

EXCEL 2007 MACROS FOR FINANCIAL CALCULATIONS

Cosma Emil

Ovidius University Constanta, Faculty of Economics Sciences, Telephone 0721/279981, E-mail: ecosma@univ-ovidius.ro

The performing of the financial calculations (but also of other types of calculations) often becomes a routine, repeatable activity. In Excel the automation of the work is possible by using macros which are registered and which can be edited. By the Recording procedure the addresses related to a domain of cells is memorized, that can be an impediment for the developing of the calculation in another zone of the electronic calculation sheet. The visual Basic for Application language associated with the Excel editing environment offers the possibility to remedy this drawback.

Key words: Macro, Visual Basic for Application, Shortcut, FV(the future value).

The *Excel* editing environment, in fact just like the *Visual Basic for Application* language → **VBA**, associated to any Office program, includes many financial functions, useful for making up applications which administer the personal or business incomes, calculations related to: the monthly installment of a loan, the future value of a rent, or the annual depreciation (clearing off) of fixed means being necessary.

VBA offers the possibility to create a set of instructions which communicates the *Excel* program the necessary operations to be performed in order to accomplish a certain task, by defining a *script* which is called *macro*. A *macro* represents a list of instructions – *macro instructions (macro statements)*. Some instructions perform operations specific to macro, but most of them correspond to the menu macros and to the options from the dialogue cassettes of the basic application. Nevertheless what *Office* program is used, the repeating of some operations is, many times, necessary (for example, the introducing and of a text section forming, the resuming of a series of menu macro). The macros are meant to lessen the editing work and the reducing of the necessary time to perform it. It is possible to *automation* a routine or repeatable activity, its spreading out, by the simple selecting of a macro, pushing of a keyboard or click on a button from a bar of instruments.

Used financial calculation functions:

	Returns
FV (rate,nper,pmt,pv,type)	the future value of an annuity based on periodic, fixed payments and a fixed interest rate.
PV (rate,nper,pmt,fv,type)	the present value of an annuity based on periodic, fixed payments to be paid in the future and a fixed interest rate.
NPer (rate,pmt,pv,fv,type)	the number of periods for an annuity based on periodic fixed payments and a fixed interest rate.
PMT (rate,nper,pv,fv,type)	the payment for an annuity based on periodic, fixed payments and a fixed interest rate.
IPMT (rate,per,nper,pv,fv,type)	the interest payment for a given period of an annuity based on periodic, fixed payments and a fixed interest rate.
PPMT (rate,per,nper,pv,fv,type)	the principal payment for a given period of an annuity based on periodic fixed payments and a fixed interest rate.
Rate (nper,pmt,pv,fv,type,guess)	the interest rate per period for an annuity.
IRR (values,guess)	the internal rate of return for a series of periodic cash flows (payments and receipts).
MIRR (values,finance_rate,reinvest_rate)	the modified internal rate of return for a series of periodic cash flows (payments and receipts).
NPV (rate,value1,value2...)	the net present value of an investment based on a series of periodic cash flows (payments and receipts) and a discount rate.

DDB (<i>cost,salvage,life,period,factor</i>)	the depreciation of an asset for a specific time period using the double-declining balance method or some other method you specify.
SLN (<i>cost,salvage,life</i>)	the straight-line depreciation of an asset for a single period.
SYD (<i>cost,salvage,life,period</i>)	the sum-of-years digits depreciation of an asset for a specified period.

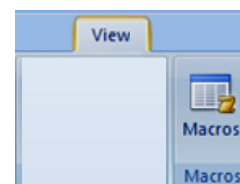
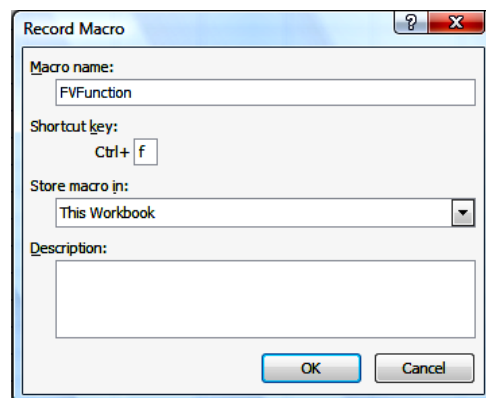
Common **arguments** for the financial functions:

rate	The fix installment of the interest until the term of the borrowing or investment.
nper	Shortening of the expression <i>number of periods</i> . It is the number of installments or of deposits until the term of the reimbursement or of the investment.
pmt	Shortening of the expression <i>payment</i> . Represents the installment or the periodical depositing.
pv	Shortening of the expression <i>present value</i> . It is the current value of the borrowing (capital) or of the initial depositing in an investment.
fv	Shortening of the expression <i>future value</i> It is the future value of the borrowing or investment.
type	Type of installment or depositing. Its value is 0 (implicit value) for the final installments or depositing and 1 for the installments or depositing of the first part of the period.

The registering of a VBA macro

The simplest method for creating a macro is the using of the *Macro Recorder* modules. By means of this method the possibility of registering is activated and the wished operations to be automated are performed gradually (the selecting of a text, the spreading out of some menu macros, the choosing of some options from a dialogue cassette). The *Recorder* changes all the operations into VBA instructions (VBA modules).

In *Excel*, the macro will be placed in current work register, a new work register of in *Personal Macro Workbook* register (the macros will be available in all the work registers). The registering of a macro begins by establishing a name for a macro (such as *FVFunction*) and a *shortcut key* (here *Ctrl+f*):



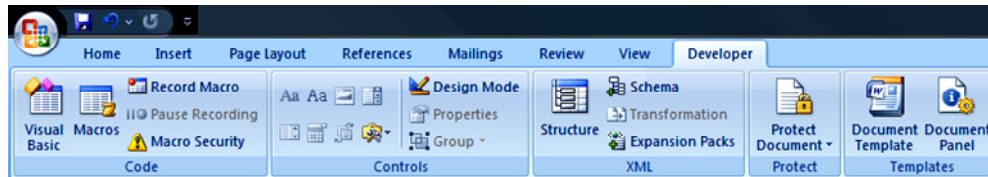
As the registering modules of the macros memorizes all the actions of the user, the nonperforming of unessential macros during the recording is indicated. The entering in the “recording” state is marked in the state bar of the *Excel* program – button .This button will be activated in the moment the registering is finished.

The activating of the VBA editor (Visual Basic Editor – VBE)

VBE can be launched in more ways:

- by visualizing a recorder macro;
- by *Alt+F11* shortcut (in fact, this *shortcut* is a *switch* that facilitates the passing between the *Visual Basic Editor* and the basic application).

- The activating of the button  (*Visual Basic*) from the *Developer* tab. This tab is not implicit visualized, but it may be activated: click on  the *Microsoft Office button*, *Popular*, *Options*, ☒ **Show Developer tab in the Ribbon** .



Running of a macro

A macro can be launched when running:

- by activating *Macros* tab (*View* tab), *View Macros*, *Run*;
- using tab *Run*, , from VBE;
- by its *shortcut* (here *Ctrl+f*);
- by general *shortcut* *Alt+F8*.

If in the *Message Bar* it is notified that the performing of the macros is not permitted because of security reasons (**Security Warning** Macros have been disabled), the user may take the adequate decision activating the  button.

The recording of a macro for the calculation of FV function

- Record Macro (Macro Name : *FVFunction*, shortcut key: *Ctrl+f*);
- Editing of the data for calculation and of FV function:

	A	B	C	D
1	interest rate		0,1	
2	number of payment		2	
3	payment		100	
4	the future value-FV		-210,00 lei	
5				
6				

- Commuting in VBE and visualization of the generated instructions:

```

Sub FVFunction()
'
' FVFunction Macro
'
' Keyboard Shortcut: Ctrl+f
'

    ActiveCell.FormulaR1C1 = "interest rate"
    Range("A2").Select
    ActiveCell.FormulaR1C1 = "number of payment"
    Range("A3").Select
    ActiveCell.FormulaR1C1 = "payment"
    Range("A4").Select
    ActiveCell.FormulaR1C1 = "the future value-FV"
    Range("C1").Select
    ActiveCell.FormulaR1C1 = "0.1"
    Range("C2").Select
    ActiveCell.FormulaR1C1 = "2"
    Range("C3").Select
    ActiveCell.FormulaR1C1 = "100"
    Range("C4").Select
    ActiveCell.FormulaR1C1 = "=FV(R[-3]C,R[-2]C,R[-1]C)"
    Range("C5").Select
End Sub

```

The main deficiency of this macro instruction is the fact that, as many times as its performing is desired, the developing of the calculations takes place only on the A1:C4 cell domain – a fixed zone from the electronic calculation sheet. If the repeating of the calculation is desired in other zones of the electronic calculation sheet, the generated instructions in the *Recording* modules can be replaced:

```

Sub FVFunction()
'
' FVFunction Macro
'
' Keyboard Shortcut: Ctrl+f
'

l = ActiveCell.Row
c = ActiveCell.Column
'

Cells(l, c).Value = "interest rate"
Cells(l + 1, c).Value = "number of payment"
Cells(l + 2, c).Value = "payment"
Cells(l + 3, c).Value = "the future value-FV"
'

Cells(l, c + 2).Value = 0
Cells(l, c + 2).Activate
a1 = ActiveCell.Address
'

Cells(l + 1, c + 2).Value = 0

```

```

Cells(l + 1, c + 2).Activate
a2 = ActiveCell.Address
'

Cells(l + 2, c + 2).Value = 0
Cells(l + 2, c + 2).Activate
a3 = ActiveCell.Address
'

Cells(l + 3, c + 2).Value = "=FV(" + a1 + "," + a2 + "," + a3 + ")"
'

Cells(l, c + 2).Activate
'

End Sub

```

The performed changes allow the developing of the calculation in any zone of the calculation sheet. The necessary values of the calculation may be introduced (reintroduced) in the new cell domain, the calculation function returning the resulting value.

	C	D	E	F	G
48					
49		interest rate		0	
50		number of payment		0	
51		payment		0	
52		the future value-FV	0,00 lei		
53					

	C	D	E	F	G	H
48						
49		interest rate		0,1		
50		number of payment		2		
51		payment		100		
52		the future value-FV		-210,00 lei		
53						

Some explanations:

- The **l** and **c** variables retain the address (top left corner of the new cell domain (the entering data are initialized with zero);
- With **Cells (....,) Value** the textual and numerical values (the entering data are initialized with zero) are displayed;
- With **Cells (....,). Activate** the calculation cells for retaining their addresses are activated;
- **a1, a2, a3** are the addresses of the cells that contain the necessary data of the calculation;
- **FV** function is the written text and it results from concatenation of strings of characters.

Bibliography

1. McFedries P., - *VBA Ghid pentru începători*, Editura Teora, 2006
2. Cosma E., - *Bazele BASIC-ului*, Editura ExPonto, Constanța, 2006