Author:

What is the optimal allocation to quant strategies for China A-share investors?

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Executive summary

Numerous studies indicate significant inefficiencies exist in China's A-share market, presenting opportunities for active portfolio managers to potentially deliver strong performance. For investors or asset owners who outsource their China exposure, fundamental active managers are often the first choice due to their in-depth company insights and industry knowledge. However, model-driven quantitative active managers have been gaining attention in recent years for their relatively more stable performance amidst heightened market volatility. Historically, their low correlation to fundamental active managers also imparted substantial diversification benefit to an asset owner's China exposure.

This paper quantifies the historical performance differences between the fundamental and quant active managers in China, by examining the median monthly returns of their mutual funds from 2010 to 2022. We find that the median quant manager has outperformed the median fundamental manager in terms of absolute return and on a risk-adjusted basis. The median quant manager also outperforms the benchmark at a higher monthly frequency. Cross-sectionally, the proportion of quant managers with positive alphas is also higher compared to fundamental managers.

To tackle the question of what optimal allocation to quant strategies would be beneficial to an investor's China portfolio, we devise a framework to determine the optimal return and risk utility derived from various allocation levels considering an investor's manager selection capability.

For an investor with a neutral manager return forecasting ability, we find a higher allocation to quant manager to better satisfy overall return and risk objectives. On the other hand, if the investor has a consistently strong forecasting and manager selection ability, we show that the optimal allocation decision will require a trade-off between return and risk objectives, which can be better fulfilled by the fundamental manager and quant manager respectively. However, the trade-off function deviates significantly each year, implying that higher risk portfolios are not consistently well compensated. Hence, we believe that long-term investors, even with strong manager selection ability, should not ignore the diversification benefits of quant strategies in smoothing their portfolio returns and enhancing portfolio information ratio.

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Introduction

China's onshore A-share active mutual fund industry has grown significantly since 2009 and rose rapidly from 2016 onward in almost a linear fashion (Figure 1). Using publicly available information we look at both fundamental mutual funds that engage in bottom-up stock picking as well as quant mutual funds[1] that follow a model-driven process.

Quant funds have historically achieved success in China by employing efficient risk-taking processes which eliminate portfolio manager bias, and by employing diversified alpha sources. The strong demand for systematic investment strategies have led to a doubling of long only quant funds from 2019 to 2022. As of 31 December 2021, quant funds accounted for approximately 18% of all China's active mutual fund assets.[2]

Figure 1 – Number of China active mutual funds (2010 – 2022)
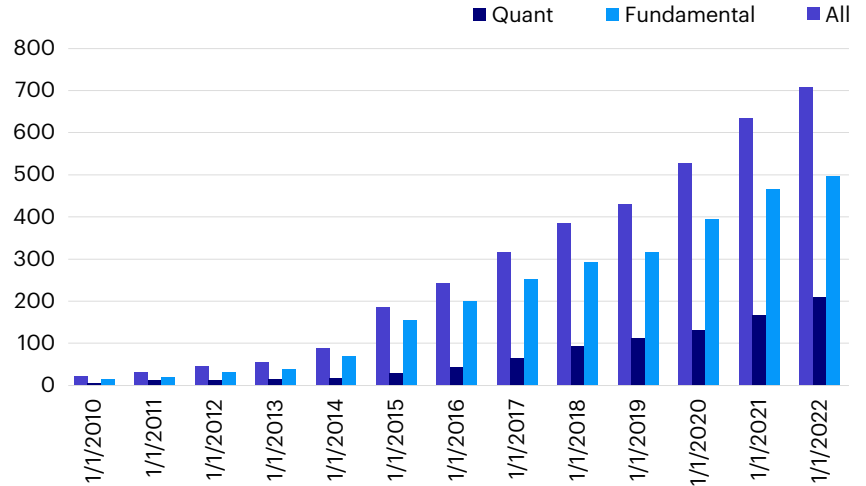
Sources: WIND, Invesco analysis.

1. Include enhanced index strategies as well as active quant equity strategies
2. Source: WIND

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Section 1: Higher risk-adjusted return of onshore A-share quant managers relative to fundamental managers

Looking at performance using median active return

To assess the long-term performance of fundamental and quantitative managers in China, we analyze their mutual fund returns from 2010 to 2022. We first calculate every fund's historical monthly active return against its own official benchmark to ensure the results are benchmark agnostic. We then construct the time series returns for a "median fundamental manager" and a "median quant manager" by sampling the median monthly active returns of their respective mutual fund groups. This allows us to fully quantify the return and risk characteristics of these two investment manager styles for an objective comparison while accounting for the growing fund sample size over the study period.

Methodology
- Sample covers a total of 707 China-domiciled A-share mutual funds (as of Dec 31, 2022) that adopt either an active fundamental ("median fundamental manager") or active quantitative investment style ("median quant manager")
- To avoid survivorship bias, the historical monthly returns of terminated funds are included in our sampling
- All returns mentioned in the piece are active returns where: Active return = Portfolio return - benchmark return
- To allow benchmark agnostic comparison, each fund's active return is calculated relative to its own official benchmark, which is usually a weighted composite of an equity index and the risk-free rate (for example, 95% x CSI300 Index + 5% x bank deposit interest)
- Fund returns are net of fees
- Active risk or tracking error is the annualized standard deviation of active returns
- Time period of 2010 to 2022 was chosen because there were an insufficient number of active mutual funds prior to 2010

Over the full period, the cumulative median active return of all managers is 3.33% p.a. net of fees (Table 1). The cumulative active return of the median quant manager (3.86% p.a.) is, however, higher than that of the median fundamental manager (3.13%). In fact, the median quant manager has a positive active return in every year of our sample. The median fundamental manager has more volatile returns with large positive returns in 2019 and 2020 being offset by underperformance in 2012, 2014, 2016, 2018 and 2022 (Figure 3).

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Table 1 – Active return of China onshore managers by investment style

	Active Return (cumulative, p.a.)		
	All managers (median)	Median quant manager	Median fundamental manager
2010 to 2022	3.33%	3.86%	3.13%

Sources: WIND, Invesco analysis. **Past performance is no guarantee of future results.**

Figure 2 – Cumulative active return of China onshore managers (2010 – 2022)
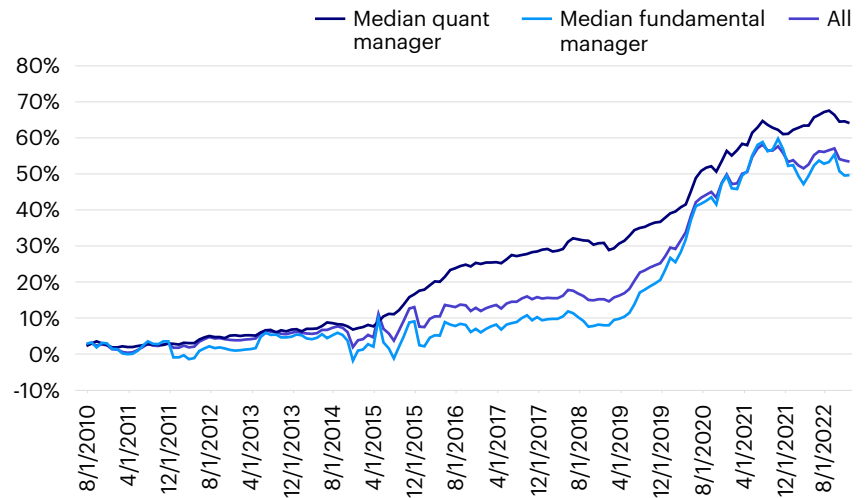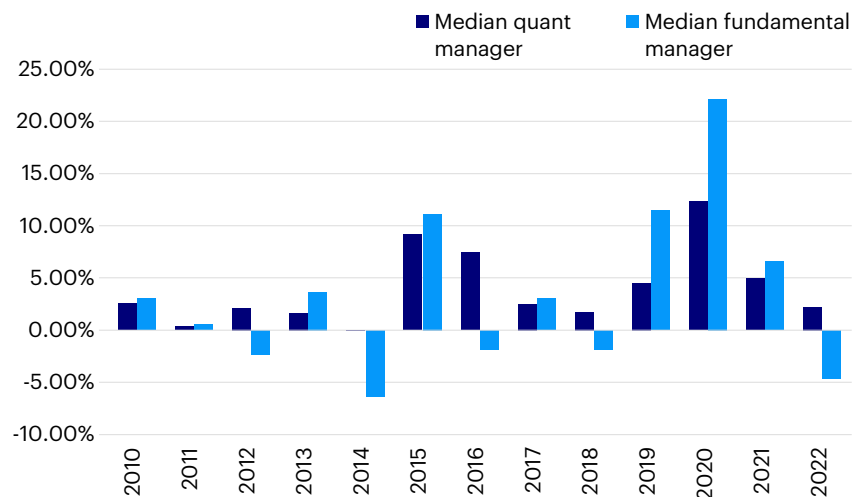

Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 3 – Annual active return of China onshore managers (2010 – 2022)

Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

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**Volatility of onshore A-share active managers**

China A-share quant managers typically demonstrate lower volatility in their returns. Our analysis shows that the active risk or tracking error of the median quant manager is less than half that of the median fundamental manager (Table 2). On a yearly basis, the median quant manager controls the active risk within a much narrower band (around 2% to 3% p.a.) than the median fundamental manager (around 2% to 12% p.a.). For example, the active risk of the fundamental manager is more than 5 times that of the quant manager in 2015 (Figure 4).

Table 2 – Active risk of China onshore managers by type

	Risk		
	All (median)	Median quant Manager	Median fundamental manager
2010 to 2022	4.32%	2.30%	5.93%

Sources: WIND; Invesco analysis. Note: Risk or tracking error is calculated using the annualized monthly median active returns. **Past performance is no guarantee of future results.**

Figure 4 – Annual active risk of China onshore managers by type (2010 – 2022)
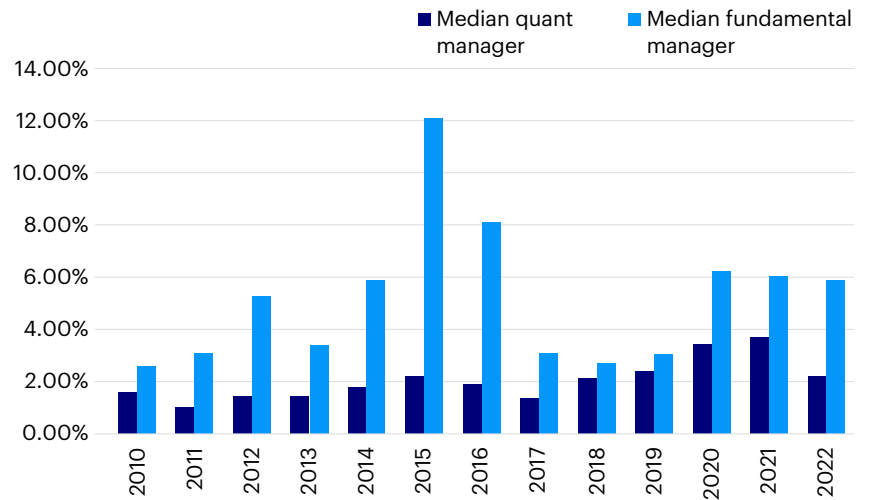
Sources: WIND; Invesco analysis. Note: Active risk or tracking error is calculated as the annualized standard deviation of monthly median active return. **Past performance is no guarantee of future results.**

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## Efficiency of quant manager relative to fundamental manager

Due to this relatively lower volatility, the China A median quant manager shows greater portfolio efficiency with a higher information ratio (IR) compared to the median fundamental manager. The aggregate IR of the median quant manager is three times that of the median fundamental manager (Table 3). On an annual basis, the median quant manager also has a consistently higher IR than the median fundamental manager except in 2019 (Figure 5).

Table 3 – Aggregate information ratio of China onshore manager by type

	Information ratio (IR)		
	All (median)	Median quant manager	Median fundamental manager
2010 to 2022	0.770	1.675	0.527

Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 5 – Annual information ratio of China onshore manager (2010 – 2022)
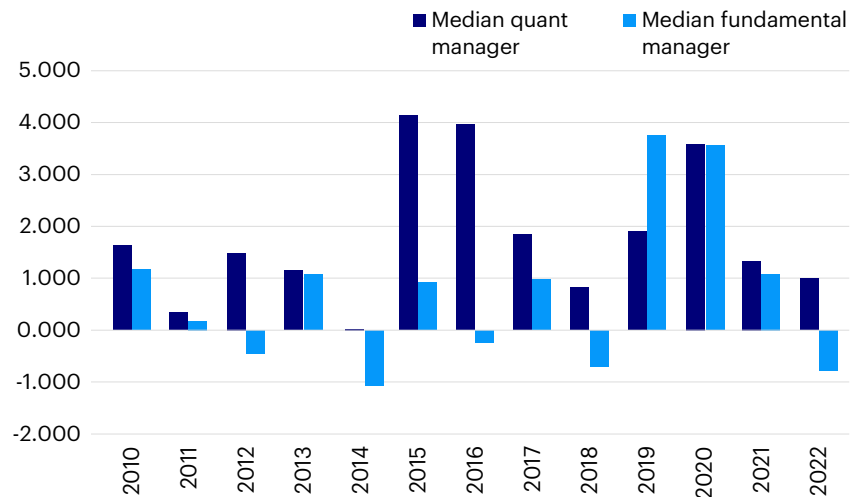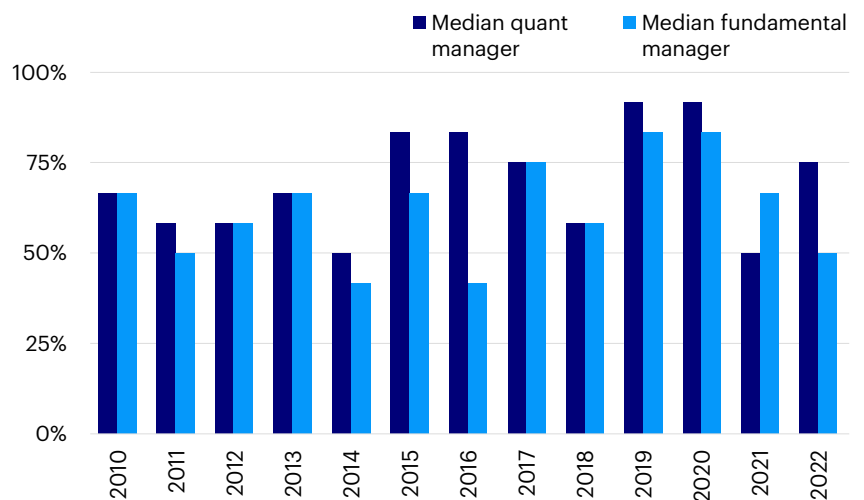

Sources: WIND; Invesco analysis.
Note: IR is calculated using median active return. **Past performance is no guarantee of future results.**

We also gauge the persistency of outperformance by the percentage number of months that a manager beats the benchmark every year (Figure 6). The higher the ratio (higher monthly frequency of outperformance), the more even the return streams are over time. We find that the median quant manager shows greater persistency by outperforming the benchmark around 66% of the time or roughly eight months every year.

Figure 6 – Percentage of outperforming months per year (2010 – 2022)

Sources: WIND; Invesco analysis. Note: Percentage of outperforming months refers to the proportion of the year during which the manager has a positive active return. **Past performance is no guarantee of future results.**

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Cross-sectional return dispersion between managers

We have shown that the China A-share median quant manager has a higher return than the median fundamental manager on a risk-adjusted basis. But we do not know the level of cross-sectional return dispersion between the managers. A low dispersion among a group of managers suggests that their returns are quite similar to one another while a high dispersion means their returns may be vastly different. The median manager return of a low dispersion group may be more representative of a randomly selected manager from the group.

We calculate the standard deviation of the monthly active returns of the managers for each investment style as a proxy for their cross-sectional return dispersion. We find that the cross-sectional dispersion between China A-share quant managers has remained stable over during the study period (Figure 7). The returns of fundamental managers, however, have become more dispersed since 2016. A possible reason is that manager performance becomes polarized when a smaller number of them benefit from concentrated thematic stock rallies during the period. While their large dispersion may mean that the top performing fundamental managers can generate larger alphas, it also means that they can have higher risk of underperformance when industry trend reverses.

The lower dispersion between the quant managers means the investors or asset owners can have some confidence that the performance of the median quant manager is more representative of the group than could be said for the median fundamental manager. The investor may also have a higher probability of replicating the returns of the median quant manager than the median fundamental manager when selecting managers randomly.

Figure 7 – Cross-sectional dispersion of China onshore managers (2010 – 2022)
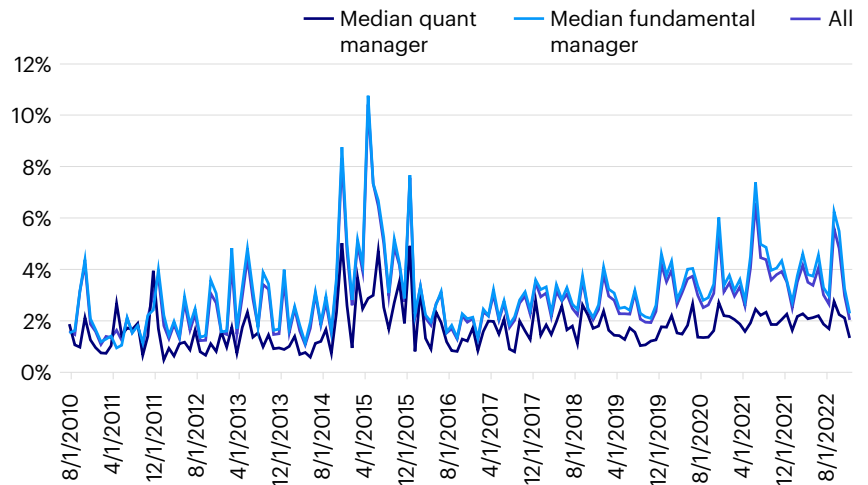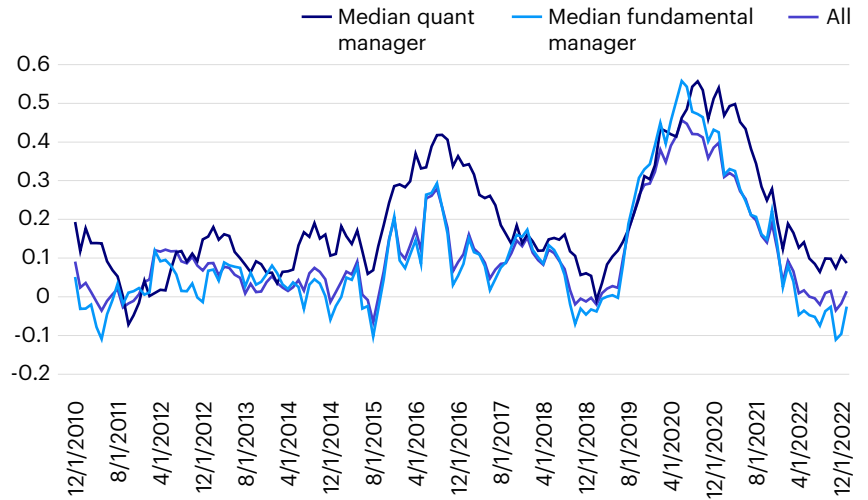

Sources: WIND; Invesco analysis. Note: Cross-sectional dispersion is calculated using median active return.
Past performance is no guarantee of future results.

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To clarify the concept further, we can divide the active return of median managers by their cross-sectional dispersion to gauge their return potential adjusted for the uncertainty in manager selection. The results remain consistent. We find that the potential reward in selecting a median performing manager per unit of the manager selection risk, has been higher for the quant manager than the fundamental manager during most of the study.

Figure 8 – Active return of median managers per unit of cross-sectional dispersion (2010 – 2022)

Sources: WIND; Invesco analysis. Note: Chart shows active return of median managers divided by their cross-sectional dispersion. **Past performance is no guarantee of future results.**

Apart from their cross-sectional dispersion, it is also useful to find out the proportion of managers who beat their benchmarks. Overall, a higher percentage of quant managers outperform their respective benchmarks than the fundamental managers (Figure 9). This suggests that quant managers as a group have had a higher success rate at delivering a positive alpha to their returns.

Figure 9 – Percentage of managers beating their benchmarks each year (2010 – 2022)
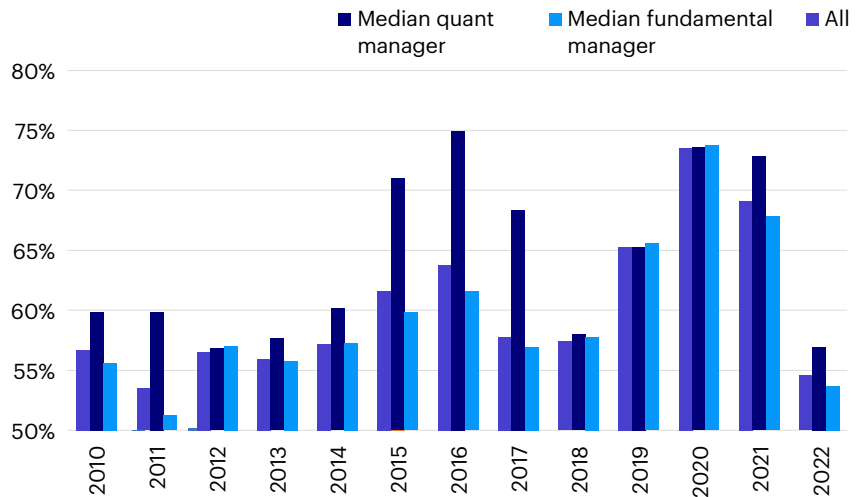
Sources: WIND; Invesco analysis. Note: Based on the average monthly proportion of managers delivering positive active return in each year. **Past performance is no guarantee of future results.**

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Correlation between fundamental manager and quant manager

Next, we analyze the correlation between the monthly active return of the median fundamental manager and the median quant manager over the 13-year period to better understand the diversification benefit the latter could provide in a portfolio (Table 4). We find that the correlation between the two managers during the full period is relatively low at 0.467, suggesting the quant manager has a relatively uncorrelated alpha to the fundamental manager. Although their correlation is noticeably higher in 2020 and 2021 (0.783 and 0.718 respectively), it has since declined to 0.407 in 2022.

Table 4 – Active correlation between the median fundamental manager and the median quant manager (2010-2022)

Period	Active Correlation
2010 to 2022	0.467
2010	-0.438
2011	0.552
2012	0.509
2013	0.513
2014	0.422
2015	0.317
2016	0.230
2017	0.434
2018	0.454
2019	0.395
2020	0.783
2021	0.718
2022	0.407

Sources: WIND; Invesco analysis.
Note: Based on monthly returns. **Past performance is no guarantee of future results.**

The strengths of quant managers

The relatively strong performance of quant managers may be attributed to their differentiated investment process and competitive edge in information processing. Most quantitative managers adopt a systematic process that minimizes the subjective biases of their portfolio managers. For example, quant managers use computer models rather than personal opinion to generate stock picks. Their stock weights and trades are usually carefully computed to maximize the portfolio's expected return and minimize its risk and transaction cost, while satisfying various other constraints. Systematic exposures that their models do not account for are routinely neutralized or hedged to avoid unintended losses. With such a disciplined risk-taking approach, it is not surprising to find that quant managers have had highly repeatable performance.

Quant managers' ability to analyze large datasets swiftly is also a significant advantage in the A-share market which now includes over 5,000 listed companies. While most fundamental managers and brokerage firms limit their research focus to just a fraction of the entire stock universe due to resource constraints, quant models can sift out asset mispricing from the entire market.

Market inefficiencies in China can arise from factor risk premia, retail investors' behavioral bias and even top-down policy effects. Quant strategies frequently utilize these diversified alpha sources because of their capacity to process and analyze information more quickly than others. The adoption of natural language processing and artificial intelligence methods by quant managers may also enable them to analyze unstructured datasets (e.g., text reports, images, etc.) more efficiently than a human analyst.

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Section 2: Fundamental manager and quant manager allocation in a multi-manager China A-share portfolio

Now that we have made a compelling case for adding allocation to quant managers, in this section we tackle the question of what allocation to quant strategies would be optimal in a multi-manager China A-share portfolio. We will examine this from the perspective of a hypothetical investor who has selected a fundamental manager and a quant manager for portfolio allocation. To disentangle the effect of manager selection from weight allocation decision, we will devise two cases: one based on median-performance managers ("Base Case") and another based on top-quartile managers ("High Performance Case"). In each case, we construct a set of portfolios with varying weights in their fundamental manager and quant manager allocation. Each portfolio is rebalanced to its allocation weights on a monthly frequency from 2010 to 2022. The results from these portfolios provide the basis for our discussion on the optimal allocation approach.

Base Case: Median-performance managers
In the base case, the investor is assumed to possess a neutral ability to forecast manager return. Hence, the investor is more likely to select a manager who is on par with the median performance in the manager pool. The selected managers can thus be represented by the median fundamental manager and median quant manager discussed in Section 1. To understand the allocation effect on these two managers, we construct 21 hypothetical portfolios with varying weights allocated to them, starting with the first portfolio (F) that allocates 100% to the fundamental manager. Each subsequent portfolio is formed by reallocating 5% weight from the fundamental manager to the quant manager until the final portfolio (Q) which is 100% invested in the quant manager (Table 5). The performance of these portfolios can help us understand the potential benefits of combining fundamental and quant strategies in a portfolio.

Table 5 – Hypothetical portfolio weights for base case scenario (2010-2022)

| Portfolio	Quant manager	Fundamental manager	Portfolio	Quant manager	Fundamental manager
P1 (F)	0%	100%	P12	55%	45%
P2	5%	95%	P13	60%	40%
P3	10%	90%	P14	65%	35%
P4	15%	85%	P15	70%	30%
P5	20%	80%	P16	75%	25%
P6	25%	75%	P17	80%	20%
P7	30%	70%	P18	85%	15%
P8	35%	65%	P19	90%	10%
P9	40%	60%	P20	95%	5%
P10	45%	55%	P21 (Q)	100%	0%
P11	50%	50%			

Sources: Invesco analysis, for illustrative purposes only.

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To determine the optimal allocation for our hypothetical investor, we first consider how the expectations of return and risk may be met by these 21 portfolios using an efficient frontier plot for the full period (Figure 10). The initial portfolio, which is 100% invested in the fundamental manager, is denoted F on the plot and shows an active return of around 3% p.a. with an active risk of around 6% p.a. As we reallocate the portfolio weight of the fundamental manager to the quant manager by 5% incrementally, we can observe the resulting portfolios' active return increases while its active risk decreases (moving towards the upper left side on the plot), until we arrive at the final portfolio that is 100% invested in the quantitative manager denoted Q. As Q completely satisfies both objectives of return maximization and risk minimization (it has the highest return and lowest risk on the efficient frontier), the 100% quantitatively managed portfolio can be considered the optimal allocation over the full study period.

Figure 10 – Overall efficient frontier for Base Case (2010-2022)
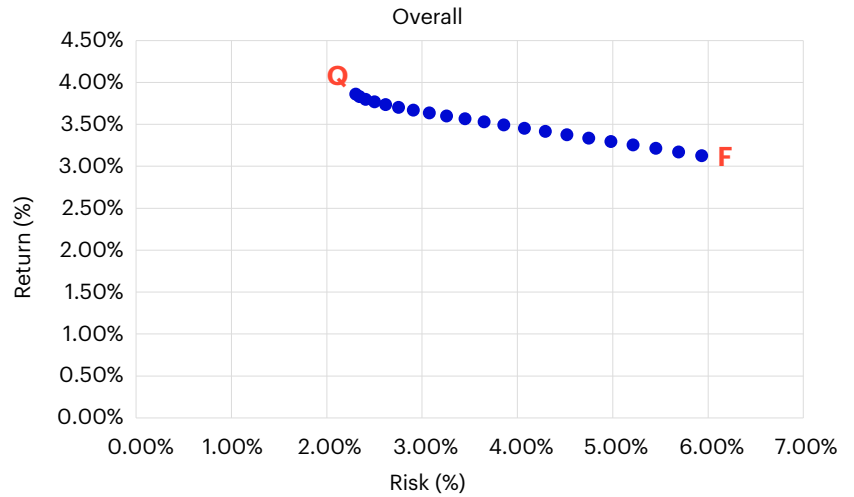
Sources: WIND; Invesco analysis. Note: Annualized cumulative monthly median returns from 31 December 2010 to 31 December 2022. **Past performance is no guarantee of future results.**

In our analysis, each portfolio is rebalanced to its allocation weight given in Table 5 on a monthly basis. To understand if there is also benefit if the investor had instead conducted the manager allocation more dynamically over time, let's drill down into the calendar year performance of these 21 portfolios in Figures 11 to 23 below.

Figure 11 – 2010 efficient frontier for Base Case
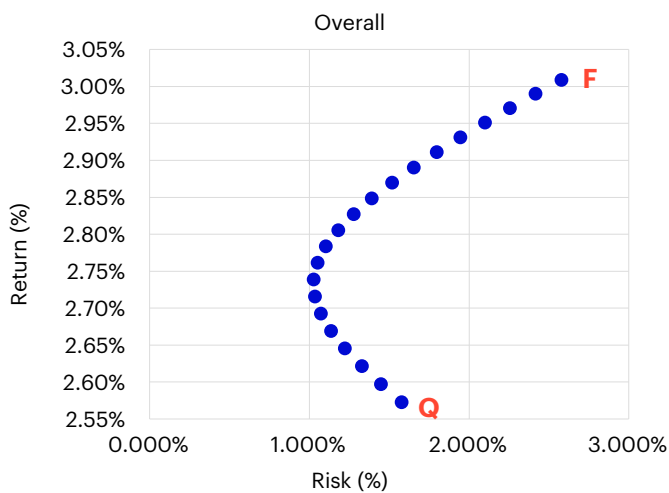
Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**
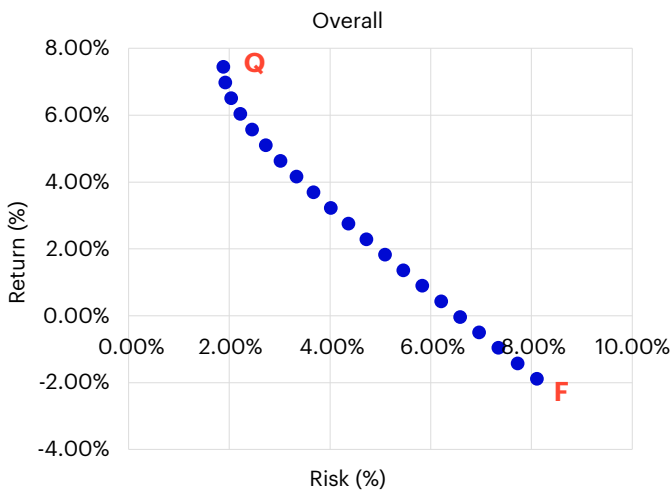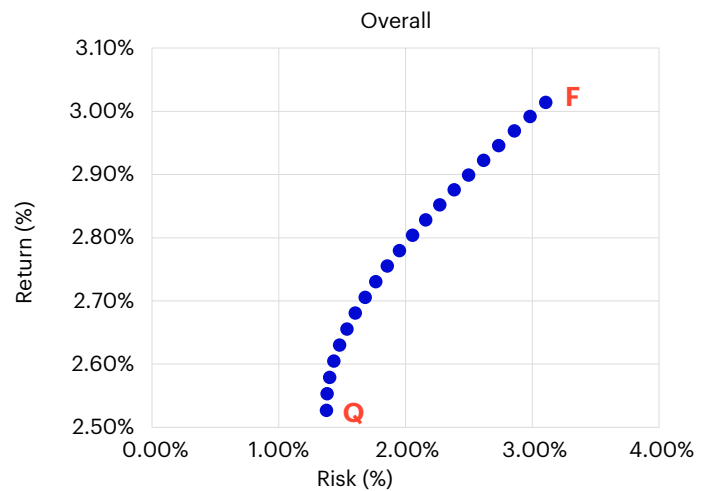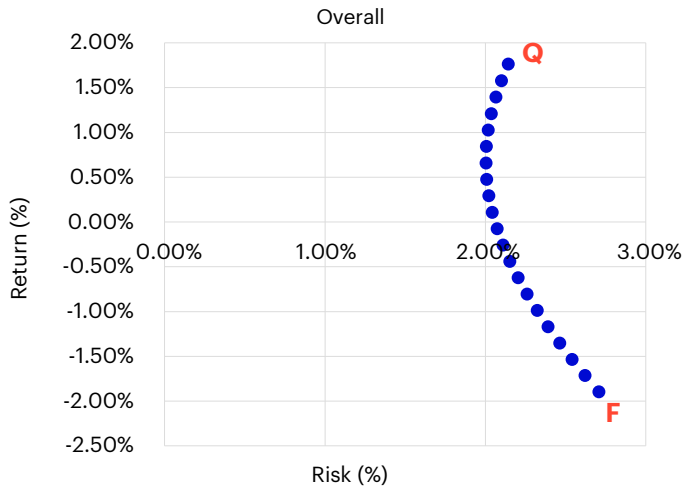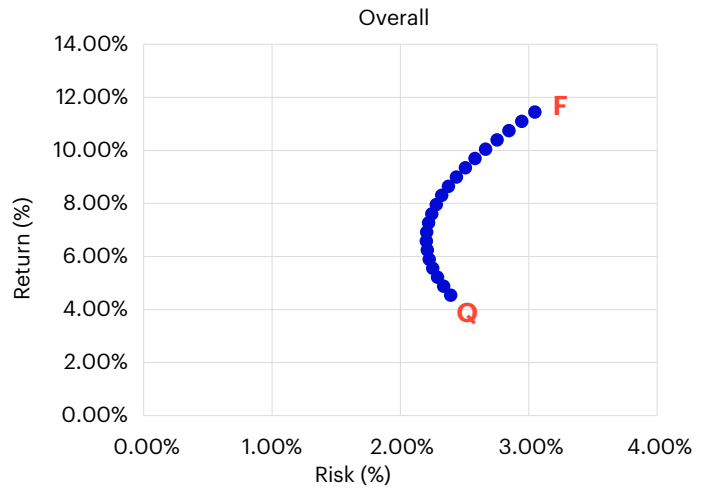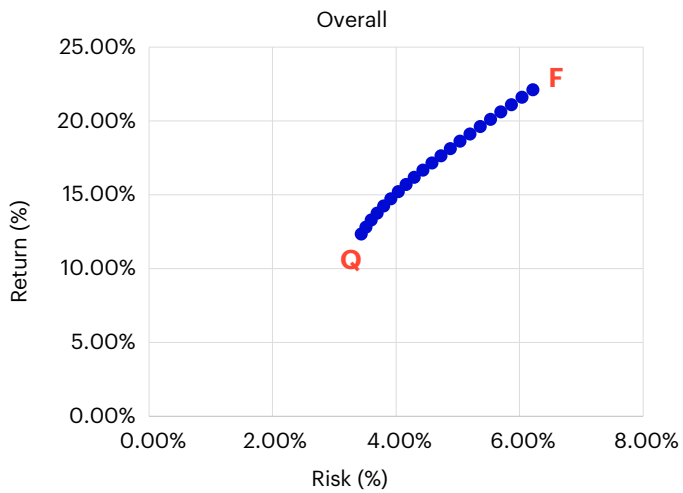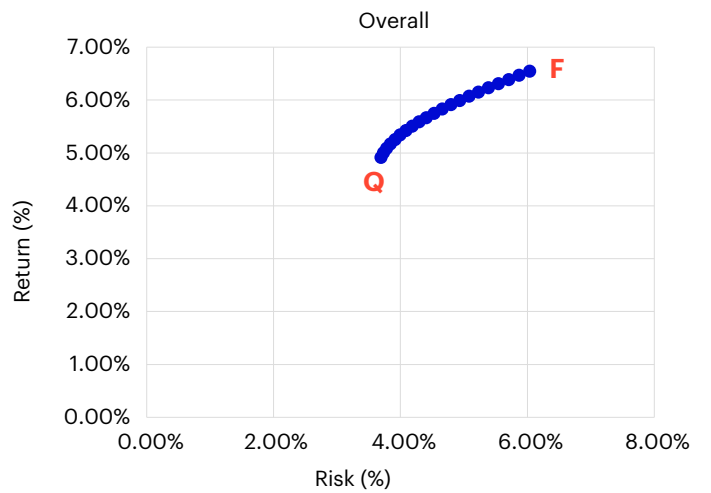
Figure 12 – 2011 efficient frontier for Base Case
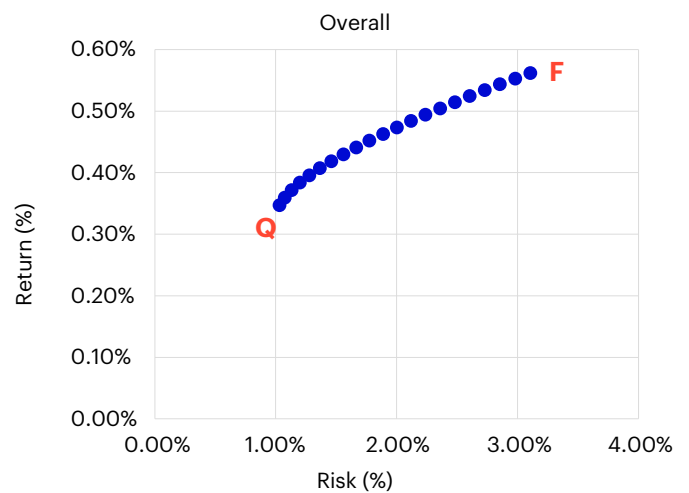
Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**
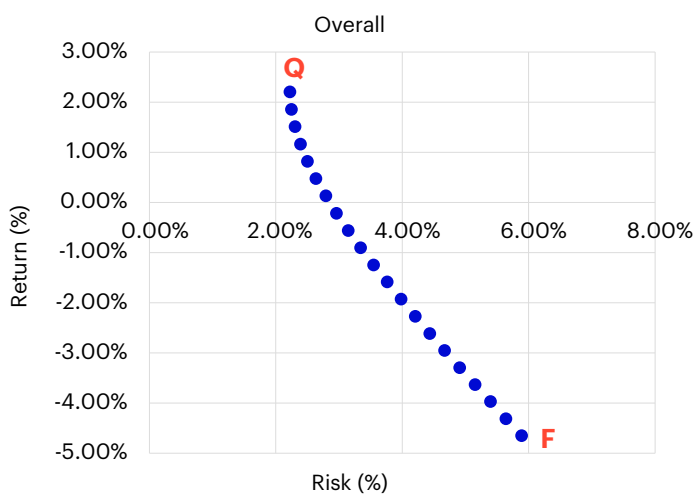
Figure 13 – 2012 efficient frontier for Base Case
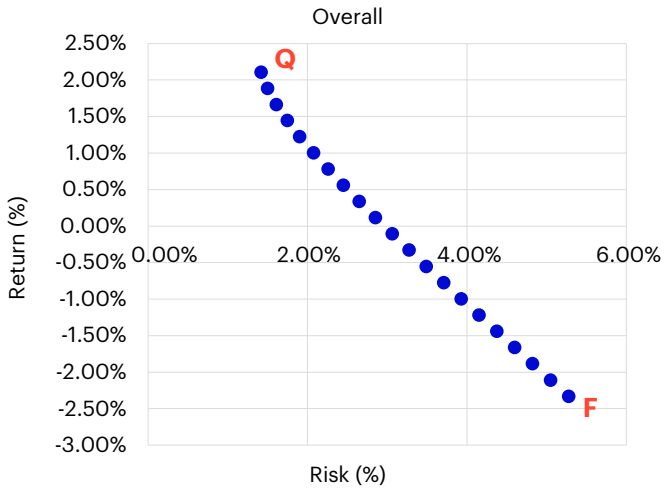
Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 14 – 2013 efficient frontier for Base Case
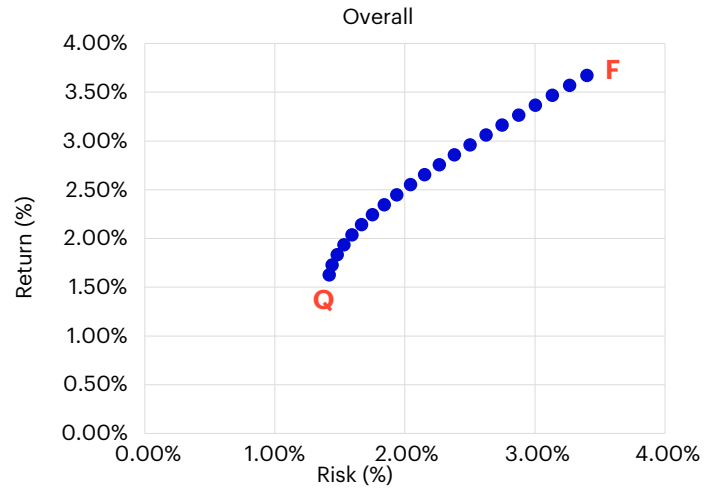
Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 15 – 2014 efficient frontier for Base Case
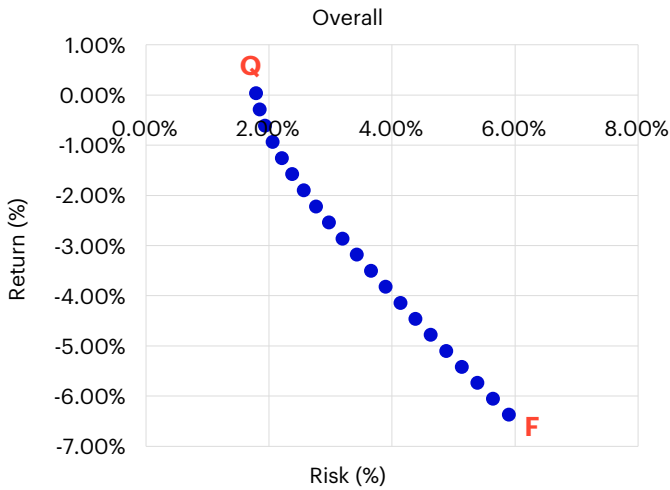
Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 16 – 2015 efficient frontier for Base Case
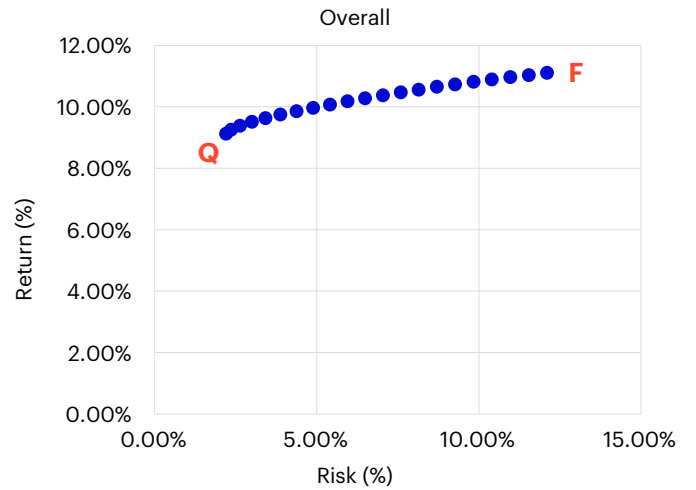
Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 17 – 2016 efficient frontier for Base Case

Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 18 – 2017 efficient frontier for Base Case

Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 19 – 2018 efficient frontier for Base Case

Overall

Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 20 – 2019 efficient frontier for Base Case

Overall

Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 21 – 2020 efficient frontier for Base Case

Overall

Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 22 – 2021 efficient frontier for Base Case

Overall

Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 23 – 2022 efficient frontier for Base Case

Overall

Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

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From these plots, we can observe four occurrences (2012, 2014, 2016, 2022) of monotonic decreasing efficient frontier wherein the 100% quant portfolio fully satisfies both return and risk objectives of the investor.

There are, however, six occurrences of monotonic positive efficient frontiers (2011, 2013, 2015, 2017, 2020, 2021) for which an optimal allocation requires a trade-off between return and risk objectives. In some instances, such as 2017, the investor may find a higher marginal utility by shifting the allocation from the fundamental manager to the quant manager (moving from Q to F halves the active risk to below 1.5% but reduces the return by only about 0.5%). But in some plots, such as 2020, the investor may find such marginal benefit to be minimal (holding portfolio Q instead of portfolio F can half the risk but requires giving up more than 10% in portfolio return).

On three occasions, the efficient frontiers show a non-monotonic behavior (2010, 2018, 2019), suggesting that not only the risk and reward function requires a trade-off, but also that minimum risk objective can only be attained by a balanced allocation to both F and Q.

We classify the calendar year outcomes into six scenarios based on how they satisfy the investor's return maximization and risk minimization objectives (Table 6). In each year, we score the return objectives of portfolios F and Q relative to each other ("Strong" for higher return or "Weak" for lower return). Their risk objectives are scored according to their risk level on the efficient frontier ("Strong" for being the minimum risk portfolio; "Weak" for being the maximum risk portfolio; and "Moderate" otherwise).

Table 6 – Outcome scenarios for investor objectives in Base Case

Outcome scenario	Portfolio F (Median Fundamental Manager)		Portfolio Q (Median Quant Manager)		Optimal Allocation	Frequency	Year
	Return Maximization	Risk Minimization	Return Maximization	Risk Minimization			
I	Weak	Weak	Strong	Strong	Q	4	2012, 2014, 2016, 2022
II	Weak	Moderate	Strong	Moderate	Q	1	2018
III	Weak	Strong	Strong	Weak	F + Q	0	
IV	Strong	Weak	Weak	Strong	F + Q	6	2011, 2013, 2015, 2017, 2020, 2021
V	Strong	Moderate	Weak	Moderate	F	2	2010, 2019
VI	Strong	Strong	Weak	Weak	F	0	

Source: Invesco analysis.

Under outcome scenarios I and II, we believe that a greater allocation to the quant manager may help the investor achieves higher return at lower risk. Conversely, a larger allocation to the fundamental manager can provide similar benefits under scenarios V and VI. Finally, the investor may wish to consider a more a balanced allocation to both managers under scenarios III and IV depending on the relative importance of the objectives.

The relatively higher frequency of scenarios I to IV suggests that the diversification benefit of quantitative strategies is robust and can enhance the long-term performance of a multi-manager portfolio. This can also be seen in the information ratio heatmaps below (Table 7 and 8) in which portfolios with larger quant allocations tend to have the highest risk-adjusted return.

Table 7 – Overall information ratios for Base Case hypothetical portfolios over 13-year period (2010-2022)

Lower IR — Higher IR

P1 (F)	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21 (Q)
0.53	0.56	0.59	0.62	0.66	0.70	0.75	0.80	0.85	0.90	0.97	1.03	1.11	1.18	1.26	1.34	1.43	1.51	1.58	1.63	1.67

Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Table 8 – Information ratios for hypothetical Base Case portfolios on an annual basis (2010-2022)

Lower IR — Higher IR

	P1 (F)	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21 (Q)
2010	1.17	1.24	1.32	1.41	1.51	1.62	1.75	1.89	2.05	2.21	2.38	2.52	2.63	2.66	2.62	2.51	2.35	2.16	1.97	1.79	1.63
2011	0.18	0.19	0.19	0.20	0.20	0.21	0.21	0.22	0.23	0.24	0.25	0.25	0.26	0.28	0.29	0.30	0.31	0.32	0.33	0.33	0.34
2012	-0.44	-0.42	-0.39	-0.36	-0.33	-0.29	-0.25	-0.21	-0.16	-0.10	-0.03	0.04	0.13	0.23	0.35	0.48	0.64	0.83	1.03	1.26	1.49
2013	1.08	1.09	1.11	1.12	1.14	1.15	1.17	1.18	1.20	1.22	1.23	1.25	1.26	1.27	1.28	1.28	1.28	1.26	1.24	1.20	1.15
2014	-1.08	-1.07	-1.06	-1.06	-1.04	-1.03	-1.02	-1.00	-0.98	-0.96	-0.93	-0.89	-0.85	-0.80	-0.74	-0.66	-0.57	-0.45	-0.31	-0.15	0.02
2015	0.92	0.96	1.00	1.05	1.10	1.16	1.22	1.30	1.38	1.47	1.58	1.71	1.86	2.04	2.25	2.51	2.82	3.17	3.56	3.93	4.14
2016	-0.23	-0.18	-0.13	-0.07	-0.01	0.07	0.15	0.25	0.36	0.48	0.63	0.80	1.01	1.25	1.53	1.87	2.27	2.72	3.19	3.63	3.96
2017	0.97	1.00	1.04	1.08	1.12	1.16	1.21	1.26	1.31	1.37	1.42	1.48	1.55	1.61	1.67	1.73	1.78	1.82	1.84	1.85	1.84
2018	-0.70	-0.65	-0.60	-0.55	-0.49	-0.42	-0.36	-0.28	-0.20	-0.12	-0.04	0.05	0.14	0.24	0.33	0.42	0.51	0.59	0.68	0.75	0.82
2019	3.76	3.77	3.77	3.77	3.77	3.75	3.73	3.69	3.64	3.57	3.49	3.39	3.27	3.14	2.99	2.82	2.65	2.46	2.28	2.09	1.90
2020	3.56	3.58	3.60	3.62	3.64	3.66	3.68	3.70	3.72	3.73	3.75	3.76	3.77	3.77	3.77	3.76	3.75	3.72	3.69	3.65	3.59
2021	1.08	1.10	1.12	1.14	1.16	1.18	1.20	1.21	1.23	1.25	1.27	1.29	1.30	1.32	1.33	1.34	1.34	1.35	1.34	1.34	1.33
2022	-0.79	-0.76	-0.74	-0.70	-0.67	-0.63	-0.59	-0.54	-0.48	-0.42	-0.35	-0.27	-0.18	-0.07	0.05	0.18	0.33	0.49	0.66	0.83	0.99

Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

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High Performance Case: Top-quartile managers

In our second case, we assume that the investor has an information advantage and makes more accurate forecasts of future manager returns consistently. Thus selected managers are represented by the top-quartile performing managers of each investment style. To quantify the performance of these two managers, we construct the time series returns for a "top-quartile fundamental manager" and a "top-quartile quant manager" by sampling the top 25th-percentile monthly active returns of their respective mutual fund groups. We then follow the same procedure described in the Base Case to construct 21 hypothetical portfolios with varying weights allocated to the two managers (Table 5).

Unlike the base case, there is a clear trade-off between risk and reward when making allocation decisions between top-quartile fundamental manager and top-quartile quant manager (Figure 24). Portfolio F, which is 100% invested in the fundamental manager, has the highest return but also comes with the highest risk. As the portfolio allocation shifts to the quant manager (towards the bottom left of the efficient frontier), portfolio return and risk both decrease monotonically until we reach portfolio Q, which has the lowest return and risk.

Figure 24 – Overall efficient frontier for High Performance Case (2010-2022)
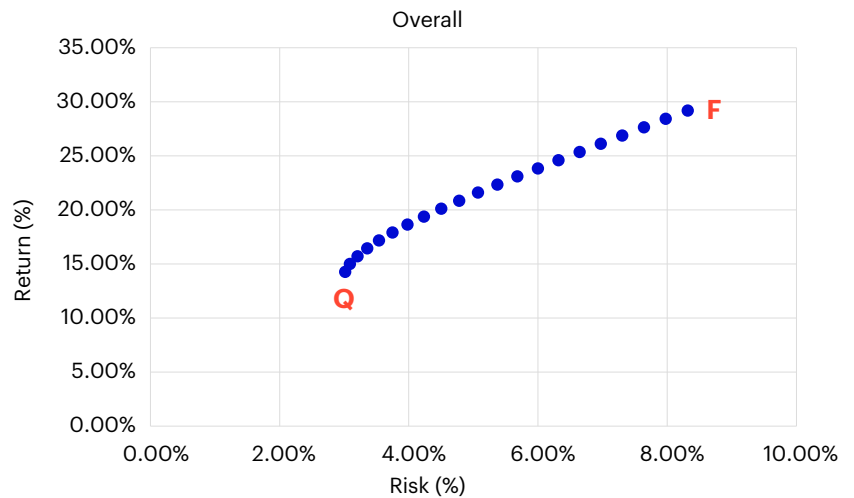
Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

An optimal allocation in this case may be determined if the investor's return and risk objectives could be attained on the efficient frontier. For example, an investor who wishes to maximize the return subject to a risk budget of, say 6% p.a., may find Portfolio 8 (65% allocated to fundamental manager and 35% to quant manager) to be the optimal choice.

To see how robust our result is, let's examine the calendar year performance of these portfolios (Figures 25 to 37). We find the efficient frontiers to be monotonic increasing functions in most years, just like their overall results. However, their slopes could differ significantly, suggesting that risks are not compensated equally all the time. For instance, the efficient frontiers of 2016 and 2021 show that moving the allocation from portfolio F to Q may reduce risk by a similar magnitude (around 3.6%) but incur very different return trade-off (1.2% in 2016 and 26% in 2021). In the other plots that are non-monotonic increasing, portfolio Q is usually very close to the minimal risk portfolio.

Figure 25 – 2010 efficient frontier for High Performance Case
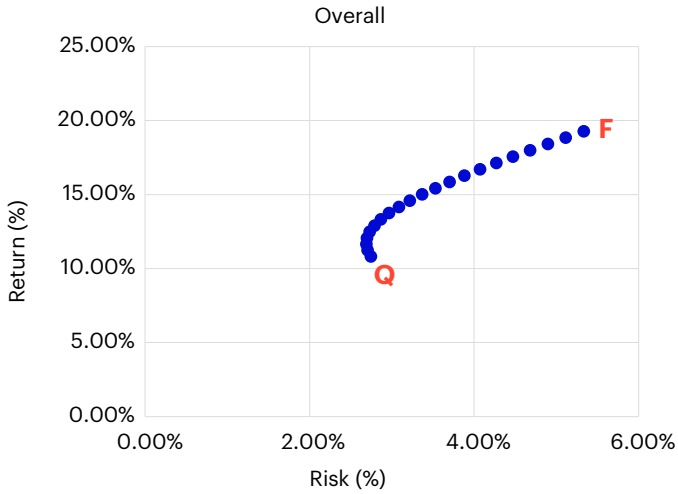
Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 26 – 2011 efficient frontier for High Performance Case
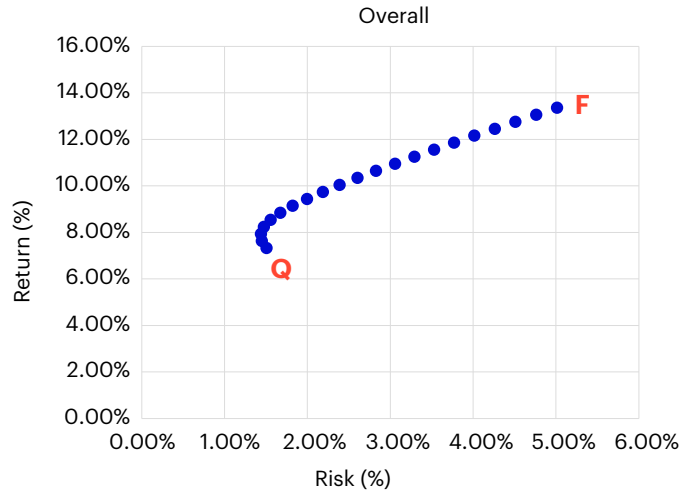
Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 27 – 2012 efficient frontier for High Performance Case
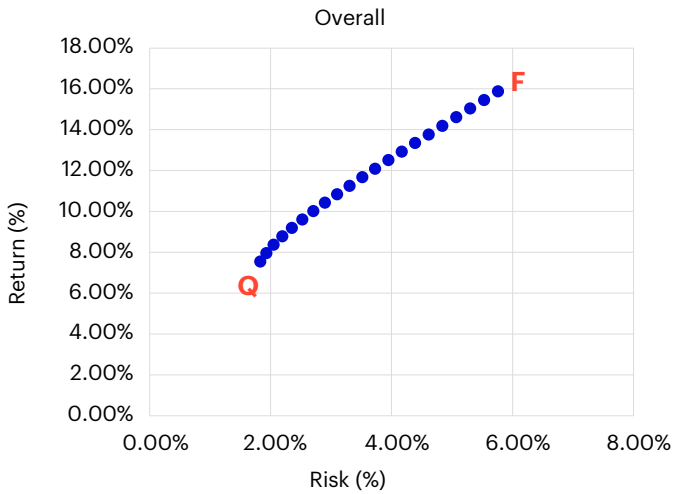
Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 28 – 2013 efficient frontier for High Performance Case
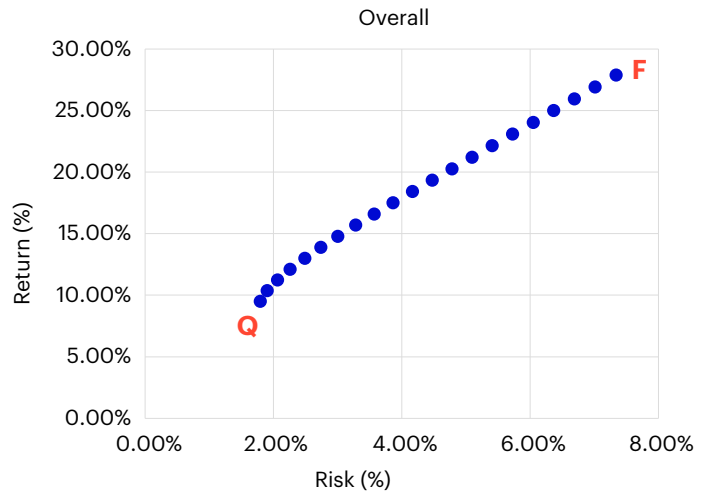
Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 29 – 2014 efficient frontier for High Performance Case
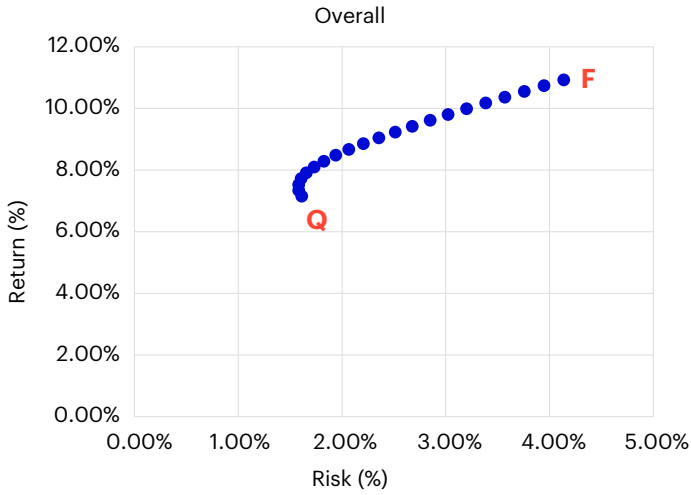
Overall

Figure 30 – 2015 efficient frontier for High Performance Case
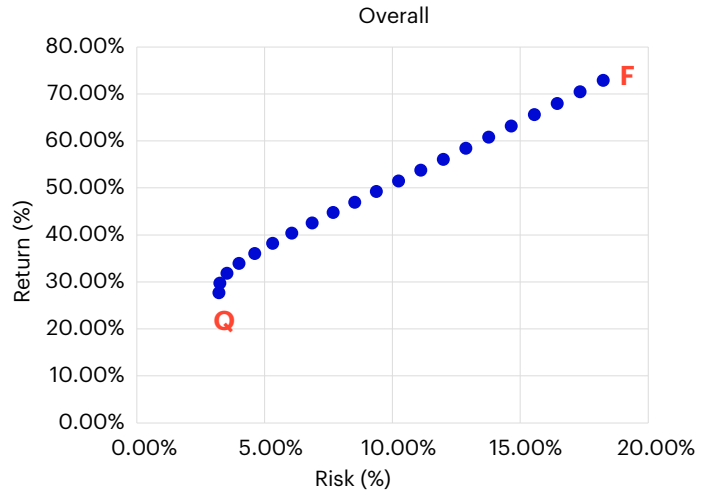
Overall

Figure 31 – 2016 efficient frontier for High Performance Case

Overall
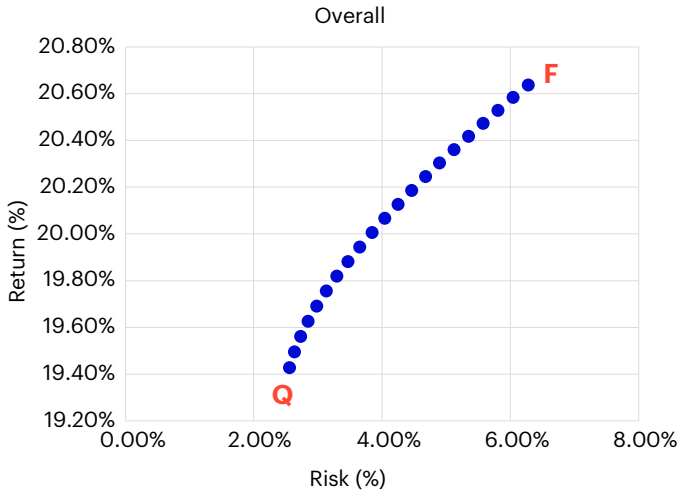
Sources: WIND; Invesco analysis.

Figure 32 – 2017 efficient frontier for High Performance Case

Overall
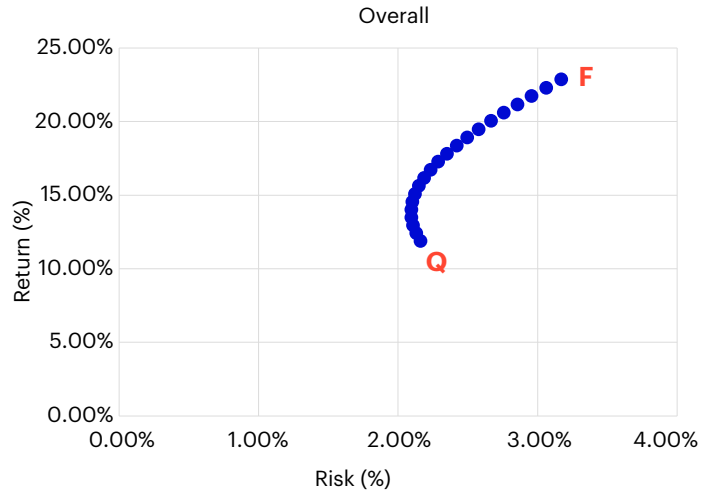
Sources: WIND; Invesco analysis.

Figure 33 – 2018 efficient frontier for High Performance Case
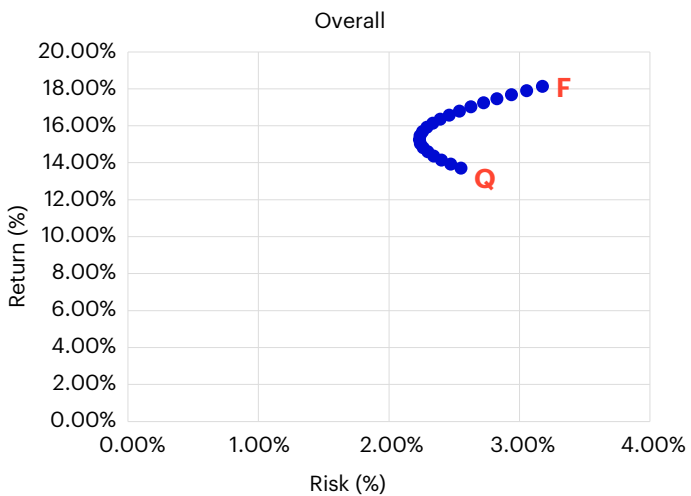
Overall

Figure 34 – 2019 efficient frontier for High Performance Case
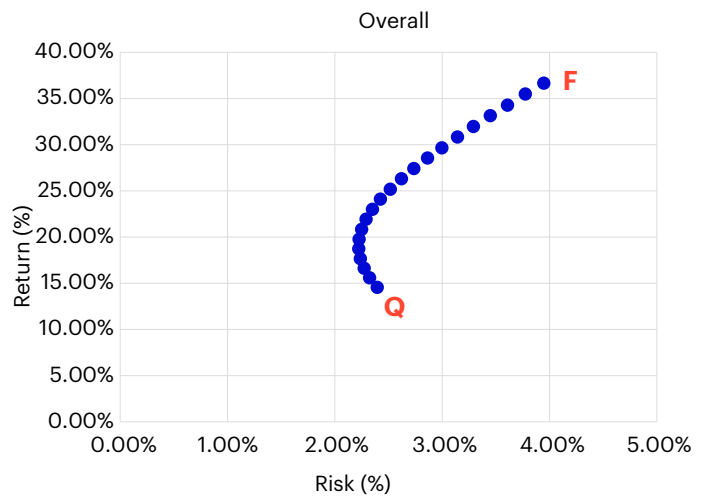
Overall

Figure 35 – 2020 efficient frontier for High Performance Case
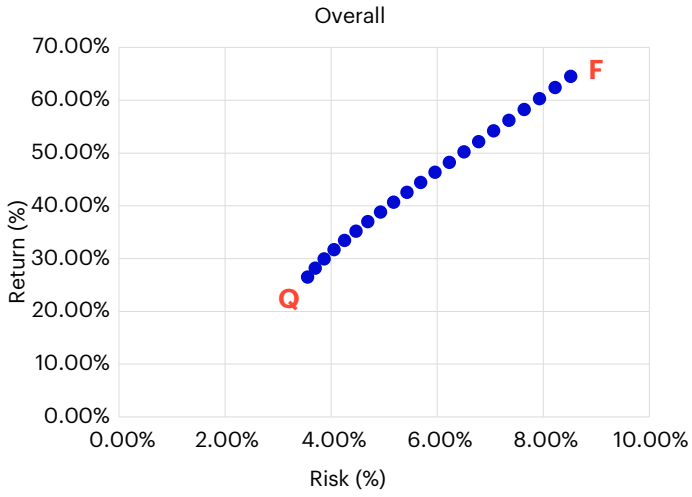
Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 36 – 2021 efficient frontier for High Performance Case
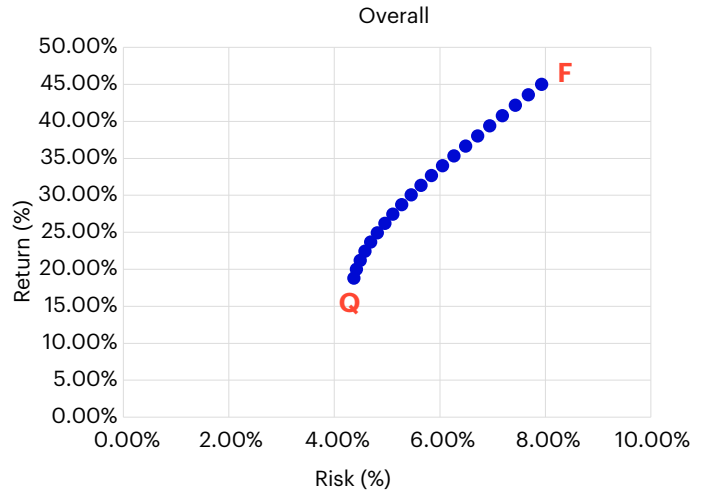
Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Figure 37 – 2022 efficient frontier for High Performance Case
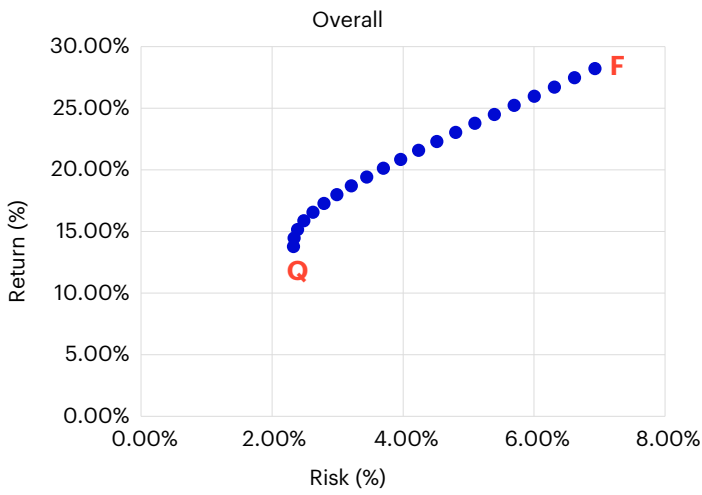
Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Using the same definitions in our base case, we classify the calendar year outcomes into six scenarios (Table 9). Some interesting results are found. First, a 100% allocation to the top-quartile quant manager may not be optimal during the study period. On the other hand, a 100% allocation to the top-quartile fundamental manager can be considered optimal in only less than half the outcomes despite their relatively stronger return than the top-quartile quant manager. In fact, the results indicate an almost even split between scenarios IV and V, which favor a balanced allocation and a 100% fundamental strategy respectively. This suggests that even an investor with strong manager selection skills may find a 100% fundamentally managed portfolio less robust in meeting the overall portfolio objectives. Instead, having some allocation to the quant manager in a China portfolio can improve the balance of return and risk due to better diversification. This is also supported by the fact that the portfolios with larger quant manager allocations also tend to have higher information ratios (Table 10 and 11).

Table 9 – Outcome scenarios for investor objectives in High Performance Case

Outcome scenario	Portfolio F (Median Fundamental Manager)		Portfolio Q (Median Quant Manager)		Optimal Allocation	Frequency	Year
	Return Maximization	Risk Minimization	Return Maximization	Risk Minimization			
I	Weak	Weak	Strong	Strong	Q	0	
II	Weak	Moderate	Strong	Moderate	Q	0	
III	Weak	Strong	Strong	Weak	F + Q	0	
IV	Strong	Weak	Weak	Strong	F + Q	7	2012, 2013, 2015, 2016, 2020, 2021, 2022
V	Strong	Moderate	Weak	Moderate	F	6	2010, 2011, 2014, 2017, 2018, 2019
VI	Strong	Strong	Weak	Weak	F	0	

Source: Invesco analysis.

Table 10 – Overall information ratios for the portfolios in High Performance Case during 13-year period (2010-2022)

Lower IR   Higher IR

P1 (F)	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21(Q)
3.51	3.56	3.62	3.68	3.75	3.82	3.89	3.98	4.06	4.16	4.26	4.36	4.47	4.57	4.68	4.77	4.85	4.90	4.90	4.85	4.73

Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

Table 11 – Information ratios for the portfolios in High Performance Case on an annual basis (2010-2022)

Lower IR   Higher IR

	P1 (F)	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20	P21(Q)
2010	3.61	3.68	3.76	3.84	3.92	4.01	4.10	4.19	4.28	4.37	4.46	4.53	4.59	4.63	4.65	4.63	4.57	4.47	4.33	4.15	3.94
2011	2.67	2.74	2.83	2.92	3.03	3.14	3.27	3.42	3.58	3.76	3.97	4.20	4.46	4.73	5.01	5.28	5.49	5.58	5.52	5.27	4.87
2012	2.76	2.80	2.84	2.88	2.93	2.99	3.04	3.10	3.17	3.24	3.32	3.41	3.50	3.60	3.70	3.81	3.91	4.01	4.08	4.13	4.13
2013	3.80	3.84	3.88	3.92	3.98	4.03	4.09	4.16	4.24	4.33	4.42	4.53	4.65	4.78	4.92	5.08	5.23	5.36	5.45	5.45	5.30
2014	2.64	2.72	2.81	2.90	3.01	3.12	3.24	3.37	3.52	3.67	3.84	4.01	4.19	4.37	4.53	4.67	4.77	4.80	4.76	4.63	4.43
2015	4.00	4.06	4.14	4.22	4.31	4.42	4.54	4.68	4.84	5.03	5.25	5.51	5.83	6.20	6.65	7.19	7.81	8.47	9.02	9.16	8.62
2016	3.29	3.41	3.53	3.67	3.82	3.98	4.15	4.33	4.52	4.74	4.96	5.20	5.46	5.73	6.02	6.31	6.61	6.90	7.17	7.41	7.60
2017	7.22	7.29	7.35	7.41	7.47	7.52	7.56	7.58	7.59	7.58	7.55	7.49	7.40	7.28	7.12	6.92	6.69	6.43	6.14	5.83	5.50
2018	5.70	5.86	6.02	6.17	6.33	6.47	6.61	6.73	6.83	6.90	6.94	6.95	6.91	6.83	6.71	6.55	6.35	6.13	5.89	5.63	5.37
2019	9.29	9.40	9.50	9.61	9.71	9.81	9.90	9.97	10.02	10.04	10.01	9.93	9.79	9.57	9.27	8.89	8.43	7.90	7.32	6.71	6.08
2020	7.57	7.59	7.60	7.62	7.64	7.67	7.69	7.72	7.75	7.78	7.81	7.83	7.86	7.87	7.88	7.88	7.86	7.81	7.74	7.62	7.45
2021	5.68	5.68	5.68	5.67	5.67	5.66	5.65	5.64	5.62	5.59	5.55	5.51	5.45	5.38	5.29	5.18	5.05	4.90	4.72	4.53	4.30
2022	4.07	4.15	4.23	4.33	4.43	4.54	4.66	4.79	4.94	5.09	5.26	5.44	5.63	5.82	6.01	6.18	6.31	6.38	6.34	6.19	5.92

Sources: WIND; Invesco analysis. **Past performance is no guarantee of future results.**

What is the optimal allocation to quant strategies for China A-share investors ?

May 2023

With contributions from Monica Uttam, Thought Leadership and Insights, Asia Pacific

Conclusion

In this paper, we analyze the differences between the long-term performance of fundamental and quantitative styles of active portfolio management in the China A-share market. By examining the monthly return samples of these two groups of mutual funds from 2010 to 2022, we find that the median quant manager has a higher active performance overall than the median fundamental manager on both absolute and risk-adjusted basis. Although the median fundamental manager has a relatively higher active return than the median quant manager in more sample years, this advantage is offset by its larger drawdowns.

In the second section, we provide a dual-case framework to help investors determine their optimal allocation to a quant strategy in a multi-manager portfolio setting. In the case of a hypothetical investor with a neutral ability to forecast manager performance, we find a higher allocation to quant strategy to better satisfy the overall return and risk objectives. On the other hand, if the investor has a consistently strong forecasting ability, we show that overall optimal allocation decisions can be guided by an approximately linear function representing the trade-off between return and risk objectives. On average, return objectives are better satisfied by higher allocation to the fundamental manager but risk objectives can be better achieved by higher allocation to the quant manager. However, the gradient of the trade-off function varies significantly each year, suggesting that higher risk portfolios are not consistently well compensated. Hence, we believe that long-term investors should not ignore the diversification benefit of lower-risk quant strategies which can smooth out their portfolio return streams and improve portfolio information ratio.

Investment risks

The value of investments and any income will fluctuate (this may partly be the result of exchange rate fluctuations) and investors may not get back the full amount invested.

When investing in less developed countries, you should be prepared to accept significantly large fluctuations in value.

Investment in certain securities listed in China can involve significant regulatory constraints that may affect liquidity and/or investment performance.

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