

Where should Active Asian Equity Strategies Focus: Stock Selection or Asset Allocation?

Pranay Gupta CFA
Visiting Research Fellow
Centre for Asset Management Research & Investments
NUS Business School

Bing Li CFA

Rohit Sharma

This Version: July 17, 2014

The majority of active Asian equity strategies claim to derive their value addition by focussing their skill on security selection. We investigate if empirically this is the most appropriate area for an active Asian manager to focus on, in comparison to focussing on asset allocation as the mainstay of the investment process. Unlike US and European equity markets, Asia has two dimensions of allocation (both country and sector) and shallower liquidity for stocks. After accounting for differences in the opportunity set in terms of breadth and asset dispersion, we find that if a manager's skill in asset allocation and stock selection were the same, then two-thirds of the portfolio's return would come from asset allocation. This is in sharp contrast to a US equity portfolio, where this would be only 18%. In Asia, a manager's skill in security selection, would need to be almost double that in asset allocation for the return contribution from security selection to be equal or more than that from asset allocation. We therefore believe that for Asian equity portfolios, a much greater emphasis is required on the allocation process; a facet which seems to have been missed by asset managers thus far.

JEL Classification G1, G2

Disclaimer

The views and opinions expressed herein are solely of Pranay Gupta, Bing Li and Rohit Sharma ("the Authors"), and bear no relationship, reference or resemblance to any individual or firm anywhere in the world. It is not intended for distribution, publication, or use in any jurisdiction where such distribution, publication, or use would be unlawful. This document is provided for information purposes only and does not constitute an offer or a recommendation to purchase or sell any security, funds or any investment product. It contains the opinions of the author as at the date of issue. These opinions do not take into account individual investor circumstances, objectives, or needs. No representation is made that any investment or strategy is suitable or appropriate to individual circumstances or that any investment or strategy constitutes a personal recommendation to any investor. Each investor must make his/her own independent decisions regarding any securities or financial instruments mentioned herein. The information and analysis contained herein are based on sources believed to be reliable. However, the Authors do not guarantee the timeliness, accuracy, or completeness of the information contained in this document, nor does it accept any liability for any loss or damage resulting from its use. All information and opinions may change without notice. This document is authorized for use only by the person to whom it is sent, and may not be reproduced (in whole or in part), transmitted, modified, or used for any public or commercial purpose without the express prior written permission of the Authors.

© 2014 Pranay Gupta, Bing Li, Rohit Sharma. All rights reserved

Where should Active Asian Equity Strategies Focus: Stock Selection or Asset Allocation?

Active portfolio managers managing Asian equity portfolios, largely market the value of their strategies by claiming that they are able to pick the right stocks within the Asian universe. This claim is further justified by the fact that the Asian equity investment landscape, unlike European and US equity markets is varied in nature across various countries, investment information is unreliable and has a smaller history and supposedly one really needs to know the individual companies to be able to make good investment decisions.

In this paper, we attempt to assess the value that stock selection actually can add to an active Asian equity portfolio, and contrast this to the value that asset allocation may add. As the majority of active asset managers in Asia underperform on a 3year investment horizon, we hypothesize the skill that is really required to manage an Asian equity portfolio successfully is that of asset allocation, and that the focus of stock selection by active managers in Asia is misplaced.

Sources of Portfolio Return

Gupta et. al. (2005) elaborate how the traditional alpha beta divide, can be seen as a separation between commoditized and non-commoditized beta, where portfolio return can be seen simply as the combined payoff to risk exposures taken in the portfolio. This is depicted in Exhibit 1.

$r_p(t) - r_0(t)$	=	$[\lambda_1(t) b_1(t) + \dots + \lambda_p(t) b_p(t)]$	+	$[\lambda_{p+1}(t) b_{p+1}(t) + \dots + \lambda_K(t) b_K(t)]$
		Not commoditized beta Traditional alpha space alpha = f(not commoditized beta)		Commoditized beta Traditional beta space beta = f (instrument availability)

Exhibit 1: Commoditized and non-commoditized beta, where r_p is the portfolio return, $r_0 = \lambda_0$ or the return to a risk free asset, b_k is the factor loading and λ_k are the risk premiums, $k= 1, \dots, K$.

With this framework, we can view all investment processes, active or passive, traditional or alternative, fundamental or quantitative as focusing on a set of specific risk factors from the universe that is available, to formulate any investment process.

In general, any active investment process attempting to beat a benchmark, can be divided into parts:

- (a) Allocation of assets across various countries, sectors and styles, without security selection
- (b) Selection of securities, while remaining neutral to allocation buckets

We therefore rewrite Exhibit 1 with groups based on this categorization, as shown in Exhibit 2.

$r_p(t) - r_{bm}(t)$	=	$[\lambda_1(t) b_1(t) + \dots + \lambda_p(t) b_p(t)]$	+	$[\lambda_{p+1}(t) b_{p+1}(t) + \dots + \lambda_q(t) b_q(t)]$
		Allocation Skill Country, Sector, currency allocation Style, factor bias		Security Selection Skill Remainder of portfolio return

Exhibit 2: Decomposition of portfolio excess return into allocation based return and security selection based return, where r_p is the portfolio return, r_{bm} is the benchmark return, b_k is the factor loading & λ_k are the risk premiums, $k= 1..K$.

It is accepted that different active managers may use these two processes either explicitly or implicitly, and with differing degrees of emphasis, however we seek to distinguish them explicitly as we want to identify the portfolio return coming from each skill, despite what the manager himself claims his skill and source of return to be.

Impact of Breadth and Cross-sectional dispersion on Portfolio Excess Return

Asset allocation and security selection can be performed independently of each other; however they are different from each other in terms of breadth of assets available and return dispersion of assets which can be exploited by active management. In order to compare their value to the portfolio, we need to account for these differences.

The relationship between ex-ante information ratio (IR), and breadth (B) can be written as:

$$IR = \frac{IC}{\sqrt{\frac{1}{B} + \sigma_{IC}^2}} \quad (1)$$

where IC is the information coefficient and σ_{IC} is the variance of IC. Ye (2008) gives the derivation of this equation.

If it is assumed that skill is constant, then $\sigma_{IC} = 0$, and equation (1) reduces to the fundamental law of active management proposed by Grinold and Kahn (1999). However, in reality no strategy has constant skill, as skill is in general time varying. The variability of skill puts a cap on the IR that can be achieved, even if breadth is higher. This is depicted in Exhibit 3 below. In our example, given the skill and precision of the skill, the maximum IR is 0.5. Even as breadth increases, the marginal benefit in IR diminishes, even in the absence of the trading costs. It can therefore be said that it does not pay to increase the breadth if the precision of the skill is low.

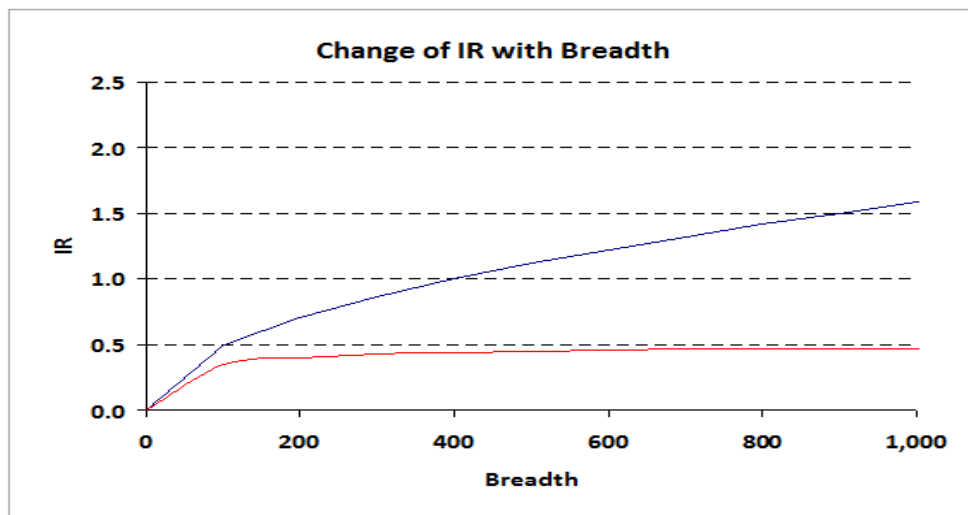


Exhibit 3: Variation in information ratio with a change in breadth, with IC = 5%.
var(IC)=0(blue); var(IC)=0.01(red)

In Appendix 1, we derive the relationship between the cross-sectional dispersion of assets D and the time-series variance and covariance. Under the assumption that all assets have the same volatility and any pair of assets has the same correlation, the portfolio tracking error σ_{TE} can be expressed as the product of the dispersion D and the portfolio activeness A,

$$\sigma_{TE} = DA \quad (2)$$

The portfolio active return R_P can be derived by combining equations (1) and (2), as follows.

$$R_P = \frac{IC}{\sqrt{\frac{1}{B} + \sigma_{IC}^2}} DA \quad (3)$$

Let R_{ss} represent the excess return generated by a particular investment team with a skill represented by IC_{ss} , if they were to perform only stock selection (without allocation decisions). If however this team is used for allocation decisions instead, they would face a different market structure, which

would result in a different opportunity set and hence generate a different excess return. Let IC_{aa} represents the team's skill in asset allocation, and R_{aa} represent the excess return from only from an asset allocation decision. Using equation (3), for the same level of activeness with either asset allocation or stock selection, we get:

$$\frac{R_{aa}}{R_{ss}} = \frac{IC_{aa} D_{aa}}{IC_{ss} D_{ss}} \sqrt{\frac{B_{aa}}{B_{ss}}} \sqrt{\frac{1 + \sigma_{IC}^2 B_{ss}}{1 + \sigma_{IC}^2 B_{aa}}} \quad (4)$$

where B_{aa} and B_{ss} represents the breadth of the investment processes. The breadth is equivalent to the degrees of freedom, which for an unconstrained portfolio would be equal to the number of assets minus 1. Equation (4) thus delineates the return that can be harnesses from each of the two independent investment processes, as a function of the differences in the opportunity set of the two decisions and the skill of each investment decision process.

Asian Equities as the Investment Universe

We apply equation (4) to the management of an active Asian equity strategy. The MSCI Asia Pacific ex Japan index is used as the benchmark and defines the universe of securities. We use data from 2007-05 to 2014-05, and categorize all stocks in the benchmark based on their country and sector classification. We exclude all stocks with an average daily trading value less than USD 1mn, to ensure a minimum liquidity for each stock. Appendix 2 gives details on the resulting security and blocks.

For the allocation decision, the assets are the country-sector blocks, on which an active allocation decision can be made. As of May 2014, there were 99 assets over which an asset allocation decision could be made. The security selection decision is represented by the ability to pick any stock in the universe of securities, at any chosen weight, such that the block weights of the resulting portfolio match that of the benchmark. We assume here for simplicity, that the portfolio is small enough, to allow for desired active bets at the stock and the block level, without undesired tracking error deviation created by liquidity. Further, we ignore transaction costs in this basic study, as much will depend on portfolio turnover of the active investment processes used.

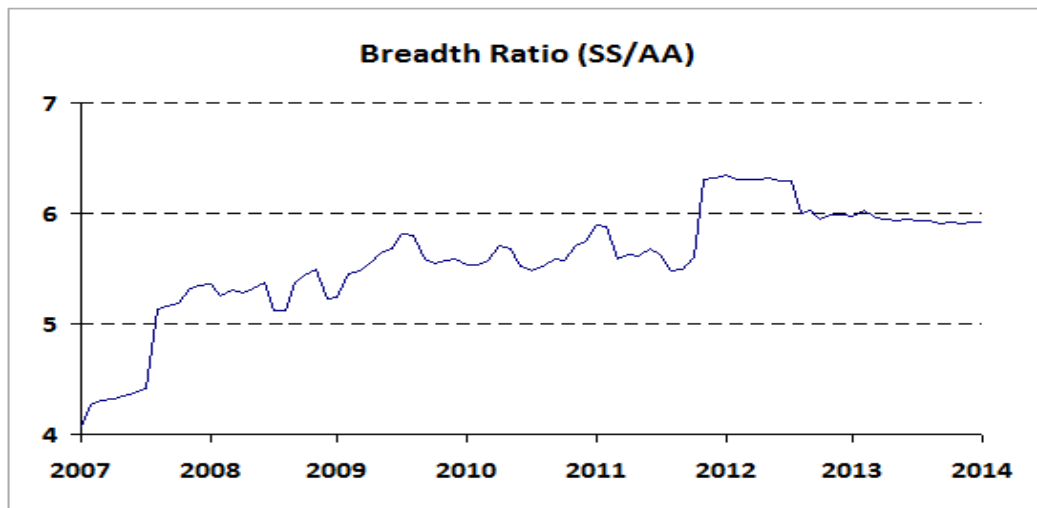


Exhibit 4: Ratio of breadth of the stock selection decision to the asset allocation decision over time

If we have N_{ss} stocks in the investment universe which are categorized into N_{aa} blocks, then $(N_{aa} - 1)$ would be the degrees of freedom for the asset allocation decision, and $(N_{ss} - N_{aa})$ would be the degrees of freedom for the stock selection decision. Exhibit 4 depicts the time series of the ratio of breadth of the stock selection decision to the asset allocation decision, which is calculated as:

$$\frac{B_{ss}}{B_{aa}} = \frac{N_{ss} - N_{aa}}{N_{aa} - 1} \quad (5)$$

The ratio could be over-stated for long only portfolios when negative active bets are constrained by the asset's benchmark weight, when activeness is increased, and when the skew in the distribution of stock sizes is higher. Exhibit 5 depicts how the breadth ratio drops, as we tighten the constraint on the minimum liquidity required for a stock. It can be seen that in Asia (left chart of Exhibit 5), there is a steep decline in the breadth ratio as liquidity constraint is tightened. Large funds in Asia would therefore find a decreased breadth advantage in stock selection, as they are forced to invest in only more liquid stocks. In the US equity market however, as evidenced by the right chart of Exhibit 5, the breadth ratio is relatively constant as liquidity is tightened, indicating that larger funds are not necessarily disadvantaged compared to smaller funds.

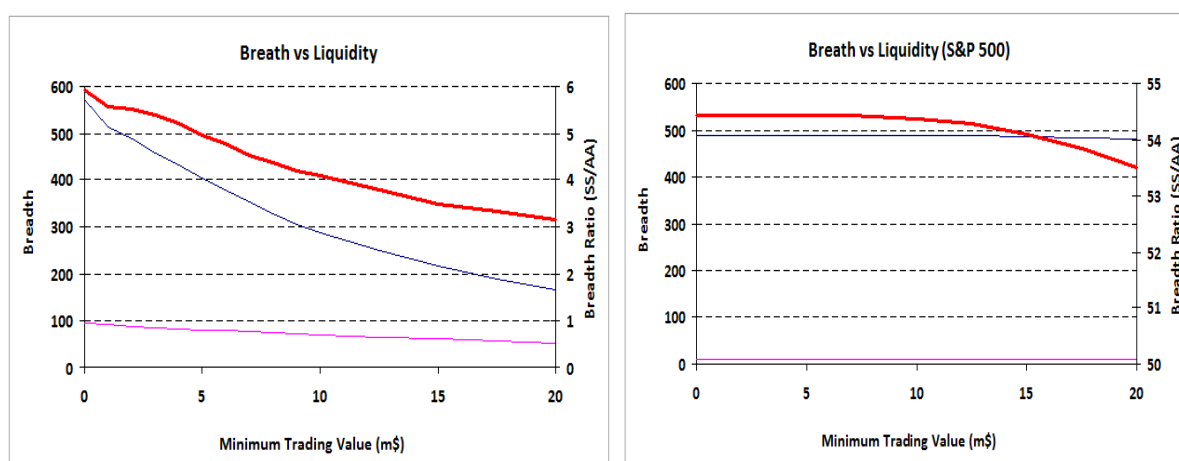


Exhibit 5: Asia (left), US S&P500 (right): Breadth (lhs) of the stock selection (blue) and asset allocation (pink) decisions with change in minimum stock liquidity. Breadth ratio (rhs in red). Dec 2013.

Cross sectional dispersion of the blocks in the asset allocation decision, and stocks (block neutral) in the stock selection decision are both time varying, and impact the portfolio return.

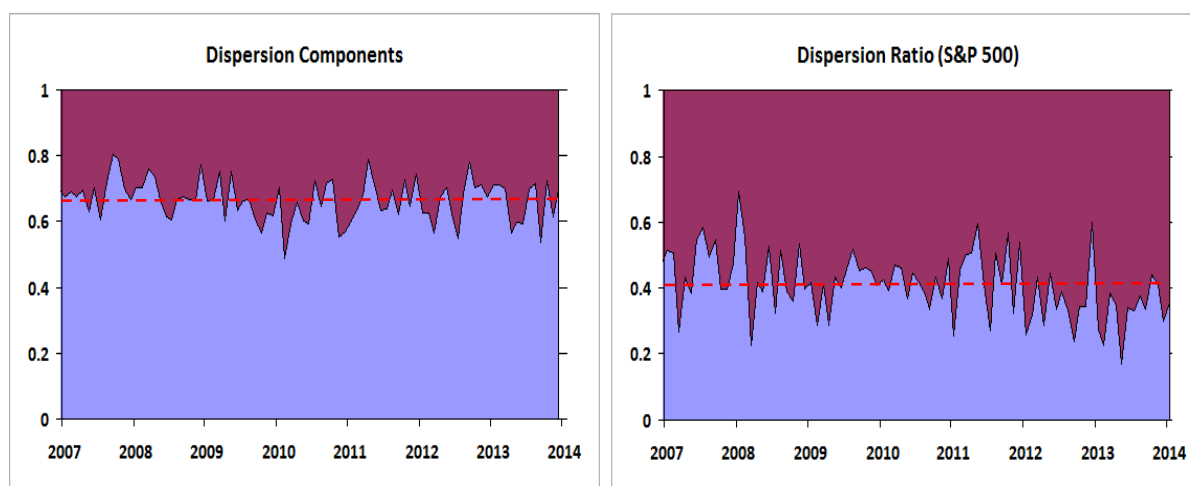


Exhibit 6: Asia (left), US S&P500 (right): Percentage of dispersion from the asset allocation decision (blue) and the stock selection decision (red).

Exhibit 6 shows the variation in the dispersion of the benchmark as divided into the allocation and stock selection components for the Asian (left chart) and the US equity universe (right chart). It is apparent that in Asia, approximately 70% of the dispersion is from asset allocation, whereas in the US this is only about 40%. It can therefore be said dispersion would advocate that asset allocation would

play a much more important role in Asia relative to stock selection, as compared to managing a US equity portfolio.

From (4) and (5), we get:

$$\frac{R_{aa}}{R_{ss}} = \frac{IC_{aa} D_{aa}}{IC_{ss} D_{ss}} \sqrt{\frac{N_{aa}-1}{N_{ss}-N_{aa}}} \sqrt{\frac{1+\sigma_{IC}^2(N_{ss}-N_{aa})}{1+\sigma_{IC}^2(N_{aa}-1)}} \quad (6)$$

Assuming a typical skill variation σ_{IC} to be 10%, we can deduce the return ratio over time, for different ratios of investment skill, to be as depicted in Exhibit 7.

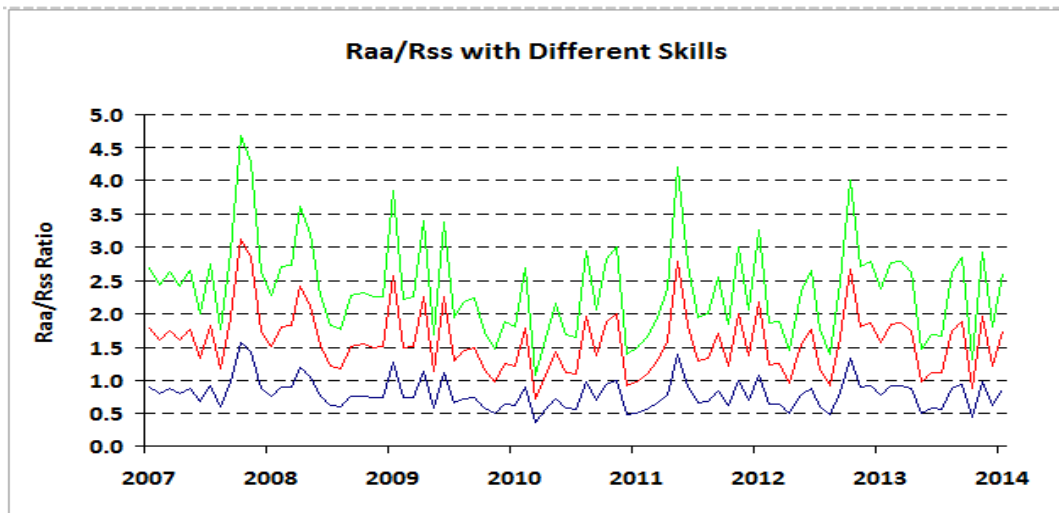


Exhibit 7: Ratio of returns of asset allocation over stock selection at different levels of IC ratio, over time : 0.5(blue), 1.0 (red), 1.5 (green)

Obviously, as the investment skill of asset allocation increases relative to security selection, the return from asset allocation also is higher. It is however noticeable that when the skill of both processes is the same ie: when the IC ratio is equal to 1, the return ratio of asset allocation to security selection is almost always above 1. This indicates the greater significance of asset allocation at all points in time.

We can compare the overall impact of breadth and dispersion on the asset allocation and stock selection decisions, by comparing the return contribution of both processes, if skill were the same. This can be done when the minimum liquidity constraint is set at US\$1 million (to be relevant for small portfolios) and set at US\$20million (to be relevant for large portfolios). Exhibit 8 shows the variation of the proportion of return from asset allocation for different skill ratios, for the two cases of Asian equity and US equity.

It can be seen that if there were equal skill in asset allocation and stock selection (the case of the IC ratio being equal to 1), then in Asia approximately 66% of the return would from asset allocation. In a US equity portfolio however, only about 18% of the return would come from asset allocation. This stark difference between the two markets is a point to be noted.



Exhibit 8: Asia (left), US S&P500 (right): Ratio of returns from asset allocation at different levels of IC ratio. Min daily trading \$1mn(blue), \$20mn(red)

Results and Conclusions

The Asian equity investment landscape has two definitive dimensions of allocations (country and sector), unlike the US and European landscape which is largely one-dimensional (sector). Further, the market depth in terms of number of investable stocks is deeper in US and Europe than it is in Asia. Both these factors make Asian equities a much richer space for asset allocation rather than stock selection conceptually. However this is at odds with the fact that most Asian equity managers emphasize security selection as their primary skill, and not asset allocation.

We find empirically from Exhibit 8, that if one's skill in asset allocation and security selection were the same, then approximately 60% of the portfolio return of an active Asian equity portfolio would come from asset allocation, after accounting for market differences. Put another way, in order for the return from security selection to be equal or more than that of asset allocation for a small portfolio, the skill of the manager in security selection would have to be about 50% more than in asset allocation in for an Asian portfolio.

By contrast, for a US equity portfolio, we find that that if one's skill in asset allocation and security selection were the same, then only about 18% of the portfolio return would come from asset allocation, and the remaining 82% would come from stock selection.

We further consider the case for a larger portfolio. By tightening the liquidity constraint to have only stocks with a average daily trading volume of US\$20mn, we are implying that if the fund size was US\$400mn, then it could still take a 5% active position in a stock, while only requiring one day's trading volume to accumulate the required position from the market. This is still considerable, as it is widely accepted that above a 20% of ADV requirement, there is significant market impact. We find that for larger funds, it makes even more sense to focus on asset allocation rather than security selection. When one's skill is the same in both processes, approximately 67% of the return comes from allocation. Further, for the return from security selection to be more than from asset allocation for a larger portfolio, the skill in security selection would have to be almost double that in asset allocation.

It therefore seems that active Asian equity strategies should consider a much greater emphasis on asset allocation as part of the investment process, rather than purely on security selection, which is a sharp contrast from what is required for managing an active portfolio in US equity.

References

Grinold, Richard C. and R. Kahn, 1999, *Active Portfolio Management: A Quantitative Approach for Producing Superior Returns and Controlling Risk*, 2nd ed. McGraw-Hill.

Gupta, P. and J. Straatman, 2005, *Alpha and Beta in an Exposure based Framework*, SSRN Working Paper 765064.

Ye, J., 2008, *How Variation in Signal Quality Affects Performance*, *Financial Analysts Journal*, vol. 64, no. 4, 48-61.

Appendix 1 : Impact on Portfolio Excess Return of varying Cross Sectional Dispersion

Using $IR = R_p/TE$

Where R_p is the portfolio excess return and TE is performance tracking error to the benchmark in (1), we get

$$R_p = \frac{IC}{\sqrt{\frac{1}{B} + \sigma_{IC}^2}} TE \quad (1.1)$$

Ex-ante portfolio volatility can be expressed as

$$TE = \overline{\Delta w}' V \overline{\Delta w} \quad (1.2)$$

Where $\overline{\Delta w}$ is the $N \times 1$ vector of stock active weight in the portfolio, $\overline{\Delta w}'$ is the transpose of $\overline{\Delta w}$, and V is a $N \times N$ covariance matrix of stock returns. For stock active weight $\sum \Delta w_i = 0$.

As a special case, assuming all stocks have the same volatility σ and the correlation between any pair of stocks is identical (ρ), we get

$$TE = \sigma \sqrt{(1 - \rho) \sum_i \Delta w_i^2}$$

Substituting TE in equation (1.1), we get

$$R_p = \frac{IC}{\sqrt{\frac{1}{B} + \sigma_{IC}^2}} \sigma \sqrt{(1 - \rho) A} \quad (1.3)$$

Where $A = \sqrt{\sum_i \Delta w_i^2}$ is the activeness of the portfolio.

Thus in a scenario where all stocks are perfectly correlated, active return will be zero.

Derivation of Cross Sectional Dispersion

The cross sectional dispersion is an instance of a joint distribution characterized by an expected returns $N \times 1$ vector $\vec{\mu}$ and a covariance matrix V . One can perform a joint draw and measure the average cross-sectional variation as the standard deviation across returns for a particular joint draw.

If $X \sim N(\mu, V)$ follows multivariate Gaussian, which can be expressed as $X = \mu + CY$, where $Y \sim N(0, 1)$ is a standard Gaussian and C is the lower-triangular Choleski matrix of V . the consistent estimator of the variance $v = \frac{1}{n-1} \sum_i (x_i - \bar{X})^2$, where $\bar{X} = \frac{1}{n} \sum_i x_i$, in terms of Y and C . The expected value of v is then

$$(n-1)E(v) = \sum_i \mu_i^2 - \frac{1}{n} \sum_{i,j} \mu_i \mu_j + \sum_i c_i c_i' - \frac{1}{n} \sum_{i,j} c_i' c_j$$

Where c_i is the i th row of the Choleski matrix.

The dispersion, D , is define as square root of the variance v , and can be simplified as

$$D^2 = E(v) = \frac{1}{N-1} \text{trace}(\mu\mu' + V) - \frac{1}{N(N-1)} i'(\mu\mu' + V)i \quad (1.4)$$

Where i is a $N \times 1$ unit vector.

Equation (1.4) shows that the cross sectional dispersion increases with stock volatility but decreases with correlations. To illustrate this point, we can examine a special case where the expected return of all stocks is the same. Then we get:

$$D^2 = \frac{1}{N-1} \text{trace}(V) - \frac{1}{N(N-1)} i'Vi \quad (1.5)$$

If all stocks have the same volatility σ and the correlations between any pair of stocks are also identical (ρ), the dispersion can be simplified as:

$$D = \sigma\sqrt{1 - \rho} \quad (1.6)$$

and equation (1.1) can be expressed as

$$R_p = \frac{IC}{\sqrt{\frac{1}{B} + \sigma_{IC}^2}} DA \quad (1.7)$$

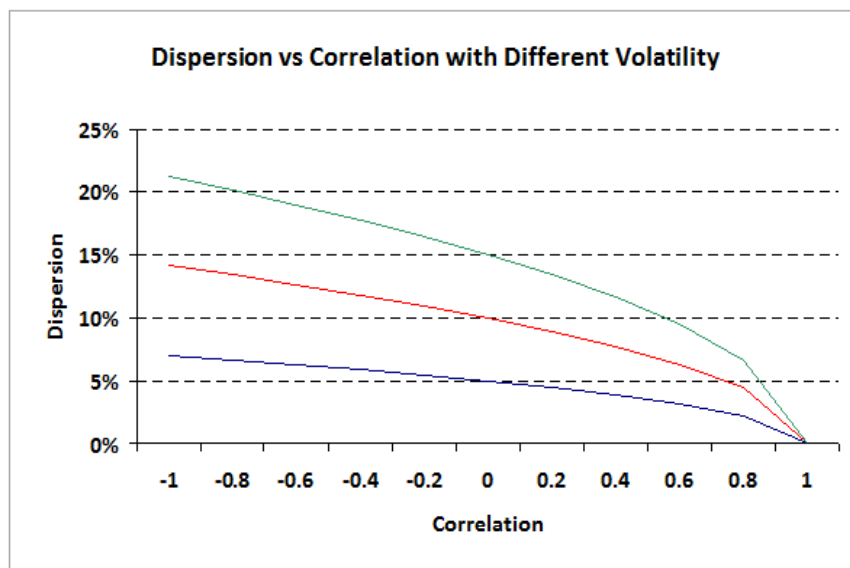


Exhibit A1.1: Cross-sectional dispersion of assets with varying asset volatility and different correlation between asset pairs

Appendix 2 : Details of securities and blocks for Asian equities

Country	Energy	Utilities	Cons Discre	Cons Stapl	Financials	Health Care	Industrials	Info Tech	Materials	Telecom	Total
Australia	1.38% 5	0.35% 3	0.50% 7	2.23% 5	12.67% 22	1.10% 4	1.33% 10	0.12% 1	4.70% 11	0.52% 1	24.90% 69
China	2.63% 9	0.71% 9	0.99% 15	1.14% 12	7.27% 38	0.28% 5	1.23% 24	2.01% 6	0.60% 14	1.97% 4	18.83% 136
Hong Kong		1.06% 4	1.75% 8		5.50% 19		1.04% 5	0.05% 1		0.10% 2	9.50% 39
India	0.73% 6	0.23% 6	0.40% 5	0.65% 8	1.41% 14	0.39% 7	0.28% 7	1.40% 5	0.41% 9	0.15% 3	6.05% 70
Indonesia	0.07% 3	0.10% 1	0.36% 4	0.28% 6	0.71% 7	0.06% 1	0.09% 2		0.15% 2	0.25% 3	2.06% 29
Korea	0.35% 3	0.26% 2	2.70% 15	0.74% 9	2.19% 19	0.09% 2	1.81% 28	5.64% 10	1.51% 13	0.13% 3	15.42% 104
Malaysia	0.23% 3	0.45% 4	0.38% 6	0.36% 5	1.05% 9	0.07% 1	0.47% 7		0.17% 2	0.44% 4	3.63% 41
New Zealand		0.04% 1				0.06% 1	0.08% 1		0.12% 1	0.09% 1	0.39% 5
Philippines		0.06% 2	0.04% 1	0.06% 1	0.31% 7		0.27% 6			0.10% 2	0.83% 19
Singapore			0.39% 3	0.25% 3	2.58% 13		1.05% 9			0.63% 2	4.91% 30
Taiwan	0.08% 1		0.55% 13	0.32% 3	2.05% 20	0.02% 1	0.34% 10	5.85% 42	1.36% 10	0.52% 3	11.08% 103
Thailand	0.45% 5	0.03% 1	0.08% 3	0.21% 2	0.72% 8	0.03% 1	0.09% 2		0.26% 4	0.19% 2	2.06% 28
Total Weight	5.93%	3.28%	8.14%	6.25%	36.46%	2.10%	8.06%	15.06%	9.27%	5.09%	99.66%
No of Securities	35	33	80	54	176	23	111	65	66	30	673

Exhibit A2.1: Equity securities and Country-Sector blocks in the MSCI Asia Pacific ex-Japan benchmark, with a liquidity constraint of USD 1mn minimum average daily trading volume. Data as of 31 Dec 2013. Source: MSCI