**MACRO Functions**

Function FAME\_Payback(CashFlows, Optional Rate = 0)

'Calculate the payback period or discounted payback period

'Note that the first cash flow must be negative

Dim PayBack As Variant

Dim CumSum As Single

Dim CFCount, Counter As Integer

 CFCount = CashFlows.Count 'Upper bound (i.e., number of cash flows)

 CumSum = 0 'Cumulative sum of cash flows, stop when greater than 0

 Counter = 0 'Counter variable

 If Rate >= 1 Then Rate = Rate / 100

 Do While CumSum <= 0 And Counter < CFCount

 Counter = Counter + 1

 CumSum = CumSum + CashFlows(Counter) / (1 + Rate) ^ (Counter - 1)

 Loop

 If CumSum >= 0 Then

 CumSum = CumSum - CashFlows(Counter) / (1 + Rate) ^ (Counter - 1)

 PayBack = (Counter - 2) - CumSum / (CashFlows(Counter) / (1 + Rate) ^ (Counter - 1))

 FAME\_Payback = PayBack

 Else

 FAME\_Payback = "Payback > Life" 'Report error

 End If

End Function

Function FAME\_Var(Values, Probabilities)

'Calculates the variance with unequal probabilities

Dim Variance As Variant

Dim Avg As Single

Dim Counter As Integer

 If Probabilities.Count <> Values.Count Then 'If counts not equal, report error

 Variance = "Counts not equal"

 GoTo MacroEnd

 End If

 Variance = 0

 Avg = FAME\_ExpValue(Values, Probabilities)

 For Counter = 1 To Values.Count

 Variance = Variance + (Values(Counter) - Avg) ^ 2 \* Probabilities(Counter)

 Next Counter

MacroEnd:

 FAME\_Var = Variance

End Function

Function FAME\_Covar(Values1, Values2, Probabilities)

'Calculates the covariance with unequal probabilities

Dim Covariance As Variant

Dim Avg1, Avg2 As Single

Dim Counter As Integer

 If (Probabilities.Count <> Values1.Count) Or (Probabilities.Count <> Values2.Count) Then

 Covariance = "Counts not equal"

 GoTo MacroEnd

 End If

 Avg1 = FAME\_ExpValue(Values1, Probabilities)

 Avg2 = FAME\_ExpValue(Values2, Probabilities)

 For Counter = 1 To Values1.Count

 Covariance = Covariance + (Values1(Counter) - Avg1) \* (Values2(Counter) - Avg2) \* Probabilities(Counter)

 Next Counter

MacroEnd:

 FAME\_Covar = Covariance

End Function

Function FAME\_Corr(Values1, Values2, Probabilities)

'Calculates the correlation with unequal probabilities

Dim Correlation As Variant

 If (Probabilities.Count <> Values1.Count) Or (Probabilities.Count <> Values2.Count) Then

 Correlation = "Counts not equal"

 GoTo MacroEnd

 End If

 Correlation = FAME\_Covar(Values1, Values2, Probabilities) / (FAME\_StdDev(Values1, Probabilities) \* FAME\_StdDev(Values2, Probabilities))

MacroEnd:

 FAME\_Corr = Correlation

End Function

Function FAME\_StdDev(Values, Probabilities)

'Calculates the standard deviation with unequal probabilities

Dim StdDeviation As Variant

 If Probabilities.Count <> Values.Count Then

 StdDeviation = "Counts not equal"

 GoTo MacroEnd

 End If

 StdDeviation = FAME\_Var(Values, Probabilities)

MacroEnd:

 If IsNumeric(StdDeviation) Then

 FAME\_StdDev = Sqr(StdDeviation)

 Else

 FAME\_StdDev = StdDeviation

 End If

End Function

Function FAME\_CV(Values, Probabilities)

'Calculates the coefficient of variation with unequal probabilities

Dim CoefVariation As Variant

 If Probabilities.Count <> Values.Count Then

 CoefVariation = "Counts not equal"

 GoTo MacroEnd

 End If

 CoefVariation = 0

 CoefVariation = FAME\_StdDev(Values, Probabilities) / FAME\_ExpValue(Values, Probabilities)

MacroEnd:

 FAME\_CV = CoefVariation

End Function

Function FAME\_ExpValue(Values, Probabilities)

'Calculates the expected value with unequal probabilities

Dim ExpValue As Variant

Dim i As Integer

 If Probabilities.Count <> Values.Count Then

 ExpValue = "Counts not equal"

 GoTo MacroEnd

 End If

 ExpValue = 0

 For i = 1 To Values.Count

 ExpValue = ExpValue + Values(i) \* Probabilities(i)

 Next i

MacroEnd:

 FAME\_ExpValue = ExpValue

End Function