EASY FINANCE V

commodore 64

THIS PRODUCT REQUIRES COMMODORE 1541 DISK DRIVE

commodore

EASY FINANCE V

Preface

In today's fast-paced economy, you need to make the right financial decisions; your Commodore 64 can show you how. EASY FINANCE calculates financial statistics and forecasting for you.

EASY FINANCE is completely pre-programmed; you need absolutely no programming knowledge to use this product. All the screens use several colors so the information is very clear. To make the program even easier, EASY FINANCE has a tutorial you can request to see on your screen any time during the program.

Here are the 9 statistics and forecasting functions EASY FINANCE can help you determine:

- Risk adjusted net present value
- Payoff matrix analysis
- Bayesian decision analysis
- Regression analysis forecasting
- Moving average forecasting
- Exponential smoothing forecasting
- Expected value computation
- Average growth rate/future projections
- Apportionment by ratios

This manual follows the same logical sequence and uses the same terminology as the statistics and forecasting functions you will see on your screen. Some generally accepted concepts and practices are also presented. At the end of the manual, you'll find a glossary that briefly explains some financial terminology.

Read through the manual and practice the examples so you feel at ease with the package in the shortest possible time. Then, you can easily select each statistics and forecasting function and enter your information. Each calculation requires only a few simple keystrokes. In just a few minutes, you'll master this powerful, easy-to-use product.

User Conventions

The Commodore 64 keyboard looks like a regular typewriter with a few extra keys; it is very simple to use. Here is a brief description of some of the conventions you should know to run EASY FINANCE V.

RETURN Pressing this key transmits information to the computer's memory.

SHIFT This key is like the **SHIFT** key on a typewriter; pressing it lets you enter the top characters on double-character keys.

/ In this manual, / denotes the CURSOR. This is the little colored rectangle you see blinking on your screen. It shows you where to begin entering information.

=> This is the prompt character which precedes the cursor on your screen. It indicates that you will be entering information on that line.

INST/DEL You can change information you have keyed in before you press **RETURN** by using the **INST/DEL** key.

DEL stands for DELETE. You can delete characters on a line by following these steps:

1. Look at the cursor. The character immediately preceding its position will be the first character deleted when you press the **INST/DEL** key.
2. Press the **INST/DEL** key.
3. You will see the cursor move back one space and the character there will be erased.
4. If you wish to erase more than one character on a line, hold the **INST/DEL** key down and you will see characters deleted one at a time on your screen.
5. Continue on with the program.

'n' In this manual, any character surrounded by single quotes (') denotes entries you will key in. Enter only the character between the quotes and **not** the quotes themselves. For this example, **n** is the character, so you would key in only the **n**; not **'n'**.

"n" Any character surrounded by double quotes (") in this manual indicates information the program will present for you on the screen.

Diskette Handling

You should handle the EASY FINANCE diskette carefully; it contains your computer programs. Follow these instructions for the use, handling, and care of all of your diskettes.

- Store diskettes in their separate paper folders and stand them on edge to prevent damage to the magnetic surface.
- Do not damage the non-removable black diskette envelope; if the envelope is damaged, the diskette itself may also be damaged.
- Do not wash diskettes; you can purchase compressed air in a spray can from most photographic stores and this can be used to remove dust. You can also use a soft brush if necessary.
- Do not store diskettes in direct sunlight or near excessive heat of any kind.
- Do not bend diskettes; handle them very carefully, especially when you are placing them in or out of the disk drive.
- Do not open the disk drive door when the red IN USE light is on; you can damage the diskettes if you open the door.
- Do not attach paper clips to diskettes.
- If you need to label a diskette, use only a felt-tip pen.
- Do not expose diskettes to any magnetic source, such as electrical equipment or telephones; this may erase data from the diskettes.

Table of Contents

Section I Tutorial

1.1. Getting Started

Here is how you start the EASY FINANCE program. We suggest you follow right along on your machine, step by step.

1. Turn on your Commodore 64 and your disk drive.
2. If you have a printer, turn it on and align the paper.
3. Insert EASY FINANCE disk with label side up into your disk drive.
4. Key in **'LOAD"*",8'** and press **RETURN.**
5. After **"SEARCHING FOR *"**, **"LOADING"**, and **"READY"** are displayed, enter **'RUN'** and press **RETURN.**

Then, you will see this on your screen:

EASY FINANCE V

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and
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After a few seconds, this menu will be displayed for you:

$$ EASY * FINANCE V $$

F1 — BACKGROUND COLOR
F3 — BORDER COLOR
F5 — CHARACTER COLOR
F7 — DONE

PRESS A FUNCTION KEY TO CHANGE COLORS

The function keys are located on the right side of the Commodore 64 keyboard. Try pressing each one several times so you can see what colors are possible on your screen. Then, choose which colors you like best for the background, border, and characters of EASY FINANCE.

When the colors on your screen are the colors you want for the program, press **F7** once. There will be a short delay and then you will see the following menu.

$$ EASY * FINANCE V $$

STATISTICS AND FORECASTING PACKAGE

MODE: INPUT
MENU DISPLAY

1 RISK ADJUSTED NET PRESENT VALUE
2 PAYOFF MATRIX ANALYSIS
3 BAYESIAN DECISION ANALYSIS
4 REGRESSION ANALYSIS FORECASTING
5 MOVING AVERAGE FORECASTING
6 EXIT
7 ADDITIONAL SELECTIONS

ENTER YOUR SELECTION (1-7): /

The cursor ("/") will be blinking where you will enter your selection. Enter the number preceding the function you want to run. For example, if you want to run RISK ADJUSTED NET PRESENT VALUE, key in **'1'**. If you respond with **'7'**, you will see this screen:

$$ EASY * FINANCE V $$

STATISTICS AND FORECASTING PACKAGE

MODE: INPUT
MENU DISPLAY

1 EXPONENTIAL SMOOTHING FORECASTING
2 EXPECTED VALUE COMPUTATION
3 AVERAGE GROWTH RATE/FUTURE PROJECTIONS
4 APPORTIONMENT BY RATIOS
5 EXIT
6 HELP
7 PREVIOUS SELECTIONS

ENTER YOUR SELECTION (1-7): /

Enter your selection by keying in the number preceding the function you wish to perform. If you respond with **'6'**, you will see the EASY FINANCE general overview tutorial presented on your screen. To continue through the tutorial, press **'C'**; to end the tutorial and return to the first function selection menu, press **'R'**.

Choose the program function you want and enter the number that precedes it on the function selection menu. If you want to see the functions on the first menu, enter **'7'** and the first menu will appear on your screen. If you want to see the second menu again, enter **'7'** while you are looking at the first menu, and the second menu will appear on your screen.

Choose the function you wish to run and then you will see different displays as you go through the program. You will be prompted for the information needed to calculate the function you chose on one of these first menus.

You may see a tutorial about the specific function you're running when you are responding to a prompt for numeric data by pressing **'T'** followed by **RETURN.** To continue through this tutorial for that specific function, press **'C'**; to end the tutorial and return to the point where you left the function's run, press **'R'**. After you have entered all the data the program requests, EASY FINANCE will calculate the function and display the results for you.

Section 4.1 of this manual follows the program step by step for computing choice number 2 on the second of the two function selection menus, EXPECTED VALUE COMPUTATION.

1.2. Guidelines for Entering Information

Here are some guidelines you should know when you are responding to the EASY FINANCE prompts:

- There are two ways you can enter responses to the EASY FINANCE prompts. Some prompts require that you press **RETURN** after you enter the information and some do not.
  1. If your response consists of only one character, such as **'Y'** or **'N'**, do not press **RETURN.**
  2. If your response consists of numeric data, such as your response to the NO. OF PERIODS prompt, you must press **RETURN** after entering your response.
- You may respond to a prompt with **'0'** by simply pressing the **RETURN** key; you will see a **"0"** on the next menu that displays your response.
- The message **"DATA ERROR"** will flash if entries are incorrect. If this happens immediately after you have keyed in your information, press any key and you will be prompted to change the incorrect item. Enter the correct information and continue on with the program from that point. If the message **"DATA ERROR"** flashes while you are waiting for EASY FINANCE to calculate your results, you must enter valid data. You may want to refer to the tutorial or this manual to see what entries are valid for your specific responses.
- EASY FINANCE can perform calculations on your individual responses. If you want the program to add (" + "), subtract (" – "), multiply ("*"), or divide ("/") your entry, simply enter the appropriate arithmetic operator between your responses. For example:
  1. The program prompts you to enter the value for each period.
  2. You know your weekly value is 50, and you want to use monthly values. Since there are four weeks in each month, enter **'50 * 4'.**
  3. The next screen will display your value for that month as **"200".**
- Exponents will not be accepted by the program; you must enter all responses in decimal format.
- Your screen shows only two decimal places, but if you enter more than two, the extended values will be used in processing your answer.

- Enter percent values as percents; do not enter them as hundredths. For example, 5 & 3/4% is entered as **'5.75'**; it is not entered as **'.0575'**.
- If you enter a value that is more than nine digits long, percent signs **("%%%%%")** will appear on the screen because the screen cannot display numbers with more than nine digits. However, EASY FINANCE can perform calculations on these numbers, so the program will still process correctly. You will not be able to view any answer that is more than nine digits long.
- If the result of any calculation is greater than 10 raised to the 38th power, the message **"FATAL ERROR"** will flash on your screen and the program will stop running at this point. You **must** turn off your Commodore 64 and start the program over again.
- When EASY FINANCE prompts you for a whole number, any decimal value you may enter will not be processed even though that value will be displayed. For example:

  1. For the NO. OF PERIODS prompt, enter **'4.1'**.
  2. On the next display, you will see **"4.1"** listed as the NO. OF PERIODS.
  3. EASY FINANCE will calculate the answer using **'4'** for the NO. OF PERIODS.

  You may enter decimal values for any prompts that do not require whole numbers, such as VALUE PERIOD #1.

1.3. Using Special Options

There are six special options you may want to use when you are running the EASY FINANCE program. You can use these options only at certain points during the program's run. The options are:

1. **'T'**
   - Displays the tutorial for the function you are currently running. Valid only when the EASY FINANCE disk is in the disk drive and you are responding to a data item prompt, such as **"NO. OF PERIODS".**

2. **'D'**
   - Displays everything you have entered for this function. Useful when you are running a function that presents more than one screen of data. Valid only when you are responding to a data item prompt or the **"ANY CORRECTIONS? (Y OR N)"** prompt.

3. **'S'**
   - Erases all previous entries and causes the program to prompt you for entries again. Valid only when you are responding to a data item prompt, such as **"NO. OF PERIODS".**

4. **'N'**
   - Cancels your request to change information you have entered. Valid only when you are responding to the prompt, **"ITEM NUMBER TO BE MODIFIED".**

5. **'P'**
   - Prints what you are currently viewing on the screen. Valid only when you are responding to these prompts:

     "RE-RUN? (Y, OR N, OR P)"
     "GRAPHIC OUTPUT? (Y, OR N, OR P)"

     If you use the **P** option, you must wait until printing has completed before you enter any more information. You will see a **"WAIT . . . PRINTING"** message on your screen while printing occurs.

     NOTE:
     If your printer is disconnected or turned off, this option is ignored.

6. **'K'**
   - Stops tabular screen or printer output; the program returns to the first function selection menu. Valid only when tabular output is being presented.

1.4. Returning to the Function Selection Menu

If you want the program to go back to the first function selection menu before the function has completed, simply press the up-arrow key located in the upper right-hand section of your keyboard next to the **RESTORE** key and, if necessary, press **RETURN.** (You must press **RETURN** if you have just responded to a prompt for numeric data.) Also, if you respond '**N**' to any "**RE-RUN**" prompt, the program will return to the first function selection menu.

1.5. Using the 'R' Option

EASY FINANCE will remember your results from one function to the next. You can ask EASY FINANCE to insert this information by entering '**R**' when you are prompted for data; EASY FINANCE remembers only its most recent function's run. If you interrupt the program using the up-arrow key or '**K**', the '**R**' values will be lost and you will have to key in the information yourself.

The '**R**' option is a convenient way to run various functions. Here is some more information you may want to know about the '**R**' option:

- EASY FINANCE usually saves the calculation or final results of running any function; the program may also save other information as well. EASY FINANCE uses this data in the next run of the program if you enter '**R**' when you are prompted for that specific information.
- Functions using multiple fields, like VALUE PERIOD #1, #2, and #3, save all the field values you enter; when you run another function and key in '**R**' to the VALUE PERIOD #1 prompt, the program will fill that field and all the remaining fields, VALUE PERIOD #2 and #3, and #4, with the responses you entered in the most recent run of the program. You will not have to enter '**R**' to each VALUE PERIOD field.

You may want to know what each function saves so you can key in '**R**' when you are prompted for information you have just entered during a previous function's run. Here is a table of what each function saves:

Function Number and Title	Information Saved
1. RISK ADJUSTED NET PRESENT VALUE	Risk adjusted net present value calculation Final expected cash flows
2. PAYOFF MATRIX ANALYSIS	Not applicable
3. BAYESIAN DECISION ANALYSIS	Not applicable
4. REGRESSION ANALYSIS FORECASTING	Forecasted Y-values
5. MOVING AVERAGE FORECASTING	Period values you key in

6. EXPONENTIAL SMOOTHING FORECASTING (BAR GRAPH)	Forecasted values if smoothing constant is between 0 and 1 Values you key in if smoothing constant equals 2
7. EXPECTED VALUE COMPUTATION	Expected value calculation Outcome values you key in
8. AVERAGE GROWTH RATE/ FUTURE PROJECTIONS	Growth rate percent calculation Period values you key in followed by next three projected values
9. APPORTIONMENT BY RATIOS	Resulting portions Contributory amounts you key in

1.6. Quitting the Program

To end the EASY FINANCE program, enter '**6**' when you are viewing the first function selection menu; enter '**5**' when you are viewing the second function selection menu. Remember you can get to the first function selection menu any time by pressing the up-arrow key and, if necessary, pressing **RETURN.** After you select the **EXIT** option, a "**BYTES FREE**" message appears on your screen, followed by "**READY**". You are now ready to begin any other program. If you want to run the EASY FINANCE program again, you must start from the beginning and load it; the program is no longer in the computer's memory.

Section II Examples For Each Menu Selection

This section shows you some typical runs of the EASY FINANCE program. An example is provided for each choice on the function selection menus (presented after the title and color selection menus): RISK ADJUSTED NET PRESENT VALUE, PAYOFF MATRIX ANALYSIS, BAYESIAN DECISION ANALYSIS, REGRESSION ANALYSIS FORECASTING, MOVING AVERAGE FORECASTING, EXPONENTIAL SMOOTHING FORECASTING, EXPECTED VALUE COMPUTATION, AVERAGE GROWTH RATE/FUTURE PROJECTIONS, and APPORTIONMENT BY RATIOS. You may want to test your understanding of the program by entering these exact samples and seeing that you arrive at the same answer.

For a more detailed, step-by-step presentation of a statistics and forecasting function, see Section 4.1.

2.1. Risk Adjusted Net Present Value

This function calculates the net present value of a project; adjustments for probability distributions of cash flows and variable rates of return based on expected value variation coefficients can affect the net present value decision criteria. This function assumes you know cash flows with certainty and that the discount rate does not change throughout the life of the asset. The risk adjusted net present value lets the discount rate change over time. Also, if your cash flows are uncertain, you can enter various cash flows with their respective probabilities of occurring. The function computes the expected cash flow which is then used in the risk adjusted net present value calculation.

Typical applications of this function can be found in capital budgeting and investment assessment.

Sample Application

What is the risk adjusted net present value of this one million-dollar, three-year project?

Year	Cash Flow	Probability	Rate of Return
1	100,000	40%	10%
	200,000	60%	
2	500,000	55%	15%
	800,000	45%	
3	1,100,000	20%	18%
	1,500,000	80%	

Information You Must Enter:

1. No. of Years	— **'3'**	
2. Initial Investment	— **'1000000.00'**	
3. No. Cash Flows (Yr. #1)	— **'2'**	(must be entered for each year)
4. Cash Flow #1 (Yr. #1)	— **'100000.00'**	
5. Cash Flow #2 (Yr. #1)	— **'200000.00'**	
6. Cash Flow Probability #1	— **'40'**	(year #1)
7. Cash Flow Probability #2	— **'60'**	(year #1)
8. Rate of Return (Yr. #1)	— **'10'**	

NOTES:

1. The number of years cannot exceed 24.
2. Negative probabilities will cause a DATA ERROR.
3. The number of cash flows each year cannot exceed 24.
4. Probabilities for cash flows within a period should add to 100%.
5. After you enter the information for each year, output for that year is calculated and displayed, followed by a **RE-RUN** prompt. If you enter **'Y'** to that prompt, you will be asked to re-enter information for that year only. If you enter **'N'**, you will see a **CONTINUE (Y OR N)** prompt. If you enter **'Y'**, the program will go on with this function; if you enter **'N'**, you will see the first function selection menu.

Results:

RISK ADJUSTED NET PRESENT VALUE

1. # FLOWS-YR # 1	=	2.00
2. CASH FLOW # 1	=	100000.00
3. PROB FLOW # 1	=	40.00
4. CASH FLOW # 2	=	200000.00
5. PROB FLOW # 2	=	60.00

EXPECTED CASH FLOW/YR # 1 = $ 160000.00
VARIANCE = 2.4E+09
STANDARD DEVIATION = $ 48989.79
COEFFICIENT OF VARIATION = .306

RISK ADJUSTED NET PRESENT VALUE

1. # FLOWS-YR # 2	=	2.00
2. CASH FLOW # 1	=	500000.00
3. PROB FLOW # 1	=	55.00
4. CASH FLOW # 2	=	800000.00
5. PROB FLOW # 2	=	45.00

EXPECTED CASH FLOW/YR # 2 = $ 635000.00
VARIANCE = 2.2275E+10
STANDARD DEVIATION = $ 149248.12
COEFFICIENT OF VARIATION = .235

RISK ADJUSTED NET PRESENT VALUE

1. # FLOWS-YR # 3	=	2.00
2. CASH FLOW # 1	=	1100000.00
3. PROB FLOW # 1	=	20.00
4. CASH FLOW # 2	=	1500000.00
5. PROB FLOW # 2	=	80.00

EXPECTED CASH FLOW/YR # 3 = $ 1420000.00
VARIANCE = 2.56000001E+10
STANDARD DEVIATION = $ 160000
COEFFICIENT OF VARIATION = .113

RISK ADJUSTED NET PRESENT VALUE

1. NO. OF YEARS	=	2.00
2. INITIAL INVEST	=	1000000.00
3. EXP FLOW YR# 1	=	160000.00
4. RR-YR# 1 (%)	=	10.00
5. EXP FLOW YR# 2	=	635000.00
6. RR-YR# 2 (%)	=	15.00
7. EXP FLOW YR# 3	=	1420000.00
8. RR-YR# 3 (%)	=	18.00

RISK ADJUSTED NET PRESENT VALUE =
$ 489861.61

2.2. Payoff Matrix Analysis

EASY FINANCE calculates the optimal action based on maximax, maximin, expected value, or minimax when you choose this function. Payoff matrix analysis is a tool for decision-making; company objectives can be accomplished using different alternatives. For each alternative, there are possible payoffs and probabilities of occurrence. You must weigh the alternatives and select the one that best coincides with your company's goals.

A payoff matrix analysis helps you choose what action to take. Here are some guidelines for making decisions when conditions are uncertain:

- You should look for which action has the greatest expected value; this is the value of an event weighted by the probability of the event occurring. The optimum action is the action with the highest value **and** the highest probability of occurring.
- If your objective is to realize the maximum possible gain, or maximax, you will want to look for the greatest payoff in the matrix from any one situation.
- If you want the least possible loss, or maximin, you should look for the best of the worst payoffs from each action in the matrix.
- You should compare the outcome of each situation in your matrix and choose the action with the least possible losses to maximize profits and minimize losses; this approach is called minimax.

Typical examples of this function's use are in decision theory, production planning, and quality control.

Sample Application

What are the best actions for these options:

	State One	State Two
Action One	– 100	200
Action Two	– 30	150
Probability	40%	60%

Information You Must Enter:

1. No. of States/Events	— **'2'**	
2. No. of Actions	— **'2'**	(possible choices)
3. Action No./State No.	— **'– 100'**	(Action 1—State 1)
4. Probability	— **'40'**	(State 1)

NOTES:

1. The number of actions and states must be greater than 1.
2. The number of states (events) times the number of actions, plus the number of states cannot exceed 53.
3. The sum of state probabilities must be 100%.

Results:

PAYOFF MATRIX ANALYSIS

1. ACT# 1/STATE# 1	=	– 100.00
2. ACT# 1/STATE# 2	=	200.00
3. ACT# 2/STATE# 1	=	– 30.00
4. ACT# 2/STATE# 2	=	150.00
5. PROB STATE # 1	=	40.00
6. PROB STATE # 2	=	60.00

MAXIMAX PAYOFF OF 200
FROM ACTION # 1

MAXIMIN PAYOFF OF – 30
FROM ACTION # 2

REGRET VALUES

ACTION # 1

STATE # 1	100.00
STATE # 2	0.00
MAX REGRET =	100.00

ACTION # 2

STATE # 1	30.00
STATE # 2	50.00
MAX REGRET =	50.00

MINIMAX REGRET PAYOFF 50
FROM ACTION # 2

EXPECTED VALUES:

FOR ACTION # 1 :	80.00
FOR ACTION # 2 :	78.00

2.3. Bayesian Decision Analysis

This function determines the revised probabilities and expected values for events occurring under various known conditions; EASY FINANCE uses the decision analysis tool based on a probability theorem created by the English mathematician Thomas Bayes in 1763. You can use this technique to revise a set of old probabilities, called prior probabilities, to a set of new probabilities, called posterior probabilities.

For example, suppose your factory has two machines. Machine 1 produces 45% of the total production and Machine 2 produces 55%. An analysis of past scrap reports showed 6% of the items produced by Machine 1 were defective and 3% of the items produced by Machine 2 were scrapped. Your quality control supervisor has just rejected a defective item. What are the odds that the defective item was produced on Machine 1?

As this table illustrates, there is a 62% chance that the scrap item has been produced by Machine 1:

(1)	(2)	(3)	(4)	(5)
Event/State	Prior Probability	Conditional Probability of Event B (defective item) Given Event A	Joint Probability (2) x (3)	Posterior (Revised) Probability (4) – P (B)
A1 (Machine 1)	0.45	0.06	0.27	0.027 / 0.044 equals 0.621
A2 (Machine-2)	0.55	0.03	0.017	0.017 / 0.044 equals 0.379
Total	1.00		P (B) equals 0.44	1.000

Typical examples of the Bayesian Decision Analysis function can be found in quality control and sales forecasting.

Sample Application

What is the revised or posterior probability that a $25 stock will rise given these statistics?

ECON	VAL #1	VAL #2	COND PROB	PRIOR PROB
STRG	30	22	75%	50%
WEAK	28	19	25%	50%

8 of 12 brokers say rise.

Information You Must Enter:

1. No. of States/Events	— '2'	
2. No. of Actions	— '2'	
3. Values for Each Action Under Each State/Event	— '30'	(Action 1 - State 1)
4. Prior Probability For Each State	— '50'	(State 1)
5. Conditional Probability For Each State	— '75'	(State 1)
6. Number of Samples	— '12'	(1 or more)
7. Number of Successes	— '8'	(1 or more)

NOTES:

1. Negative and 0 probabilities cause a DATA ERROR.
2. Prior probabilities must equal 100.
3. The no. of states plus the no. of actions plus 2 times the no. of states cannot exceed 51.

Results:

BAYESIAN DECISION ANALYSIS

1. ACT# 1/STATE# 1	=	30.00
2. ACT# 1/STATE# 2	=	28.00
3. ACT# 2/STATE# 1	=	22.00
4. ACT# 2/STATE# 2	=	19.00
5. PRIOR PROB # 1	=	50.00
6. COND. PROB # 1	=	75.00
7. PRIOR PROB # 2	=	50.00
8. COND. PROB # 2	=	25.00
9. NO. OF SAMPLES	=	12.00
10. NO. OF SUCCESSES	=	8.00

EXPECTED VALUES:

ACTION # 1 29.98
ACTION # 2 21.96

PROBABILITY REVISION:

STATE	PRIOR	LIKELIHOOD	JOINT	POSTERIOR
1	0.50	0.19	0.10	0.99
2	0.50	0.00	0.00	0.01

2.4. Regression Analysis Forecasting

This function forecasts the level of one variable based on the level of an independent variable. You need a set of matched observations to use this function; you can choose linear, geometric, or exponential equations. For example, the relationship between sales and advertising can be forecasted; if sales change, the advertising expenses will change. The change in sales could be in constant proportion to the change in advertising expenses, or it could change in geometric or exponential proportion. The least squares regression method helps you forecast the change in sales given a change in advertising expense.

Typical examples of this function's use are in sales forecasting, risk analysis, and trend analysis.

Sample Application

Suppose your company is considering using a $780 annual advertising budget next year. The advertising costs for the past 5 years have been $333, $600, $275, $910, and $550. Sales for each of those years have been $1000, $2550, $925, $3050, and $1810. What is the sales forecast for next year?

Information You Must Enter:

1. No. of Pts.	— **'5'**	
2. Regression Type	— **'0'**	(linear, geometric, exponential)
3. Y-Scale Factor	— **'1'**	(adjusts graph when minimum and maximum values are too close together or too far apart)
4. X and Y Value Observation For Each Pt.	- **'333'**	(X-Value #1)

NOTES:

1. The no. of observed points must be greater than 2 and less than 25.
2. A Y-Scale factor of 0 or 1 results in no scaling.
3. Scale factors above 1 increase the scale proportionally, e.g., a scale factor of 5 increases the scale 5 times.
4. You can request graphic output; for this example, enter **'780'** in response to the INTERPOLATE X VALUE prompt. 1984 sales are $2748.92.

Results:

RÊGRESSION ANALYSIS FORECASTING

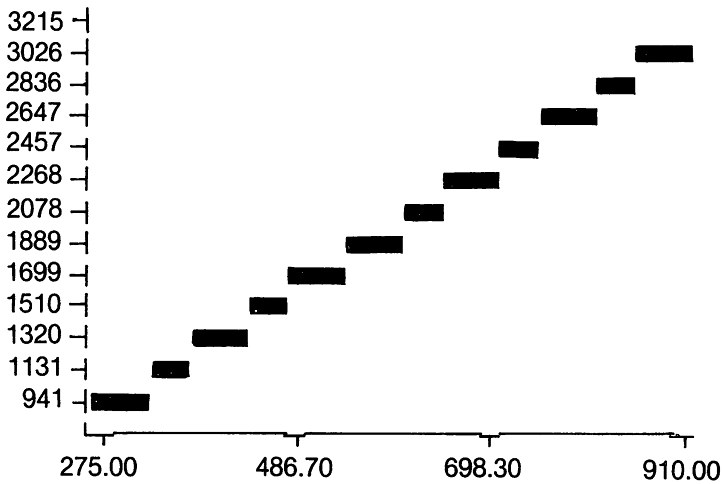
1. NO. OF POINTS	=	5.00
2. REGRESSION TYPE	=	0.00
3. Y-SCALE FACTOR	=	1.00
4. X-VALUE # 1	=	333.00
5. Y-VALUE # 1	=	1000.00
6. X-VALUE # 2	=	600.00
7. Y-VALUE # 2	=	2550.00
8. X-VALUE # 3	=	275.00
9. Y-VALUE # 3	=	925.00
10. X-VALUE # 4	=	910.00
11. Y-VALUE # 4	=	3050.00
12. X-VALUE # 5	=	550.00
13. Y-VALUE # 5	=	1810.00

VALUE	X-VALUE	Y-VALUE	FORECAST	LINEAR
1	333.00	1000.00	1149.01	
2	600.00	2550.00	2104.66	
3	275.00	925.00	941.42	
4	910.00	3050.00	3214.21	
5	550.00	1810.00	1925.70	

EQUATION IS:

Y = − 42.865412 + 3.57920805 * X

DETERMINATION COEFFICIENT	=	0.93
CORRELATION COEFFICIENT	=	0.96
STANDARD ERROR	=	295.04


3215
3026
2836
2647
2457
2268
2078
1889
1699
1510
1320
1131
941
275.00
486.70
698.30
910.00

2.5. Moving Average Forecasting

This function calculates a moving average based on the number of periods you specify. Using moving averages to forecast, EASY FINANCE deletes old information as new information is obtained. This technique tends to smooth out fluctuations and wide cyclical variances over time.

Suppose no major changes take place in your business for six weeks and you want to predict what your sales will be in the seventh and eighth weeks. You would average the first six weeks' sales to predict the seventh week's sales; then, you could go on to predict sales for the eighth week by averaging weeks two through seven.

Typical applications for this function are sales and expense trend forecasting.

Sample Application

Suppose your company's sales were $1000, $2550, $925, $3050, and $1810 for the first five years. What would be the two period moving average sales forecast for the sixth year?

Information You Must Enter:

1. No. of Periods — **'5'**
2. No. of Periods for Average — **'2'**
3. Value for Each Period — **'1000'** (period #1)

NOTES:
1. The number of periods must be between 2 and 45.
2. You can request a bar graph of the forecasted values.
3. The number of periods for the average cannot be greater than the total number of periods.

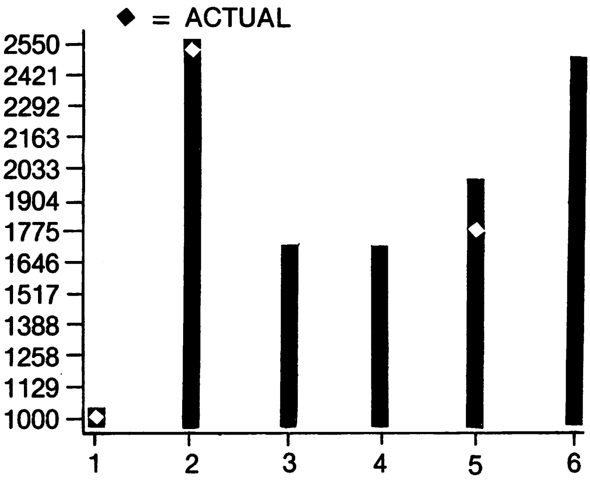
Results:

MOVING AVERAGE FORECASTING

1. NO. OF PERIODS	=	5.00
2. # PER. FOR AVER	=	2.00
3. VALUE PERIOD# 1	=	1000.00
4. VALUE PERIOD# 2	=	2550.00
5. VALUE PERIOD# 3	=	925.00
6. VALUE PERIOD# 4	=	3050.00
7. VALUE PERIOD# 5	=	1810.00

PERIOD	FORECAST	ACTUAL	DIFF
1	0.00	1000.00	
2	0.00	2550.00	
3	1775.00	925.00	850.00
4	1737.50	3050.00	−1312.50
5	1987.50	1810.00	177.50
6	2430.00		

MOVING AVERAGE FORECASTING



2.6. Exponential Smoothing Forecasting

You can develop a future period forecast using this function. EASY FINANCE uses a weighted average derived from applying a smoothing constant to the previous period's actual and forecasted performances. This technique uses both expected and actual values gathered from the previous period to forecast a value for the current period. The smoothing constant can be from 0 to 1; it adjusts the forecast. Factors closer to zero, such as .25, will weigh the values toward the forecast. Factors approaching 1 will weigh the values toward the actual.

Typical examples of this function's use are in sales and demand forecasting.

Sample Application

What is the sales forecast for period six if the smoothing value is .25 from a series with actual sales of $1000, $2550, $925, $3050, and $1810?

Information You Must Enter:

1. No. of Periods	— **'5'**	
2. Smoothing Value	— **'25'**	
3. Value Each Period	— **'1000'**	(period #1)

NOTES:
1. For forecasting, the smoothing value must be a decimal between 0 and 1.
2. A bar graph of actual data (no forecast) can be generated if the smoothing value is 2.
3. The number of periods must be between 2 and 45.
4. You can request a bar chart of forecasted values.

Results:

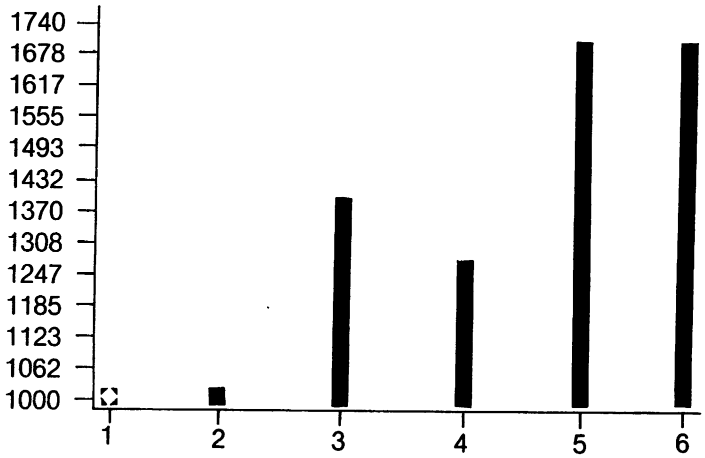
EXPONENTIAL SMOOTHING FORECASTING

1. NO. OF PERIODS	=	5.00
2. SMOOTHING VALUE	=	0.25
3. VALUE PERIOD# 1	=	1000.00
4. VALUE PERIOD# 2	=	2550.00
5. VALUE PERIOD# 3	=	925.00
6. VALUE PERIOD# 4	=	3050.00
7. VALUE PERIOD# 5	=	1810.00

PERIOD	FORECAST	ACTUAL	DIFF
1	0.00	1000.00	0.00
2	0.00	2550.00	– 1550.00
3	1387.50	925.00	462.50
4	1271.88	3050.00	– 1778.13
5	1716.41	1810.00	– 93.59
6	1739.80		

EXPONENTIAL SMOOTHING FORECASTING

◆ = ACTUAL



2.7. Expected Value Computation

This function calculates the expected value of a future event weighted by the probability of outcome. With this function, you can establish a range of possible outcomes and the odds that each will occur. The payoffs will be summarized into a single expected value. Generally, you will want to choose the action with the highest expected value when you are comparing alternatives.

Typical applications of this function are in probability, weighted average cost of capital, and risk adjusted net present value calculations.

Sample Application

How much would you expect from a project with these characteristics:

- 40% probability of netting $10,000
- 50% probability of netting $15,000
- 10% probability of netting $25,000

Information You Must Enter:

1. No. of Outcomes Possible	— **'3'**	
2. Value Each Outcome	— **'1000'**	(first outcome)
3. Probability-Each Outcome	— **'40'**	(first outcome)

NOTES:

1. The number of outcomes must be greater than 1.
2. The number of values cannot exceed 24.
3. The sum of the probabilities for each outcome should add to 100%.
4. A probability value must be greater than 0.

Results:

EXPECTED VALUE COMPUTATION

1. NO. OF OUTCOMES	=	3.00
2. VAL OUTCOME # 1	=	10000.00
3. PROB OUTCOME# 1	=	40.00
4. VAL OUTCOME# 2	=	15000.00
5. PROB OUTCOME# 2	=	50.00
6. VAL OUTCOME# 3	=	25000.00
7. PROB OUTCOME# 3	=	10.00

EXPECTED VALUE OF POSSIBLE OUTCOMES	=	14000.00
STANDARD DEVIATION	=	4358.9
COEFFICIENT OF VARIATION	=	.311

2.8. Average Growth Rate/Future Projections

This function determines the geometric growth rate in a series; future events are predicted more accurately than in conventional forecasting methods because the effect of wide swings in values are minimized. One of the simplest forecasting methods is based on the assumption that growth will continue in the future as it has in the past; historical data is averaged to forecast the future. This method is often acceptable until there is a structural change in your company or the economy; when these changes occur, simple averaging can be greatly affected by data variations and the ratios developed tend to lose meaning. EASY FINANCE takes these factors into consideration when forecasting your financial future.

Suppose your company's earnings are $1 million in year 1, $2 million in year 2, and $1 million in year 3. Even though earnings doubled between years one and two, there has been no real change in earnings from years one to three. The geometric growth rate is zero.

If you used a more conventional forecasting method, the results would have been misleading. The simple arithmetic average is 25%. This method is really incorrect because if earnings grow by 25% in each year, they would be $1.25 million in year two and $1.5625 million in year three.

You can use this function for sales forecasting and cost projections.

Sample Application

If net earnings continue at this rate, what will they be in year 10?

Year	1	2	3	4	5
Flow	1000	2550	925	3050	1810

Information You Must Enter:

1. No. of Years — '5'
2. Projected Year Number — '10'
3. Value Each Year — '1000' (year #1)

NOTES:

1. The number of years cannot exceed 45.
2. The yearly values cannot be 0.
3. You can request a bar graph of actual and projected values.
4. The maximum projected year number is 45.

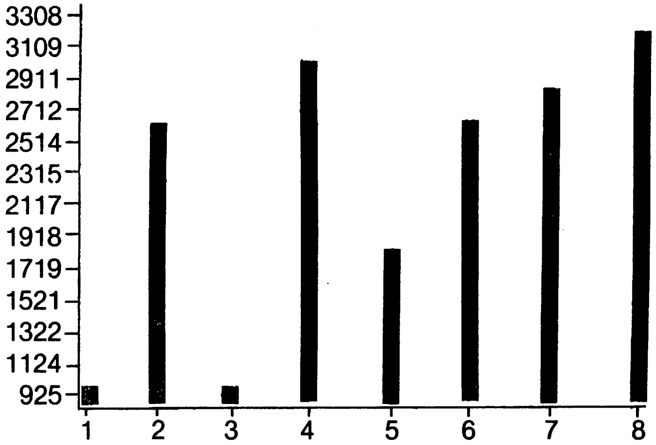
Results:

AVERAGE GROWTH RATE/FUTURE PROJECTIONS

1. NO. OF YEARS	=	5.00
2. PROJECTED YR #	=	10.00
3. VALUE YEAR # 1	=	1000.00
4. VALUE YEAR # 2	=	2550.00
5. VALUE YEAR # 3	=	925.00
6. VALUE YEAR # 4	=	3050.00
7. VALUE YEAR # 5	=	1810.00
AVERAGE GROWTH RATE	=	14.63%
VALUE YEAR # 6	=	2516.91
VALUE YEAR # 7	=	2885.22
VALUE YEAR # 8	=	3307.43
VALUE YEAR # 10	=	4346.24

AVERAGE GROWTH RATE/FUTURE PROJECTIONS

X = YEAR   Y = VALUE



2.9. Apportionment by Ratios

This function determines what percentage and how much each person will receive of an upcoming distribution. Apportionment by ratios distributes to each person on the person's individual contribution.

Typical examples of this function's use are in profit sharing, bonus plan, and overhead allocation.

Sample Application

Suppose one employee works 700 hours, another employee works 200 hours, and a third employee works 100 hours. If profits are $20,000, how much and what percentage will each employee receive?

Information You Must Enter:

1. No. of Portions	— **'3'**	
2. Total Amount	— **'20000.00'**	
3. Individual Contributions	— **'700'**	(first employee)

NOTES:

1. The number of portions cannot exceed 45.
2. If the results show a percentage less than 2.78, that portion of the apportionment chart will not be represented.
3. If the total of several values is greater than 2.78%, these values will be represented at the end of the graph as "All Other".

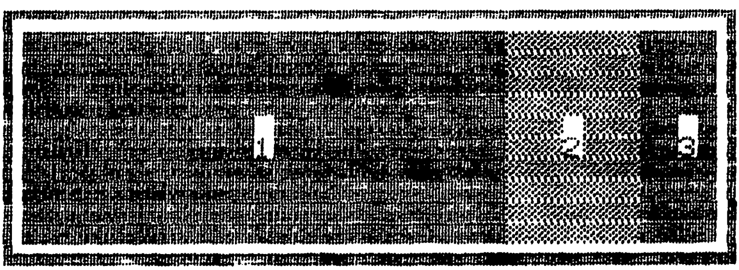
Results:

APPORTIONMENT BY RATIOS

1. NO. OF PORTIONS	=	3.00
2. TOTAL AMOUNT	=	20000.00
3. AMOUNT # 1	=	700.00
4. AMOUNT # 2	=	200.00
5. AMOUNT # 3	=	100.00

PORTION #	AMOUNT	PERCENT	PORTION
1	700.00	70.00	14000.00
2	200.00	20.00	4000.00
3	100.00	10.00	2000.00
3	1000.00	100.00	20000.00

APPORTIONMENT BY RATIOS



Section III Terms and Information

3.1. Probability

Probability is the likelihood of a future event actually occurring. Most business decisions deal with events that have yet to occur, so determining the probability of occurrence is an important part of business decision-making.

The EASY FINANCE functions using probability are:

- Risk Adjusted Net Present Value
- Payoff Matrix Analysis
- Bayesian Decision Analysis
- Expected Value Computation

3.2. Forecasting

The EASY FINANCE program uses forecasting and graphs to calculate some of the functions. You should understand the benefits of these concepts to improve your business planning.

Forecasting is the evaluation of information with historical value with predictions of future occurrences based on probability of occurrence. Forecasting is particularly valuable in business because it reduces the uncertainty of the future by helping management assess alternatives based on ranges of performance and probabilities of occurrence. For example, a company's sales history could be used to predict future demand and trends.

The EASY FINANCE functions that help you in business forecasting are:

- Moving Average Forecasting
- Regression Analysis
- Exponential Smoothing
- Average Growth/Future Projections

3.3. Graphs

Graphs are used to clarify information by presenting it in the form of pictures. You can see trends quickly when they are put on a chart; graphs show you the calculations in a format that is easily understood. Presenting a list of numbers will not tell a clear story quickly; showing these figures on a graph will help you communicate all the reasons why you've chosen a certain course for your organization.

Section IV Sample Run of a Statistics and Forecasting Function

Here is a menu-by-menu presentation of one of the functions of the EASY FINANCE program. This example calculates EXPECTED VALUE COMPUTATION, choice number 2 on the second function selection menu.

4.1. Expected Value Computation

When you enter **'2'** on the second display, the screen will clear and the following screen will appear:

```
              $$ EASY * FINANCE V $$
      STATISTICS AND FORECASTING PACKAGE
  MODE: INPUT
  EXPECTED VALUE COMPUTATION
  NO. OF OUTCOMES POSSIBLE  =>  /
```

A cursor **("/")** will be blinking on the display, waiting for your response.

For our example, the number of outcomes is 3. Enter **'3'; ** before you press **RETURN,** you may change your response by using the **INST/DEL** key. Your response is not entered into the computer until you press **RETURN.** Press **RETURN** and the following screen is displayed:

```
              $$ EASY * FINANCE V $$
      STATISTICS AND FORECASTING PACKAGE
  MODE: INPUT
  EXPECTED VALUE COMPUTATION
     1. NO. OF OUTCOMES     =      3.00
  VAL OUTCOME #1 =>  /
```

You can see that your response, **'3',** has been entered as the number of outcomes. The cursor **('/')** will be blinking where you will enter your response to the value of outcome #1. For our example, enter **'10000'** and press **RETURN,** remembering the computer does not receive your response until you press **RETURN.**

Next, this screen is displayed:

```
            $$ EASY * FINANCE V $$
      STATISTICS AND FORECASTING PACKAGE
   MODE: INPUT
   EXPECTED VALUE COMPUTATION
      1. NO. OF OUTCOMES    =      3.00
      2. VAL OUTCOME #1     =  10000.00
   PROB OUTCOME #1 (PERCENT)=>  /
```

Enter **'50'** for the probability of outcome #1 and press **RETURN.** The next screen displayed will be:

```
            $$ EASY * FINANCE V $$
      STATISTICS AND FORECASTING PACKAGE
   MODE: INPUT
   EXPECTED VALUE COMPUTATION
      1. NO. OF OUTCOMES    =      3.00
      2. VAL OUTCOME #1     =  10000.00
      3. PROB OUTCOME #1    =     50.00
   VAL OUTCOME #2 (PERCENT)=>  /
```

For this example, enter the value as **'15000'** and press **RETURN.** Then, you will see this screen:

```
            $$ EASY * FINANCE V $$
      STATISTICS AND FORECASTING PACKAGE
   MODE: INPUT
   EXPECTED VALUE COMPUTATION
      1. NO. OF OUTCOMES    =      3.00
      2. VAL OUTCOME #1     =  10000.00
      3. PROB OUTCOME #1    =     50.00
      4. VAL OUTCOME #2     =  15000.00
   PROB OUTCOME #2 (PERCENT)=>  /
```

Enter **'50'** for the probability and press **RETURN.** After you have responded to this prompt, you will see this screen:

```
$$ EASY * FINANCE V $$
STATISTICS AND FORECASTING PACKAGE
MODE: INPUT
EXPECTED VALUE COMPUTATION
1. NO. OF OUTCOMES       =     3.00
2. VAL OUTCOME #1        = 10000.00
3. PROB OUTCOME #1       =    50.00
4. VAL OUTCOME #2        = 15000.00
5. PROB OUTCOME #2       =    50.00
VAL OUTCOME #3=> /
```

Key in **'25000'** for the value and press **RETURN.** Then, you will see this screen:

```
$$ EASY * FINANCE V $$
STATISTICS AND FORECASTING PACKAGE
MODE: INPUT
EXPECTED VALUE COMPUTATION
1. NO. OF OUTCOMES       =     3.00
2. VAL OUTCOME #1        = 10000.00
3. PROB OUTCOME #1       =    50.00
4. VAL OUTCOME #2        = 15000.00
5. PROB OUTCOME #2       =    50.00
6. VAL OUTCOME #3        = 25000.00
PROB OUTCOME #3 (PERCENT)=> /
```

Enter **'10'** as this probability and press **RETURN.** Then, you will see this screen:

$$ EASY * FINANCE V $$

STATISTICS AND FORECASTING PACKAGE

MODE: INPUT
EXPECTED VALUE COMPUTATION

1. NO. OF OUTCOMES	**=**	**3.00**
2. VAL OUTCOME #1	**=**	**10000.00**
3. PROB OUTCOME #1	**=**	**50.00**
4. VAL OUTCOME #2	**=**	**15000.00**
5. PROB OUTCOME #2	**=**	**50.00**
6. VAL OUTCOME #3	**=**	**25000.00**
7. PROB OUTCOME #3	**=**	**10.00**

ANY CORRECTIONS (Y OR N) => /

Enter **'Y'**, but do not press **RETURN.** You will now see a prompt requesting **"ITEM # TO BE MODIFIED".** In this example, you want to change the probability of outcome #1, so enter **'3'** and press **RETURN.**

The next screen highlights the area you want to change (the probability). The last line of the display prompts you for the new probability. Enter **'40'** and press **RETURN.** This corrects the probability outcome and another **"ANY CORRECTIONS? (Y OR N)"** prompt is displayed.

$$ EASY * FINANCE V $$

STATISTICS AND FORECASTING PACKAGE

MODE: INPUT
EXPECTED VALUE COMPUTATION

1. NO. OF OUTCOMES	**=**	**3.00**
2. VAL OUTCOME #1	**=**	**10000.00**
3. PROB OUTCOME #1	**=**	**40.00**
4. VAL OUTCOME #2	**=**	**15000.00**
5. PROB OUTCOME #2	**=**	**50.00**
6. VAL OUTCOME #3	**=**	**25000.00**
7. PROB OUTCOME #3	**=**	**10.00**

ANY CORRECTIONS? (Y OR N) => /

Enter **'N'** and do not press **RETURN.** You may see a **'WAIT . . . COMPUTING"** message as computation occurs. After the answer has been calculated, it replaces the **"WAIT"** message.

Next, a prompt for re-running the program appears on the last line of the display.

```
                $$ EASY * FINANCE V $$
         STATISTICS AND FORECASTING PACKAGE
   MODE: CALCULATION/OUTPUT
   EXPECTED VALUE COMPUTATION
     1. NO. OF OUTCOMES      =     3.00
     2. VAL OUTCOME #1       = 10000.00
     3. PROB OUTCOME #1      =    40.00
     4. VAL OUTCOME #2       = 15000.00
     5. PROB OUTCOME #2      =    50.00
     6. VAL OUTCOME #3       = 25000.00
     7. PROB OUTCOME #3      =    10.00
   EXPECTED VALUE OF POSSIBLE
   OUTCOMES                              = $ 14000.00
   STANDARD DEVIATION                    = $  4358.9
   COEFFICIENT OF VARIATION              = $       .311
   RE-RUN? (Y OR N, OR P) /
```

Enter **'N'**. The program returns to the first function selection menu where you may now select additional functions. To print these results, simply enter **'P'**. A **"WAIT. . .PRINTING"** message will be displayed after the **"RE-RUN"** prompt until printing is finished.

If you answer **'Y'** to the **"RE-RUN"** prompt on the preceding screen display, you will be asked if you want to begin the function with all new data. The preceding screen continues to be displayed until you enter an answer to this prompt.

If you enter **'N'** to the **"ALL NEW DATA"** prompt after entering **'Y'** to the **"RE-RUN"** prompt, you will be asked which item number from the previous run you wish to change. After you enter that number and press **RETURN,** you will see the item you wish to change displayed as described in the sample run. Proceed with the program as discussed previously.

If you enter **'Y'** to the **"ALL NEW DATA"** prompt, the program will clear the data display area and start prompting you from the first prompt (in this case, NO. OF OUTCOMES POSSIBLE) as if you had just selected the EXPECTED VALUE COMPUTATION function.

To end the EASY FINANCE program, enter **'6'** when you are viewing the first function selection menu, or **'5'** when you are viewing the second function selection menu. Remember you can get to the first selection menu any time during the program by pressing the up-arrow key and, if necessary, pressing **RETURN.** After you select the EXIT option, a **"BYTES FREE"** message appears on your screen, followed by **"READY".** You are now ready to begin any other program.

Appendix A: Screen and Report Options

This section shows you samples of the tabular reports EASY FINANCE can tell your printer to print out for you. You will always see the results EASY FINANCE has calculated for you on your screen. If the function you are running presents results in tabular form, you can ask the program to make a printed copy of the tabular report if you wish. Graphic output is possible with several functions; you can ask the program print the graph if you wish. If the function you are running does not present results in tabular form, you can request that the screen that shows the results in non-tabular form be printed.

Tabular reports are possible with these functions:

- Payoff Matrix Analysis
- Bayesian Decision Analysis
- Regression Analysis Forecasting
- Moving Average Forecasting
- Exponential Smoothing Forecasting
- Apportionment by Ratios

With these tabular functions the program can print:

- Exactly what you see on your screen when you enter data; and
- A tabular report of the calculations.

Graphic output is possible with these functions:

- Average Growth Rate/Future Projections
- Apportionment by Ratios
- Regression Analysis Forecasting
- Moving Average Forecasting
- Exponential Smoothing Forecasting

If you are running a non-tabular function and you want the program to print what is on the screen that presents the function calculations, enter **'P'** when EASY FINANCE asks you **"RE-RUN? (Y OR N, OR P)'** on the screen where the results are being displayed.

If you are running a tabular function and you want the program to print the tabular report of the calculations, enter **'Y'** to the **"PRINTER OUTPUT? (Y OR N)"** prompt.

If you are running a function with a graph option and you want the program to print the screen, results, **and** a graph of the calculations, enter **'Y'** to the **"PRINTER OUTPUT? (Y OR N)"** prompt and enter **'Y'** to the **"GRAPHIC OUTPUT? (Y OR N)"** prompt. Then, enter **'Y'** to the second **"PRINTER OUTPUT? (Y OR N)"** prompt.

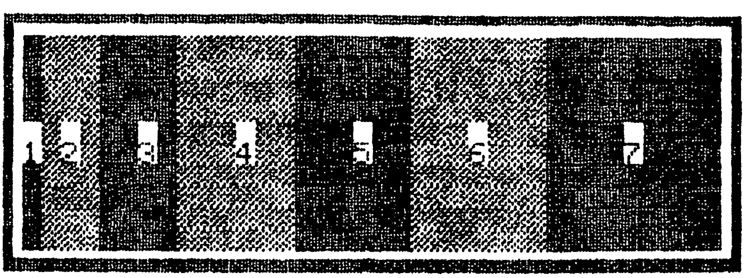
If you want to see the tabular or graphic reports on your screen, **but** you do **not** want the results to be printed, simply answer **'N'** to the **OUTPUT** prompts and the results will appear **only** on your screen.

APPORTIONMENT BY RATIOS

1. NO. OF PORTIONS	=	7.00
2. TOTAL AMOUNT	=	135000.00
3. AMOUNT # 1	=	5000.00
4. AMOUNT # 2	=	12000.00
5. AMOUNT # 3	=	15000.00
6. AMOUNT # 4	=	20000.00
7. AMOUNT # 5	=	20000.00
8. AMOUNT # 6	=	23000.00
9. AMOUNT # 7	=	30000.00

PORTION #	AMOUNT	PERCENT	PORTION
1	5000.00	4.00	5400.00
2	12000.00	9.60	12960.00
3	15000.00	12.00	16200.00
4	20000.00	16.00	21600.00
5	20000.00	16.00	21600.00
6	23000.00	18.40	24840.00
7	30000.00	24.00	32400.00
7	125000.00	100.00	135000.00

APPORTIONMENT BY RATIOS

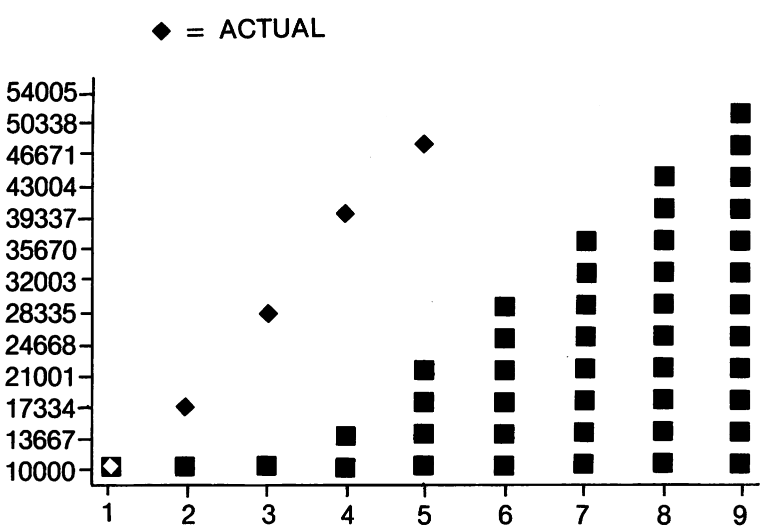


EXPONENTIAL SMOOTHING FORECASTING

1. NO. OF PERIODS	=	8.00
2. SMOOTHING VALUE	=	0.25
3. VALUE PERIOD # 1	=	10000.00
4. VALUE PERIOD # 2	=	20000.00
5. VALUE PERIOD # 3	=	30000.00
6. VALUE PERIOD # 4	=	40000.00
7. VALUE PERIOD # 5	=	50000.00
8. VALUE PERIOD # 6	=	60000.00
9. VALUE PERIOD # 7	=	70000.00
10. VALUE PERIOD # 8	=	80000.00

PERIOD	FORECAST	ACTUAL	DIFF
1	10000.00	10000.00	0.00
2	10000.00	20000.00	– 10000.00
3	12500.00	30000.00	– 17500.00
4	16875.00	40000.00	– 23125.00
5	22656.25	50000.00	– 27343.75
6	29492.19	60000.00	– 30507.81
7	37119.14	70000.00	– 32880.86
8	45339.36	80000.00	– 34660.64
9	54004.52		

EXPONENTIAL SMOOTHING FORECASTING



Appendix B: Calculation Methods

Here are the calculation methods EASY FINANCE uses to determine each function's results. You do not need to know how the program calculates results to use EASY FINANCE, but if you want to see what methods are used, they are provided here.

1. RISK ADJUSTED NET PRESENT VALUE

$$\text{RANPV} = \sum_{t=1}^{L} \left[\frac{\sum_{i=1}^{N_t} P_{it}\, CF_{it}}{(1 + r_t)^t} \right] - I$$

RANPV = Risk Adjusted Net Present Value

L = Number of years in the life of the asset

N_t = Number of cash flows in period $_t$

CF_{it} = Cash flow $_i$ in period $_t$

P_{it} = Probability of cash flow $_i$ in period $_t$

r_t = Required rate of return in period $_t$

I = Initial investment.

^{t} = Subscript for no. of cash flow years, $_{t=1}$,...L

^{i} = Subscript for no. of cash flows in a given year, $_{i=1}$, ...N_t

2. PAYOFF MATRIX ANALYSIS

$$EV = \sum_{i=1}^{N} W_i P_i$$

EV = Expected value for an action

N = Number of states

W_i = Probability of state $_i$ occurring

P_i = Payoff for the action under state $_i$

$Loss_{ij} = B_i - P_{ij}$ $Regret_j = MAX_i (Loss_{ij})$

$MINIMAX = Min_j (Regret)$

$Loss_{ij}$ = Foregone payoff from not having best action for each state

B_i = Best outcome for state $_i$

P_{ij} = Payoff for action $_j$ under

$Regret_j$ = Maximum loss for action$_j$ over all states

$MINIMAX$ = Minimum regret over all actions

$$P\ (H_i/D) = (P\ (D/H_i) \bullet P(H_i)$$

$P(H_i/D)$ = Probability of state i given sample results

$P\ (D/H_i)$ = Probability of sample results given state i occurred

$P\ (H_i)$ = Probability of state i

4. REGRESSION ANALYSIS FORECASTING

$Y = \alpha + \beta X$ (Linear)

$Y = \alpha * X^{\beta}$ (Geometric)

$Y = \alpha e^{\beta X}$ (Exponential)

Y = Forecasted value of Y at level X

α = Intercept term (Y—X)

YA = Average value of Y

X = Average value of X

β = Slope coefficient change in Y for change in X

$$\sum_{i=1}^{N} = \frac{\sum_{i=1}^{N} (X_i - XA)(Y_i - YA)}{(X_i - XA)_2}$$

N = Number of paired observations on X and Y

i = Subscript for observation: i=1,...N

e = Natural logarithm base

5. MOVING AVERAGE FORECASTING

$$MA_t = \sum_{i=T-S}^{T-1} \frac{A_i}{S}$$

A_T = Moving average for period T

S = Number of periods to be used in averaging

A_i = Amount in period $_i$

T = Total number of periods

i = Subscript for periods, i= T-S,...T-1

6. EXPONENTIAL SMOOTHING FORECASTING

$F_t = A_{t-1}(X) + F_{t-1}(1\text{-}X)$

F_t = Forecast for period $_t$ (this period)

A_{t-1} = Actual for period $_{t-1}$ (last period)

X = Smoothing value expressed as a decimal

F_{t-1} = Forecast for period $_{t-1}$ (last period)

7. EXPECTED VALUE COMPUTATION

$$EV = \sum_{i=1}^{N} P_i O_i$$

$EV =$ Expected Value of an event

$P_i =$ Probability of outcome $_i$

$O_i =$ Payoff of outcome $_i$

$N =$ Number of possible outcomes

$_i =$ Subscript for no. of outcomes, $_{i=1}$,...N

8. AVERAGE GROWTH RATE/FUTURE PROJECTIONS

$$_g = \sum_{i=1}^{N} \left[(1 + r_i) \right]^{1/N} \quad -N$$

$_g =$ Geometric average growth rate

$r_i =$ Simple returns between two years

$N =$ Number of returns (last year - first year)

$_i =$ Subscript for number of returns, $_{i=1}$,...N

9. APPORTIONMENT BY RATIOS

$$P_i = \frac{X_i}{\sum_{i=1}^{N} X_i}$$

$$A_i = P_i \bullet D$$

P_i = Percent entity $_i$ will receive (N entities)

X_i = Contribution of entity $_i$

N = Total number of entities

X_i = Total contribution of all entities

A_i = Amount of the distribution for entity $_i$

D = Total amount to be distributed

Glossary

Asset	Something of value owned by an individual or corporation. It can be tangible or intangible, but generally has some market value.
Cash Flow	The positive or negative change in a cash position in a given period.
Coefficient of Variation	A measurement of the variation in the relative values used in a computation. A small company and a large one may have no basis for comparison in absolute sales dollars, but the return on sales expressed as a percent ratio is a basis for performance comparison. This is useful when comparing analyses that can only be compared in a relative sense, such as percentages and ratios.
Correlation Coefficient	In regression analysis, this is an additional measurement of the degree to which the data used in the analysis are related. The range is 0-1, so the higher the coefficient, the greater the degree to which the data used in the analysis are related.
Cost of Capital	The minimum rate of return needed by a firm to satisfy the rate of return required by investors.
Determination Coefficient	In regression analysis, this is a relative measurement of the degree of closeness in the relationship of the variables. This is also known as the ratio of explained variance to the total variance. The range is 0-1, so the higher the coefficient, the closer the Y values are to the regression line and the more reliable the analysis.
Forecasting	Predicting the outcome of future events and actions.
Initial Investment	The amount paid to acquire an asset or the first deposit required to initiate an investment.

Interest	Dollars paid by the borrower to the lender for use of cash.
Interest Rate	An amount paid for the use of capital.
Net Present Value	The present value of an investment minus the amount required to purchase the investment.
Non-numeric	Any character other than 0 through 9. Such characters may be alphabetic or special characters like a dash (–) or an asterisk (*).
Numeric	Information consisting of the digits 0 through 9 or any combination of such characters.
Payoff Matrix	Grid which associates payoff probabilities with outcomes.
Present Value	The current value of a future payment or stream of payments discounted at the appropriate discount rate.
Rate of Return	The dividend yield plus the profit from the external sale of stock.
Regression	This term originated in a famous study by Francis Galton in 1885. Galton analyzed the relationship between the average height of two parents in a family and the average height of their chtldren; tall parents were found to have tall children. On the average, tall children were not as tal as their parents. Short parents tended to have short children but the short children were not as short on the average as their parents. Galton concluded that the heights of children tended to **regress** toward the average height of the population.

Regression Analysis	A forecasting technique involving mathematical equation development. A line representing the equation is also developed to depict the shape of the relationship beween variables. Variables can be estimated based on the relationship described by the equation, such as sales and cost of goods sold or sales and travel expenses.
Required Rate of Return	The rate of return necessary to avoid a decline in the value of a security.
Standard Deviation	A measurement of the variation of the absolute values from the mean in a series of data. Generally, the lower the standard deviation, the more reliable the analysis will be.
Standard Error	The standard deviation of the Y axis values from the line of regression. In most cases, the smaller the standard error, the more reliable the analysis will be.

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