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CAPITAL

Pengana Portfolio Analysis Service

Pengana Capital

- Pengana Capital is a funds management group specialising in listed equities, managing five active strategies focused on the Asia Pacific region
- At Pengana we believe that the alignment of interests between a fund manager and its investors is crucial. Our business and our funds are structured and managed within this framework
- Pengana was founded in 2003. We are headquartered in Sydney and also have operations in Singapore and Melbourne
- We are an independent entity. National Australia Bank is a minority strategic investor and the majority of the remaining shares are owned by our directors and staff
- Pengana constructs its funds with the sole purpose of generating performance
- We do not pursue standard industry practices that promote a focus on asset gathering rather than performance

The challenges and opportunities facing investors

- The move to absolute return investing requires a fundamental change in objectives and methodology
- An absolute return outcome is not going to be achieved solely through adding absolute return strategies or alternative asset classes to a traditionally constructed portfolio
- Need to develop a framework where advisors can take advantage of opportunities and actively manage their clients' risk of not meeting his or her objectives
- Absolute return funds can materially improve the efficiency of portfolios by offering low correlation with traditional asset classes (and each other) while not sacrificing performance
- Introducing a wider set of alpha generation opportunities and more flexible investment strategies can provide greater robustness through more diverse alpha sources and risk factors
- Optimisation analysis or modelling may be used to gain a broad understanding of efficient options, the portfolio characteristics of different investments and the changes in allocations across an efficient portfolio frontier

The Portfolio Analysis Service

By obtaining portfolio information and running it through our portfolio analysis models, we can assess the risk and return impact of different combinations of assets.

Using our Portfolio Analysis Service and comparing this against current portfolio/s, we aim to;

- Determine if certain assets offer portfolio diversification benefits over others, which may not have been captured in traditional model portfolio’s
- Efficiently manage asset correlation
- Manage the risk exposure of one particular asset class by capturing the various risk metrics and drawdown information associated with it
- Compare the current asset allocation mix to our Portfolio Analyser model to improve the expected risk adjusted return
- Use our optimisation process to find the most efficient portfolios

The Analyser process

Using performance information from an individual portfolio, the Analyser process is used to;

- Illustrate various risk and return metrics
- Highlight the benefits of low correlation
- Compare competitors to determine best performance and risk characteristics – we can also combine a number of Fund's as a sub portfolio to determine how it may increase/decrease the overall performance

Annualised Risk	Return	Standard Deviation	Information Ratio	Sharpe (5.00%)	Maximum Drawdown	Periods to Recovery
Pengana Absolute Return Asia Pacific Fund	11.63%	6.18%	1.88	1.07	-4.05%	9
XXXX Global Fund	12.42%	10.70%	1.16	0.69	-14.45%	17
XXXX International Fund	9.87%	10.77%	0.92	0.45	-17.30%	35
XXXX Asia Fund	9.09%	13.65%	0.67	0.30	-22.67%	28
XXXX Global Equity Fund	4.99%	12.30%	0.41	-0.00	-25.64%	55
MSCI The World Index	6.31%	11.46%	0.55	0.11	-21.53%	52

Return Analysis	Pengana Absolute Return Asia Pacific Fund	XXXX Global Fund	XXXX International Fund	XXXX Asia Fund	XXXX Global Equity Fund	MSCI The World Index
3M	1.17%	-2.99%	-3.16%	-3.53%	-3.20%	-2.13%
6M	3.98%	10.00%	8.33%	6.14%	8.84%	10.59%
1Y	9.28%	30.59%	35.43%	18.91%	31.14%	34.66%
2Y Ann	6.72%	25.06%	21.15%	15.62%	23.01%	22.71%
3Y Ann	7.88%	23.06%	12.39%	8.20%	16.50%	14.98%
5Y Ann	9.54%	17.12%	10.66%	11.22%	11.91%	12.28%
SI	83.11%	90.41%	67.86%	61.38%	30.69%	40.05%
SI (ann)	11.63%	12.42%	9.87%	9.09%	4.99%	6.31%

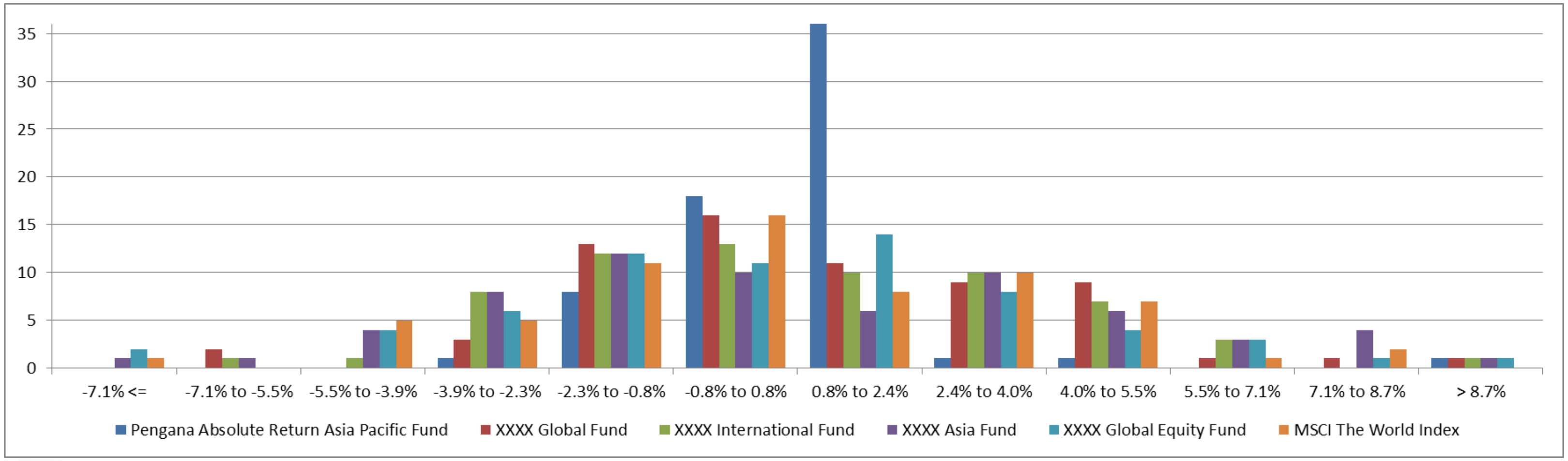
The above shows the risk/return outputs from the Analyser but is not limited to these, in addition there are many other metrics, including; tracking error, Jensen's Alpha, Treynor Ratio, Periodic Alpha, Periodic R Square, and Periodic Beta / 2 Variable Regression which can be used.

The Analyser process

The table below shows the correlation matrix between all Funds in the portfolio

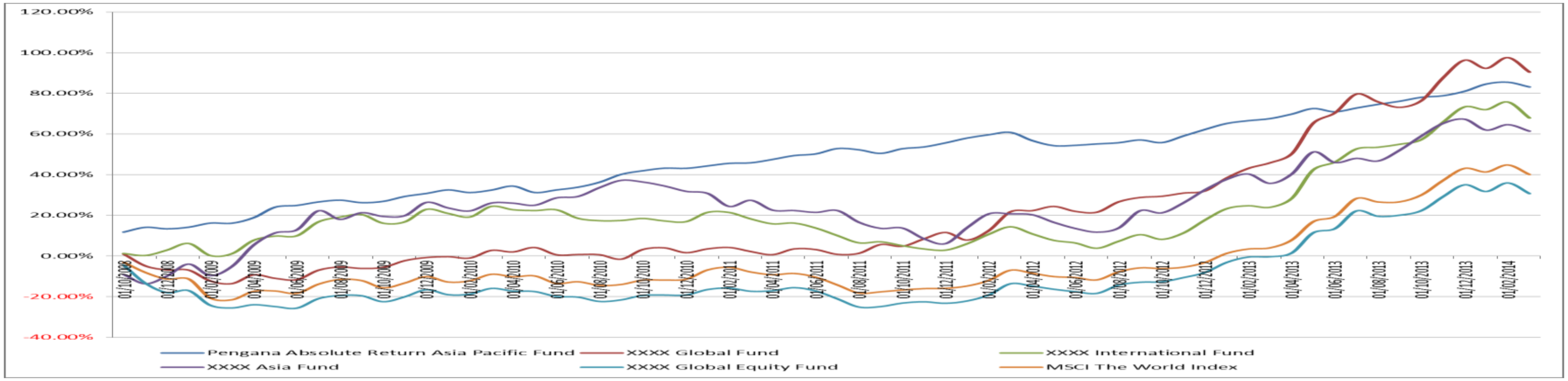
Periodic Correlation	Pengana Absolute Return Asia Pacific Fund	XXXX Global Fund	XXXX International Fund	XXXX Asia Fund	XXXX Global Equity Fund	MSCI The World Index
Pengana Absolute Return Asia Pacific Fund	1.00	-0.01	0.20	-0.04	-0.05	-0.01
XXXX Global Fund	-0.01	1.00	0.65	0.27	0.81	0.81
XXXX International Fund	0.20	0.65	1.00	0.66	0.76	0.81
XXXX Asia Fund	-0.04	0.27	0.66	1.00	0.49	0.49
XXXX Global Equity Fund	-0.05	0.81	0.76	0.49	1.00	0.95
MSCI The World Index	-0.01	0.81	0.81	0.49	0.95	1.00

The following chart shows the distribution of returns for each Fund. Returns are split into buckets and the number of times the return fits into that bucket are displayed on the vertical axis. Ideally returns would be concentrated to the right of the mean and be limited in the tails

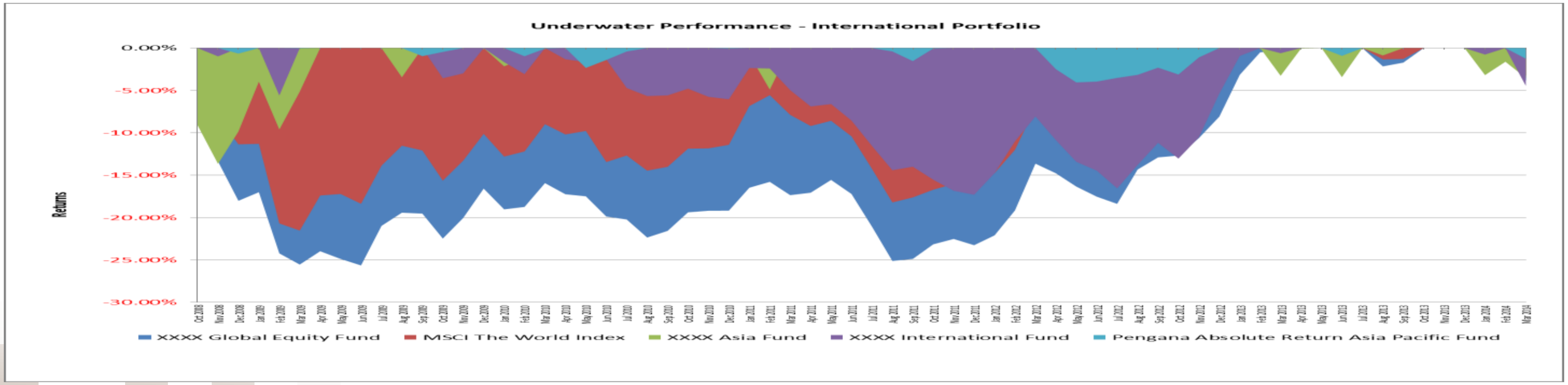


The Analyser process

As part of the analysis, the below chart is useful to understand the cumulative performance of each asset over the time period specified. Ideally we are searching for a smooth upward moving curve with less volatility and less correlation to other assets



The following chart establishes the cumulative negative performance of each asset. As the assets negative performance increases, it shows an increase in its cumulative loss, positive performance will reduce the negative cumulative performance until it reduces back to zero. We are looking for Funds that keep the downside to a minimum over the long term and show a consistent and repeatable investment process.



The Optimisation process

Using performance information from an individual portfolio, the Optimisation process is used to;

- Establish the most efficient portfolios
- Highlight the benefits of portfolio weighting
- Compare competitors to determine best performance and risk characteristics – we can also combine a number of Fund's as a sub portfolio to determine how it may increase/decrease the overall performance

The below table provides us with the ability to weight the assets according to what we believe will provide the most efficient portfolio. We can use both minimum and maximum weights to limit the exposure per asset where appropriate

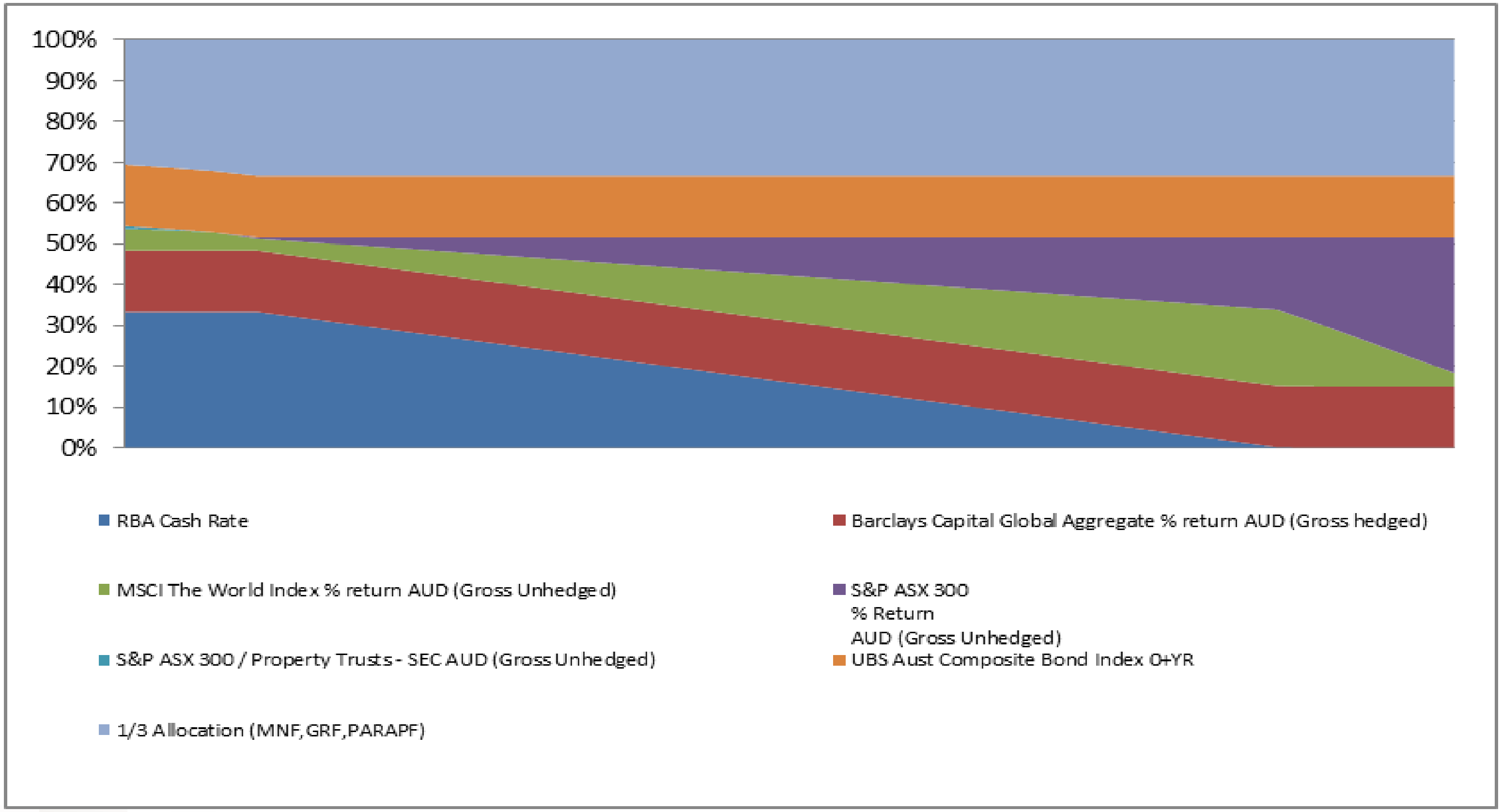
Stocks:	RBA Cash Rate	Barclays Capital Global Aggregate % return AUD (Gross hedged)	MSCI The World Index % return AUD (Gross Unhedged)	S&P ASX 300 % Return AUD (Gross Unhedged)	S&P ASX 300 / Property Trusts - SEC AUD (Gross Unhedged)	UBS Aust Composite Bond Index 0+YR	1/3 Allocation (MNF,GRF,PARAPF)
Min Weight:	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Max Weight:	33.34%	15.00%	33.34%	33.34%	33.34%	15.00%	33.34%

From the above information that we enter into the Optimisation model , the below output is produced. In this example, the portfolio of lowest risk implies an annualised Standard Deviation of 2.08% with a return of 6.87%. This return is slightly less than the highest Information Ratio which is the portfolio with the highest risk adjusted return. At the far right of the efficient frontier is the highest risk, highest return portfolio.

	Ann Standard Deviation	Ann Rate Of Return (RoR)	Ann Information Ratio	RBA Cash Rate	Barclays Capital Global Aggregate % return AUD (Gross	MSCI The World Index % return AUD (Gross Unhedged)	S&P ASX 300 % Return AUD (Gross Unhedged)	S&P ASX 300 / Property Trusts - SEC AUD (Gross Unhedged)	UBS Aust Composite Bond Index 0+YR	1/3 Allocation (MNF,GRF,PARAPF)
Portfolio of Lowest Risk/	**2.08%**	**6.87%**	3.31	33.34%	15.00%	5.33%	0.00%	0.73%	15.00%	30.60%
Highest Information Ratio	**2.09%**	**6.97%**	3.33	33.34%	15.00%	4.53%	0.00%	0.00%	15.00%	32.13%
Portfolio of Highest Return	**6.09%**	**8.26%**	1.36	0.00%	15.00%	3.32%	33.34%	0.00%	15.00%	33.34%

The Optimisation process

The following chart shows the entire Risk/Return frontier and the different portfolio weightings along it. The far left is the portfolio of lowest risk/lowest return which is the safest portfolio. The far right is the portfolio of highest return/highest risk. The highest Information Ratio portfolio (the portfolio with the highest risk adjusted return) lies somewhere in between. In this example it is almost on the far left along with the portfolio of lowest risk.



Further considerations

- Take into account current environment and asset valuations
- Perform analysis over rolling periods and assess changes to recommended asset allocation
- Identify portfolios that best meet risk and return objectives

- Further consideration to:
  - Other risk characteristics e.g. drawdown
  - Factor exposure analysis
  - Stress testing
  - Liquidity requirements
  - Means of accessing alpha and beta strategies
  - Costs

- Monitoring and management
  - Dynamic or static?

What we need to produce this service

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In order to produce the required output from this system, we need the following information;

- Risk and return objectives, particularly with respect to volatility and drawdown
- Restrictions that should be applied to the underlying assets or funds
- Data for the underlying funds and/or assets
- Data for the relevant indices
- The start date for the analysis - ideally the longer the time frame the more relevant and beneficial this process will be

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