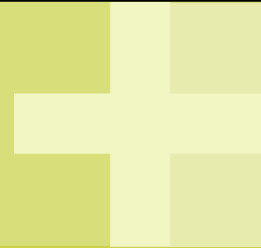


Product Risk Analysis Service - Investment Products

Review of Design and Positioning of Investment Products for ABC plc

Approach Taken & Example Outputs

October 2008



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1 Approach Taken: Summary

We use the Barrie & Hibbert ESG as the basis for creating a set of stochastic projections for an agreed set of our client's specific products, together with a number of risk graded benchmark investment strategies.

In this example, we consider the client's suite of investment products, although the Product Risk service can be extended to cover both pension accumulation and retirement income products.

We use a standard ESG model set-up and calibration methodology developed by B&H for the specific purposes of retail product and wealth projections. This standard model set-up and calibration is reviewed on a quarterly basis in accordance with changes to economic conditions and market data such as bond and derivative prices.

Product projections are produced for a range of different cashflow or liability profiles; these would be based on the type of products being evaluated, but for investment products will include both 'growth' and 'income' profiles:

- Liability Profile 1: Investing for growth (single initial premium; no withdrawals)
- Liability Profile 2: Low Withdrawals (annual withdrawals at 3% of initial fund value)
- Liability Profile 3: Medium Withdrawals (annual withdrawals at 5% of initial fund value)
- Liability Profile 4: High Withdrawals (annual withdrawals at 7% of initial fund value)

Based on each of these product projections, we can calculate a range of measures of risk and return for specified investment terms (in this example, we have used a 5 year investment term).

The stochastic model and quantitative framework for product risk and return allows us to:

- Define a set of customer segments or risk profiles (eg. 'Defensive', 'Cautious', 'Balanced', etc.) using a set of quantitative measures of risk and return. For investment products, we will use risk measures based on total return, and based on return relative to a Cash benchmark. Different risk measures will be used when assessing pension accumulation or retirement income products.
- Analyse individual funds or products, to assess how these map onto the different customer segments. This supports the effective and consistent targeting of an entire range of products to a set of objectively defined customer segments.
- Assess how different funds or products compare to each other. For example, do certain products perform less well than others?
- Assess whether the risk and return characteristics of any of the funds or products changed due to changes in economic conditions.

These are all important considerations with regard to **Treating Customers Fairly**.

This analysis can be repeated for different liability profiles and for different investment terms. In this example, we use a growth profile (no withdrawals) and a 5 year investment term.

Section 2 of this sample report describes the type of risk and return measures used.

Section 3 of this document shows examples of the key output measures of risk and return and illustrates how these can be used to map individual products onto the objective customer risk framework.

2 Risk Measures - Example

Based on the stochastic asset returns and associated product projections, we can calculate measures of risk and return for a range of investment products and for different income levels and investment terms. The particular risk and return measures we use will be determined by the type of product/customer. For example, the risk measures to reflect risk and return in a long-term pension accumulation investment product will be different to those used to measure risk in a typical 5-10 year investment product.

As an example, the following table demonstrates the type of risk and return measures we would use to assess typical investment products, and to align these products with stated customer risk categories:

Risk Measure	Notes
Mean - Total Return (% pa)	The mean annualized total return over a 5 year term.
Volatility – Total Return (% pa)	The annualised volatility of the total return over a 5 year term.
Upper 5% Best Case - Total Return (% pa)	The upper 5% value (5 th percentile) of the distribution of the total annualised return over a 5 year term.
Median – Total Return (% pa) (Total Residual Fund Value)	The median value of the distribution of the total annualised return over a 5 year term.
Lower 95% Value at Risk – Total Return (% pa)	The lower 5% tail value (95 th percentile) of the distribution of the total annualised return over a 5 year term.
Expected Loss – Total Return (%)	The expected loss in the capital value of the fund or product, across all scenarios where the fund or product loses value. This conditional expectation incorporates more information regarding the shape of the 'tail' and is expressed as a %.
Risk Measures - Relative to Cash	
Mean - Return Relative to Cash (% pa)	The upper 10% tail of the distribution of the residual fund as a proportion of the residual Cash fund, at each time horizon.
Probability of Beating Cash (%)	The probability that the total return on the fund or product exceeds the return on Cash over a 5 year term.
Probability of Beating Cash+2% (%)	The probability that the total return on the fund or product exceeds the return on Cash by at least 2% pa over a 5 year term.
Probability of Beating Cash+4% (%)	The probability that the total return on the fund or product exceeds the return on Cash by at least 4% pa over a 5 year term.
Expected Loss - Relative to Cash (%)	The expected loss in the value of the fund or product, relative to a Cash account, across all scenarios where the fund or product underperforms Cash. This conditional expectation incorporates more information regarding the shape of the 'tail' and is expressed as a %.
Relative Efficiency (%)	
Relative Efficiency (%)	This gives a measure of the return on the fund or product relative to a benchmark diversified portfolio with the same level of risk. This value can be greater than or less than 100%.

3 Results - Example Outputs

3.1 Liability Profile 1: Single Initial Premium; No Withdrawals

Exhibit 1

Benchmark Investment Strategies and Risk Measures

	Benchmark Risk Grades				
	Conservative	Cautious	Balanced	Aggressive	Adventurous
Cash	77.5%	32.5%	0.0%	0.0%	0.0%
Govt Bond	0.0%	0.0%	0.0%	0.0%	0.0%
Corp Bond	10.0%	32.5%	40.0%	4.0%	0.0%
High Yield Bond	0.0%	0.0%	0.0%	14.0%	0.0%
Index Linked	0.0%	0.0%	0.0%	0.0%	0.0%
Property	3.5%	10.0%	15.0%	15.0%	0.0%
UK Equity	3.0%	9.0%	15.0%	16.0%	21.0%
US Equity	3.0%	9.0%	15.0%	21.0%	25.0%
Euro Equity	0.0%	1.0%	3.0%	8.0%	20.0%
Japan Equity	1.0%	3.0%	4.0%	6.0%	5.0%
Asia ex Japan Equity	1.0%	1.0%	3.0%	6.0%	10.0%
Emerging Equity	1.0%	2.0%	5.0%	10.0%	19.0%
Risk Metrics: Total Returns					
Mean (total return) (% pa)	5.7%	5.8%	6.6%	7.8%	9.4%
Volatility (total return) (% pa)	2.5%	8.5%	10.5%	12.5%	17.8%
Upper 5% Best Case (total return) (%pa)	7.7%	11.3%	15.4%	19.6%	23.0%
Median (total return) (%pa)	5.6%	6.8%	7.7%	7.9%	7.7%
Lower 95% Value at Risk (total return) (% pa)	3.7%	2.5%	0.4%	-2.2%	-5.5%
Expected Loss (total loss) (%)	0.4%	2.0%	5.0%	8.0%	13.0%
Risk Metrics: Returns vs Cash					
Mean (relative to Cash) (% pa)	0.7%	1.6%	2.6%	3.5%	4.1%
Probability of Beating Cash (%)	95.0%	88.0%	76.0%	68.0%	59.0%
Probability of Beating Cash + 2% pa (%)	2.0%	8.0%	16.0%	24.0%	33.0%
Probability of Beating Cash + 4% pa (%)	0.0%	1.0%	3.0%	10.0%	16.0%
Expected Loss (vs Cash) (%)	1.4%	4.0%	6.8%	10.1%	14.0%
Relative Efficiency (%)	94%	97%	93%	89%	96%

Exhibit 1 details the asset allocations and risk and return characteristics of each of the benchmark strategies aligned with the different customer segments.

Exhibit 2 in the report uses a heat-map to denote funds or products whose risk/return characteristics have changed to a material extent.

Exhibit 2

Client ABC plc – Investment Product Suite: Product Risk Measures and Mappings to Benchmark Investment Strategies

	Client ABC plc - Investment Product Suite									
	Product 1	Product 2	Product 3	Product 4	Fund 5	Fund 6	Fund 7	Fund 8	Fund 9	Fund 10
Risk Metrics: Total Returns										
Mean (total return) (% pa)	5.7%	7.2%	7.9%	8.2%	5.9%	5.3%	5.8%	7.8%	8.6%	8.9%
Volatility (total return) (% pa)	2.6%	5.7%	9.4%	13.1%	4.3%	2.5%	6.0%	9.4%	13.8%	17.6%
Upper 5% Best Case (total return) (%pa)	7.9%	11.8%	15.4%	17.1%	10.1%	7.7%	10.8%	16.2%	19.5%	21.9%
Median (total return) (%pa)	5.5%	6.6%	7.1%	7.3%	5.6%	5.6%	5.5%	7.5%	7.7%	7.5%
Lower 95% Value at Risk (total return) (% pa)	3.6%	2.6%	-0.2%	-2.2%	3.1%	3.7%	1.2%	0.3%	-2.5%	-5.4%
Expected Loss (total loss) (%)	0.0%	1.8%	5.7%	8.1%	2.1%	0.2%	2.4%	5.5%	9.0%	12.7%
Risk Metrics: Returns vs Cash										
Mean (relative to Cash) (% pa)	0.8%	2.0%	2.5%	2.7%	1.1%	0.5%	1.0%	2.4%	3.3%	3.8%
Probability of Beating Cash (%)	96.0%	87.3%	74.0%	68.0%	89.0%	93.0%	88.0%	73.0%	66.2%	61.1%
Probability of Beating Cash + 2% pa (%)	2.5%	10.1%	15.0%	22.1%	8.3%	0.8%	8.0%	14.1%	23.6%	31.6%
Probability of Beating Cash + 4% pa (%)	0.0%	2.5%	3.8%	7.8%	0.0%	0.0%	1.0%	2.3%	10.2%	13.2%
Expected Loss (vs Cash) (%)	1.6%	4.5%	7.4%	9.5%	3.1%	1.5%	5.0%	7.0%	11.0%	13.5%
Relative Efficiency (%)	99%	101%	93%	89%	96%	94%	86%	93%	92%	96%
Benchmark Investment/Risk-Grade Mapping (1 - 5)	1	2	3	4	2	1	2	3	4	5

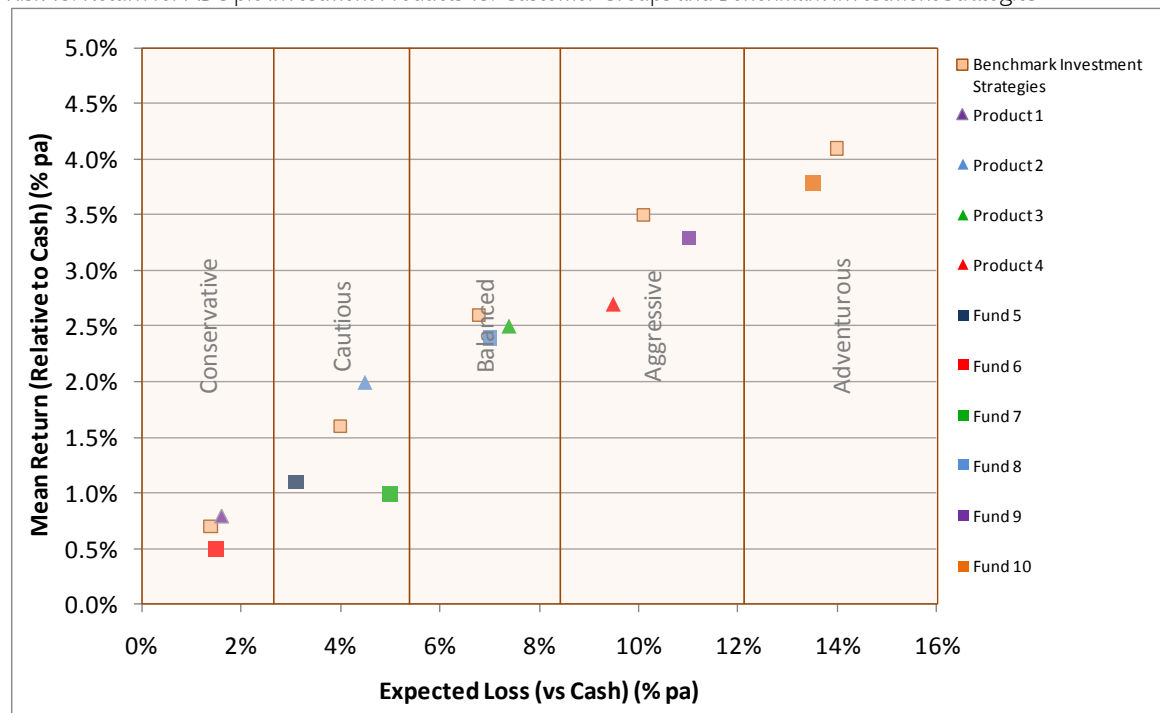
The red/amber/green colour-coding in the 'Relative Efficiency (%)' row illustrate those funds or products which may be considered to under-perform the benchmark investment strategy with the same risk level.

The final row details the risk mapping between each of the products and one of the Benchmark Investment Strategies. This is illustrated in Exhibit 3, over.

Exhibit 3

Product Monitor:

Risk vs. Return for ABC plc Investment Products vs. Customer Groups and Benchmark Investment Strategies



The chart in Exhibit 3 provides a comparative graphical illustration of the different investment products, based on two of the risk measures from the analysis presented in Exhibits 1 and 2.

This Exhibit 3 – 'Product Monitor' allows the client to:

- Quickly analyse individual funds or products, to assess how these map onto the different customer segments, and how these products compare with a defined set of benchmark investment strategies or asset allocations.
- Assess how different funds, products or investment strategies compare to each other. For example, do certain products perform less well than others?
- Consider the appropriateness and the targeting of an entire range of products in relation to a set of objectively defined customer segments, based on changes in the economic environment (changes in interest rates, inflation, equity volatility, etc.)
- The quarterly update to the Product Risk report, allows clients to assess whether the risk and return characteristics of any of the funds or products changed due to changes in economic conditions.
- New products can be added into the Product Monitor, to understand how the new product can be targeted consistently, and to understand how the new product compares to the client's existing product proposition.

Typically, the above analysis would be repeated across a number of defined liability profiles.

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