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Banking Techniques. A Didactical Application

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Abstract. This work is a presentation of the Excel software containing 15 computing sheets and proposed problems in order to improve the students' abilities to perform calculus about banking specific area. Thus calculus related to bank deposits, taking a loan, refinancing a credit and leasing operations are provided.

Keywords: teaching software, banking, loans, interest, rates

INTRODUCTION

In order to educate the students in the Banking discipline it was necessary to create a teaching software to get accustomed with the related specific items, and to offer a strong computing method for mainly operations like would be a bank deposit, a loan payment, bounds purchasing and more. The Romanian bank system received many accusations from the clients about many ambiguous contract clauses and the situation was partially regulated by a Governmental decision this year. This software could also be used by any potential bank client

MATERIALS AND METHODS

The MS Office Excel version 2008 was used to perform the work, using the financial functions and facilities offered by the program. General formulas of calculating the interest, payments and other banking related items were also used.

RESULTS AND DISCUSSION

The simplest banking operation is a bank deposit. In order to obtain a profit for such a bank deposit we have to calculate the final interest. Thus we will need the initial data as initial deposit, interest rate and regular deposit if any.

There are three types of possible deposits: 1 year, a number of months and a number of days. Having the number of capitalizations (the minimum term deposit multiplied by an integer number) we will obtain the final amount to be withdrawn. The second problem is returning the sum necessary to be deposed periodically in order to finally obtain a certain amount.

All this desired data are exposed in Tab 1 bellow as a spread sheet image.

Tab. 1

Excel sheet to calculate the final amount of a deposit in certain conditions and the necessary regular deposit in order to obtain a certain amount

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	D E	F G	н і ј к	L N	M
Returns the final amount	of a deposit in		Returns the necessary annu		
certain conditions			to obtain a desired amount i	n certain conditions	
Application 1			Application 4		
Initial deposit	15000		Initial deposit	10000	
Number of years	7 🗸	EARS	Number of years	5 AN	
Number of years	<mark>, 1</mark> 1	EARS	Number of years	JAN	41
	100		Interest rate	0.000	
Anual deposit	100		interest rate	8,00%	
¹ 2 Interest rate	4,00%		Account amount	25000	
3	1,0070		, lood and amount	20000	
Account amount	20.528,81		Annual deposit	1.756,85	
	20.020,01		, unidal depotit	11100,00	
Amount for a X-month	term deposit with matu	urity der	position		
Application 2			Application 5		
Initial deposit	15000		Initial depositt	10000	
Deposit term	-1 LU	JNI	Term deposit	3 LU	JN
2					
Capitalisation	86		Capitalisations	40	
4					
Term deposition	200		Interest rate	8,00%	
6					
/ Interest rate	4,00%		Account amount	36000	
3					
Account amount	39.850,90		Term deposit	230,45	
	(luni 🖉 Depozite la 1 an 🏑 Depozite la X zile	🖉 Rata imprum	ut PMT Valoal 4		
	abau - Microsoft Word 59 Belatii bancare engleza				-

In the Tab 2 is presented the representation of a days-term deposit (left side) and also the final account amount end of each cycle. On the right side is the corresponding problem to be solved by the student. Thus the student receive instantly the confirmation if his answer is correct or no. More than that the student can create his own problem by changing the initial data of the problem

Tab. 2

Excel sheet to calculate the final amount of a deposit in certain conditions and the amount after each

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ennu	eposit - /	uays					FIODiem	. com	plete by yourself the green	neius	and solve the	problem		
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Jebosi	annitou		10000						and knowing that the int			8,00%	and the year I	
nteres	•		8.00%						We will have in our account after		capitalisations	16584		CORE
iteres			0,00 /8				303	uays	sive will have in our account after	0	capitalisations	10004		CORE
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								ber c	of capitalisation till the en	a of t	ne year are		capitalisatic	
ycle		000	beginning		Ammount to	the final cycle								
1					15253,15									
2	1525				15510,57									
3	1551				15772,34									
4	1577				16038,53									
6					16309,20									
6	1630	9,20			16584,45									
> > P	rotect Dep	inere FV	Depozite la X lur	i De	pozite la 1 an De	pozite la X zile	Rata imprum	UT PMT	Valoal 4					-

In the sheet presented in Table 3 the annual interest rate is determined for a loan, knowing the loan value, the annuity and the number of periods the payment will be performed. Also this sheet is working in two variants: monthly payment and yearly payments.

Tab. 3

Tab. 4

	cel sheet to calculate the annual interest rate for	a loan		
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	;"Date incorecte.Anuitatea e prea mare.Mariti creditul sau micsorati anuitatea sau micso	orati perioada";(IF(E17 <e15 e19;"date<="" th=""><th></th><th>0</th></e15>		0
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	ST RATE DETERMINATION FOR A LO	DAN		
2	1000			
3 Loan value	1000			
4				
5 ANUITY (monthly)	<u>50</u>			
6				
7 Period	60 month			
8				
Monthly interest rate	4,68%			
	4,0070			
Annual interest rate	EQ 440/			
	56,14%			
12				
ANNUAL INTEREST R	ATE FOR A LOAN			
Loan value	1000			
	1000			
16	50			
7 Anuity	50			
18				
19 Period	5 ani			
20				
Annual yearly payment	-33,53% Date incorecte.Anuitatea	e prea mica. Marit	i anuitat	te
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One of the most important problems is to determine the actual value of a bond (or Net Present Value). Other ways, which is the real value of the bond knowing the nominal value the bond rate, the market interest rate , the period of payments and the expired periods (Tab 4)

		Excel sh	neet to calcul	ate the actual value	of a bond and the c	ash flow	
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9				-		· · · · · · · · · · · · · · · · · · ·	
10 Inte	rest ra	te on th	ne marke	et	12,00%		
11							
12 Nun	nber o	f perioc	ls		36		
13							
14 Pres	sent va	alue		5075,80	Cash flow		
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In Table 5 is presented a complex database the initial data being: the amount taken, the rate interest, the credit period, the promotional period with reduced interest rate and the Non payment period. This data can be easily introduced in the program. More than that a very large range of commissions could be inserted in data entry: Both fixed and variable commissions, in the three possibilities: initial, annual and monthly commissions. All of these possibilities can be specifically splinted in: included in credit or to be paid from the beginning, as percentage of sold or as percentage of credit. The different variants could be chosen by rolling lists.

Bellow the data entry section are calculated the following items for each month: the remaining credit, the interest to be paid, the principal, the annuity, the commissions, the total

amount to be paid. The results are presented as the reimbursement graphic. A synthesis of a certain month payment is available also with a month's balance presenting the total paid amount and the remaining amount to be paid. In order to report these situations a rolling list is provided thus having the possibility to choose between desired months. A rolling list is also available in order to choose between equal and decreasing credit annuity.

The indicator of "DAE" –the initial of annual effective interest including the bank interest rate and the total commissions is also provided. DAE is the proper indicator in order to assess the real interest rate of a loan and has to be calculating according with legislations.

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	к12 • (э	∬∝ % of cred	it								
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	Promotional pe		nth)			Fixed com	missions		EUR		
F	Promotional in	terest		4,00%		Variable com	missions			% of sold	
1	No payment pe	eriod (mo	nth)	4		Commissi	ons to ne	- naid	En	d of the year	
	to payment p								EII	u or the year	
						MONTHLY					
F	Payment method	ds: Anuity	1	Egual		Fixed com	missions		EUR		
						Variable com	missions	0,10%		% of credit	ŀ
-	o be paid in month	data		2011	mar		Payment data			% of sold % of credit	1
'	Initial credit	Interest	Principal	Anuity		Total payment		halance	1	(end of the month)	1
	10202.00	34.01	0.00	34.01	10.20	44.21	Credit	Interest		Total	
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- 12						+	Annual	Data	Monthly		
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About the same explanations are available for the sheet presented in Tab 6 related to refinancing a credit. The main difference consists in the possibility to refinance the credit from the previous sheet (Tab. 5) starting with a certain amount. Thus the amount to be refinanced is automatically taken following the options from a rolling list.

Excel sheet to calculate the refinancing credit graphic

Tab. 6

The value of refinancing credit Preluare foaie EUR Refinancing Takes the credit from "Calculator rate" Sheet Refinancing Promotional interest 12 (651,42) (651,42) INITIAL COMMISSIONS EUR Refinance data 8,00% Variable commissions EUR includ in credit Refinance data 20-feb11 ANNUAL COMMISSIONS EUR includ in credit Promotional period (month) 6 Fixed commissions EUR % of sold Promotional interest 4,00% Variable commissions EUR % of sold No payment period (month) 3 Commissions to pe paid EUR % of sold Promotional interest Anuity Egual Fixed commissions 0,10% % of sold Payment methods: Anuity Egual Fixed commissions 0,10% % of sold Initial credit Interest Anuity Commissions 0,10% % of sold Payment methods: Anuity Egual Commissions 0,10% % of sold % of sold Initial credit Interest Anuity Commissions 0,10% % of sold Payment attribution<	The value of refinancing credit Proluare foaie Function of the credit from "Catculator rate" Sheed CALCULATES THE REFINANCING CREDIT The value of refinancing credit Proluare foaie EUR Takes the credit from "Catculator rate" Sheed Refinancing starting with month no: 12 Colspan="2">Colspan="2">Colspan="2">Colspan="2">Catculator rate" Sheed Refinancing starting with month no: 12 Colspan="2">Colspan="2">Colspan="2">Catculator rate" Sheed Refinancing starting with month no: 12 Colspan="2">Colspan="2">Colspan="2">Colspan="2">Catculator rate" Sheed Refinancing starting with month no: 12 Colspan="2">Colspan="2">Colspan="2">Colspan="2" Period colspan="2" Colspan="2" Colspan="2" Colspan="2" Promotional interest Along % Colspan="2" Colspan="2" Colspan="2" Promotional interest Principal Anuity Colspan="2" Colspan="2" <th c<="" th=""><th></th></th>	<th></th>	
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Tab. 5

The leasing procedure is reflected in table 7 which introduces some new items: the residual value and the two type of leasing: operational and functional. The residual value is the remaining value not being paid by the leasing taker after the restitution of the leasing taken good (operational leasing).

In case of functional leasing the residual value is paid in the last month of the leasing. The program offers the possibility of switching through the two types of leasing using a rolling list.

Overall the application offers about 15 spreadsheets. More than the presented sheets, the program offers the possibility to calculate the annuity of a loan, the maximum possible value of a loan considering a monthly payment, the number of month determination for a certain amount to be granted, the interest rate for certain month and conditions and others all presented gradually in order to allow students to get accustomed with the topic. Each computing spreadsheet has a related problem to be solved and the end about 20 complex problem are proposed to be solved (the number can be easily increase). Some problems are interactive meaning that the student can change the entry data. After each answer a confirmation of correct/wrong answer is provided and to some problems is calculated even the degree evaluation.

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Excel sheet to calculate the reimbursement leasing graphic

Tab. 7

CONCLUSIONS

The author of this software application hopes to offer a useful instrument for students in order to get accustomed with the necessary term and notions in order to perform a broad range of banking operations. As the author knows this is the strongest instrument of calculus nowadays on Romanian market.