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Risk Management Formulas

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List of 20 Risk Management Formulas

Risk Management

1) Basis Risk

$$fx \quad BR = FPC - SPHA$$

[Open Calculator !\[\]\(a870788d6ed9b8fd294b7654a8c8526b_img.jpg\)](#)

$$ex \quad 14755 = 22255 - 7500$$

2) Calmar Ratio

$$fx \quad CR = \left(\frac{ARR}{MDD} \right) \cdot -1$$

[Open Calculator !\[\]\(c50c8b7b2cc2cf9ff925edec0ee94c0d_img.jpg\)](#)

$$ex \quad 0.24 = \left(\frac{12}{-50} \right) \cdot -1$$

3) Credit Spread

$$fx \quad CS_P = CBY - TBY$$

[Open Calculator !\[\]\(f60b7a900783ac3fd531bfd9c111be6d_img.jpg\)](#)

$$ex \quad 0.54 = 2.5 - 1.96$$

4) Credit Value at Risk

$$fx \quad CR_v = WCL - ECL$$

[Open Calculator !\[\]\(83bbbd261710c59db0214aa27b2edc0d_img.jpg\)](#)

$$ex \quad 12500 = 33000 - 20500$$



5) Default Risk Premium

$$fx \quad \text{DRP} = R_i - R_f$$

[Open Calculator !\[\]\(cbe80b694ebd74fcfe136a095b608235_img.jpg\)](#)

$$ex \quad 5.7 = 6 - 0.3$$

6) Economic Capital

$$fx \quad \text{EC} = \frac{\text{EaR}}{\text{RR}}$$

[Open Calculator !\[\]\(3e2231b1ad3ca8da8658228c00dd08e0_img.jpg\)](#)

$$ex \quad 7750 = \frac{620}{0.08}$$

7) Interest Rate Risk

$$fx \quad \text{IR}_{\text{risk}} = \frac{\text{OP} - \text{NP}}{\text{NP}}$$

[Open Calculator !\[\]\(0d5ec72f61334709c3fc9450209b754f_img.jpg\)](#)

$$ex \quad 2.982301 = \frac{450 - 113}{113}$$

8) Loss Given Default

$$fx \quad \text{LGD} = 1 - R_r$$

[Open Calculator !\[\]\(b64b40baaee5acddc1eab8538ba84754_img.jpg\)](#)

$$ex \quad 0.6 = 1 - 0.4$$

9) Market Risk Premium

$$fx \quad \text{MRP} = \text{EEMR} - R_f$$

[Open Calculator !\[\]\(aff7c69c44a5e015f18c35867ef3f5c3_img.jpg\)](#)

$$ex \quad 18.7 = 19 - 0.3$$



10) Maximum Drawdown

$$fx \quad MDD = \left(\frac{V_{\text{trough}} - V_{\text{peak}}}{V_{\text{peak}}} \right) \cdot 100$$

[Open Calculator !\[\]\(e78f798d4ea5c530c9db49e7d26e6b95_img.jpg\)](#)

$$ex \quad -50 = \left(\frac{25000 - 50000}{50000} \right) \cdot 100$$

11) Modigliani-Modigliani Measure

$$fx \quad M_2 = R_{\text{ap}} - R_{\text{mkt}}$$

[Open Calculator !\[\]\(05be7c7a8995decd503647c99211f7c2_img.jpg\)](#)

$$ex \quad 20.1 = 25 - 4.9$$

12) Pain Ratio

$$fx \quad PR = \frac{ER}{PI}$$

[Open Calculator !\[\]\(fe3aebe81acea8d45108cd2768939da7_img.jpg\)](#)

$$ex \quad 7.333333 = \frac{110}{15}$$

13) Probability of Default Regression Model

$$fx \quad PD = \frac{1}{1 + \exp(-z)}$$

[Open Calculator !\[\]\(899d8b7697d64725bf017d3296cfcf1b_img.jpg\)](#)

$$ex \quad 0.507499 = \frac{1}{1 + \exp(-0.03)}$$



14) Risk Adjusted Return on Capital

$$fx \text{ RAROC} = \frac{R - e - el + ifc}{P_{\text{Capital}}}$$

[Open Calculator !\[\]\(e2376d476d06eb31946dc01a69a4403a_img.jpg\)](#)

$$ex \ 374.15 = \frac{780000 - 47000 - 6700 + 22000}{2000}$$

15) Risk Determination

$$fx \ \sigma_R = RI \cdot L$$

[Open Calculator !\[\]\(0b5e7e25e8775f7e7e80906ada4f0021_img.jpg\)](#)

$$ex \ 84 = 21 \cdot 4$$

16) Risk Exposure

$$fx \ RE = RI \cdot p$$

[Open Calculator !\[\]\(bd3b31712ad9bab5a241210fa6925cdd_img.jpg\)](#)

$$ex \ 10.5 = 21 \cdot 0.5$$

17) Risk Tolerance

$$fx \ RT = \frac{PEE \cdot 0.35}{MGI}$$

[Open Calculator !\[\]\(7bc43b319a082987e20f7bf78f4bab80_img.jpg\)](#)

$$ex \ 17.5 = \frac{500000 \cdot 0.35}{10000}$$




18) Sortino Ratio 

$$fx \quad S = \frac{R_p - R_f}{\sigma_d}$$

[Open Calculator !\[\]\(d3fb9f94af8b26d1c844efa9a98805b0_img.jpg\)](#)

$$ex \quad 3.566667 = \frac{11 - 0.3}{3}$$

19) Sterling Ratio 

$$fx \quad SR = \left(\frac{CAGR}{AMDD - 10} \right) \cdot -1$$

[Open Calculator !\[\]\(e1d6102fe77919492c04879c8450f1f5_img.jpg\)](#)

$$ex \quad 10 = \left(\frac{150}{-5 - 10} \right) \cdot -1$$

20) Upside/Downside Ratio 

$$fx \quad R_{up/down} = \frac{AI}{DI}$$

[Open Calculator !\[\]\(ab4e2b3fc7e7887b7a72f548aa6f5e60_img.jpg\)](#)

$$ex \quad 3.090909 = \frac{17}{5.5}$$



Variables Used

- **AI** Advancing Issues
- **AMDD** Average Maximum Drawdown
- **ARR** Average Rate of Return
- **BR** Basis Risk
- **CAGR** Compound Annual Growth Rate
- **CBY** Corporate Bond Yield
- **CR** Calmar Ratio
- **CR_v** Credit Value at Risk
- **CS_p** Credit Spread
- **DI** Declining Issues
- **DRP** Default Risk Premium
- **e** Expenses
- **EaR** Earnings at Risk
- **EC** Economic Capital
- **ECL** Expected Credit Loss
- **EEMR** Expected Equity Market Rate
- **eI** Expected Loss
- **ER** Effective Return
- **FPC** Future Price of Contract
- **ifc** Income From Capital
- **IR_{risk}** Interest Rate Risk
- **L** Likelihood
- **LGD** Loss Given Default



- **M₂** Modigliani-Modigliani measure
- **MDD** Maximum Drawdown
- **MGI** Monthly Gross Income
- **MRP** Market Risk Premium
- **NP** New Price
- **OP** Original Price
- **p** Probability
- **P_{Capital}** Capital Cost
- **PD** Probability of Default
- **PEE** Public Equity Exposure
- **PI** Pain Index
- **PR** Pain Ratio
- **R** Revenue
- **R_{ap}** Return on Adjusted Portfolio
- **R_f** Risk Free Rate
- **R_i** Interest Rate
- **R_{mkt}** Return on Market Portfolio
- **R_p** Expected Portfolio Return
- **R_{up/down}** Upside/Downside Ratio
- **RAROC** Risk Adjusted Return on Capital
- **RE** Risk Exposure
- **RI** Risk Impact
- **Rr** Recovery Rate
- **RR** Required Rate of Return
- **RT** Risk Tolerance



- **S** Sortino Ratio
- **SPHA** Spot Price of Hedged Asset
- **SR** Sterling Ratio
- **TBY** Treasury Bond Yield
- **V_{peak}** Peak Value
- **V_{trough}** Trough Value
- **WCL** Worst Credit Loss
- **Z** Linear Combination
- **σ_d** Standard Deviation of Downside
- **σ_R** Risk



Constants, Functions, Measurements used

- **Function:** **exp**, $\text{exp}(\text{Number})$
n an exponential function, the value of the function changes by a constant factor for every unit change in the independent variable.



Check other formula lists

- **Risk Management Formulas** 

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