

Balloon

Updated: 31 Mar 2016

Use the table-valued function **Balloon** to return the cash flow schedule for a loan with periodic payments of interest (only) and with the principal paid at maturity.

The interest payment period is entered in **Balloon** as the number of months between interest payments. For example, a loan with monthly interest payments would have a frequency of 1. A loan with quarterly interest payments would have frequency of 3. A loan with annual principal payments would have a frequency of 12.

Balloon supports both an initial grace period and an additional grace period during the life of the loan. All payments and their associated dates are calculated with respect to a reference date supplied to the function (which should not be confused with the start date). If an initial grace period is entered in **Balloon** and it is greater than the reference date, then it becomes the first interest payment date and subsequent interest payments are calculated from that date forward.

If any payments would otherwise occur in the specified grace period, then that payment is moved to the end of the grace period and all remaining payments are calculated from the end of the grace period.

If no initial grace period is specified then the first payment date is calculated using the interest payment frequency. If the start date has been entered and the number of months between the start date and the reference date is less than the frequency, then the first payment date is calculated by adding the frequency (as a number of months) to the start date.

If no start date has been entered but a previous payment date has been entered and the number of months between the previous payment date and the reference date is less than the frequency, then the first payment date is calculated by adding the frequency (as a number of months) to the previous payment date.

If there is not start date and previous payment dates or the number of months between those dates and the reference date is greater than the frequency, then the first payment date is calculated by adding the frequency (as a number of months) to the reference date.

All payments in the resultant table are moved to the end of the month and interest is calculated using these end-of-month dates.

The interest payment is calculated as:

$$I = P \times \left[\left(\left(1 + \frac{R \times F}{12} \right)^{12/F} \right)^T - 1 \right]$$

Where:

- I = **InterestPayment**
- P = *OutstandingAmount*
- R = *InterestRate*

F = *Frequency*
T = Time, in years, from **PaymentDate(Period -1)** to **PaymentDate**

If an interest payment occurs at the end of the initial grace period or at the end of the interim grace period and the length of the period (in months) is greater than the frequency, then **Balloon** calculates a 'grace' interest amount and a regular periodic interest amount.

Syntax

```
Public Shared Function Balloon(  
    ByVal OutstandingAmount As Double,  
    ByVal InterestBasis As String,  
    ByVal InterestRate As Double,  
    ByVal PaymentFrequency As Integer,  
    ByVal MaturityDate As Date,  
    ByVal ReferenceDate As Date,  
    ByVal PrevPayDate As Date,  
    ByVal StartDate As Date,  
    ByVal FirstPayDate As Date,  
    ByVal GracePeriodStartDate As Date,  
    ByVal GracePeriodEndDate As Date,)
```

Arguments

OutstandingAmount

the principal amount of the loan. *OutstandingAmount* is an expression that returns a **Double**, or of a type that can be implicitly converted to **Double**.

InterestBasis

the day count convention used to calculate the interest amount. *InterestBasis* can be 30/360, Actual/360, Actual/365, or Actual/Actual. *InterestBasis* is an expression of the character string data type category. *InterestBasis* is an expression that returns a **String**, or of a type that can be implicitly converted to **String**.

InterestRate

the annual rate of interest for the loan. *InterestRate* is an expression that returns a **Double**, or of a type that can be implicitly converted to **Double**.

PaymentFrequency

the number of months in a regular interest payment. *PaymentFrequency* is an expression that returns an **Integer**, or of a type that can be implicitly converted to **Integer**.

MaturityDate

the maturity date of the loan. *MaturityDate* is an expression that returns a **Date**, or of a type that can be implicitly converted to **Date**.

ReferenceDate

the starting date for the number of months with respect to all other dates. *ReferenceDate* is an expression that returns a **Date**, or of a type that can be implicitly converted to **Date**.

PrevPayDate

the last interest payment date prior to the reference date. *PrevPayDate* is an expression that returns a **Date**, or of a type that can be implicitly converted to **Date**.

StartDate

the start date of the loan. *StartDate* is an expression that returns a **Date**, or of a type that can be implicitly converted to **Date**.

FirstPayDate

the {description}. *FirstPayDate* is an expression that returns a **Date**, or of a type that can be implicitly converted to **Date**.

GracePeriodStartDate

the date on which the (interim) grace period commences. *GracePeriodStartDate* is an expression that returns a **Date**, or of a type that can be implicitly converted to **Date**.

GracePeriodEndDate

the date on which the (interim) grace period concludes. *GracePeriodEndDate* is an expression that returns a **Date**, or of a type that can be implicitly converted to **Date**.

Return Type

FinancialTypes.Balloon_table

Class Balloon_table

Inherits Data.DataTable

Property Item(RowIndex As Integer) As FinancialTypes.OutputRow_Balloon

Class OutputRow_Balloon

Public Period As Integer

Public PrincipalPayment As Double

Public InterestPayment As Double

Public CashFlow As Double

Public OutstandingExposure As Double

Public CapitalAmountInDebt As Double

Public TotalExposure As Double

Public NumberOfMonth As Integer

Public PaymentDate As Date

Public GraceInterest As Double

Public InterestRate As Double

End Class

Column	Description
Period	A reference number uniquely identifying a row in the resultant table.
PrincipalPayment	The amount of the principal payment. The only principal payment is on the maturity date of the loan.
InterestPayment	The amount of the regular interest payment.

CashFlow	PrincipalPayment + InterestPayment + GraceInterest.
OutstandingExposure	When Period = 0 then <i>OutstandingAmount</i> . For Period > 0 then OutstandingExposure(Period-1) + InterestPayment.
CapitalAmountInDebt	When Period = 0, <i>OutstandingAmount</i> . For Period > 0 then CapitalAmountInDebt(Period-1) – PrincipalPayment
TotalExposure	When Period = 0, <i>OutstandingAmount</i> . For Period > 0 then CapitalAmountInDebt(Period-1) + InterestPayment
NumberOfMonth	The number of months between the <i>ReferenceDate</i> and the PaymentDate .
PaymentDate	The end-of-month date of the payment.
GraceInterest	The amount of the grace interest
InterestRate	The interest rate from the <i>ReferenceDate</i> to the <i>MaturityDate</i> . See formula above.

Remarks

- The **PaymentDate** for all rows is generated as the last day of the month.
- For **Period** = 0, **PrincipalPayment**, **InterestPayment**, **CashFlow**, **NumberOfMonth**, **GraceInterest**, and **InterestRate** are set to 0.
- The time value (see formula above) is calculated based on *InterestBasis*:
 - For Actual/360 it is the number of days between the 2 **PaymentDate** values divided by 360.
 - For Actual/365 it is the number of days between the 2 **PaymentDate** values divided by 365.
 - For Actual/Actual it is the number of days between the 2 **PaymentDate** values divided by the number of days in the year of the later **PaymentDate**.
 - For 30/360 is the number of months between the 2 **PaymentDate** values divided by 12.
- If *InterestBasis* is NULL then *InterestBasis* = 30/360
- If *InterestBasis* is not 30/360, ACTUAL/360, ACTUAL/365, or ACTUAL/ACTUAL then an error message will be generated.
- If *Frequency* is NULL then *Frequency* = 1
- If *InterestRate* is NULL then *InterestRate* = 0
- If *ReferenceDate* is NULL then *ReferenceDate* = the current system date
- If *MaturityDate* is NULL then *MaturityDate* = the current system date
- **GraceInterest** is only calculated on *FirstPayDate* and *GracePeriodEndDate*.
- **GraceInterest** is only calculated if **NumberOfMonth – NumberOfMonth(Period-1) > PaymentFrequency**
- **GraceInterest** is the difference between the interest for the period from the previous row to the current row minus interest that would have been calculated for a period with length equal to *PaymentFrequency*
- The last row returned will always be for the maturity date and may be shorter than a regular period depending on the combination of dates and *PaymentFrequency*

See Also

- AMORTRATE - Constant daily effective rate for bond/loan amortization
- AMORTSCHED - Generate amortization schedule of a loan
- Bullet - Schedule with single interest and principal payment at maturity
- ConstantCashFlow - Schedule with equal periodic cash flows
- ConstantCashFlowFR - Schedule for a loan with a fixed maturity date and annuity-style payments
- ConstantPaymentAmount - Schedule with no maturity with fixed periodic payment amount
- ConstantPrincipal - Schedule with fixed maturity date where the periodic principal payment is calculated on a straight-line basis
- ConstantPrincipalAmount - Schedule with no fixed maturity with a fixed periodic principal payment
- ConstantPrincipalRate - schedule with no fixed maturity where a fixed percentage principal payment
- CONSTPRINAMORT - Schedule of a loan with a fixed principal repayment
- NPD - Next payment date of a loan
- NPNO - Next payment number of a loan
- PAYMENTPERIODS - Number of months until first payment date, start of grace period, end of grace period, and total number payments for a loan
- PERIODRATE - Adjust the nominal rate of a loan
- PPD - Previous payment date of a loan
- PPNO - Previous payment number of a loan
- UNEQUALLOANPAYMENTS - Schedule for a loan where interest and principal payment frequencies differ