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Volatility-responsive asset allocation

An extensive study on Global, Asia Pacific ex-Japan and Singapore markets

Issue: The recently published Russell research paper¹, “*Volatility-responsive asset allocation – A stronger link between asset allocation policy and the market environment*” by Bob Collie et al. demonstrated attractive risk/return outcomes in a US model portfolio using a volatility-responsive asset allocation (VRAA) strategy. Noting that the original research was based on the application to US markets, we ask if the strategy will prove equally effective for Asian investors in managing their portfolio’s risk and return profile, given the scope of their investment universe.

Response: This paper explores the possibility of implementing a dynamic asset allocation strategy that varies according to changes in market volatility within the Global, Asia ex-Japan and Singapore markets. We recommend reading this paper in conjunction with Bob Collie et al.’s VRAA paper that was published in August 2011. The original paper provides a more comprehensive explanation of the principles of VRAA.

VRAA can be considered as a more responsive approach to traditional static Strategic Asset Allocation and an alternative to other downside protection strategies. In our analysis, the VRAA strategy has led to lower standard deviations in returns for all three markets. Improved returns were observed for portfolios

¹ Bob Collie, Mike Sylvanus, Michael Thomas, “Volatility-responsive asset allocation – A stronger link between asset allocation policy and the market environment”, *Russell Research – Viewpoint*, August 2011. http://www.russell.com/Institutional/research_commentary/PDF/Volatility_responsive_asset_allocation_.pdf

investing globally and across Asia Pacific ex-Japan but not for a portfolio investing solely in Singapore markets. The Singapore centric portfolio experienced significant return penalty over the period examined.

Background

Many Asian investors are looking to increase their exposure to pan-Asian markets. They are also increasingly concerned about managing portfolio risk in the current market environment given high volatility levels. This has driven the demand for more dynamic and cost effective risk management strategies that do not sacrifice portfolio performance. Compared to derivative-based strategies which can be costly, we have seen greater client interest in dynamic asset allocation based on various market signals or portfolio funding positions.

Bob Collie et al.'s paper demonstrated that a more consistent return and volatility outcome can be achieved, by adopting either a dynamic or volatility-responsive approach to asset allocation, depending on the changes in market volatility levels.

In this paper, we explore the possibility of implementing the VRAA approach in Global, Asia Pacific ex-Japan and Singapore markets by answering the following questions:

- Does VRAA respond to equity volatility changes in a timely manner?
- Does VRAA minimize return volatility and smooth the risk profile?
- What effect does VRAA have on portfolio return?
- Is VRAA useful for Asian investors?

The asset allocation for each model portfolio is between fixed income and equity. The returns of each asset class are represented by historical index returns.

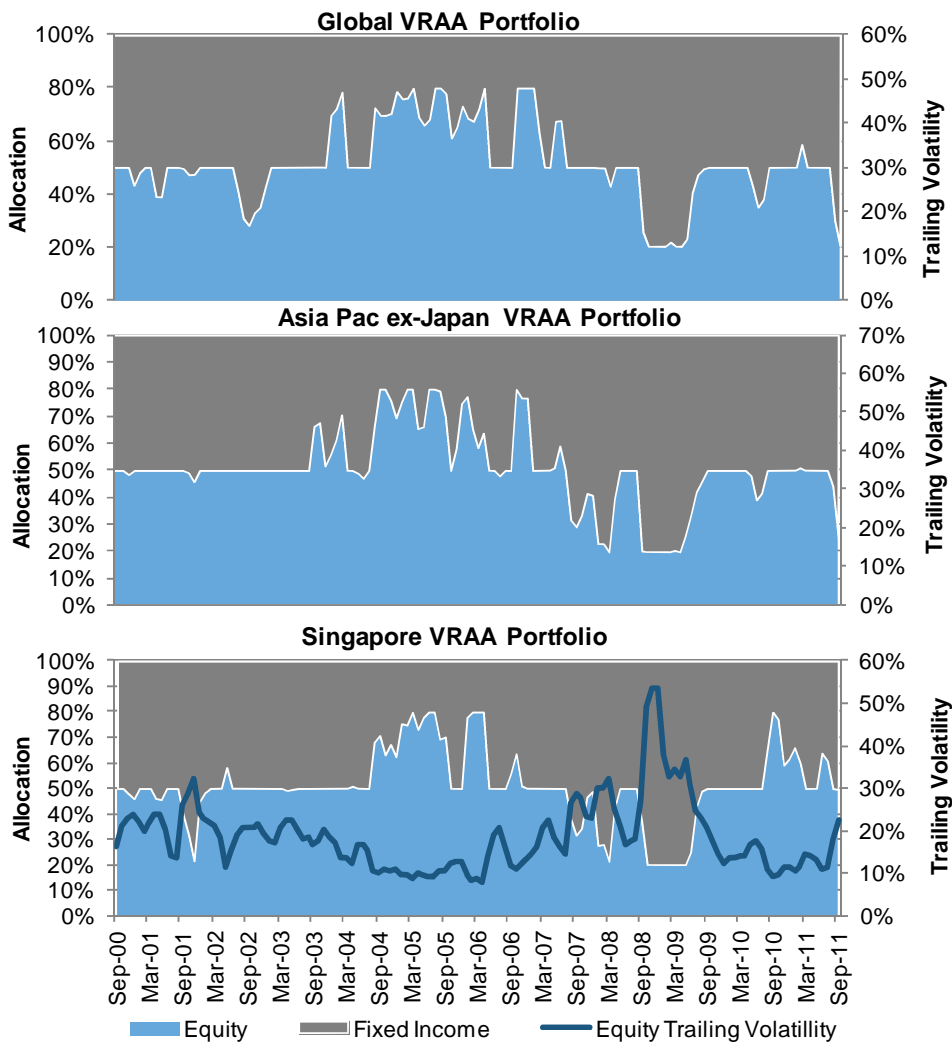
Details of the model portfolio construction and strategy implementation can be found in **Appendix 1**.

Does VRAA respond to equity volatility changes in a timely manner?

The idea behind VRAA is to under-weight equity during volatile periods and to over-weight equity during stable times. The success of the VRAA approach depends on the speed of response to market volatility.

Exhibit 1 clearly shows that the VRAA strategy has been effective in all markets in terms of timeliness of response to equity market volatility, (i.e., reducing allocation to equity in times of volatility spikes, and maintaining a higher allocation to equity when volatility is low).

Exhibit 1: Equity/bond allocation under the VRAA strategy



Source: Russell Investments.

The results in this paper are based on index data from Russell Investments, Bloomberg and Barclay's Capital. Indices are unmanaged and cannot be invested directly. Past performance is not indicative of future results.

Does VRAA minimize return volatility and smooth risk profile?

The return volatility data summarized in Exhibit 2 shows that VRAA strategy has led to lower standard deviation, improved worst monthly return and worst 3-month return data for all three portfolios. The slight differences in average equity allocation had minimal impact on the portfolios' risk/return profile as dynamic allocation is the dominant contributor.

Exhibit 2: Return volatility summary, Sept 2000 ~ Sept 2011

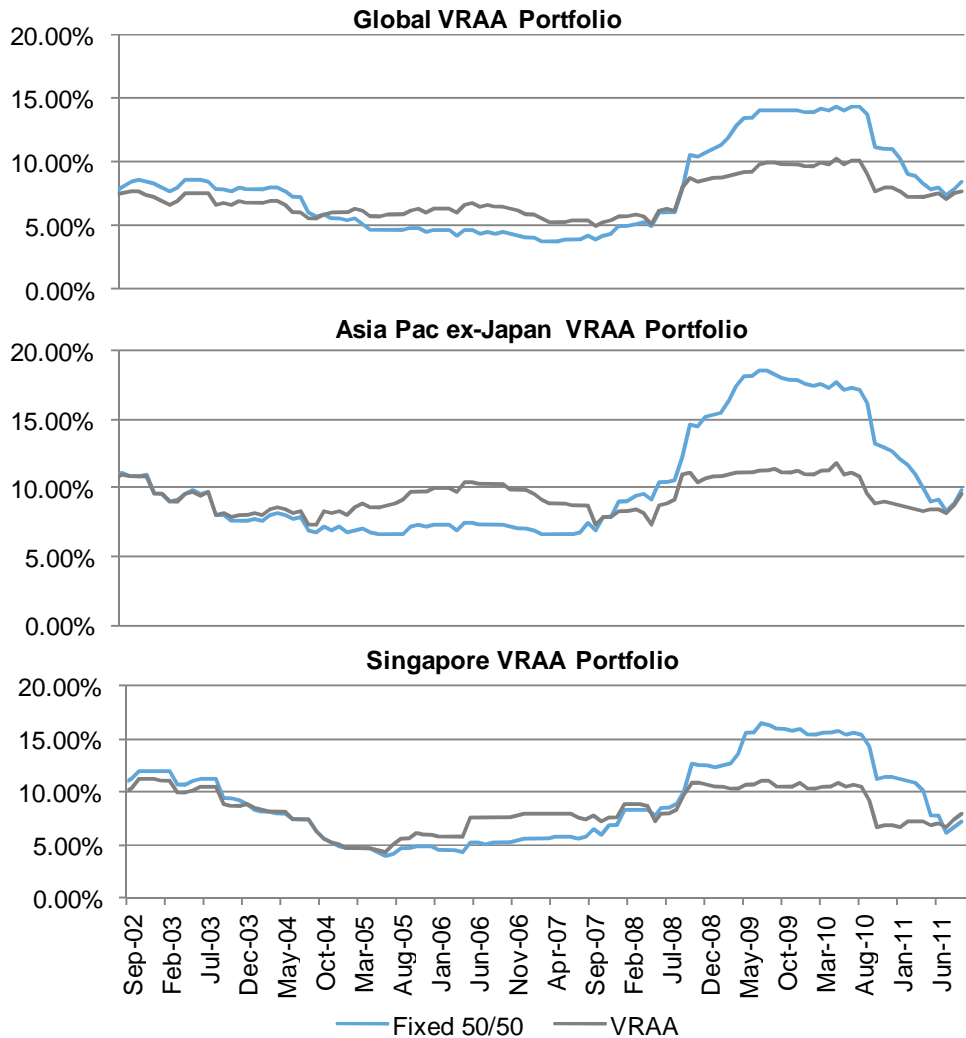
	Global		Asia Pacific ex Japan		Singapore	
	Fixed 50%/50%	VRAA	Fixed 50%/50%	VRAA	Fixed 50%/50%	VRAA
Annualized Standard Deviation	8.85%	7.69%	11.35%	10.06%	10.06%	9.00%
5 percentile Monthly Return	-4.38%	-3.49%	-4.70%	-4.45%	-4.00%	-4.51%
Worst Monthly Return	-10.58%	-6.87%	-11.67%	-8.20%	-11.24%	-8.05%
- month ending	10/31/2008	9/30/2008	10/31/2008	9/30/2008	10/31/2008	9/28/2001
Worst 3-Month Return	-18.43%	-12.63%	-20.97%	-13.61%	-19.84%	-16.80%
- month ending	11/28/2008	10/31/2008	10/31/2008	10/31/2008	10/31/2008	10/31/2008
Average Equity Allocation	50%	52%	50%	51%	50%	51%

Source: Russell Investments

Indices are unmanaged and cannot be invested directly. Past performance is not indicative of future results.

Exhibit 3 shows that the risks experienced by the VRAA portfolios have been more stable than that of a fixed-weight portfolio. The strategy has been effective in minimizing and stabilizing risk.

Exhibit 3: Trailing 24-month standard deviation of returns, annualized.



Source: Russell Investments

Indices are unmanaged and cannot be invested directly. Past performance is not indicative of future results.

What effect does VRAA have on portfolio return?

As summarized in Exhibit 4, the volatility-responsive strategy delivered better returns relative to the static allocation approach for both the global and Asia Pacific ex-Japan portfolios. A return penalty was observed for the Singapore portfolio.

Exhibit 4: Annualized returns summary, Sept 2000 ~ Sept 2011

	Global		Asia Pacific ex Japan		Singapore	
	Fixed 50%/50%	VRAA	Fixed 50%/50%	VRAA	Fixed 50%/50%	VRAA
Annualized Cumulative Return	4.25%	5.50%	9.17%	9.85%	4.68%	3.41%
Annualized Average Return	4.56%	5.66%	9.45%	9.94%	5.09%	3.77%

Source: Russell Investments

Indices are unmanaged and cannot be invested directly. Past performance is not indicative of future results.

As evident in Exhibit 5, the return profiles for the VRAA portfolios can be episodic, whereby there will be periods during which the VRAA approach will underperform the fixed allocations. This means that there will be occasions where the three VRAA portfolios will deliver relative underperformance across different investment horizons.

In order to understand the drivers of the return differential, further analysis was undertaken and the following observations were noted:

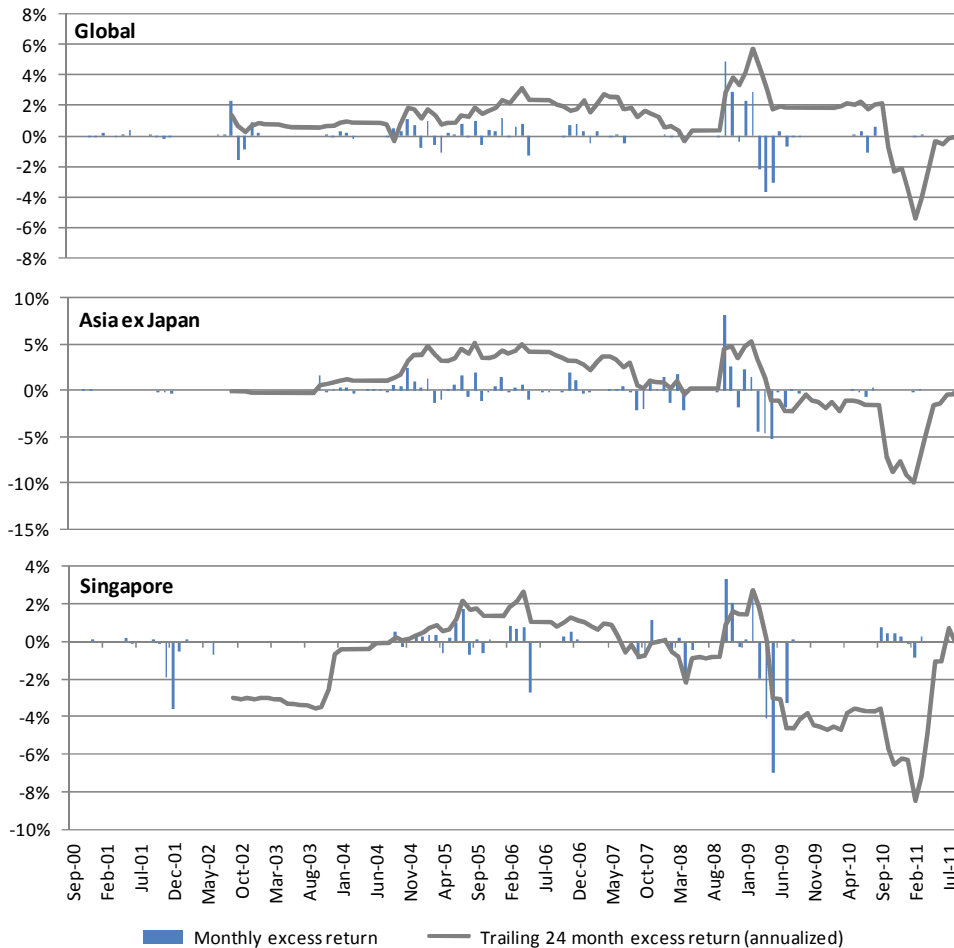
- 1) Overweighting equity in low volatility periods generally tends to generate higher returns across all markets.
- 2) During periods of higher volatility, different scenarios will lead to different relative performance:
 - A. Market keeps falling - VRAA outperforms;
 - B. Market fall, followed by a rapid recovery with high return - VRAA underperforms.
 - C. Market keeps rising - VRAA underperforms;
 - D. Market rise, followed by an abrupt drop to negative return - VRAA outperforms.

All 3 portfolios experienced the above four scenarios but with different frequency and amplitude. During the 2008 global financial crisis, when markets worldwide fell, all three portfolios benefited from VRAA, but the gain for Singapore was less relative to the Global portfolio. During the following recovery, VRAA underperforms for all three portfolios, but the Singapore VRAA portfolio underperformed the most as the Singapore market had experienced a faster recovery, resulting in a worse return overall. Within the Singapore portfolio, we observed that the opportunity cost of underweighting equity in a volatile but upward trending market is higher than the gain generated from a volatile but downward trending market.

- 3) Statistically, although the current month's volatility has a weak positive correlation (0.05) with the subsequent months return for the Singapore portfolio,

this month's volatility is not a good predictor of next month's return as indicated by the small R squared value (0.0023).

Exhibit 5: Excess return of VRAA over Fixed 50/50, Monthly and trailing 24 months



Source: Russell Investments

Indices are unmanaged and cannot be invested directly. Past performance is not indicative of future results.

Is VRAA useful for Asian investors?

Our analysis has indicated that the volatility-responsive strategy has been effective in reducing return volatility while maintaining a consistent risk profile in Global, Asia Pacific ex-Japan and Singapore markets.

For an Asian investor who is seeking downside protection while retaining upside potential, the VRAA approach can be considered as an alternative to other downside protection strategies.

Even though the volatility-responsive strategy delivered a better risk/return trade-off for the Global and Asia Pacific ex-Japan portfolios, the Singapore portfolio however, generated prolonged periods of underperformance relative to the fixed allocation. On this basis, investors should also consider other downside protection strategies.

The authors wish to thank Bob Collie, Mike Sylvanus and Michael Thomas for providing the VRAA quant model and their contributions to the issues discussed above.

Appendix 1: Model portfolio construction

Three market portfolios; Global, Asia Pacific ex-Japan and Singapore were constructed using two asset classes; equity and fixed income. The default allocations for the fixed and VRAA portfolios is an equal weighting between equity and fixed income.

The asset classes are represented by their index proxies as listed in Exhibit 6 below. The investment period is from Sept 2000 to Sept 2011 for all three portfolios based on available index data. Exhibit 6: List of indices used as proxies for model portfolios

Portfolio	Class	Name	Data Type	Base Currency
Global	Equity	Russell Global Index	Total return	USD
	Fixed income	Barcap Global Aggregate Index	Total return	USD
Asia Pacific ex. Japan	Equity	Russell Asia Pac ex. Japan Index	Total Return	USD
	Fixed income	Barcap Aggregate Asia ex. Japan Index	Total return	USD
Singapore	Equity	FTSE Straits Times Index	Total return	SGD ²
	Fixed income	Singapore Government Bond Index All UOB	Total return	SGD

Index data used in this paper is sourced from Russell Investment, Bloomberg, and Barclay's capital. Indices are unmanaged and cannot be invested directly. Past performance is not indicative of future results.

There is more than one way in which a volatility-responsive strategy could be structured. The choice among different approaches depends on the investor's objective. In this paper, a two-sided approach is discussed for investors who hope to protect from downside, reduce portfolio risk and retain upside potential simultaneously. Other allocations are possible but out of the scope of this paper.

The principle of two-sided volatility-responsive asset allocation is to over-weight equity when equity volatility is low; and to under-weight equity when equity volatility is high. At the start of each month, the volatility of the daily equity market returns for the previous 60 trading days is calculated. Change in allocation is triggered when the calculated volatility falls outside the range of 25th and 75th percentile. For this paper, half of the months fall in the no-trade zone, 25% in the over-weight zone and 25% in the under-weight zone. The parameters are set to be the same as the VRAA paper, which includes more detailed technical discussions of this strategy.

² We have also investigated Singapore portfolio using USD returns. The observations and conclusions are no different from the result of SGD returns.

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