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Amendment to IFAD's Investment Policy Statement Risk Budget

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Amendment to IFAD's Investment Policy Statement Risk Budget

Executive summary

1. In December 2011, the Executive Board approved IFAD's Investment Policy Statement (IPS) which introduced the concept of risk budgeting for IFAD's investments.
2. Risk budgeting is the procedure of allocating risk within funds. It entails setting predetermined risk limits for the investment portfolio both on an aggregate level and at the level of individual managers, monitoring these measures and adjusting the portfolio whenever they exceed the tolerance level.
3. The measures used by IFAD for risk budgeting purposes are the conditional value at risk¹ (CVaR) on single mandates and on the overall portfolio, and the ex ante tracking error on single mandates.
4. The maximum allowable CVaR for the overall portfolio was approved in the IPS at a level of 10 per cent over a one-year forward-looking horizon and at a 95 per cent confidence level.
5. After the full implementation of IFAD's revised investment policy in July 2012, several analyses were run on the portfolio. These included potential reallocations across asset classes and stress tests applying historical high-volatility financial conditions such as the 2008 financial crisis and the 2010 European peripheral debt crisis. The aim was to test the CVaR level of the overall portfolio, and verify if a potential downward revision of the current allowable 10 per cent would have been a financially sound proposal.
6. It was verified that, even in extreme conditions assuming the concurrence of several stress factors, the CVaR of the overall portfolio would not increase above the level of 5.5 per cent.
7. It is therefore hereby proposed to revise the **overall portfolio maximum allowable CVaR to a level of 6 per cent.**

¹ IFAD's IPS CVaR is calculated at a 95 per cent confidence level, over a one-year forward-looking horizon, based on historical simulations with five years of historical data and a half-life of 252 days.

I. Background

1. The current risk budget for IFAD's investment portfolio is stated in the IPS approved by the Executive Board in December 2011. The measures used for risk budgeting purposes are the CVaR on single mandates and on the overall portfolio, and the ex ante tracking error on single mandates.
2. The one-year CVaR at 95 per cent is a measure of the potential average expected loss of a portfolio under extreme conditions (the so-called "left tail"). It gives an indication of how much value a portfolio could lose on average over a forward-looking one-year time horizon with a 95 per cent confidence level in highly adverse scenarios. To derive this measure, the portfolio is revalued (stressed) assuming a large number of market condition scenarios. For example, a CVaR of 4.0 per cent on a portfolio of US\$1,000,000 means that there is a 5 per cent chance that the average loss of the portfolio will be US\$40,000.
3. The maximum allowable limits as per IFAD's approved risk budget are reported in table 1.

Table 1

IPS risk budget for CVaR

(Confidence level at 95 per cent, percentage terms, based on historical simulations over five years)

| | <i>IPS budget level</i> |
|--|-------------------------|
| | <i>1-year CVaR</i> |
| | <i>per cent</i> |
| Global government bonds | 4.00 |
| Diversified fixed-income bonds | 15.00 |
| Inflation-indexed bonds | 9.00 |
| Emerging market bonds (investment grade) | 27.00 |
| Total portfolio (including held-to-maturity and operational cash) | 10.00 |

II. Risk budget levels of IPS portfolio

4. In line with the IPS risk budgeting approach for investments (section IV, Risk management framework and performance measurement), both the ex ante tracking error levels of single managers and the CVaR levels are monitored on a monthly basis against the risk budget to ensure that the levels are not breached. In cases where a manager or a mandate reaches a level close to the risk budget, IFAD liaises pre-emptively with the manager or reviews the mandates' characteristics and risk profile (e.g. duration) so as to adjust the risk profile in line with the budget.
5. The new IPS was fully implemented in July 2012 through the funding of the emerging market debt (EMD) mandate and the revised diversified fixed-income mandate that was changed from a pure United States dollar-denominated mandate to a global mandate. Table 2 shows the investment policy allocations.

Table 2
Investment policy allocations

| <i>Asset class</i> | <i>Allocation per cent</i> |
|--------------------------------------|--------------------------------|
| Cash | 7.0 |
| Held-to-maturity (HTM) | 17.0 |
| Global government bonds (GGB) | 36.0 |
| Diversified fixed-income bonds (DFI) | 13.0 |
| Inflation-indexed bonds (INF) | 20.0 |
| Emerging market bonds (EMD) | 7.0 |
| Total portfolio | 100.0 |

6. Prior to the full IPS implementation in July 2012, specifically the implementation of the EMD mandate and the revised diversified fixed-income (DFI) mandate, and once new benchmarks had been defined,² the CVaR levels of the benchmarks and the overall portfolio were tested for the months of May and June 2012, applying the new investment policy weights.
7. It is important to note that all the CVaR and other risk measures for IFAD's investment portfolio are performed on a currency-hedged basis, i.e. excluding the impact of currency fluctuations. This is in line with the currency-hedging procedure that IFAD applies of hedging the currency exposure through the alignment of assets and liabilities to the special drawing rights (SDR) currency weights, and is consistent with the investment performance calculations which are performed in local currency terms.
8. As shown in table 3, the CVaR of the single asset classes remained below the risk budget levels for the periods analysed, i.e. May 2012 to August 2012. The level of the overall portfolio CVaR ranged from 2.59 per cent to 2.83 per cent, thereby remaining well below the 10 per cent risk budget.

Table 3
CVaR levels of new investment policy benchmarks and weights

| <i>Asset class</i> | <i>Policy allocation</i> | <i>IPS budget level one-year CVaR per cent</i> | <i>CVaR 31 May 2012</i> | <i>CVaR 30 June 2012</i> | <i>CVaR 31 July 2012</i> | <i>CVaR 31 August 2012</i> |
|------------------------|------------------------------|--|-----------------------------|------------------------------|------------------------------|------------------------------------|
| Cash | 7.0 | n.a. | - | - | - | - |
| HTM | 17.0 | n.a. | - | - | - | - |
| GGB | 37.0 | 4.00 | 2.22 | 2.15 | 2.18 | 2.01 |
| DFI | 13.0 | 15.00 | 5.31 | 5.19 | 4.94 | 4.81 |
| INF | 20.0 | 9.00 | 7.28 | 7.00 | 7.14 | 7.10 |
| EMD | 7.0 | 27.00 | 12.42 | 12.22 | 12.88 | 12.41 |
| Total portfolio | 100.0 | 10.00 | 2.72 | 2.66 | 2.83 | 2.59 |

III. Stress testing the risk budget levels of IPS portfolio

9. The evolution of the CVaR on the new investment portfolio was reviewed and a number of stress tests were performed on alternative investment policy allocations.³ The aim of the stress tests was to assess the necessity of the current allowable level of CVaR on the overall portfolio, i.e. 10 per cent.

² The benchmarks of the new IPS are the Barclays Global Treasury 1-3 years for the GGB, the IFAD Global Aggregate Custom Benchmark for the DFI, the Barclays World Government Inflation-Linked 1-10 years and the IFAD Emerging Markets Custom Index.

³ The tests were performed with the use of the enhanced risk management software implemented in-house during July 2012.

10. The stress tests were performed by reallocating a percentage of the portfolio, ranging from 2.5 to 10 per cent, across asset classes.
11. The stress tests were performed by respectively decreasing the GGB asset class in favour of the DFI, INF and/or EMD classes (table 4) and by increasing the GGB by reallocating a percentage of the portfolio from the DFI and INF (table 5) asset classes. Both sets of stress tests were run under two scenarios: one category of scenarios assumed that the current held-to-maturity (HTM) portfolio would remain as it is, i.e. that the investment strategy will remain a hold-to-maturity one. This means that the portfolio is not subject to market price fluctuation and therefore its CVaR is assumed to be nil; the second category of scenarios assumed that the HTM strategy would be reverted to a marked-to-market (MTM) one. This explains the marginally higher CVaR numbers in the second set of stress tests.

Table 4

Stress tests on decreased GGB allocation - CVaR levels on alternative investment policy allocations

| Percentage shift | - | 2.5% | 5.0% | 2.5% | 5.0% | 5.0% | 5.0% | 10.0% | 10.0% |
|--|-------------------|---|---------------------------------------|---|---------------------------------------|---|---|--|--|
| Asset class | Policy allocation | Scenario 1: 2.5% switch from GGB to DFI | Scenario 2: 5% switch from GGB to DFI | Scenario 3: 2.5% switch from GGB to INF | Scenario 4: 5% switch from GGB to INF | Scenario 5: 5% switch from GGB, 2.5% to INF and 2.5% to DFI | Scenario 6: 5% switch from GGB, 5% to EMD | Scenario 7: 10% switch from GGB to DFI | Scenario 8: 10% switch from GGB to INF |
| Cash | 7.0 | 7% | 7% | 7% | 7% | 7% | 7% | 7% | 7% |
| HTM | 17.0 | 17% | 17% | 17% | 17% | 17% | 17% | 17% | 17% |
| GGB | 37.0 | 34% | 32% | 34% | 32% | 32% | 32% | 27% | 27% |
| DFI | 13.0 | 15% | 18% | 13% | 13% | 15% | 13% | 23% | 13% |
| INF | 20.0 | 20% | 20% | 23% | 25% | 23% | 20% | 20% | 30% |
| EMD | 7.0 | 7% | 7% | 7% | 7% | 7% | 12% | 7% | 7% |
| Total portfolio | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Overall portfolio CVaR with HTM | May 2012 | 2.80 | 2.87 | 2.85 | 2.94 | 2.92 | 2.97 | 3.01 | 3.18 |
| | June 2012 | 2.72 | 2.79 | 2.78 | 2.86 | 2.84 | 2.91 | 2.93 | 3.08 |
| | July 2012 | 2.73 | 2.80 | 2.80 | 2.88 | 2.85 | 2.95 | 2.93 | 3.10 |
| | August 2012 | 2.64 | 2.71 | 2.71 | 2.79 | 2.76 | 2.85 | 2.84 | 3.02 |
| Overall portfolio CVaR with MTM | May 2012 | 3.20 | 3.22 | 3.25 | 3.33 | 3.31 | 3.36 | 3.41 | 3.56 |
| | June 2012 | 3.09 | 3.10 | 3.13 | 3.21 | 3.19 | 3.25 | 3.30 | 3.42 |
| | July 2012 | 3.31 | 3.34 | 3.36 | 3.46 | 3.42 | 3.28 | 3.52 | 3.72 |
| | August 2012 | 3.20 | 3.23 | 3.26 | 3.35 | 3.32 | 3.16 | 3.41 | 3.62 |

Stress tests based on current financial conditions

12. As shown in table 4 and graph 1, the overall portfolio CVaR on the stress tests ranges from 2.64 per cent to 3.72 per cent. As expected, these values are higher than those envisaged in the IPS because the simulated reallocation occurs from the least risky asset class, i.e. the GGB, into the more risky DFI and INF asset classes. The highest CVaR of 3.72 per cent is shown in the July scenario 8, where 10 per cent is transferred from GGB to INF and HTM is treated as marked-to-market.

Graph 1
CVaR levels on alternative investment policy allocations where GGB allocation is decreased

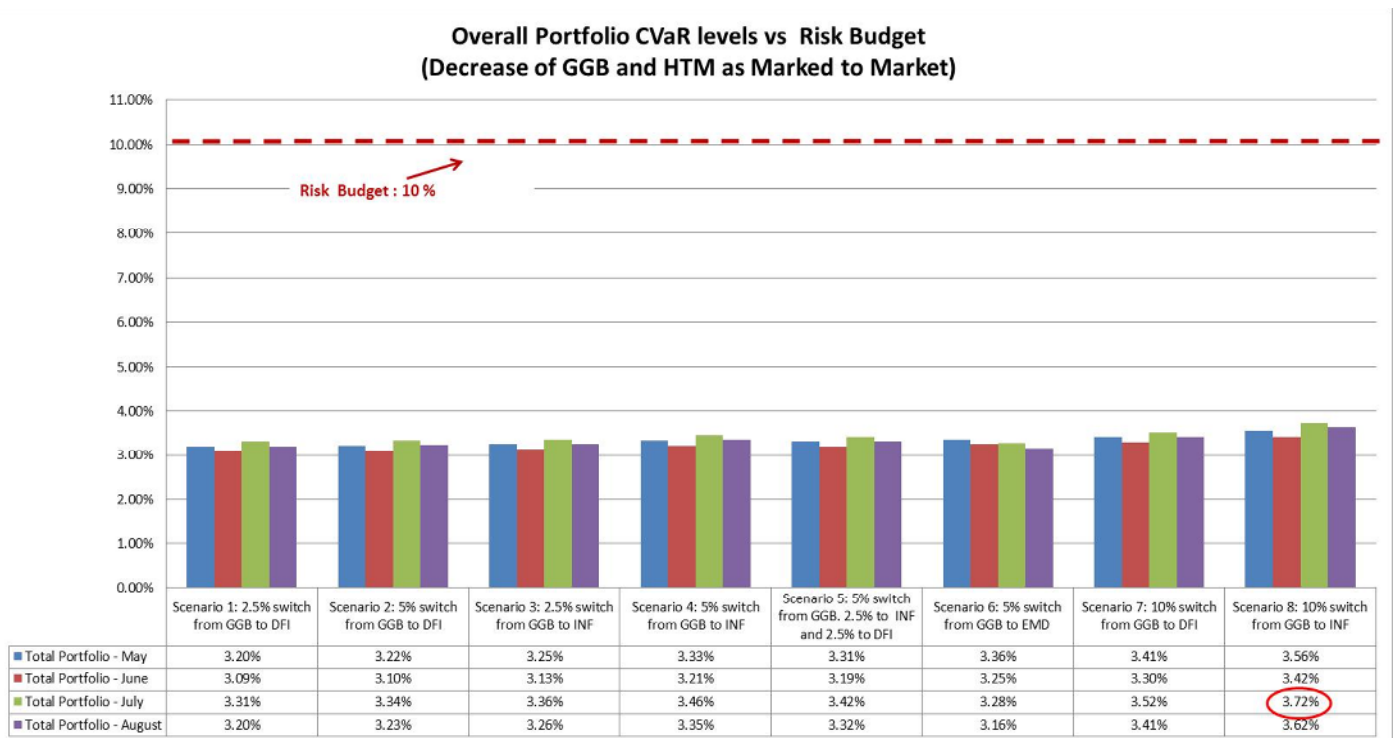


Table 5
Stress tests on increased GGB allocation - CVaR levels on alternative investment policy allocations

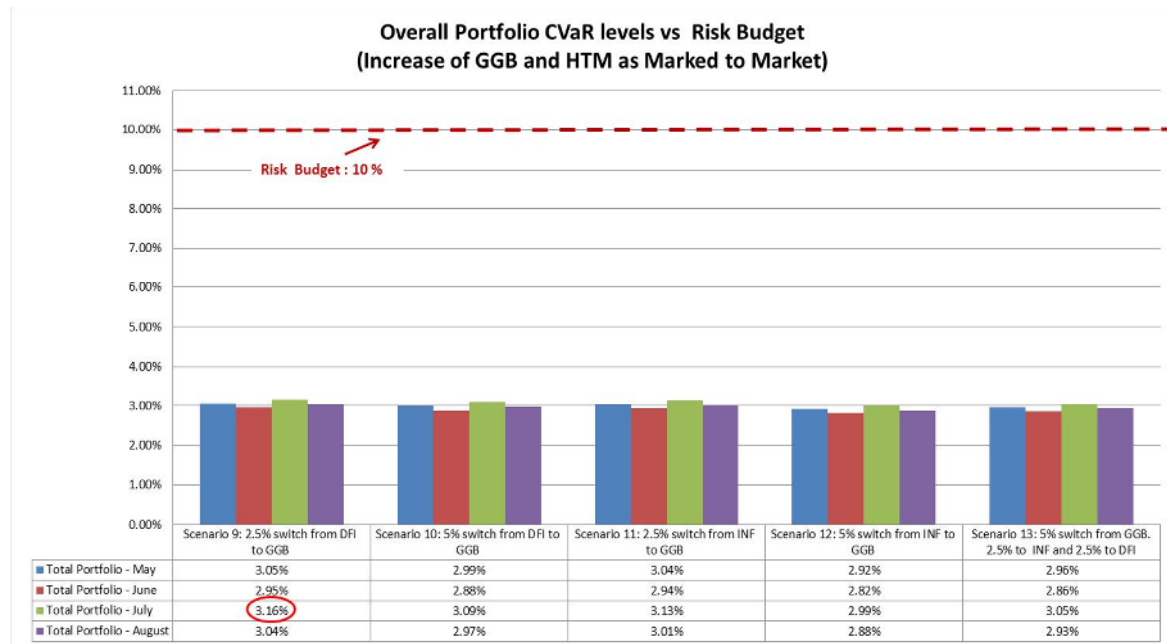
| Asset class | Policy allocation | Scenario 1: 2.5% switch from DFI to GGB | Scenario 2: 5% switch from DFI to GGB | Scenario 3: 2.5% switch from INF to GGB | Scenario 4: 5% switch from INF to GGB | Scenario 5: 5% switch to GGB, 2.5% from INF and 2.5% from DFI |
|--|-------------------|---|---------------------------------------|---|---------------------------------------|---|
| Cash | 7.0 | 7% | 7% | 7% | 7% | 7% |
| HTM | 17.0 | 17% | 17% | 17% | 17% | 17% |
| GGB | 37.0 | 39% | 42% | 39% | 42% | 42% |
| DFI | 13.0 | 10% | 8% | 13% | 13% | 10% |
| INF | 20.0 | 20% | 20% | 18% | 15% | 18% |
| EMD | 7.0 | 7% | 7% | 7% | 7% | 7% |
| Total portfolio | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Overall portfolio CVaR with HTM | May 2012 | 2.66 | 2.60 | 2.65 | 2.53 | 2.57 |
| | June 2012 | 2.59 | 2.53 | 2.58 | 2.47 | 2.50 |
| | July 2012 | 2.62 | 2.56 | 2.60 | 2.49 | 2.53 |
| | August 2012 | 2.52 | 2.47 | 2.51 | 2.40 | 2.44 |
| Overall portfolio CVaR with MTM | May 2012 | 3.05 | 2.99 | 3.04 | 2.92 | 2.96 |
| | June 2012 | 2.95 | 2.88 | 2.94 | 2.82 | 2.86 |
| | July 2012 | 3.16 | 3.09 | 3.13 | 2.99 | 3.05 |
| | August 2012 | 3.04 | 2.97 | 3.01 | 2.88 | 2.93 |

13. As shown in table 5 and graph 2, the overall portfolio CVaR on this set of stress tests ranges from 2.40 per cent to 3.16 per cent in the scenarios where the HTM is assumed to be marked-to-market. In contrast to the results shown in table 4, the

CVaR values where the HTM is treated as cash, i.e. with a CVaR of zero, are lower than the current values established in the IPS because the simulated reallocations increase the percentage weight of the least risky asset class, i.e. the GGB, and decrease the weights of the more risky DFI and INF asset classes.

Graph 2

CVaR levels on alternative investment policy allocations where GGB allocation is increased



14. In summary, based on the above analyses, the highest CVaR is 3.72 per cent, well below the budget level of 10 per cent.
15. In order to further ascertain the potential level of risk in the portfolio under extreme market conditions, stress tests were also performed by changing the underlying financial data, to reflect periods of extreme market volatility. In particular, the analyses were run by using historical data reflecting the 2008 financial crisis, which affected all markets and increased volatility across all asset classes.
16. To consider the most extreme case, the financial crisis analyses assumes that all of the portfolios will be marked-to-market, including the held-to-maturity portfolio, and are therefore subject to higher levels of risk than scenarios where the held-to-maturity portfolio is treated as cash. The results of this set of stress tests are shown in table 6.

Table 6
Stress tests on decreased GGB allocation - CVaR levels on alternative investment policy allocations based on 2008 financial crisis data

| Percentage shift | - | 2.5% | 5.0% | 2.5% | 5.0% | 5.0% | 10.0% | 10.0% |
|--|-------------------|--|--|--|--|---|---|---|
| Asset class | Policy allocation | Scenario 1: 2.5% switch from DFI to GGB | Scenario 2: 5% switch from DFI to GGB | Scenario 3: 2.5% switch from INF to GGB | Scenario 4: 5% switch from INF to GGB | Scenario 5: 5% switch to GGB. 2.5% from INF and 2.5% from DFI | Scenario 6: 10% switch from GGB to DFI | Scenario 7: 10% switch from GGB to INF |
| Cash | 7.0 | 7% | 7% | 7% | 7% | 7% | 7% | 7% |
| HTM | 17.0 | 17% | 17% | 17% | 17% | 17% | 17% | 17% |
| GGB | 37.0 | 34% | 32% | 34% | 32% | 32% | 27% | 27% |
| DFI | 13.0 | 15% | 18% | 13% | 13% | 15% | 23% | 13% |
| INF | 20.0 | 20% | 20% | 23% | 25% | 23% | 20% | 30% |
| EMD | 7.0 | 7% | 7% | 7% | 7% | 7% | 7% | 7% |
| Total portfolio | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Overall portfolio CVaR with MTM | 5.07 | 5.15 | 5.23 | 5.27 | 5.41 | 5.37 | 5.40 | 5.76 |

17. As shown in table 6, even assuming the concurrence of the exogenous event of a spike in market volatility, a shift from the less risky GGB asset class to the more risky DFI and INF asset classes, and no HTM portfolio, the overall portfolio CVaR level ranges between 5.07 per cent and 5.76 per cent.

18. For additional safety, a further stress test was run, applying the financial conditions underlying the 2008 Bear Stearns collapse and the 2010 European peripheral crisis (table 7). Even in such scenarios, having applied the above shifts, the overall portfolio CVaR level ranged between 3.60 per cent and 4.10 per cent.

Table 7
Stress tests on decreased GGB allocation - CVaR levels on alternative investment policy allocations based on conditions underlying 2008 Bear Stearns collapse and the 2010 European peripheral crisis

| Percentage shift | - | 2.5% | 5.0% | 2.5% | 5.0% | 5.0% | 10.0% | 10.0% |
|---|-------------------|--|--|--|--|--|---|---|
| Asset class | Policy allocation | Scenario 1: 2.5% switch from DFI to GGB | Scenario 2: 5% switch from DFI to GGB | Scenario 3: 2.5% switch from INF to GGB | Scenario 4: 5% switch from INF to GGB | Scenario 5: 5% switch to GGB. 2.5% from INF and 2.5% from DFI | Scenario 6: 10% switch from GGB to DFI | Scenario 7: 10% switch from GGB to INF |
| Cash | 7.0 | 7% | 7% | 7% | 7% | 7% | 7% | 7% |
| HTM | 17.0 | 17% | 17% | 17% | 17% | 17% | 17% | 17% |
| GGB | 37.0 | 34% | 32% | 34% | 32% | 32% | 27% | 27% |
| DFI | 13.0 | 15% | 18% | 13% | 13% | 15% | 23% | 13% |
| INF | 20.0 | 20% | 20% | 23% | 25% | 23% | 20% | 30% |
| EMD | 7.0 | 7% | 7% | 7% | 7% | 7% | 7% | 7% |
| Total portfolio | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |
| Bear Stearns collapse - Overall portfolio CVaR with MTM | 3.60 | 3.67 | 3.73 | 3.69 | 3.75 | 3.77 | 3.86 | 3.90 |
| European peripheral crisis - Overall portfolio CVaR with MTM | 3.67 | 3.74 | 3.81 | 3.80 | 3.88 | 3.87 | 3.96 | 4.10 |

IV. Conclusion and recommendations

19. Based on all the above analyses, it can be reasonably and safely assumed that the current risk budget of 10 per cent for the overall portfolio is significantly higher than what the current policy allocation and the new IPS asset classes require. As confirmed by the stress tests, even in the event of a significant change in allocation, including the change of the held-to-maturity strategy for a marked-to-market one, the current risk budget would be above IFAD's tolerance level.
20. Revision to the overall portfolio maximum allowable for the CVaR budget is recommended from the current 10 per cent to a maximum of **6 per cent.**

Glossary of risk measures and related terms

Ex ante tracking error (Active risk): The risk a portfolio or fund acquires when it is actively managed, especially when its managers attempt to outperform a benchmark. More specifically, the more a fund or portfolio differs from the benchmark upon which it is based, the more likely it is to underperform or outperform that same benchmark. This extra risk is active risk. For example, a one-year forward-looking active risk of 0.2 per cent means that, over the coming year, the portfolio excess return over the benchmark is expected to be in the range of +/- 0.2 per cent of its mean value.

The active risk can be predictive (or ex ante), based on expected return, or ex post, derived from the actual returns of the portfolio.

Benchmark: A benchmark is a standard against which the performance of a security or manager can be measured. The benchmark should have certain characteristics of investability, transparency and replicability so as to best represent the performance of a certain investment universe. In financial markets, the most popular indices are used as benchmarks. For example, the Standard & Poor's 500 is a widely used benchmark for United States "large-cap" equities markets.

Conditional VaR: CVaR is a measure of the average expected loss of a portfolio assuming that (conditional to) the value at risk has (having) been reached. Since assumption is made that the portfolio loss has exceeded the VaR, the CVaR gives an indication about the magnitude of the losses in "the tails" of the distribution, i.e. in extreme loss cases. The higher the CVaR, the more a portfolio is expected to lose in extreme scenarios and, hence, the riskier it is.

Confidence level: This is the range (with a specified value of uncertainty, usually expressed in percentage terms) within which the true value of a measured quantity exists. It is also the level of certainty to which an estimate can be trusted.

Duration: This is a measure of the sensitivity of a bond's price to changes in the level of market yields. For bonds, prices and yields have an inverse relationship. If the yields increase, the bonds' prices decrease. A bond with longer duration is more sensitive to changes in market yields meaning that, all else equal, its price will decline more for a given increase in yields than the price of a bond with shorter duration.

Half-life: The rate at which a variable's value erodes through time. This parameter means that older observations are given less weight than more recent ones. Its magnitude determines how fast the weight of the observations BarraOne uses in a VaR simulation decays over the historical period.

Historical simulation: Historical simulation is a procedure for predicting the values of a portfolio deriving such values from historical portfolio data but applying historical data to current portfolio holdings.