



INTRO

Bayes5

PROFESSIONAL-FULL VERSION 8R-PROGRAM FOR QUANTITATIVE RISK ASSESSMENT

MANUAL

All information in this Owner's Manual is current at the time of publication in 2016. International Investment Council reserves the right to make changes at any time as part of the policy of continual product improvement may be carried out.

Worksheet Operation Guides Contents at a Glance Bul

Bul Practice1

This is a user-friendly tool. It was the main reason for choosing Excel and Visual Basic—easy for operation, modification, visualization, and flexible updated to every requirements. <u>Please never try to distribute this Excel file</u> (program application).

Worksheet 1stOpen . When done, read the framed introduction note and then click the "More Information" button. Read the line-by-line general instructions that appear to get into the subject matter. Please remember to go to next page by clicking the special buttons only. Click **Continue** \geq when it appears to start operation with the program. (*Avoid using the sheet tabs of the workbook to change the sheet. It troubles the efficiency of the operations*).

Worksheet Bul . A sheet with two topics:

First Topic: QUANTITATIVE RISK ASSESSMENT (RA)

Second Topic: ASSESSMENT OF PERSONALITY TRAITS (PT)

There are four fields on the screen. When open the sheet, two message windows may appear—a shield which hides the matrix, and another red alert message. Read each one carefully, then click to remove them.

At the top-left there are two charts (you will first see only one of them). This is a visual model representing a pessimistic forecast of Risk Assessment. Click the chart or the associated button "< Click to run personality traits" and you'll see a similar chart, representing the option ASSESSMENT OF PERSONALITY TRAITS of an individual who might be a CEO or other senior officer of the managing staff of the project



company. Scoring of each one of the eight Factors are applied on the rectangular axes of two coordinates systems with a common center, rotated on 450 each other, forming eight radiuses of a circle*. Each coordinate axis, however, is with different scales according to the Current Ratio selected by each assessor. It corresponds at least to the second quantity assessment parameter of the material effect over the result. It incorporates at least two very important components: (i) the real impact of this Factor over the outcome of the system, and (ii) the prior probability values for specific events of interest that can possibly occur. The

^{*} This shape resembles the known in Buddhist tradition the *Wheel of Dracula* and the so called *Eight Saturn Cycles* of periodic cyclic assessments of the Ratios of impact of the risk factors, which will provide in practice the most effective conditions for risk management. Such a system was used for testing and evaluation of the structural cycles of the U.S. history.

computed final level of risk, determined by the sum of the areas, is calculated through sums of four subtriangles $\Delta \triangleleft \triangleright \bigtriangledown$ in each of the two quadrangles, the blue and the green one. To recognize those triangles notice their notifications by the alphabetic names of the axes l; d; e; c; and $\dot{\nu}$; σ ; p; b; and the center of both coordinate systems.

✓ On the bottom-left is the main Operating Matrix. It contains columns Factor, Scoring, Current Ratio, Extent,

 Δ , Relative Level, **Critical**, and **R**atio.

NOTE. The DEMO version (to which you have free online access, and that you have reviewed or are studying now) has fixed values of every *F*actor and of the Relative Level of its impact over the final evaluation of each of both topic. They simulate very high degree of risk and personal shortcomings of the manager when making decisions, both excess and beyond their *Critical value*s of the risk, which are respectively indicated by * and Symbols.[†]

_Check box (ActiveX Control) for upgrading the Scoring of Risk Factor " ${\cal V}$ "

Fai	ctor↓	Risk	Ratio ↑	Extent	Δ	Level	Curre	ntik	aur
1	Z	8	1.11	8.9	lod	53.3		ł	-
3	đ	10	1.20	12.0	d _o c	<mark>60.</mark> 0	٩	d	_
5	C	10	1.00	10.0	coe	<mark>45.</mark> 0		e	
7	e	9	1.00	9.0	loe	40.0		¢	
-		*	Critic	al va	lue		1.10	1.1	
2	í	9	0.80	7.2	100-	36.0		í	
4	p	10	1.00	10.0	pob	49.5		p	
6	Ъ	9	1.10	9.9	00i	35.6		Ъ	
8	o	9	1.10	9.9	iob-	49.0		o	-
ZERO All	Risk	9	1.04		Total:	368.39	\rightarrow area	3	0

(1) Fill in **S**coring column to assess the relevant **Risk Factor**. You can do that by selecting the desired value 1 to 10 through the **ActiveX Spin Button**[‡], and then click the respective **Factor**'s button to enter the value into the cell on the right. Repeat that for each **Factor**.

(2) In case the investor has no cash (min 15% own funds) for participation in credit transaction with upfront payment and will borrow them, or an angel investor will meet them, that significantly increases the **Lender's Capital** Risk Factor " \mathcal{L} ". An average of 1.2, will be automatically added to the **Scoring** of Factor " \mathcal{L} " when this Check Box (ActiveX Control) is activated.

③ Similarly, fill in the Ratio column. However, the Factor's Cur-

rent Ratio value 0,5 to 1,2 A is selected first via the scrollbar on the right and then by clicking the respective Ratio's button to enter it. As far as there are some specific events of interest for a Factor that might have significant impact over the outcome of the system operation, the assessors often TEND TO RAISE the value of most of the Ratios. In order to escape such a deformation of the expertise, we introduced 1 Ratio. Critical value and Quotient of the permissible level of exceeding of the selected Ratio of a Factor by an assessor – on the next sheet Practice1 (to be discussed later). Anyway, every assessor has an option to select his or her personal Critical Value corresponding to his of here assessment of the impact of this very Factor over the final total level of the project's risk. Both numbers, Scoring and Ratio, are then multiplied. This

sets the value of the respective Risk Factor.

So, the project (business venture) **Risk Assessment**, made by a single internal expert, an outside assessor, and an auditor, through this **open-source computer program**, is the sum of the quantitative assessment of

⁺ You cannot use this DEMO version for operating assessment of your projects because if you try to do it, the program automatically will switch out after 15 minutes and close the file without saving the changes. If you need it, you can bespeak professional-purpose version with training course including.

⁺ Don't forget that once you use the Operating Matrix for quantitative risk assessment, the program starts close timing.

eight Risk **F**actor, where each one is a multiplication of two numbers—(i) general **Scoring** of the risk *and* (ii) its specific impact over the analyzed investment project or business venture due to prior probability estimates for specific events of interest.

- ➤ At the bottom-right there are brief and simple instructions suggesting how to select the appropriate Score for each Risk Factor depending, but not limited to, on the type of investor.
- On the top-right is (A) the field where you have to indicate the project name, and (B) a graph that visualizes the selected assessment of both Scoring (1:10) and Ratio (1:2). On the Y-axis is marked the selected critical value (in this case equal to 1.2) selected by an assessment maker.
- ④ To indicate the project name, you can either select it from the drop-down list of already analyzed, or write it for the first time in the marked filed, from where, the name automatically goes to one row up and is added to into the list of projects (sheet "List")

Click "Practice1" button or Go to Practice 1 > at the bottom below the operating matrix. (Avoid using

sheet tabs of the workbook to change the sheet. It restricts the effect of the program)

Worksheet Practice1 contains four lines of tables – sub-matrixes. Each of them is purposed for one group of operators of the assessment process. As far as you are one of the group of External Assessors, you have an option to save the information in a similar submatrix and to operate with it when required. Assessment made by everybody is forwarded automatically "OPERATING FORM" in the same size, shape and configuration as it was made in the main matrix on the previous sheet "Bul".

(If you use CONSUMER-ORIENTED VERSION, seven sub-matrixes of Group A are capable for operation.)

(5) From this position the information will be forward to a sub-matrix on this Personal Code sheet and 1 002 in this case) saved for further processing when you select an appropriate sub-matrix and click its button "Complete". However, as one of the INSIDE EXPERTISE, you belong to Group A and must select consecutively the up to seven sub-matrixes in the

first line. It could be clean or completed. The figure below it changes "0" – for empty or "1" – completed. This will happen when you select appropriate option from the appeared MsgBox (e.g. "Yes"). "No" will cause data block to go automatically to archiving on sheet "File" where each data are respectively pasted in the first empty available row at the bottom of the table. To clean up all sub-matrix click the red button \bowtie at the top-left corner.

EXTERNAL ASSESSORS form Group B complete sub-matrixes on the second line;

INDEPENDENT AUDITS form **Group C** complete sub-matrixes on the third line;

QUALITY ASSIGNMENT from **Group D** completes two examinations: (i) "what-if" expertise, designed for refining of the **Default Risk** (\mathcal{A}); and (ii) **Personal Traits** of up to eight managers of the project company to reform the **Operational Risk** (\mathcal{O}).

Obviously, there are two risk **F**actors of special interest, and they are bolded above as well as in the submatrixes too. You need this audit when you have to add credibility through your final assessment to what you're trying to achieve. Such a need arises in case of significant difference(s) between the **Ratio** of one **F**actor (usually l or d) and the rest.

1	Risk :	002	1 (
40	8.4	1.20	7
53	9.6	1.20	8
59	11.0	1.10	10
46	10.8	1.20	9
54	10.8	1.20	9
60	10.0	1.00	10
46	9.2	1.02	9
65	12.0	1.20	10
423	Area:	back	
7.7	6.8	Total:	

Complete

- (6) Visual analysis of the information in the table of sheet Practice1 is presented in this unique matrix containing 32 submatrixes (including the first one, called "OPERATING FORM"). Each of the first three group's rows contains a computed Total average level of risk regardless of whether all sub-matrixes are completed or not. Finally the Cell AN46 represents the Total level of the risk computed for the average of groups A+B+C. The charts at the top show: *the first* average computed risk of each so called (A) expert, (B) assessor, (c) auditor and/or (C) high qualified professionals belonging to the respective group assigned to audit the above assessments; *the second*—percentage contribution of each group to the total result. Now the manager can make decision how to proceed with the forthcoming business venture by superposing his or her own opinion over the results in the table.
- At the bottom of the spreadsheet is the section of Group D sub-matrix with an ActiveX Control scrollbar and graphic applications. Group D is paired for a double meaning and purposes. If you chose on sheet Bul, PERSONALITY TRAITS mode then Group D consists of auditors for due diligence of individual personality traits of the managing staff. Each of them has to score first the eight factors as individual behavior criteria, and then to select a Ratio for each Factor in compliance with a conceptual scenario for specific events of interest based on a well-defined set of assumptions.
- (8) The said conceptual scenario includes adjustment and improvement of the behavior for mitigation of the Factor Operational Risk "o". ActiveX control scroll-bar at the bottom right of the sheet to simulate events that change the Ratio of impact of the assessed personality traits over the Factor "o" and its relative part of the total risk. With this information, on the next upper-level of a well-defined set of assumptions, and in compliance with a updated conceptual scenario by the coordinator, the panel of experts may repeat the above described procedure as many times as the case requires. Thus the "basis" of the total risk is reduced. This process is displayed in the pyramid to the right on the program spreadsheet with the reduction of its size together with the decreasing of the impact of Factor "o" over the total level of risk. Per se, "o"-impact may drop, as it is commonly said, by up to 95%.

The program allows monitoring and control of *posterior probabilities*, i.e. to exercise initial and current **risk management**. The **HANDBOOK** was designed to provide general guidelines of how to do it. From the above analysis discussing conditional probability, it is expected the managers (decision makers) to revise probabilities given new information.

(9) Worksheet File . "To Sheet File *******" button on the top left moves you to the next sheet to previous assess-

ments. (Avoid using sheet tabs of the workbook to change the sheet. It restricts the effect of the program). To restore the last saved data back to original sub-matrix, click **b** Back to "Bul" button. **Theoretical Background**

(1) Worksheet Bayes. When a Ratio multiplied by selected quotient for a prior probability has exceeded the

critical value, and the alert sign has appeared (predominately but not limited to the Default Risk (d), a correct assessment requires assignment of a HIGHLY QUALIFIED AUDIT GROUP TO ADD CREDIBILITY TO

YOUR FINAL ASSESSMENT. The auditors collect new information from samples, or request a special report or a product test of the system output, etc. in order to revise or update the prior probability value and to define events referred to as *posterior probabilities*. They can be computed by means of the Bayes Theorem. This is a sensitivity analyses of *posterior probabilities* that should be later applied in the business plan, provided the decision maker decides to accept the risk and continue the development of the project.

Event A1 from: QUALITY	Supplier A1 (Subcontractor)	98%
Event A2 from: QUALITY	Supplier A2 (Subcontractor)	95%
QUANTITY:	Supplier A1	65%

- (1) Set up an event of interest following the supplied goods or services, depending on the nature of the business venture, by two sub-contractors.
- (2) Complete the percentage of <u>Good</u> quality of both A1 and A2 supplies (*subcontractors*), and the percentage of the A1's quantity from the total supply. (For the master model they are respectively 98%, 95% and 65%). Posterior probabilities of <u>Bad</u> events will be computed respectively for both of them, as well as the overall probability of a <u>Bad</u> event to happen. (For the master model it is equal to 3.05).

(13) The field Name of Project was entered automatically, but don't forget to fill in the Event of In- terest you have already set up. Don't forget to fill in the You're done.
1 Note. The program re-computes <i>d</i> -Factor's Ratio [cell D15, sheet Bul] with the impact of the received overall probability for a <u>Bed</u> event to happen over <i>d</i> pro rata based on the difference from the assessed Ratio up to the maximum allowable Ratio (2), fixed for every Factor. This way a posterior probability emerges from the analysis of the influence of new information over the historical information by a special professional team of experts (Group D) and the objectivity the assessment of this Risk Factor <i>d</i>) increases.
 (15) For easier operation with the program, among other tools, you have one that cleans the table prior to starting a new analysis. Click the big red button on sheet Practice1 and select the right option on the appeared MsgBox. For more than two events following delivery of goods or services by suppliers (subcontractors) to go to sheet Bayes5. Click one of the "5 Events" buttons (Avoid using sheet tabs of the workbook to change the sheet. It restricts the effect of the program).
(6) Worksheet Bayes5. The decision analysis may require computing the impact of the Default Risk (\mathcal{A}) over the total level of risk for a business venture when the historical information leads to more than two mutually exclusive events of interest. Just complete the empty cells.
Worksheet INTRO introduces the problems of risk with two sections:
Section 1 has short definitions of the selected types of risks (preferentially prevailing financial Factors), subject of quantity assessment; and

Section 2 has a description of the risk matrix double polar coordinate system quantity assessment software program.

When you finish, return to sheet **Bayes5** by clicking the "**See Comments**" button to make better sense of the results.



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