasing and we expect about 55% of investors to be allocated to the strategy in 2017. Additionally, the number of investors with no allocations to either strategy has been decreasing and is expected to fall to 30% in 2017. Considering that average allocation levels to systematic strategies have remained stable through 2015 and 2016 (not shown), we believe that the growth in investment in systematic strategies is likely driven primarily by new investors entering the space rather than existing investors upweighting their systematic exposure. This is an important consideration for managers as it suggests the need for a marketing strategy targeted at new systematic investors (i.e., greater need for education, more time spent prospecting, etc.) rather than investors known to be already invested in other systematic strategies.

Growth of the largest systematic HF managers

We believe that the increase of new investors entering the systematic space is one of the reasons that the largest systematic managers have grown disproportionately in relation to the rest of the HF industry, as newcomers are more comfortable investing in large and established names. Figure 6 shows how the composition of the top 50 HF managers in the HFI Global Billion Dollar Club has changed since 2011, and it appears that the importance of scale is especially pronounced among systematic managers. While the list of the largest 50 managers in the industry still remains dominated by discretionary managers (70%), their share of AUM has diminished significantly, from 67% to 58%, while both systematic and hybrid managers have gained share. It seems that substantial growth has come from the largest purely systematic managers, whose AUM has grown by 18% annually over five years, compared to 12% for the hybrid managers, and just 4% for discretionary managers. Interestingly, outside of the five largest systematic managers, the

other systematic managers as a group have actually grown more slowly than the overall industry (2% versus 8% respectively, not shown). It is also worth noticing that the large systematic managers appear to be able to preserve their market position much better than the large discretionary ones: four out of the five systematic managers included in the 2016 top 50 Global Billion Dollar Club are the same names from 2011 versus just 43% for discretionary managers.

Estimating systemic risk: leverage, liquidity and crowdedness in equity quant strategies

With assets flowing into equity quant strategies growing, some investors fear the risk of a repeat of the 2007 'quant crash'. In addition, discretionary managers are also increasingly interested in the broader market impact of systematic funds and the effect of their trading volumes on the overall equity markets. With that in mind, we sought to track the evolution of various measures of risk – leverage, liquidity and crowdedness – since the pre-crisis period, in order to assess the relative change in systemic risk in the equity space.

Beginning with leverage, equity quant strategies are known for employing higher levels than discretionary managers, and this was one of the fundamental determinants of the severity of the crash in 2007. Therefore, as depicted in Figure 7, we attempted to track how equity quant leverage has changed over time in order to estimate the true equity quant footprint within the equity HF universe. According to our estimates, leverage used by equity quant HFs is now at approximately half of pre-crisis levels, which peaked at eight times in 2006, although, on average, leverage still remains significantly higher when compared to that of non-systematic strategies. As a result, equity quant HFs have a much larger footprint within the equity HF universe than their relatively small AUM (15%) would imply, and account for over one-third of total HF equity gross market value (GMV) globally. Still, when evaluating the riskiness of systematic investing today,

FIGURE 7: Leverage in Equity Quant Strategies

Levered Assets in Systematic Strategies, 2005 – 2016H1
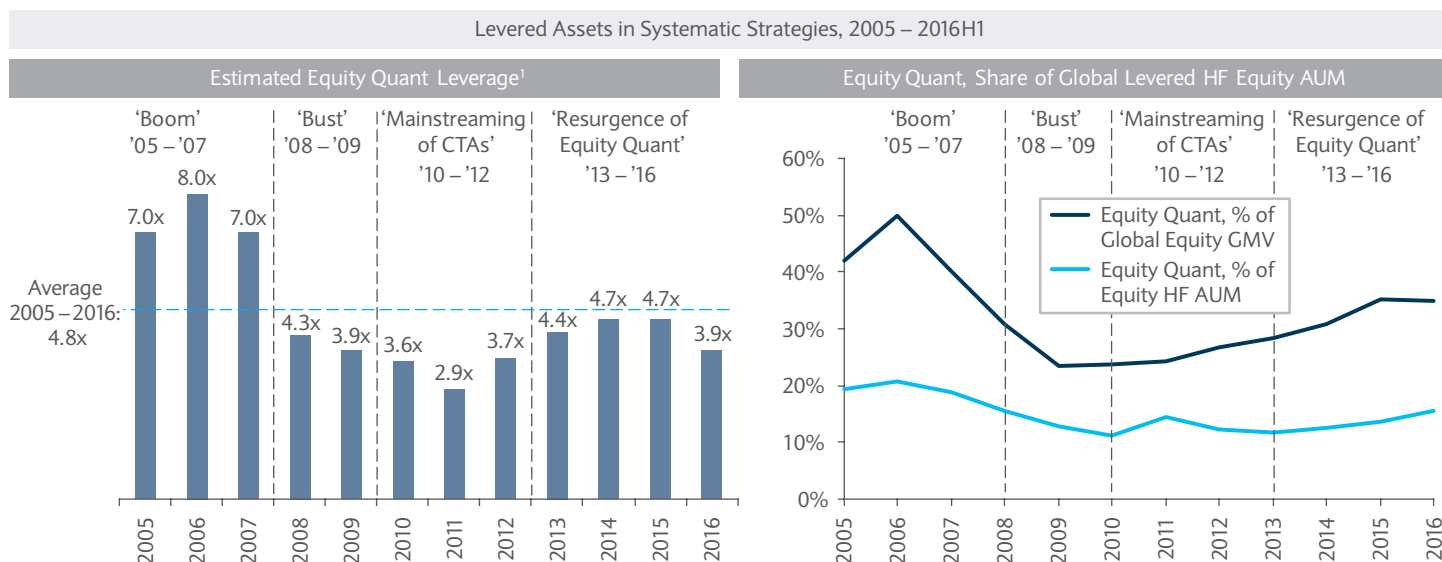
current average leverage levels are approximately half that of a conservative pre-crisis level estimate, considering that the '05 – '07 figures in Figure 7 do not take into account additional high-leverage players (e.g., proprietary trading funds at banks) that do not exist in the same form today.

Moreover, it is also worth viewing the recent growth in AUM / GMV in equity quant strategies in the context of trading volumes to better understand both the scope of their market footprint and the potential market impact in a liquidation scenario. In Figure 8a, we use the ratio of equity quant HF GMV to median volume traded of the Russell 1000 as a proxy to estimate how the stock of levered equity quant HF assets compares to broader market liquidity. The lower this number, in theory, the better the ability of quant HF managers to liquidate portfolios without market impact. Therefore, despite the significant growth in equity quant GMV in recent years, our analysis suggests that the market footprint of these strategies is a long way below the peak in 2006. A decade ago, global equity quant HF GMV was 17x the size of the 30-day median trading volumes of the Russell 1000, a factor which makes the 10x multiple today seem relatively moderate. However, this analysis admittedly does not account for the potential impact of crowding – i.e., what happens to market liquidity if systematic HF managers simultaneously try to sell the same longs / close the same shorts. We explore this problem in detail later in this section. We also wanted to track the relative market activity levels in the

FIGURE 8a: Market Footprint / Liquidity of Equity Quant Strategies (I / II)

Global Equity Quant HF GMV / 30d Median Volume Traded of Russell 1000[1]
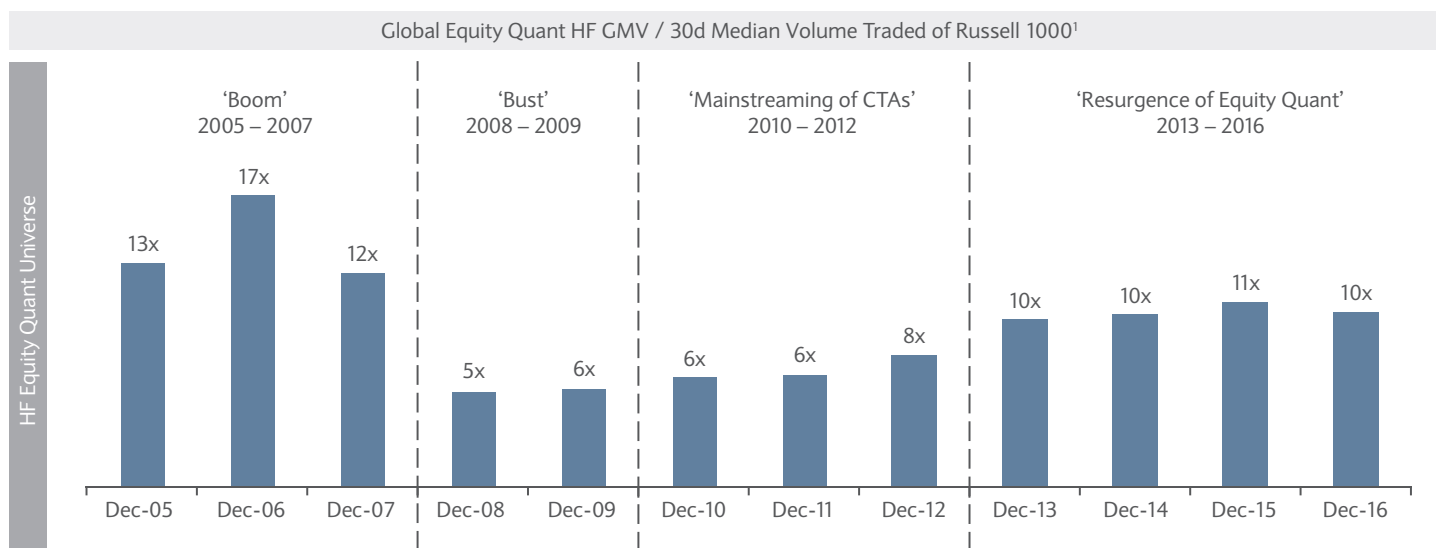
Source: HFR, HFI, FactSet, Novus, Strategic Consulting analysis, Global Equity Derivatives Strategy team
1. Compares our estimate of global equity quant GMV with the median dollar volume traded over the trailing 30-day period for the Russell 1000 index in order to estimate the market footprint of quant equity strategies. Values for GMV and 30d median volume are as of December in each year

FIGURE 8b: Market Footprint / Liquidity of Equity Quant Strategies (II / II)

"Model Portfolio" Dollar Volume Traded of Median Stock (2005 – 2016)[1]
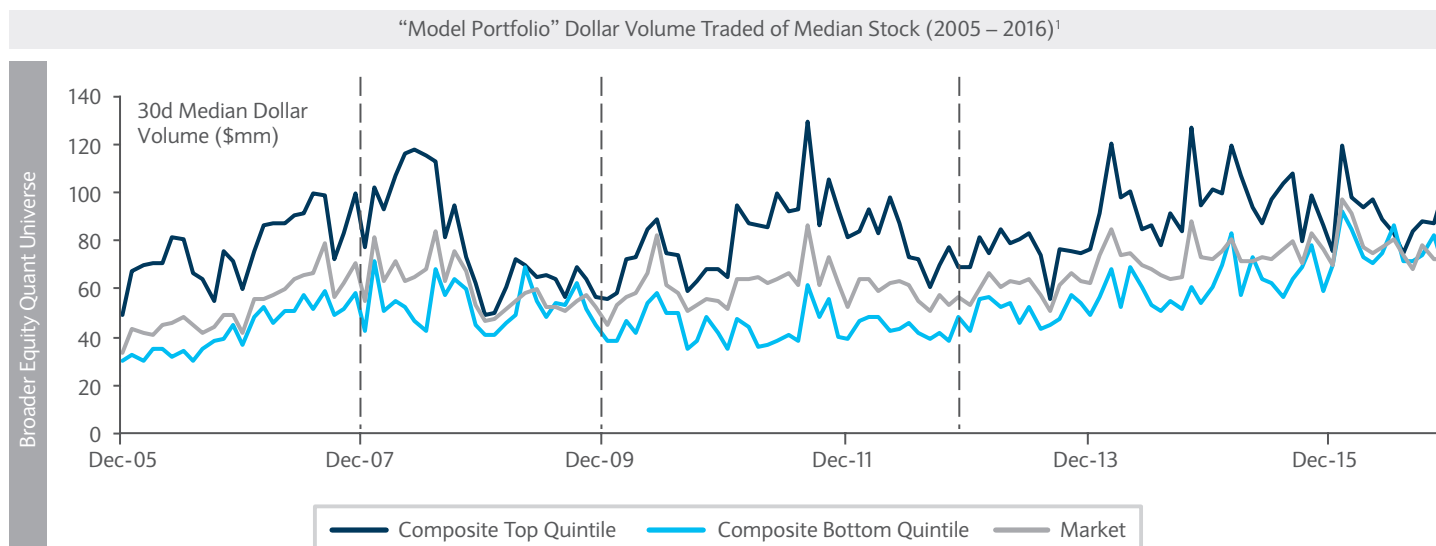
Source: Strategic Consulting analysis, Global Equity Derivatives Strategy team
1. The median value of the trailing 30-day average dollar volume for stocks within the Composite Top Quintile, Composite Bottom Quintile and the Overall Market (Russell 1000)

broader equity quant universe, taking into account the trading of all market players and products (versus only equity quant HFs). The Global Equity Derivatives Strategy team within Barclays created an equity quant 'Model Portfolio', using a stepwise selection process and a selection of factors, back-tested for applicability. As shown in Figure 8b, the average 30-day dollar volume traded of median stocks within the top and bottom quintiles (i.e., the long / short holdings) is roughly the same as 2007.

Finally, we assess crowding. We used data from Novus to determine portfolio holdings overlap across a sample of major equity quant HFs, and then supplemented the analysis with data from our Global Equity Derivatives Strategy team and other external data to ensure the short holdings were accounted for. We look at portfolio overlap, which is usually more often considered a proxy for returns correlation (see below), in an attempt to add to the publicly available discourse which otherwise focuses more exclusively on long holdings. In doing so, we found that, on average, ~20% – 30% of equity quant portfolio holdings overlapped with other equity quant portfolios in the same direction (i.e., short versus short, long versus long), and ~5% – 10% in the opposite direction (i.e., long versus short), with the difference of ~15% – 20% representing the effective portfolio overlap. The effective portfolio overlap figures assume that opposite direction overlap serves as a natural hedge. This is comparable to the ~17% average long portfolio overlap across the 30 largest managers (skewed toward discretionary) in the Novus Hedge Fund universe, suggesting that these levels of crowdedness are not idiosyncratic to systematic managers. We also investigated intra-strategy correlation (see Figure 9). A low average intra-strategy correlation implies that managers are generally reasonably uncorrelated to each other within that strategy (and thus take fairly idiosyncratic risks), whereas high intra-strategy correlation implies exposure to substantially similar

systemic risks (and thus little advantage of building a portfolio of different funds). Across a broad range of discretionary and systematic strategies, equity quant tends to have one of the lowest intra-strategy correlations (0.32), while managed futures is slightly higher at 0.47, although still significantly below equity and credit L / S. It is interesting to note that during times of stress, when equity quant strategies are underperforming, intra-strategy correlation tends to be much higher (e.g., from February to April 2016, intra-strategy correlation was ~0.57). In addition, the intra-strategy correlation of sub-strategies within equity quant varies quite significantly from the average; fundamental equity quant has a much higher intra-strategy correlation of 0.5, while stat arb is slightly less correlated at 0.28.

In order to build out a more complete picture, additional factors such as the size and role of synthetics (i.e., swaps) and average holding periods (i.e., intraday versus monthly / quarterly) are also important to consider.

IV. Historical performance

Relative performance of systematic and discretionary strategies

Considering the media attention surrounding the performance of systematic managers and the anecdotal perception that machines have indeed gained the edge, whether in fact systematic strategies on balance have performed better than their discretionary counterparts was one of the main questions we sought to answer. Therefore we compared the performance of corresponding strategies of systematic and discretionary managers across a range of metrics and time periods. In reality, we found that, over the last decade, the performance disparity between systematic and discretionary HF strategies has not been

FIGURE 9: Crowdedness in Equity Quant Strategies

Equity Quant Average Holdings Overlap[1]

Same direction overlap	Opposite direction overlap	Effective portfolio overlap
30% (20%)	10% (5%)	20% (15%)

Average Intra-Strategy Correlation, Quant Equity / Managed Futures vs. Other Strategies, 2011 – 2016[2]

Disc. Macro	Equity MN Disc.	Equity Quant	FIRV	Merger Arb	Distressed	Managed Futures	Special Sits	Activist	Equity L / S	Credit L / S
0.29	0.30	0.32	0.33	0.42	0.44	0.47	0.49	0.57	0.58	0.62
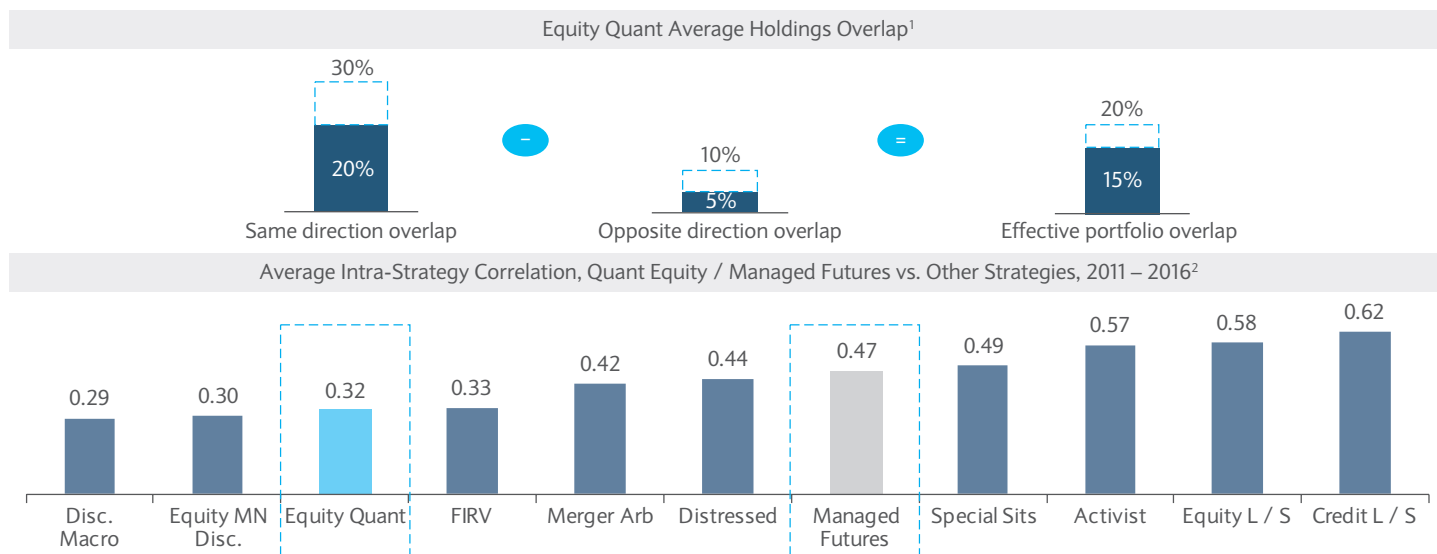
Source: Strategic Consulting analysis; Novus; Global Equity Derivatives Strategy team
1. Same direction overlap refers to long / long or short / short positions in the same names; opposite direction overlap refers to short / long positions in the same names; effective overlap is a proxy for effective exposure from a risk perspective; 2. Intra-strategy correlation measured by calculating the correlation of each fund to the average return for the strategy, and then taking an average of all of these correlations for each sub-strategy

as pronounced as one might have expected. In Figure 10, we plot the average annualized returns versus volatility (i.e., the Sharpe ratio) of corresponding systematic and discretionary strategies over various lengths of time. Despite the finding in our survey that nearly 70% of investors believe that systematic HFs have outperformed their discretionary counterparts in recent years, our analysis suggests that over a longer period of time this is not a foregone conclusion. While Systematic Macro appears to have consistently outperformed its discretionary counterparts over the last 10 years (albeit with a higher level of risk), there is very little to differentiate EMN quant and discretionary. However, the return dispersion between the first and third quartile of funds within each strategy is such that being able to pick the top quartile in

any strategy will yield better results than the average of the best performing strategy in any time frame considered.

Moreover, while the outcomes of risk and return have been reasonably similar over longer periods of time in the EMN world, interestingly, there appears to be a cyclicality to the relative out- / under-performance of quantitative and discretionary HF strategies. In fact, when looking at Figure 11, it appears that both EMN quant and managed futures have often tended to outperform their corresponding discretionary strategies in similar periods, suggesting that there may be some common underlying factor in systematic returns that exist across both macro and equity strategies. This may also be notable to investors from a

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FIGURE 10: Relative Performance of Systematic and Discretionary Strategies (I / II)

Over the last decade, the performance disparity between corresponding systematic and discretionary HF strategies has not been as pronounced as might have been expected.

Annualized Performance of Quantitative and Discretionary HF Strategies[1]
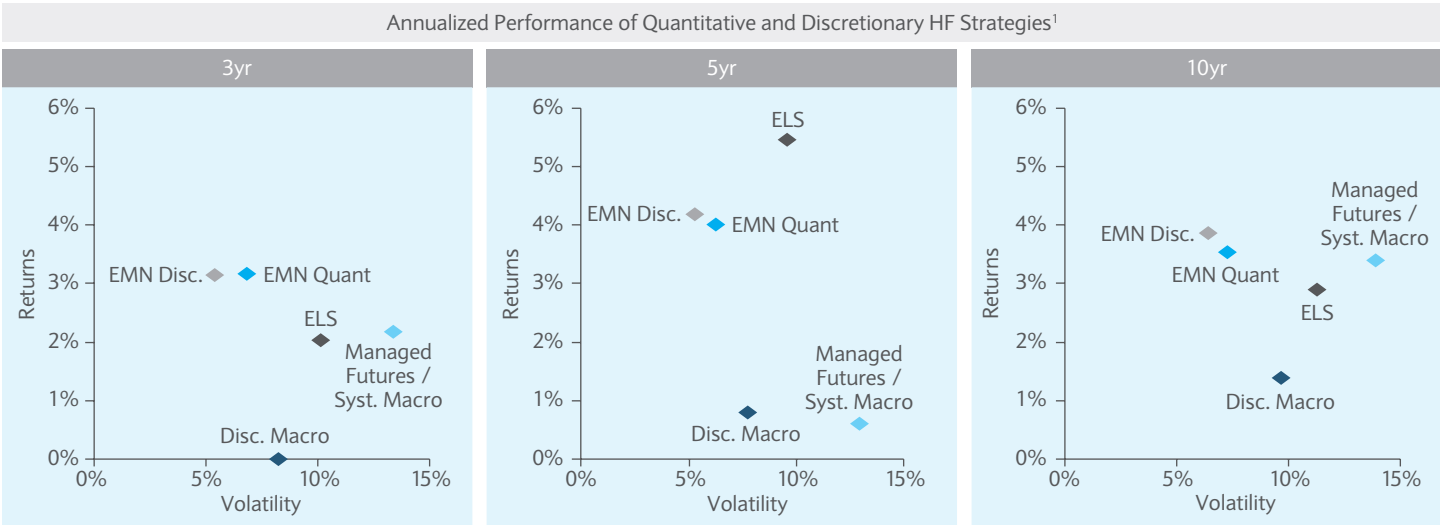
Source: HFR, HFI, Strategic Consulting analysis. Data as of Dec 2016
1. Refers to index return and the median volatility of funds within each strategy. HFRI indices used whenever available, otherwise indices based on HFI database used

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FIGURE 11: Relative Performance of Systematic and Discretionary Strategies (II / II)

12m Rolling Performance Δ, Quant vs. Discretionary Equity Market Neutral and Managed Futures Strategies, 2006 – 2016
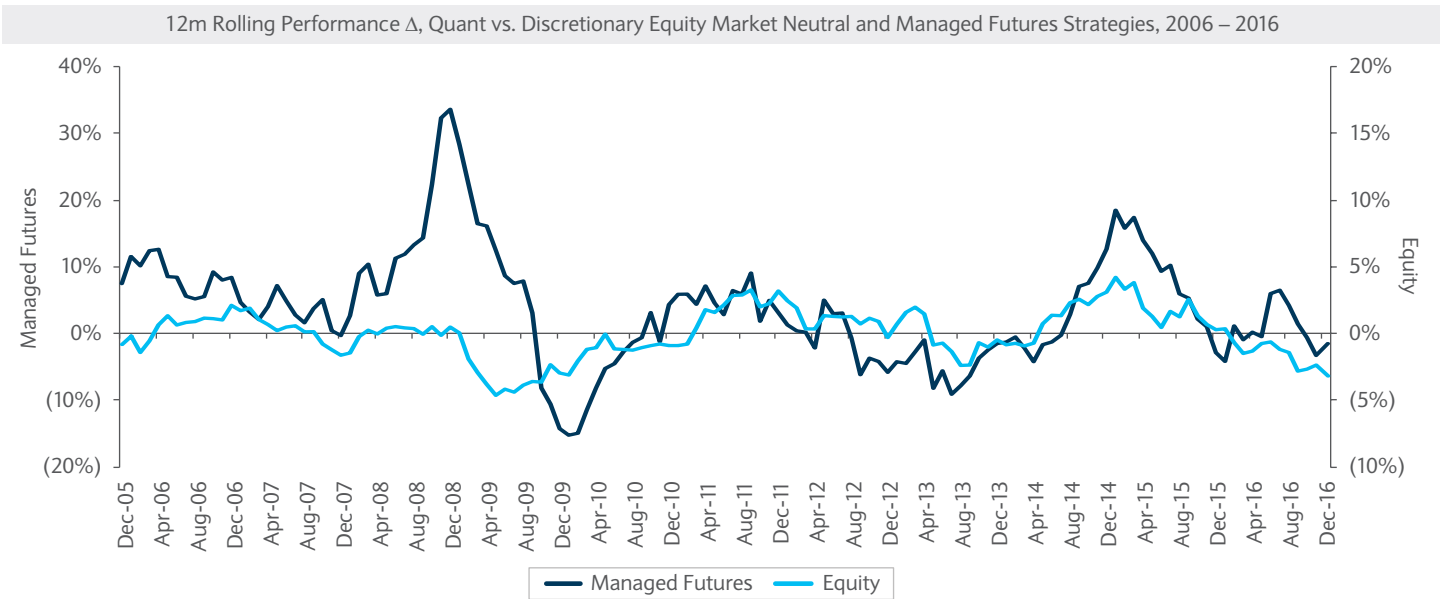
Source: HFR, HFI, Strategic Consulting analysis

portfolio construction point of view, as such cyclicality suggests that there is a case to be made for holding both discretionary and systematic HFs of corresponding strategies in a single portfolio.

We also tested the average monthly returns for each strategy during certain market conditions and policy environments in an attempt to find the catalysts that drive systematic / discretionary returns. When looking at Figure 12, it is first interesting to note the commonalities: all strategies except managed futures / multi-strategy tend to lose money in poorly performing equity markets as well as in high correlation conditions. As for the individual

strategies: EMN quant seems to be highly sensitive to intra-stock correlation / dispersion (both high and low) and appears to perform best in low correlation and high dispersion environments. In addition, managed futures do not tend to perform well in low correlation environments but are able to navigate falling equity markets (bottom 10 months) far better than other strategies. Perhaps unsurprisingly, changes to rate policy (in both directions) are best for both discretionary and systematic macro. All strategies have done well in rate rise environments, but these results need to be taken with a grain of salt as we have not experienced many rate rises since 2000.

FIGURE 12: Impact of Market Conditions on Returns

Average monthly returns for each strategy have varied across market conditions and policy environments, demonstrating the benefits / drawbacks of exposure to each.

	Average Monthly Returns of Corresponding Systematic and Discretionary Strategies in Select Market Conditions since 2000									
	Equity Market Conditions[1]								Monetary Policy[2]	
	Top 10 Months	Btm 10 Months	High Vol.	Low Vol.	High Correl.	Low Correl.	High Disp.	Low Disp.	Rate Rise	Rate Cut
EMN Quant		(0.37%)			(0.53%)	1.47%	1.49%	0.34%	1.04%	
Mgd Futures and M / S	(0.06%)	0.93%				0.12%		0.24%	1.65%	1.76%
EMN Disc.	0.87%	(0.28%)	0.12%		(0.52%)		0.63%		0.70%	
Disc. Macro		(0.19%)	0.26%	0.70%	(0.46%)				0.61%	0.94%

Three worst conditions per strategy   Three best conditions per strategy

Source: HFR, HFI, Strategic Consulting analysis
1. Equity market conditions refer to S&P 500 in 10 highest and lowest months for performance, realized volatility, intra-stock correlation and dispersion; 2. Rate Rises / Cuts refer to the month in which the Fed Funds Rate changes

FIGURE 13: Portfolio Effect of Systematic Strategies

Ann. Perf. 60 / 40 Portfolio with 20% HF Strategy Addition, 2006 – 2016

Ann. Sharpe 60 / 40 Portfolio with 20% HF Strategy Addition, 2006 – 2016
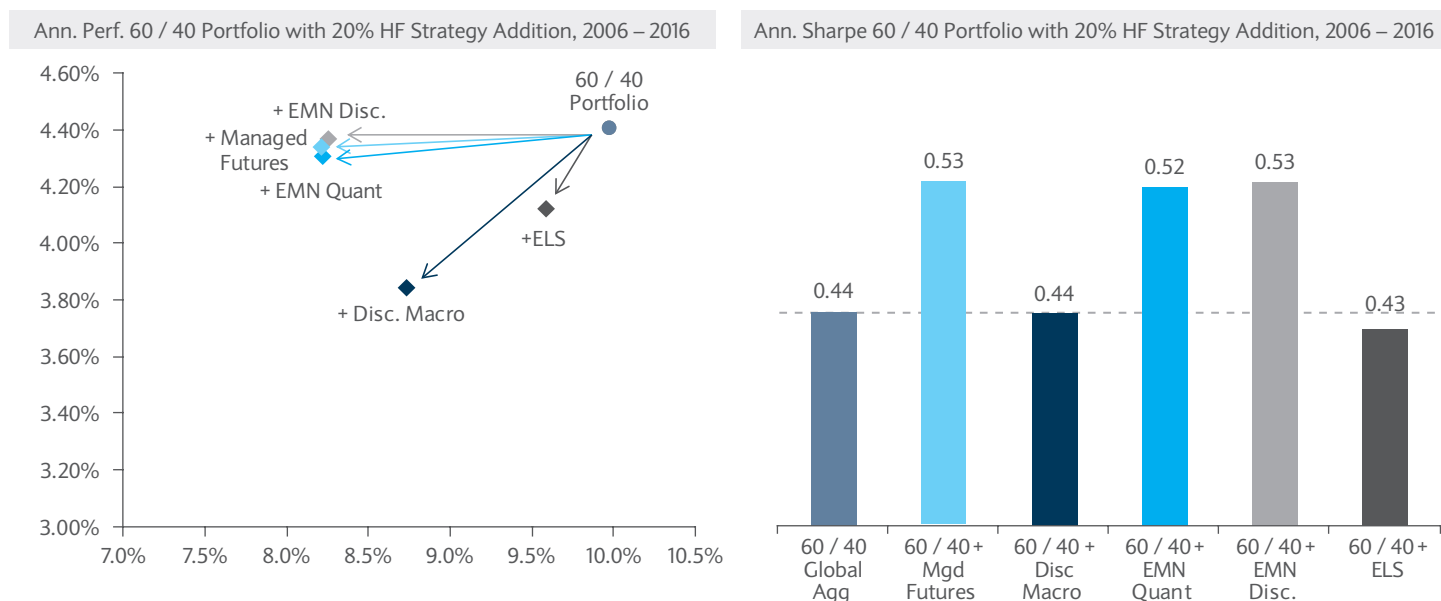
Source: HFR, HFI, Strategic Consulting analysis. 60 / 40 portfolio comprised of 60% MSCI World TR and 40% Bloomberg Barclays Global Agg TR indices and index return for each HF strategy

Portfolio effect of systematic strategies

Next, we wanted to assess the effect these corresponding systematic and discretionary strategies had on a typical equity / bond portfolio from a risk-return perspective. As cited by the investors we surveyed, one of the key reasons for investing in systematic HFs is their lower correlation to long only (LO) indices and other HF strategies. Our analysis suggests that there is merit to this theory and it appears that systematic HFs are certainly additive from a portfolio construction perspective. In Figure 13, we tested the effect of adding the index of each of the sets of corresponding discretionary / systematic strategies to a basic 60 / 40 equity bond portfolio in a 20%:80% blend over the last decade. In all cases, the addition of the HF index reduced the portfolio volatility, but especially in market neutral and managed future strategies which reduced the volatility by ~2%. EMN discretionary, EMN quant and managed futures were all additive from a Sharpe ratio perspective, while discretionary macro and equity long / short were not. However, it is worth noting that adding one individual fund in each strategy (versus entire index), with similar returns to the index, would likely have a stronger effect on average on the Sharpe ratio, since the 'index effect' artificially increases correlations by offsetting the idiosyncratic performance of component funds against each other.
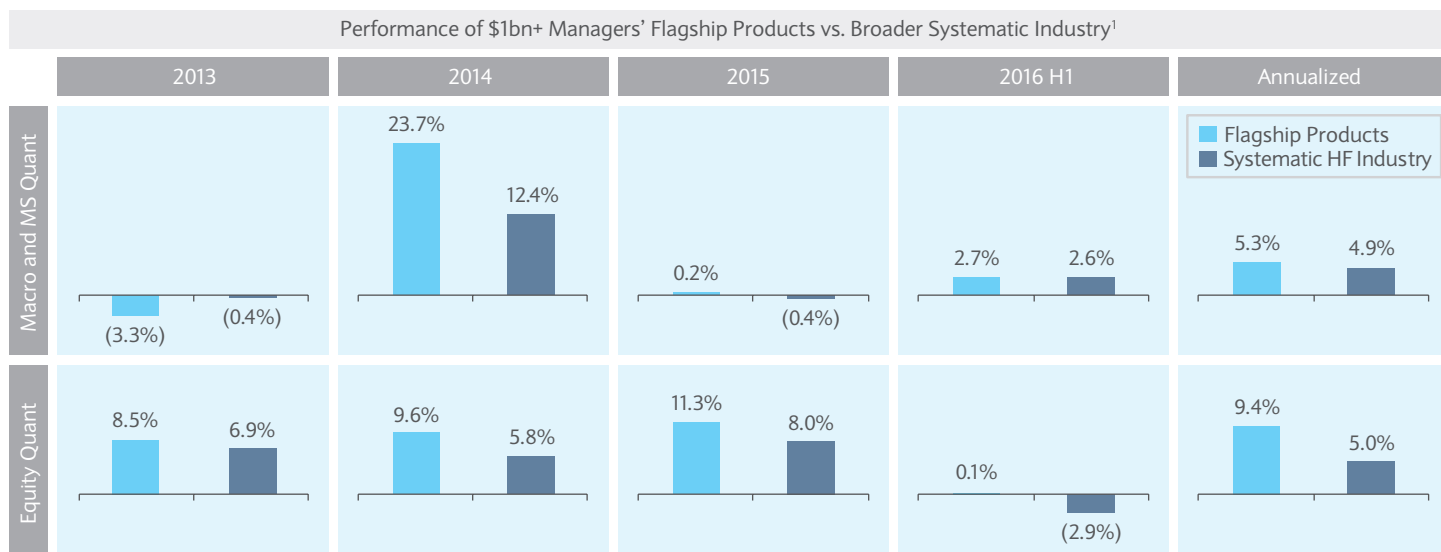
Performance of flagship products

After running various types of analysis with respect to performance, we were still puzzled as to the common perception that systematic strategies had performed better than their discretionary counterparts. We decided to pay closer attention to the 70% of our investor interviewees that indicated this view and noticed a commonality in the HF names they were mentioning – they all tended to be flagship products of fairly established firms. As such, we decided to do some additional analysis. In Figure 14, we compared the performance of $1bn+ managers' flagship

products with the broader systematic industry and found that both equity quant and managed futures / multi-strategy quant flagship products outperformed their peers over a three-and-a-half-year period, although the disparity was particularly prevalent in the equity quant space. In most cases, these were the founding products of the firms in question, and on average they have 14 years of track record. However, most of these systematic funds (65%) are closed to new investors and, in fact, all of the equity quant products are closed. This may help to explain why 70% of the investors that we interviewed thought that, on a long-term basis, systematic funds had outperformed discretionary funds, while our analysis suggested that the differentiation, if any, was slight. Much of the misconception may be due to the publicity and mystique associated with the largest and most well-established (and exclusive) equity quant HFs.

V. Recent developments

Considering the recent growth of low-cost alternatives to HF strategies such as risk premia and LO quant, systematic managers offering high-quality, capacity-constrained alpha products are having to take part in somewhat of an 'arms race' in order to justify their price point. While the media has certainly done its best to embellish new phenomena such as 'Big Data' and Machine Learning, we sought to bypass much of the noise and find out to what extent managers are actually using them in their investment process. Managers are clearly investing in new data sources and systematic techniques, but whether they have borne any fruit and, if so, in what areas, were questions we looked to answer. Additionally, we did a deep dive into scalable strategies at the other end of the spectrum, looking at the percentage of managers offering such a product and their performance relative to their benchmark.

FIGURE 14: Performance of Flagship Products

Performance of $1bn+ Managers' Flagship Products vs. Broader Systematic Industry[1]

	2013	2014	2015	2016 H1	Annualized
Macro and MS Quant	(3.3%) / (0.4%)	23.7% / 12.4%	0.2% / (0.4%)	2.7% / 2.6%	5.3% / 4.9%
Equity Quant	8.5% / 6.9%	9.6% / 5.8%	11.3% / 8.0%	0.1% / (2.9%)	9.4% / 5.0%

Flagship Products / Systematic HF Industry
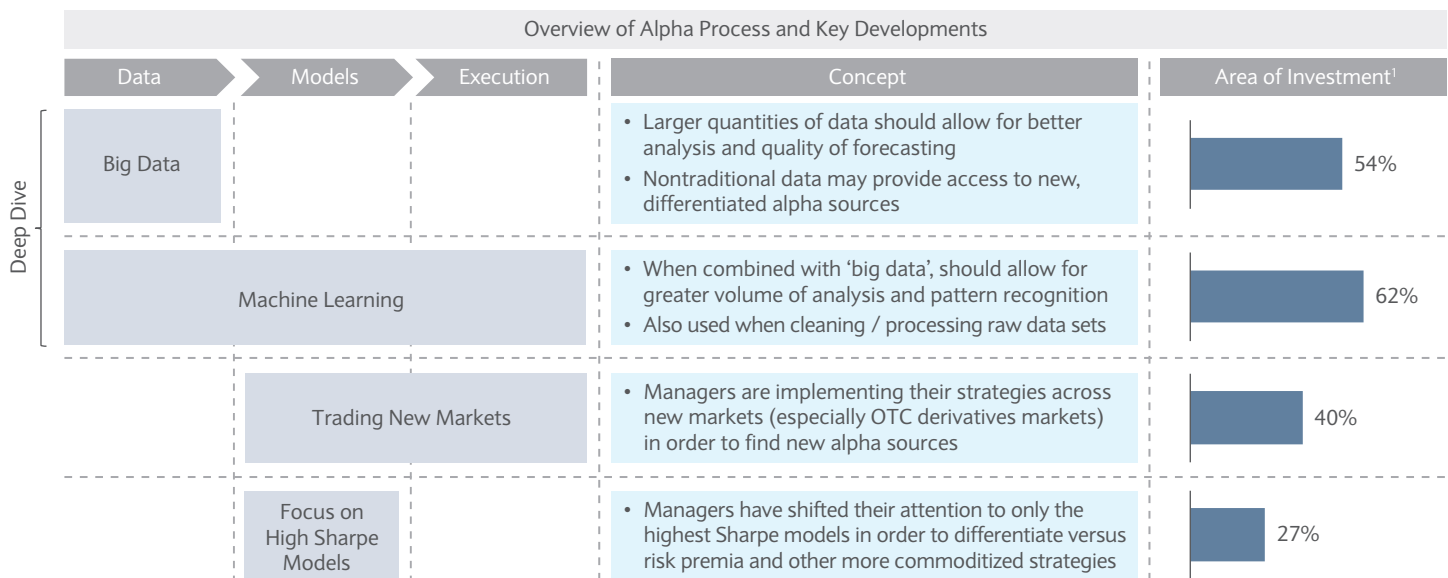
Source: HFR, HFI, Bloomberg, Strategic Consulting analysis
1. Includes the one flagship product of each of the systematic managers with >$1bn according to the HFI Global Billion Dollar Club as of H1 2016, where performance data is available. Analysis encompasses a universe of 20 funds / managers in total

Current investment areas by systematic managers

Managers are investing and developing new techniques across all the steps in the systematic investment process: (1) data – gathering, processing, cleaning, etc.; (2) models – data analysis, determining relationships in the data, building models to implement; and (3) execution – minimizing slippage / costs, etc. While many of our investors have questioned whether 'Big Data' and Machine Learning are simply marketing tools, we found that over half of our sample are actually investing in these areas (see Figure 15). Interestingly, while Machine Learning is often solely associated with processing 'Big Data' sets or in execution algorithms, in fact, it is increasingly being used to clean traditional data sources (e.g., price / tick data) which explains why a larger proportion of our sample are investing in it than 'Big Data'. Those investing in trading new markets and focusing on higher Sharpe models represent the CTA managers in our sample, as these funds are experiencing greater pressure to either reduce their fees or justify the cost of their product with new sources of alpha and a higher risk-return profile. Beyond these areas, some managers also mentioned other areas of focus and investment that are of importance, namely: (1) focus on execution as an alpha source; (2) increased focus on talent management (hiring and retention best practices); and (3) investment in technology.

FIGURE 15: Current Investment Areas by Systematic Managers

Overview of Alpha Process and Key Developments				
Data	Models	Execution	Concept	Area of Investment[1]
Big Data (Deep Dive)			• Larger quantities of data should allow for better analysis and quality of forecasting • Nontraditional data may provide access to new, differentiated alpha sources	54%
Machine Learning (Deep Dive)			• When combined with 'big data', should allow for greater volume of analysis and pattern recognition • Also used when cleaning / processing raw data sets	62%
	Trading New Markets		• Managers are implementing their strategies across new markets (especially OTC derivatives markets) in order to find new alpha sources	40%
Focus on High Sharpe Models			• Managers have shifted their attention to only the highest Sharpe models in order to differentiate versus risk premia and other more commoditized strategies	27%

Source: Strategic Consulting survey results and analysis
1. Percentage of managers within sample that are active or investing in these areas

FIGURE 16: 'Big Data' (I / II) – Current Usage

% of Managers Using Different Types of Data Sources		
Type of Data	Examples	Use of Data Source[1]
Price / Tick	Security prices, trade volumes	100%
Fundamental	Company fundamentals from balance sheet / income statement: P / E, EBITDA, etc.	62%
Economic	Economic data, e.g., employment, inflation, interest rates, GDP, etc.	38%
Sell-Side	'Alpha capture': research analyst / broker recommendations	31%
Alternative / 'Big Data'	Web scraping, social media, satellite data, credit card data, etc.	54%

1. Strategic Consulting survey results and analysis – refers to percentage of interviewed managers incorporating each data source in their research process

Big Data and Machine Learning

The amount of data being created annually on a global basis is increasing exponentially, from 1.2 zettabyte (ZB) per year in 2010 to an expected 44 ZB per year by 2020. Simultaneously, improvements in computer power and developments in cloud computing are increasing our analytical capabilities. As a result of these advances, systematic HF managers are looking to exploit newer and larger data sets in pursuit of sources of alpha. This has given rise to increased investment in alternative / 'Big Data'; 54% (see Figure 16) of systematic managers in our sample are now employing alternative and 'Big Data' sources, such as web scraping, social media data, satellite data, credit card data, etc. Surprisingly, this surpasses the amount of systematic managers using alpha-capture from the sell-side or economic data, which stresses the importance managers are now placing on finding unique alpha sources. However, considering that not one of the managers we interviewed considered alternative data to be the most helpful input in their investment process, it is fair to say that managers are still dependent on traditional sources for the time being.

That said, the meaningful level of capital that managers are starting to deploy toward such initiatives (3% – 5% of revenue and up to 10% of headcount on average across our survey sample) certainly offers a clear indication of the importance that managers are attributing to new data sources and the increasingly pivotal role they will play in the future.

FIGURE 17: 'Big Data' (II / II) – Challenges

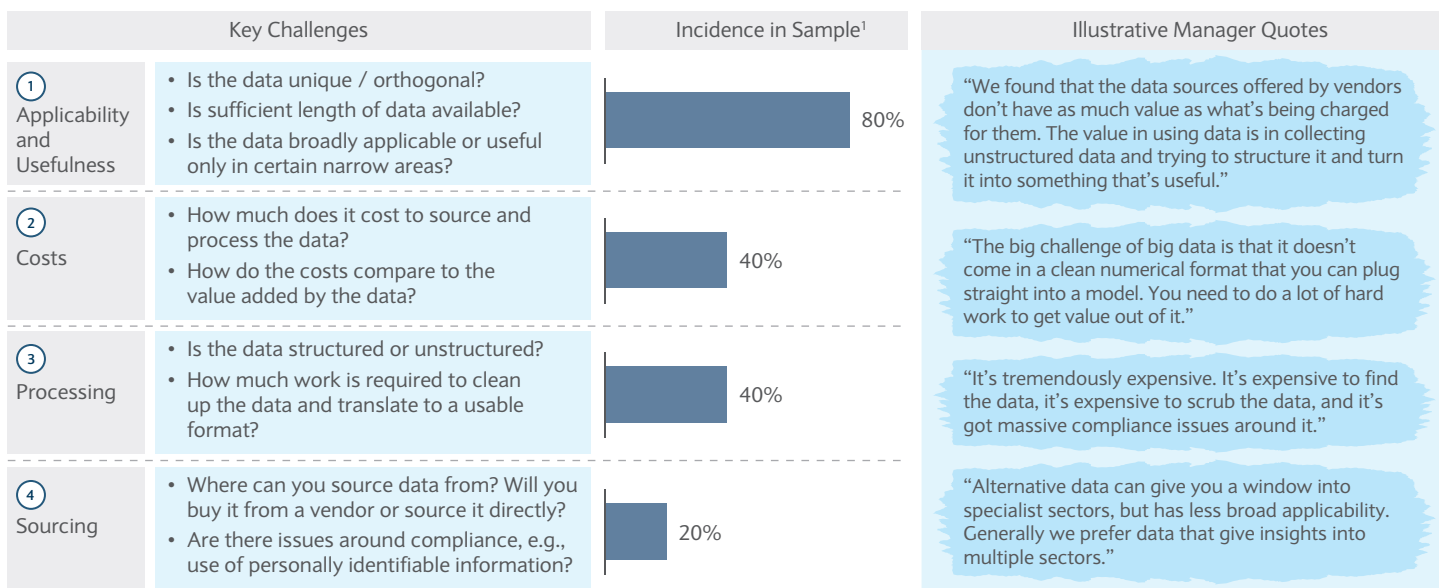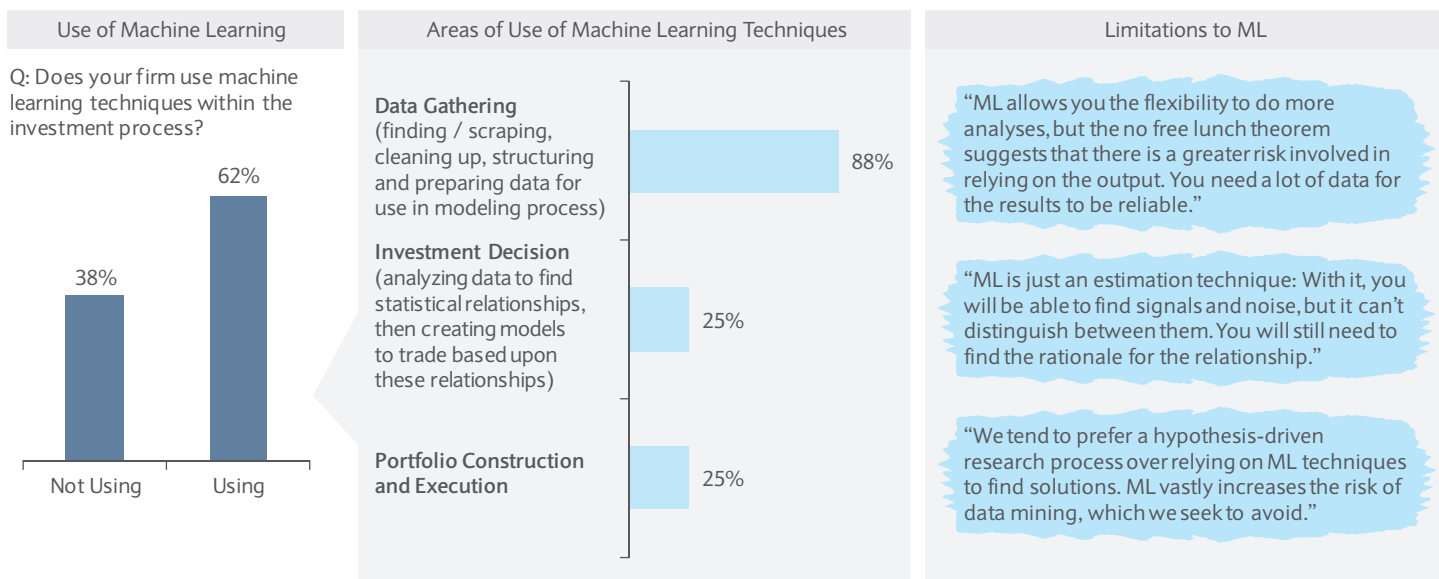|	Key Challenges	Incidence in Sample[1]	Illustrative Manager Quotes
1 Applicability and Usefulness	• Is the data unique / orthogonal? • Is sufficient length of data available? • Is the data broadly applicable or useful only in certain narrow areas?	80%	"We found that the data sources offered by vendors don't have as much value as what's being charged for them. The value in using data is in collecting unstructured data and trying to structure it and turn it into something that's useful."
2 Costs	• How much does it cost to source and process the data? • How do the costs compare to the value added by the data?	40%	"The big challenge of big data is that it doesn't come in a clean numerical format that you can plug straight into a model. You need to do a lot of hard work to get value out of it."
3 Processing	• Is the data structured or unstructured? • How much work is required to clean up the data and translate to a usable format?	40%	"It's tremendously expensive. It's expensive to find the data, it's expensive to scrub the data, and it's got massive compliance issues around it."
4 Sourcing	• Where can you source data from? Will you buy it from a vendor or source it directly? • Are there issues around compliance, e.g., use of personally identifiable information?	20%	"Alternative data can give you a window into specialist sectors, but has less broad applicability. Generally we prefer data that give insights into multiple sectors."

Source: Strategic Consulting survey results and analysis
1. Percentage of managers using big data that cited this as a key concern

FIGURE 18: Machine Learning Adoption and Sentiment

Use of Machine Learning	Areas of Use of Machine Learning Techniques	Limitations to ML
Q: Does your firm use machine learning techniques within the investment process? Not Using 38% — Using 62%	**Data Gathering** (finding / scraping, cleaning up, structuring and preparing data for use in modeling process) — 88% **Investment Decision** (analyzing data to find statistical relationships, then creating models to trade based upon these relationships) — 25% **Portfolio Construction and Execution** — 25%	"ML allows you the flexibility to do more analyses, but the no free lunch theorem suggests that there is a greater risk involved in relying on the output. You need a lot of data for the results to be reliable." "ML is just an estimation technique: With it, you will be able to find signals and noise, but it can't distinguish between them. You will still need to find the rationale for the relationship." "We tend to prefer a hypothesis-driven research process over relying on ML techniques to find solutions. ML vastly increases the risk of data mining, which we seek to avoid."

Source: Strategic Consulting Survey results and analysis

However, using 'Big Data' and alternative data sources still poses a number of challenges and many remain skeptical of its near-term potential as an alpha source. In Figure 17, we present the key challenges faced by managers. The first set of issues comes with sourcing and processing the data; managers have to decide whether to buy the data from a vendor or source it themselves, and then the data needs to be cleaned and processed in order to be used. Cost is also a significant consideration; many of these data sets are so expensive that purchasing them may not make sense when considering the question of cost per unit of alpha generated. However, by far the biggest challenge is assessing the applicability and usefulness of the data – an issue faced by 80% of our sample. Managers expressed concerns about whether the data is truly unique or is even applicable to a wide array of markets for such a high cost and, considering many of these data sources are a fairly new phenomenon, there isn't sufficient length of data available for managers to back-test. Such challenges have limited the uptake of 'Big Data' / alternative data among managers.
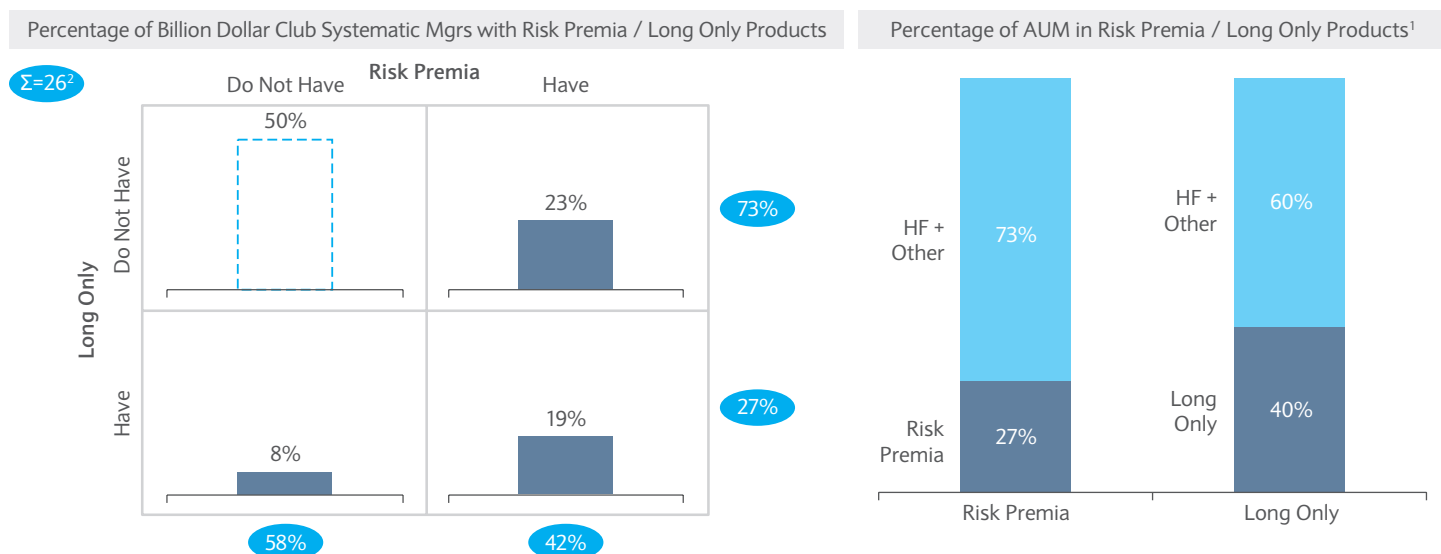
As shown in Figure 18, we identified three areas where Machine Learning (ML) is being used: (1) data gathering – finding / scraping, cleaning and structuring the data for use in the modeling process; (2) investment decision – analyzing data to find statistical relationships, then creating models to trade based upon these relationships; and (3) portfolio construction and execution. However, in our conversations with managers, we observed a division of opinion; while most have evaluated ML techniques and are using it to some extent (62%), over a third said that they are not using it, and not one manager stated that they rely exclusively on ML for any of the three areas shown in Figure 17. Where managers are employing ML, it is largely used as a tool for gathering and cleaning data, particularly in the sphere of 'Big Data', where the data is vast and unstructured. Managers are still for the most part not employing ML for making investment decisions, where concerns over data mining predominate, i.e., unintentional misuse of data can produce results which appear to be significant, often due to investigating too many hypotheses.

That said, those managers that do use ML for making investment decisions told us that they are less concerned about finding a hypothesis that explains the relationships (i.e., explanations for outcomes) and are more concerned with exploiting the signals while they are still valid. Often, market inefficiencies exist for only a short space of time, and ML can allow managers to exploit these signals most optimally. These signals have a much faster rate of decay before they lose predictive power and are therefore only additive for a relatively short period of time and for that specific set of data. Thus, some managers prefer to take advantage of the signal while it is still useful rather than waste time trying to find hypotheses for these signals. As for portfolio construction and execution, a handful of managers mentioned using ML in this process, where the data sets involved tend to be large enough to allow for this.

Scalable strategies: Risk premia and long only quant

Next, we wanted to shift our attention to the other end of the spectrum focusing on scalable products such as risk premia and long only (LO) quant. While some systematic managers aiming to develop high quality products have been investing considerably in alternative data sources and ML techniques to unlock new sources of alpha, others have been focusing on launching scalable, lower-cost products such as risk premia and long only quant. Such scalable strategies have become an increasingly sizable part of managers' asset base, as half of the systematic managers in the HFI Global Billion Dollar Club have a scalable product, whether it be risk premia or LO quant (see Figure 19). Of the two, risk premia is more prevalent, with 42% of the systematic managers in the Billion Dollar Club having a product versus 27% for LO. However, LO quant products tend to represent a significantly larger share of managers' asset base, which is perhaps a reflection of the fact that risk premia is still a new and growing strategy. Interestingly, of those in our sample that had neither products, around 20% were planning to launch one, while 80% were not due to concerns of brand dilution and a

FIGURE 19: Scalable Strategies: Risk Premia / Long Only (I / II)

Percentage of Billion Dollar Club Systematic Mgrs with Risk Premia / Long Only Products

Percentage of AUM in Risk Premia / Long Only Products[1]

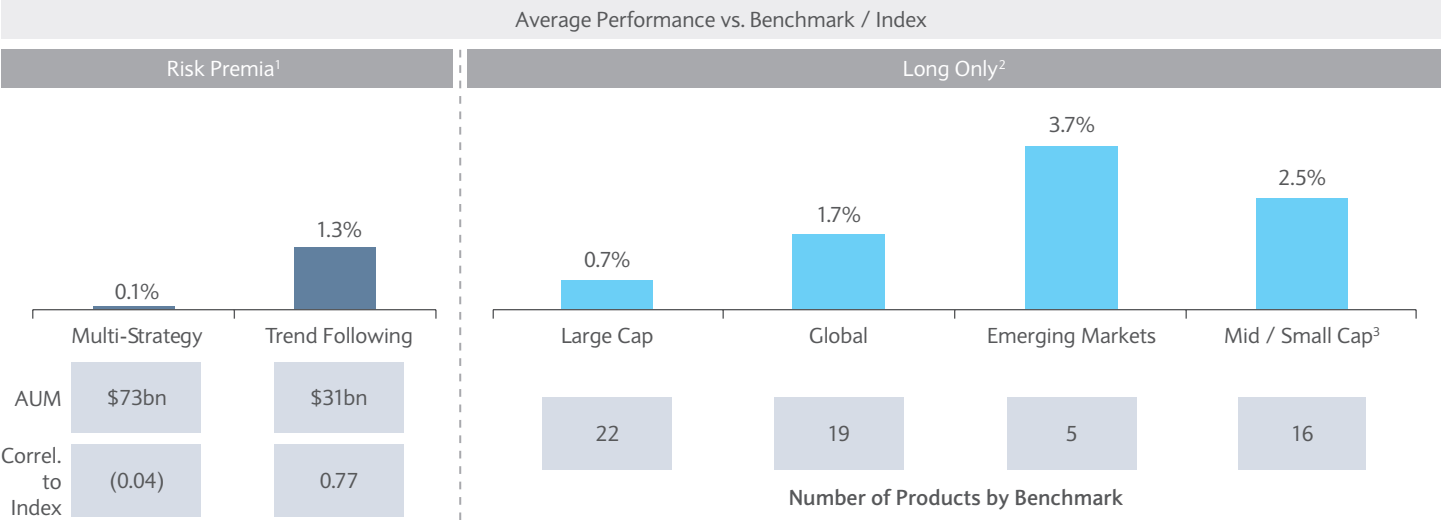Source: HFI, HFR, Strategic Consulting analysis
1. For those managers that have risk premia / LO products; 2. The 26 pure systematic HFs in the Billion Dollar Club represent ~8% – 10% of the total managers, roughly in line with the level of representation in the Top 50 largest managers

desire to remain small / capacity-constrained. This suggests that the majority of those planning to launch a risk premia or LO quant product already have, and that the remainder are putting all their efforts into investing in high-quality, capacity-constrained offerings.

In terms of performance, it appears that both risk premia and LO quant products have performed well against their respective benchmarks / indices which may explain their popularity with investors (see Figure 20). Looking at the two main criteria of HF-managed risk premia products (multi-premia and trend following), both on average have outperformed their comparable HF indices. While trend risk premia products have a high (~0.8) correlation to the HFRI Systematic Diversified index, they have on average outperformed by >1% p.a., suggesting that they may represent a cannibalization risk to their HF counterparts. Although multi-premia strategies have basically matched the returns of the benchmark, they have essentially zero correlation to HFs more broadly, making them a valuable addition to any HF portfolio. As for LO quant products, they have on average tracked significantly above their benchmarks, which is particularly noteworthy given that discretionary long only managers have on average underperformed their benchmarks in recent years.

FIGURE 20: Scalable Strategies: Risk Premia / Long Only (II / II)

Average Performance vs. Benchmark / Index					
Risk Premia[1]		Long Only[2]			
Multi-Strategy	Trend Following	Large Cap	Global	Emerging Markets	Mid / Small Cap[3]
0.1%	1.3%	0.7%	1.7%	3.7%	2.5%

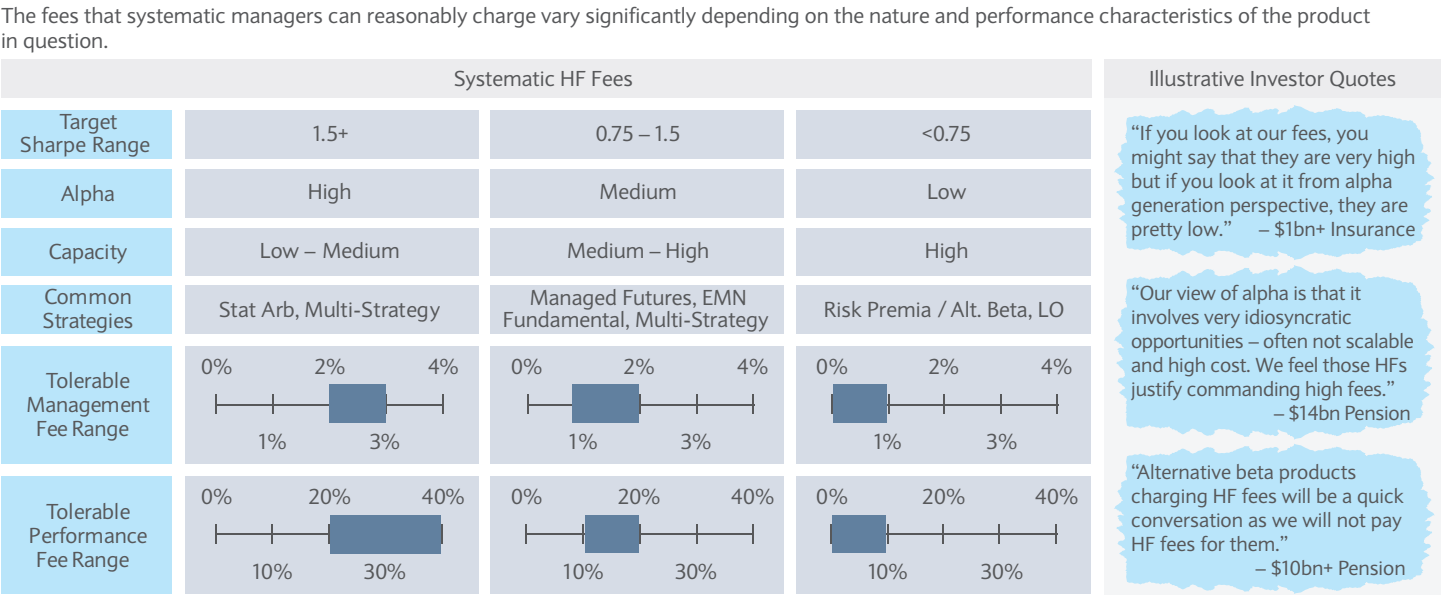|	Risk Premia		Long Only			
AUM	$73bn	$31bn				
Correl. to Index	(0.04)	0.77				
Number of Products by Benchmark			22	19	5	16

Source: HFI, HFR, Strategic Consulting analysis, review of manager marketing materials and publicly available documents
1. Average annualized 'tracking error' between products and their respective index since inception (Multi-Strategy Risk Premia products against HFRI Fund Weighted Composite Index and Trend Risk Premia products against HFRI Systematic Diversified Index). Measured since product inception wherever available; 2. Includes full quant LO universe as benchmarked in assets on p. 4. 5-Year annualized average used; 3. Most commonly used small cap indices are S&P US Small Cap and Russell 2000

FIGURE 21: Fees for Quantitative HF Products

The fees that systematic managers can reasonably charge vary significantly depending on the nature and performance characteristics of the product in question.

	Systematic HF Fees			Illustrative Investor Quotes
Target Sharpe Range	1.5+	0.75 – 1.5	<0.75	"If you look at our fees, you might say that they are very high but if you look at it from alpha generation perspective, they are pretty low." – $1bn+ Insurance
Alpha	High	Medium	Low	
Capacity	Low – Medium	Medium – High	High	"Our view of alpha is that it involves very idiosyncratic opportunities – often not scalable and high cost. We feel those HFs justify commanding high fees." – $14bn Pension
Common Strategies	Stat Arb, Multi-Strategy	Managed Futures, EMN Fundamental, Multi-Strategy	Risk Premia / Alt. Beta, LO	
Tolerable Management Fee Range	0% 2% 4% / 1% 3%	0% 2% 4% / 1% 3%	0% 2% 4% / 1% 3%	"Alternative beta products charging HF fees will be a quick conversation as we will not pay HF fees for them." – $10bn+ Pension
Tolerable Performance Fee Range	0% 20% 40% / 10% 30%	0% 20% 40% / 10% 30%	0% 20% 40% / 10% 30%	

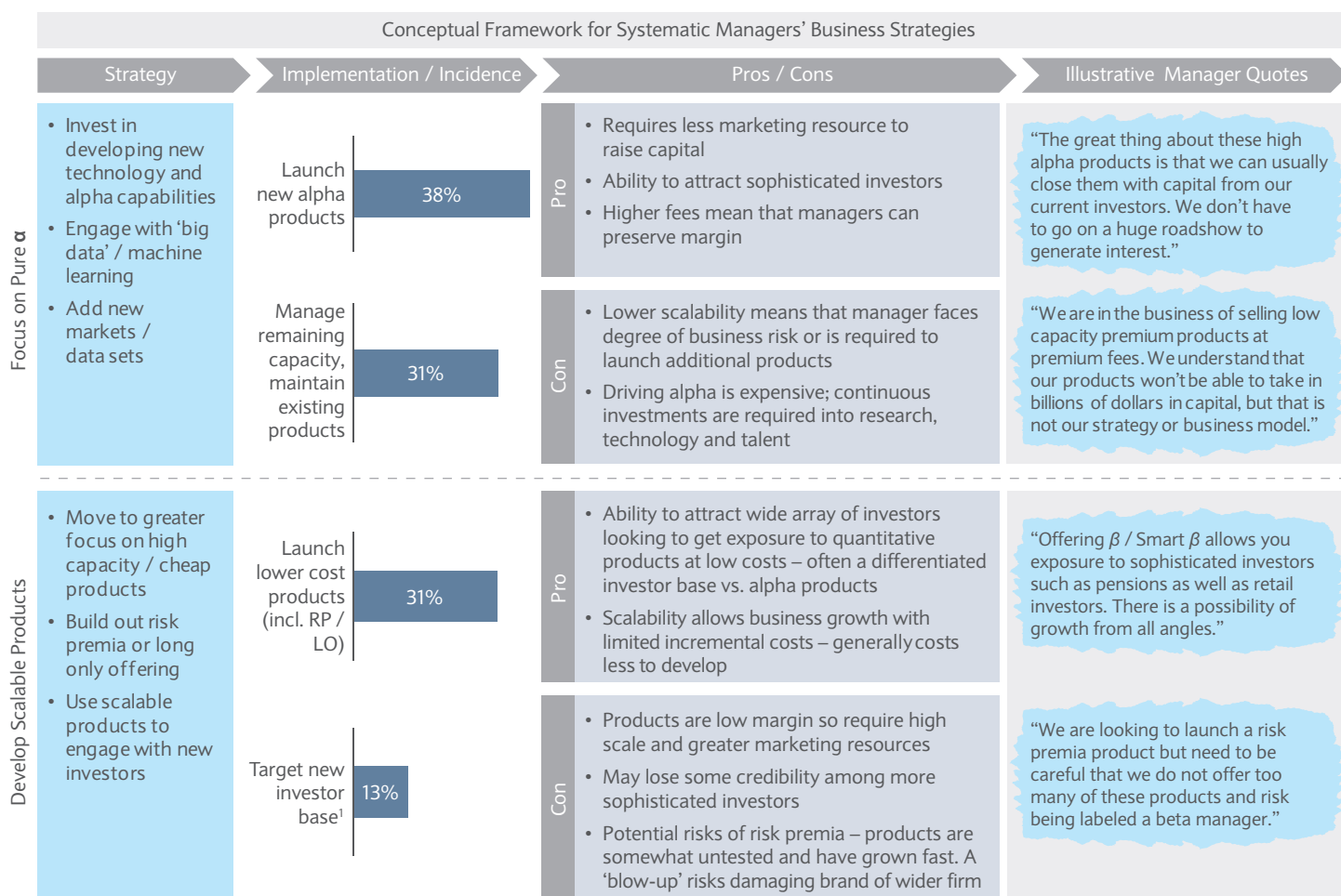Source: Strategic Consulting survey data and analysis

Fees and business strategies for quantitative HF products

One topic that kept coming up in our conversations with investors, whether discussing alpha products or the emergence of the scalable strategies, was the importance of fees in their allocations. Fees have been in the spotlight for a number of years now across the broader HF industry as relatively poor performance has left investors disappointed and made it increasingly difficult for managers to justify the traditional 2 / 20 structure. Going forward, the fees that systematic managers can reasonably charge will vary significantly depending on the nature and performance characteristics of the product in question. Looking at Figure 21, we identify three tiers of fee ranges across various variables such as target Sharpe ratio range, level of alpha and capacity constraints of the strategy. For a premium product targeting 1.5+ Sharpe ratio, investors are prepared to pay the highest fees; they understand that running a systematic shop requires a high level of investment in technology and personnel, and are therefore willing to pay 2%+ management fees and 20%+ performance fees provided that the product performs. At the other end of the spectrum, there is a clear appetite for risk premia and alt beta products, which fall at a lower price point, with most having management fees <1% and no performance fees.

But between these extremes, there is something of a 'squeezed middle'. These are lower Sharpe / alpha products that don't yet fall into the risk premia bucket price standpoint; managers offering such products are likely to face an uphill battle to grow or even maintain their offering.

As a result, systematic HFs looking to build stable businesses might want to consider a barbell offering of high-alpha / capacity-constrained products coupled with high-capacity / low-cost products. However, both ends of the spectrum have their pros and cons. Focusing on pure alpha – investing in new technologies, engaging with 'Big Data' and ML, adding new markets / data sets – requires less marketing to raise capital, attracts sophisticated investors and enables margin preservation as a result of higher fees. That said, lower scalability means that managers face a degree of business risk and the expenses on research, talent and technology are vast. At the other extreme, launching a scalable product allows business growth with limited incremental costs. It also gives you the ability to attract a wide array of investors looking to get exposure to quantitative products, which is often a differentiated investor base to those seeking alpha products. Nevertheless, the products are low margin so require high scale coupled with greater marketing

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FIGURE 22: Systematic Manager Business Strategies

	Strategy	Implementation / Incidence		Pros / Cons	Illustrative Manager Quotes
Focus on Pure α	• Invest in developing new technology and alpha capabilities • Engage with 'big data' / machine learning • Add new markets / data sets	Launch new alpha products	38%	**Pro** • Requires less marketing resource to raise capital • Ability to attract sophisticated investors • Higher fees mean that managers can preserve margin	"The great thing about these high alpha products is that we can usually close them with capital from our current investors. We don't have to go on a huge roadshow to generate interest."
		Manage remaining capacity, maintain existing products	31%	**Con** • Lower scalability means that manager faces degree of business risk or is required to launch additional products • Driving alpha is expensive; continuous investments are required into research, technology and talent	"We are in the business of selling low capacity premium products at premium fees. We understand that our products won't be able to take in billions of dollars in capital, but that is not our strategy or business model."
Develop Scalable Products	• Move to greater focus on high capacity / cheap products • Build out risk premia or long only offering • Use scalable products to engage with new investors	Launch lower cost products (incl. RP / LO)	31%	**Pro** • Ability to attract wide array of investors looking to get exposure to quantitative products at low costs – often a differentiated investor base vs. alpha products • Scalability allows business growth with limited incremental costs – generally costs less to develop	"Offering β / Smart β allows you exposure to sophisticated investors such as pensions as well as retail investors. There is a possibility of growth from all angles."
		Target new investor base[1]	13%	**Con** • Products are low margin so require high scale and greater marketing resources • May lose some credibility among more sophisticated investors • Potential risks of risk premia – products are somewhat untested and have grown fast. A 'blow-up' risks damaging brand of wider firm	"We are looking to launch a risk premia product but need to be careful that we do not offer too many of these products and risk being labeled a beta manager."

Source: Strategic Consulting survey data and analysis
1. E.g., Retail through UCITS / '40 Act

resources, and managers launching such products risk losing credibility among the more sophisticated investors by becoming associated with beta offerings. Additionally, risk premia products are somewhat untested and have grown exponentially; as a result, there are those who fear that a 'blow-up' could be on the horizon, leaving brands tarnished and investors regretful.

VI. 'Quantamental'

With the quantitative techniques and processes of systematic managers becoming ever more sophisticated year-on-year, one might question how the bottoms up, fundamentally driven investment process of discretionary managers will ever be able to keep up. However, we have seen a surge in 'quantamental' managers – discretionary managers using quantitative techniques in various stages of their investment process in an attempt to incorporate 'the best of both worlds'.

We surveyed ~45 discretionary managers regarding their use of quantitative methods in their investment process and, overall, as shown in Figure 23 about half have incorporated quantitative methods in one of the following areas:

1. Information gathering – internet / social media scraping and consumer sentiment analysis;

2. Portfolio construction / risk management – optimization techniques used to construct the portfolio based on intra-stock correlation / factor exposure;

3. Idea generation – for example, credit card data analysis used to develop a view toward companies ahead of earnings reports;

4. Performance analysis – Systematic methods to tag trades based on ideas, analysis of PM performance (at M / S HFs) to identify cycles and aid capital allocation.

In terms of 'alternative data', a phenomenon largely associated with systematic investing, up to a quarter of the discretionary managers in our sample have in fact incorporated them into their investment process, with consumer credit card and internet / social media data receiving the most interest. Of those that have incorporated 'alternative data' in their investment process, the data tends to be cleaned and processed in-house (48% of respondents), as many who have purchased pre-cleaned data from vendors end up having to spend additional time cleaning it themselves anyway. Equally meaningful is that another 26% of respondents continue to handle some of the processing in-house, notwithstanding purchasing pre-cleaned data in the first place. This highlights the sentiment that data scrubbing is an essential part of the alpha-generation process.

While introducing quantitative techniques to a discretionary investment process seems like a logical step, it does pose a number of challenges for managers to overcome. First, the barriers to entry are high and there is considerable investment required; the systems used by systematic managers are extremely costly both to build and to maintain, such that discretionary managers are unlikely to be able to 'dip in' to the space. Moreover, creating a culture that is attractive to the personalities of systematic investment professionals often requires some changes to the traditional HF working environment. The talent pool for quant overlaps with that of tech companies, so being more attractive than a 'competitor' is multi-dimensional. As a result, considerable effort needs to be put into integrating the discretionary and systematic investment professionals in a way that suits both sides. Highly qualified systematic experts are unlikely to be happy with their research being used as a 'complementary tool' to the discretionary manager's convictions, and, therefore, there must be clear and practicable articulation of the role of data / analytics and systematic methods in the investment process.

FIGURE 23: Quantamental – Use of 'Big Data', Quant Techniques

Quantamental HFs Use of 'Big Data' / Quantitative Techniques

Use of 'Big Data'	Alternative / 'Big Data' Sources	Data Cleanup and Processing of Alternative Data

Use of 'Big Data': No 76%, Yes 24% — All

Alternative / 'Big Data' Sources: Consumer Credit Card 20%, Internet / Social Media 20%, Weather 16%, Satellite 7%

Data Cleanup and Processing of Alternative Data: Handle In-House 48%, Buy Processed Data 26%, Both 26%

Quantitative Techniques: Implementation 55% / 50%[1] / 45%

Examples:

Information Gathering
- Internet / social media scraping, consumer sentiment analysis

Portfolio Construction / Risk Management
- Optimization techniques used to construct the portfolio based on intra-stock correlation / factor exposure

Idea Generation
- Credit card data analysis used to develop a view toward companies ahead of earnings reports

Performance Analysis
- Syst. methods to tag trades based on ideas
- Syst. analysis at M / S HFs re PM performance in various markets to identify cycles to provide PM with more or less capital

Source: Strategic Consulting analysis
1. Range of 45% – 55% covers responses across all four categories (info gathering, idea gen, port construction / risk mgt, performance analysis)

All in all, while our expectation (and that of the investors and managers that we interviewed) is that systematic strategies and techniques will continue to grow in importance within the HF industry, clearly there are areas in which discretionary management is likely to prevail (see Figure 24). It is generally felt that more idiosyncratic and narrowly focused investment processes, with small sample sizes and data sets available, particularly in more illiquid asset classes, are likely to remain in the realm of discretionary management. In contrast, the consensus is that discretionary managers will find it increasingly difficult to keep up with systematic managers in highly liquid markets where the sample size is large and the investment horizon is short term. That said, 73% of the investors that we surveyed believe that the industry is likely to converge and that, in the long run, those managers incorporating both systematic and discretionary approaches within their investment process are likely to be best placed. In fact, the quantamental trend is not one-directional; some systematic managers are meeting discretionary managers in the middle as well, and are investigating ways to incorporate fundamental / discretionary methods in their own processes.

VII. Final considerations

1. While systematic HF strategies continue to remain a minority of overall HF industry AUM, there are numerous signs to indicate that they may be in for sustained growth in the short and long term.

• Systematic HF AUM has been range-bound since 2005, accounting for 11% – 15% of industry AUM, but as of 2016 has grown to its highest level in the last 10 years.

• However, recent inflows have tended to favor systematic managers – particularly equity quant – and our conversations with investors suggested that the phenomenon of 'algo aversion'

and suspicion of 'black boxes' is diminishing and more investors are becoming open to systematic HFs. As such, investors are overwhelmingly in favor of growing their systematic allocations in the short term.

• Ancillary products in the systematic space, such as risk premia / smart beta and long only, are also proving to be popular and offer another avenue of potential growth for systematic managers.

2. Systematic HF performance has on aggregate not been particularly differentiated from discretionary performance over the cycle from a risk / return perspective, but nevertheless offers some appealing characteristics from a portfolio perspective.

• Comparing the performance of corresponding systematic and discretionary strategies suggests that over longer periods of time there is little to choose between them: returns are broadly similar, albeit with slightly higher levels of volatility in systematic.

• However, systematic HFs have tended to outperform discretionary HFs in certain market environments – particularly equity market corrections – and they tend to offer lower correlation to equity markets and other HF strategies, making them a good complement within a portfolio.

3. New developments in systematic investing may not yet be bearing much fruit, but they offer exciting potential for new alpha sources.

• There have been some exciting new developments in the systematic HF space – Machine Learning and Big Data are the most commonly cited – and developments in technology and computing power have enhanced the research process, all of which point to potential new alpha sources.

FIGURE 24: The Future of Systematic and Discretionary Investing

Areas of Comparative Advantage			Expectations for Manager Edge Going Forward[1]
Systematic Advantage	⟷	Human Advantage	Q: Which types of HF manager do you believe will have the investment edge going forward?
Liquid	Liquidity of Underlying	Illiquid	
Large	Sample Size	Small	
Broad	Area of Focus	Narrow	
Diversified	Portfolio Construction	Concentrated	
Shorter	Investment Horizon	Longer	
Generic	Investment Themes	Idiosyncratic / Event Specific	
Generalist ELS / EMN, Macro	Key Strategies	Distressed / stressed credit, concentrated / focused ELS, activist, convert arb	

Expectations for Manager Edge Going Forward[1]:
- Systematic Managers: 17%
- Discretionary Managers: 10%
- Managers using a blend of systematic and discretionary approaches: 73%

Source: Strategic Consulting Survey results and analysis
1. Based on a survey of 150+ HF managers and investors conducted at the Barclays Hedge Fund Symposium in October 2016

- At the moment, these developments remain in their infancy and both managers and investors are treating them with a healthy degree of skepticism – for now they remain more marketing 'buzzwords', but few managers are ignoring their potential.

4. Growing investor sophistication is presenting a challenge for managers, but there are signs the industry is adapting.

- Investors have become more sophisticated in distinguishing between alpha and more commoditized strategies, for which they are unwilling to pay HF fees. This has put some managers / products under pressure as they struggle to justify their existence within these terms.

- As a result, we see managers adapting to focus their businesses on either (or both) alpha and beta / smart beta / risk premia products, balancing the needs for scale and margin.

5. Discretionary managers are not ignoring the potential benefits that quantitative techniques offer, and the future may be a hybrid approach.

- We see an increased adoption of and investment in quantitative techniques by discretionary HF managers across the whole investment process, from research / idea generation all the way through to risk management, portfolio construction and performance analysis.

- While many investors and managers believe that the future is some sort of a 'best-of-both-worlds' approach, there are challenges to successfully combining discretionary and systematic processes, meaning not all managers will be able to capitalize on this trend.

VIII. Capital Solutions

The Capital Solutions team within Prime Services offers a unique blend of industry insights and tailored client solutions for a broad range of issues.

Strategic Consulting

- Development of industry-leading content, driven by primary analysis, on the HF industry and its participants (e.g., HF and FoHF managers, institutional investors, investment consultants).

- Provision of management consulting services to HFs, asset managers, institutional investors and internal management on a wide array of business topics such as the launch of a new strategy, marketing effectiveness, product development and organizational efficiency.

- Acting as an HF competence center internally for Barclays.

Capital Introductions

- Maintenance of ongoing investor dialogue to provide valuable feedback to HF managers.

- Introducing HF managers to a select number of interested investors. Hosting events that provide a forum for knowledge transfer and discussion / debate on industry issues that helps educate and inform both clients and investors.

- Helping HF managers identify and source high quality talent to fill openings across their organizations through a talent management effort.

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