Casio Financial Consultant

A Supplementary Reader - Part 3

An Electronic Publication
By QED Education Scientific

CASIO Financial Consultant: A Supplementary Reader - Part 3

CONTENTS

INTRODUCTION

Welcome to the world of CASIO Financial Consultant calculator.

The intention of this 4-part reader is to supplement the User's Guide of FC-100V/FC-200V. We adopt the work-example approach as we believe this makes the reader both effective and efficient for use. Some examples are slightly methodical, but you should find them useful nonetheless. The goals of the 4 parts are:

- Part 1 – Help users get started and explore the interface and setting.
- Part 2 – Using CMPD and AMRT for loan and annuity related calculations.
- Part 3 – Help users get familiar with CASH and CNVR modes.
- Part 4 – Using FC-200V Bond and Depreciation calculations

The FC-200V is an extended version of the FC-100V, and for your convenience we include a comparison chart of both models in the reader. Key-strokes for all financial modes for both models are cleverly remained the same by **CASIO**, with the exception to Bond, Depreciation and Break-Even Value, which are functions only available on the FC-200V. User will also find that operations of some scientific calculations are different too. We refer ONLY to FC-200V in all examples but owner of FC-100V will find that the examples provided also work on their machine.

We have referred to these resources for inspiration: (i) Schaum's Outlines on Mathematics of Finance and (ii) Casio's Financial Activity for TVM. Screenshots in the pages are screen dumps from the Casio AFX-2.0+. For this we would like to thank Marco Corporation (M) Sdn. Bhd. for their technical support.

We did our best to reduce number of mistakes within this reader. But if you do see any, you are most welcome to report them via info@qed-edu.com. Please also send us your feedbacks.

Mun Chou, Fong
Product Specialist
QED Education Scientific Sdn. Bhd.

First publication: June 2006, Edition 1
This publication: June 2007, Edition 2

Equivalent Rates with CNVR

In this discussion we take that the nominal rate of interest j_m (compounded m times a year) is equivalent to the annual effective interest rate j (compounded annually) if they both yield the same interest per year.

Example 1 ►>> Find the rate j_{12} equivalent to $j = 10.08\%$.

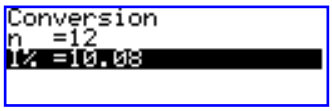
Operation

❖ First enter CNVR mode by tapping on [CNVR].

❖ Enter 12 for [n] and input the value 10.08 for [I%].

[1] [2] [EXE]

[1] [0] [•] [0] [8] [EXE]



Screenshot from Casio TVM

❖ Scroll down to select [►APR], and then solve it.

[▽] [SOLVE]

Output: APR = 9.642251301

The calculator gives us the nominal rate as roughly $j_{12} = 9.64\%$. ■

Sometimes users are confused with APR and EFF; just remember that solving for APR will yield a lower interest rate, while solving for EFF will yield a higher rate. Also, understand that APR and EFF are inverse functions of each other.

Example 2 ►>> Find the rate j_2 equivalent to $j_4 = 12\%$.

Operation

We cannot do a direct conversion for this example at the calculator. So firstly, we solve for the annual effective interest rate j which is equivalent to $j_4 = 12\%$.

❖ Enter CNVR mode, then enter 4 for [n] and 12 for [I%].

[CNVR] [4] [EXE] [1] [2] [EXE]

❖ With [►EFF] selected, press [SOLVE] to solve.

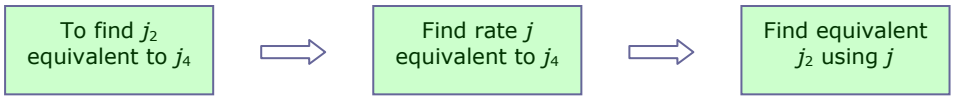
Output: EFF = 12.550881

The rate obtained is the annual effective rate j. Now we use j to find j_2.

❖ While the result of EFF still in display, tap [ESC] to return to CNVR screen. Notice that [I%] now takes the value of 12.550881.

❖ Scroll up to enter 2 for [n], and then scroll down to select [►APR] and solve it.

[▲] [▲] [2] [EXE] [▼] [▼] [SOLVE] **Output: APR = 12.18**



Solution Flow Chart for Example 2

So we have $j_2 = 12.18$ being equivalent to $j_4 = 12\%$. ■

FC-100V/FC-200V cannot perform a conversion when the rate involved is a continuously compounded rate; we could however overcome this by assigning a large value to n, say 10^{10}.

Example 3 ►>> Find the rate j_4 equivalent to $j_\infty = 9\%$.

Operation

Note that this example's solution flowchart is similar to the example above. So firstly, we find the annual effective rate j from $j_\infty = 9\%$ first, and use this rate to find j_4.

❖ Enter CNVR mode, then enter 10^{10} for [n] and enter 9 for [I%].

[CNVR] [1] [0] [x10^x] [1] [0] [EXE] [9] [EXE]

❖ With [►EFF] selected, press [SOLVE] to find j. **Output: EFF = 9.417428371**

❖ Now tap [ESC] to return to CNVR screen. Scroll up to enter 4 for [n], and then scroll down to select [►APR] and solve it.

[▲] [▲] [4] [EXE] [▼] [▼] [SOLVE] **Output: APR = 9.102013666**

So we understand that the rates $j_\infty = 9\%$ and $j_4 = 9.10\%$ both yield the same amount of interest per year. An important note on is that the larger the value n is assigned with, the more accurate the resulting output becomes.

We end this discussion on CNVR mode with an example on using CNVR mode in making a financial decision.

Example 4 ►>> A financial institution offers guaranteed investment certificates paying interest rate at $j_{12} = 11\frac{1}{4}\%$, $j_4 = 11\frac{3}{4}\%$ and $j_1 = 12\frac{1}{4}\%$. Which options is the best?

Operation

To do the comparison we just need to find all three effective rates. Firstly, the annual effective rate of $j_{12} = 11\frac{1}{4}\%$.

❖ Enter CNVR mode, then enter 12 for [n] and enter 11.25 for [I%].

CNVR 1 2 EXE 1 1 • 2 5 EXE

❖ With [►EFF] selected, press SOLVE to find j. Output: EFF = 11.84859374

So the annual effective rate of $j_{12} = 11\frac{1}{4}\%$ is about $j = 11.85\%$. Next solve for $j_4 = 11\frac{3}{4}\%$.

❖ Return to CNVR screen, then enter 4 for [n] and enter 11.75 for [I%].

CNVR 4 EXE 1 1 • 7 5 EXE

❖ Again, with [►EFF] selected, press SOLVE to find j. Output: EFF = 12.2779478

Finally, without any calculation required, we know that the effective rate of $j_1 = 12\frac{1}{4}\%$ is $12\frac{1}{4}\%$, or 12.25%.

Comparing these three rates, the guaranteed investment certificate at $j_4 = 11\frac{3}{4}\%$ gives the best rate of return. ■

Cash Flow with CASH

Evaluating future cash flows is one of the methods that help businesses make investment appraisals. The CASH mode of FC-100V/FC-200V can assist us in making the essential cash flows calculations. A new feature is the list-like data editor which allows user to "see" all entries and this should help reduce entry mistake.

As with *Equivalent Rates with CNVR*, the nominal rate of interest is represented by j_m (compounded m times a year). In the first example we look at the NPV calculation.

Example 1 ►>> A project is expected to provide the cash flows indicated below. Is it wise to invest \$100,000 in this project if the cost of capital is (a) $j_1 = 7\%$, (b) $j_1 = 14\%$?

Year End	1	2	3	4
Cash Flow	\$40,000	\$25,000	\$35,000	\$30,000

Operation

❖ First enter CASH mode by tapping on [CASH]. A good practice is to clear the data editor before a new calculation. Enter memory manager, then scroll down to select [D.Editor:EXE] and clear it.

[SHIFT] [9] [▽] [▽] [▽] [▽] [▽] [▽] [EXE] [EXE] [AC]

❖ Scroll down to select [Csh=D.Editor x] and enter data editor.

[▽] [EXE]

The data editor may have 2 columns (if STAT at Setup is ON) but only column 'X' is used in CASH mode calculations. Enter the cash flows into column 'X'.

❖ As the initial investment is \$100,000, the first entry should be -100,000.

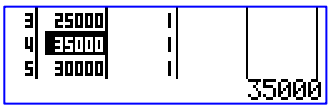
[(–)] [1] [0] [0] [0] [0] [0] [EXE]

[4] [0] [0] [0] [0] [EXE]

[2] [5] [0] [0] [0] [EXE]

[3] [5] [0] [0] [0] [EXE]

[3] [0] [0] [0] [0] [EXE]



Screenshot from Casio TVM

❖ Return to CASH mode and enter 7 for [I%].

CASH 7 EXE

❖ Now scroll down to select [NPV:Solve] and then solve it.

▽ SOLVE

Output: NPV = 10676.42783

The NPV indicates an expected profit of about $10,676 when cost of capital is 7%. Now repeat the same cash flows calculation but with cost of capital of 14%.

❖ Return to CASH mode and enter 14 for [I%].

CASH 1 4 EXE

❖ Now scroll down to select [NPV:Solve] and solve it again.

▽ SOLVE

Output: NPV = -4289.181102

For cost of capital of 14%, we can expect a loss of about $4,289.

Obviously the project is viable when $j_1 = 7\%$ but not when $j_1 = 14\%$. ■

Another investment appraisal method is through the calculation of IRR.

Example 2 ►>> An investment of $5 million is expected to return $1.75 million at the end of year 1 and year 2, and $2.5 million at the end of year 3. Calculate the IRR this investment produces.

Operation

❖ First enter CASH mode by tapping on CASH, then clear the data editor.

SHIFT 9 ▽ ▽ ▽ ▽ ▽ ▽ EXE EXE AC

❖ Scroll down to select [Csh=D.Editor x] and enter data editor.

▽ EXE

❖ Enter the initial investment of 5 million or, 5,000,000.

(–) 5 0 0 0 0 0 0 EXE

❖ Follow by entering the inflow values for the next three years.

1	7	5	0	0	0	0	EXE
1	7	5	0	0	0	0	EXE
2	5	0	0	0	0	0	EXE

❖ Return to CASH mode once more, scroll to select [IRR:Solve] and solve it.

CASH ▽ ▽ ▽ EXE

Output: IRR = 9.093967317

Therefore the IRR of this investment is approximately 9.094%. ■

FC-100V/FC-200V also allows us to appraise the Payback Period (PBP) and Net Future Value (NFV) of the investment. Plainly put PBP is the time (in year) when NPV = 0; while NFV is the accumulated value of NPV at the end of *n* period.

Example 3 ►>> Find the corresponding Payback Period and Net Future Value of the investment in Example 2 when cost of capital is $j_{12} = 10\%$.

Operation

It is easier to deal with j_1 so first let's convert $j_{12} = 10\%$ to its equivalent j_1.

❖ Enter CNVR mode, enter 12 for [n], 10 for [I%] and select to solve [►EFF].

CNVR 1 2 EXE 1 0 EXE

SOLVE

Output: EFF = 10.47130674

So the equivalent effective rate is approximately $j_1 = 10.47\%$. Now use this to find PBP and NFV, assuming that the data editor has not been edited since Example 2.

❖ Return to CASH mode again, scroll down to select [PBP:Solve] and solve it.

CASH ▽ ▽ ▽ ▽ SOLVE

Output: Math Error

The error message means there is no possible PBP! The reason is because the rate of $j_1 = 10.47\%$ is greater than the IRR obtained earlier, which in turn means that this investment will produce a loss. We also expect NFV to be negative, which is indeed true.

❖ Clear the error message, and then select to solve [NFV:Solve].

Output: NFV = -171977.1617

With NFV at minus 172 thousand, this is certainly not a viable investment. ■

FC-200V/FC-100V Comparison Chart

Calculator Functions	FC-200V	FC-100V
Scientific Calculation	Yes	Yes
1- & 2- Variable Statistics	Yes	Yes
Statistical Regression	Yes	Yes
Simple Interest	Yes	Yes
Compound Interest	Yes	Yes
Cash Flow (IRR, NPV, PBP, NFV)	Yes	Yes
Amortization	Yes	Yes
Interest Rate Conversion	Yes	Yes
Cost & Margin Calculation	Yes	Yes
Days and Date Calculation	Yes	Yes
Depreciation	Yes	-
Bonds	Yes	-
Breakeven Point	Yes	-

Key Applications		
Business and Finance Studies	•	•
Banking and Banking Studies	•	•
Insurance and Financial Planning	•	•
Investment Appraisal	•	•
Stock Market and Bonds	•	
Business and Financial Investment	•	

Product Features		
Expression Entry Method	Algebraic	
Screen Display	4 Lines x 16 Characters	
Memory (plus Ans Memory)	8	
Programmable?	No	
Settings and Functions Short Cut Keys	Yes, 2	
Function Catalog	Yes	
Batteries	Solar Cell & LR44	1 x AAA-Size
Dimension (mm)	12.2 x 80 x 161	13.7 x 80 x 161
Weight	105g	110g