MODIFYING THE CASH FLOW ESTIMATE BY ADOPTING THE EQUIVALENT COEFFICIENT (CE) AND ITS IMPACT ON THE NET PRESENT VALUE

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Abstract

The use of the Certainty Equivalent Method allows for the modification of cash flows in the event of risk diagnosis after determining these flows and for emerging conditions. Given the limits surrounding economic forecasting, it is reasonable to assume that cash estimates during the early years of the project are more accurate than they are in later years. The Certainty Equivalent Coefficient (CEC) is defined as the ratio of the confirmed cash flow in the year to the uncertain cash flow in the same year, and the value of the certainty coefficient ranges from zero in the case of high risk level (uncertainty), and a true one in the case of certainty. The certainty equivalent method compensates for risks in general, and therefore it is appropriate to discount all the adjusted cash flows by means of the certainty equivalent at the risk free rate of return (Treasury Bills). All investment evaluation models are based on Assumptions that can be made to reduce the problem of uncertainty surrounding the estimation of the components of the value of the project. The conditions of uncertainty are the conditions that control all investment decisions, and there is no doubt that this fact is consistent with the nature and characteristics of investment. Under conditions of uncertainty, the analyst can know the cash flows of the investment through the probability distribution, and as a result, the dispersion of the probability distribution of those flows is the one that expresses the risks. Risk is the possibility that realized cash flows will deviate from expected cash flows. Since risks are an inherent component of all investment decisions, it is necessary to study it alongside the expected return from this investment.

Keywords: Certainty Equivalent Method, equivalent coefficient, investment, Economy

Introduction

Fluctuations in political, economic and social conditions have a significant and influential role in the cash flow estimates that investors expect for their investment projects. Conditions may be favorable for optimistic estimates, but the investor is forced to make adjustments after a period and perhaps before the start of the project to obtain variables that leave their effects on previous estimates. To address this, the equivalent coefficient (CE) is adopted to make adjustments and bring the estimates closer to a more accurate level due to the expected risks. From identifying the sources of uncertainty, therefore, the factors affecting uncertainty and the results of the measurement process must be identified, as well as studying the background of these factors and the available information for the measurement process, and thus determining the number of influencing factors and the impact of each variable. These influencing factors are macroeconomic variables, such as inflation rate, interest rates, and exchange rate changes,

and what they reflect in terms of changes in revenues, costs, and pure flows due to the change in each of them. macroeconomic variables.

The orientation towards rational investment by investors and the estimation of cash flows requires a clear vision and benefit from the statistical and mathematical models adopted in adjusting these cash flows. Therefore, the problem is summed up in the loss of rational vision in the investment decision and the lack of familiarity and knowledge of the approved models.

The research gains its importance through the importance of calculating the correct estimates of cash flows, as calculating the cash estimates correctly avoids the potential risks facing the rational investor in a world in which its political and economic conditions fluctuate constantly, as the rapid and sudden fluctuations reflect their negative effects in all areas and directions, including specifically Investments, whether they are financial investments or investments in real assets, and where the investor aims to achieve acceptable returns and profits at least that exceed the costs and risks incurred by the investor and compensation for his waiver of immediate consumption and the allocation of his money in the investment opportunity that he chose, so this research is Aid for investors, especially in the Iraq Stock Exchange.

We used in the research two types of mathematical statistical methods used in the field of statistical data analysis:

Arithmetic mean (average): The arithmetic mean is one of the most important measures of central tendency and the most used one to find a point around which the most frequencies in the sample used gather.

$$\bar{x} = \frac{\sum xi}{n}$$

Standard Deviation: The square root of the sum of squares of values from their arithmetic mean

$$\sqrt{\frac{\sum(yi - \bar{y})^2}{n - 1}}$$

3- Variance: i.e. the sum of the squares of the values from their arithmetic mean:

$$S^2 = \frac{\sum(yi - \bar{y})^2}{n - 1}$$

4- Equivalent coefficient for adjusting expected cash flows:

Equation No. 1 is the equivalent coefficient of certainty equation.

CE = u12 +u22 +…………+un2 …………(1)
Cu = (u12 +u22 +…….+un2) ½…….(2)
EU = K * CU…………. (3)
whereas
Equivalent coefficient = EU
Confidence coefficient = K
Total deviations = CU

Note that the level of confidence is 1.96 and number 2 can be adopted for a greater level of confidence.

As for extracting the value of CU, it is done by adopting equation (1), which is the sum of the squared deviations of the values of a group of variables related to the economic activity of investment projects, and therefore any changes that occur in these variables will have an impact

on the outcome of these projects in terms of cash flows during the economic life of investment projects and square each of them. These factors are inflation rate, interest rates and exchange rates.

The temporal and spatial limits of the research: the temporal limits were the period between (2010-2019) and the spatial limits were studied on a hypothetical project.

1- The concept and nature of cash flows are cash flows that are expected to be achieved over the economic life of the proposed investment project. They are estimated during the preparation of the financial and economic feasibility study for the investment project. These studies are prepared to show the feasibility of projects according to internationally, regionally and locally approved standards. Flows are estimated based on marketing, financial and accounting studies. These flows come after the projects bear costs of both types, fixed costs and variable costs, and there is no revenue unless there are costs or sales, and these revenues are prepared according to a financial statement, which is the statement of profits and losses, as it begins with revenues and ends with net income, after deducting costs that include fixed costs, cash and non-cash And the variable costs that include the costs of raw materials, direct labor wages, and other expenses such as administrative and marketing expenses, subtracting interest and loan payments, if any, and tax deduction [EBIT(1-T) + Depreciation and amortization,{

Brigham & Houston, 2017) and since depreciation is one of the non-cash fixed costs, that is, a book cost that is added to the net income (NI + Dep. to obtain the inward cash flow (Flow) IN Cash, which is based on measuring the feasibility of investment projects by adopting criteria Approved Feasibility Among these criteria is the net present value (NPV) criterion, which expresses the present value of free cash flows, which is calculated by the following formula:

FCF ={EBIT(1-T) +DEP. & Amortization}-{capital expenditures + Net operating working capital (Brigham & Houston, 2017)

Free cash flow is profit before interest and tax less tax and fixed payments minus the investment portion and net operating capital.

2- The areas of cash flows: Studying the company's sources and uses of cash flows is a very important step to study the cash flow statement that focuses on the source of the cash flow and how to spend it to reveal the field or activity of its investment, and it is not limited to this role, but also reveals the company's cash position and changes Which occurs in the paragraphs of assets and liabilities and in cash between the beginning and the end of the period, as this expresses the position of the cash position of the company and there are three important and main areas or activities of cash flows that show the cash inflows and the cash outflows outflow and each of them has its own field and plans that work to achieve what It seeks to achieve goals, namely: (Stephen 2015).

A- Operational activities: These flows are related to operations and operational activities, and they are activities for which the company pays cash outside as costs for the purchase of assets such as machinery, equipment, inventory, and other operational requirements. In return, the company receives revenues or receipts from customers, i. And cash flow inside and dominated by the positive side, and operating flows are settled according to the accounting principle, which is a principle that takes the operations as they are, and in that it differs from the principle of cash accrual, which only recognizes what was actually received or what was actually paid. Therefore, the statement of profits and losses ends, according to the accounting principle, with

net income, while non-cash flows are added to net income to obtain the cash flow, such as extinction.

B- Investment activities: The second activity is investment activities, and these investment activities are activities in new businesses and investments, acquisition of assets, or purchase of new equipment and machinery. Purchase operations result in cash outflows and sales operations result in cash inflows. It is known that investment aims to achieve Revenues and profits In order to achieve revenues, there must be expenses, and this is possible for a short period, as it is not quick to obtain investment revenues, because the investment is likely for not short periods, especially if the investment is in long-term assets.

C- Financing activities: The third type of activities is the internal financing activities, which is the company's issuance of shares or bonds to be offered in the financial market. These are external sources of financing, but the holders of ordinary shares will become owners of ownership later. As for the bondholders, they are indebted to whom the company pays interest as a cost in exchange for using the indebtedness. Offering bonds with a nominal value of 1000 dinars is an inflow, but it is indebted in exchange for interest that is agreed upon at the rate of this interest. As for the shares, they become owners of property as mentioned, and they get an annual return in the event of a profit. And the company's management took a decision to distribute the profits as a dividend (Net Present Value) and according to its suitability.

2- Equivalent CE coefficient

When preparing feasibility studies and evaluating projects, future cash flows are estimated using probability measures such as forecasting techniques. These actions do not give a true picture of future events. To avoid uncertainty, convert expected future cash flows into given cash flows. Some cash flows are the cash flows which are obtained by multiplying the uncertain cash flows with a predetermined rule known as the certainty equivalent coefficient. The equivalent certainty factor is the factor that determines the risks associated with future cash flows. Risky investments have a low CE rating and are therefore avoided. This is because the potential for offsetting estimated cash flows is unlikely.

3 - Net Present Value

The net present value is one of the criteria approved in the capital budget to estimate the feasibility of the proposed investment projects, and it is approved by the United Nations organizations and regional specialized organizations such as the Arab Industrial Development Organization, and it is based in its calculation on certain variables that enter into the equation Net cash flows before and after using the equivalent coefficient to adjust cash flows:

In this paragraph, the cash flows will be calculated in two cases, the first without modification, and the second by adjusting the cash flows by adopting the equivalent coefficient according to the changes that occurred to some variables that had an impactful role on one of the national projects assigned by the Investment Authority to one of the investors, as shown in Table (1). Its annual cash flows during the life of the project, and the cost of the project was 950 million dinars. As for its cash flows, it was as in the table, and the cost of capital is 10%. The cost of capital is the best rate for discounting cash flows, because it is related to the cost and its relationship to the expected return. From the cost of capital, because it is not acceptable for the return to be less than the cost of capital. In such cases, investment projects whose return is less than its cost are rejected, and accordingly this cost will be adopted to deduct the expected cash flows.

Table 1 Project cash flows - million dinars

Average	10	9	8	7	6	5	4	3	2	1	Year
	295	290	275	265	270	260	220	180	200	180	flows cash

First case - before modification:

For the purpose of knowing the feasibility of the project and its acceptance by the investor, a feasibility study was conducted for the project using the net present value and adopting the capital cost rate to discount the cash flows. The results were as shown in Table (2):

Table 2 cash flows after discount

10	9	8	7	6	5	4	3	2	1	Year
295	290	275	265	270	260	220	180	200	180	Cash flow
0.3855	0.4241	04665	0.5132	0.5645	0.6209	0.6830	0.7513	0.8264	0.9091	discount coefficient
113.723	122.989	128.288	135.998	152.415	161.434	150.26	135.224	165.28	163.638	flow after discount

NPV = PV - I
= 1429.24-- 950
479.239 = million dinars

The second case:

1- Calculation of the Equivalent Assurance Coefficient:

By looking at some of the variables affecting the economic activity of investment projects, which are the rate of inflation, exchange rates, and interest rates, all of which affect the course of cash flows for investment projects, especially if the project is in a worried and turbulent investment environment that lacks political and economic stability. Table (3) shows these variables And fluctuations in it during ten years, starting from 2010 to 2019, where it is noted that the inflation rate between increase and decrease during the period and was the highest level during the year 2017 when it reached 6.9% and 6.5% in the year 2012 and the lowest level is 1.4% in 2015, with an average of 3.86 % Where the rate of inflation is one of the main variables affecting the volume of cash flows and resulting from multiple political and economic factors, the most prominent of which is the low level of investment of economic resources and thus the low level of the volume of gross domestic production. And the decline was thus, as it reached its highest level in 2017, which was 1275, and its lowest level was in 2010, when it reached

1185 dinars per dollar, with an average The period was 1228.3 dinars per dollar, and interest levels were also variable according to their duration, although it was noted that some years were the interest rates on short-term loans higher than their counterparts on medium and long-term loans, and this may be due to the increase in demand for short-term loans compared to medium and long loans term. However, it is noticeable on interest rates that the year 2010 is the highest in interest rates compared to the rest of the years for all types of short, medium and long interest, as it reached 14.35% for short, 13.35% for medium and 14.35% for long-term loans, with an average of 67.12%, 10.65% and 12.42% on average. Respectively, the standard deviation and variance for each of these variables are shown in Table (4), which is a measure of the dispersion of values from their mean, as the farther and wider the dispersion, the more that is an indicator of the risk facing business establishments and thus the impact on the volume of annual cash flows. The rate of change in the exchange rate has been adopted for the time series to be consistent with the data of the variables in order to obtain an acceptable equivalent assurance coefficient, and to make the necessary adjustments to the size of the cash flows, the equivalent assurance coefficient must be calculated according to which the cash flows of the project are modified. Therefore, Equation No. (1) must be used, which is the approved equation in calculating this coefficient and by adopting the data of Table 4 related to the variance of the variables:

Cu = (0.033064 + 0.0003 + .032589 + 0.011436 + 0.022612)

   = 0.099981

 EU = 1 - 0.099981 ×1.96

= 0.81

Table 3 Variables affecting cash flows

interest rates %			Rate of change	Exchange rate	Inflation rate%	Year
Long	Medium	Short				
14.35	13.35	14.35	0.0025	1185	2.5	2010
14.21	12.75	14.3	0.0083	1196	5.6	2011
13.75	13,03	13.87	0.0343	1237	6.5	2012
13.67	13.13	13.57	-0.004	1232	2.4	2013
12.3	11.3	12.5	-0.0146	1214	2.2	2014
11.88	12.06	12.21	0.0272	1247	1.4	2015
11.8	11.5	14	0.0225	1275	4.5	2016
11.6	11.3	12	0.0133	1258	6.9	2017
11.3	11.4	11.9	0.039	1209	3.3	2018
9.3	9.7	8	0.0174	1230	3.3	2019
12.416	10.649	12.67	0.01459	1228.3	3.86	المتوسط

Table (4) The standard deviation and variance of the variables

Variance	Standard Deviation	Variable	
3.3064	1.818	Inflation rate	
0.0003	0.016	The percentage change in the exchange rate	
3.2589	1.81	Short	interest rates
1.1436	1.07	Medium	
2.2612	1.50	Long	

d- Calculating the net present value

10	9	8	7	6	5	4	3	2	1	Year
295	290	275	265	270	260	220	180	200	180	Cash flow
0.81	0.81	0.81	0.81	0.81	0.8`1	0.81	0.81	0,81	0.81	Equivalent confirmation factor
238.95	234.9	222.75	214.65	218.7	210.6	178.2	145.5	162	145.8	cash flow after adjustment
0.3855	0.4241	0.4665	0.5132	0.5645	0.6209	0.6830	0.7513	0.8264	0.9091	discount coefficient
92.115	99.621	103.913	110.159	123.456	130.762	121.711	109.314	133.877	132,547	cash flow after discount

NPV = PV - I
NPV = 1157 - 950
- 207.475 million dinars

Results and discussion

The research dealt with the extent of the effect of the Equivalent Assurance Coefficient (CE), which is a coefficient that takes the risk surrounding cash flows into account and resulting from the change in political and economic conditions, which reflects its effects on economic factors that are considered the most influential on future expectations, most notably the inflation rate, the exchange rate and the three-term interest rates (short, medium and long-term), and therefore this coefficient was calculated, which is the sum of the drifts of the variables mentioned, and the present value of the cash flows was calculated in two cases, the first before the amendment,

and the results showed that the net present value of the project under study is a high net present value, and this indicates the feasibility of the project From the point of view of the net present value criterion, it was in the amount of 479.279 million dinars, but the net present value became another criterion by adopting the equivalent assurance coefficient, which, as previously mentioned, reached a scale of 81%, so that the estimates are closer to reality, and it takes into account the impact of these variables on the expected cash flows of projects The future, as all of them are affected by political and economic developments, whether at the international level or less Yemeni or local, and the results were different, as the net present value amounted to 207.475 million dinars, which is an acceptable indicator as well, as long as the present value of the expected cash flows exceeds the estimates set for the project before making adjustments according to the equivalent assurance factor, and therefore when it is called the assurance factor because it makes an appropriate adjustment to the flows It is based on the study of deviations and their calculation in expectations that show the extent of departure from the average observations, where deviation and variance are considered a measure of risk, and thus this coefficient takes these risks into account in anticipation of unsatisfactory results.

Conclusions

1- The inflation rate was not stable, and it is a rate that increases and decreases according to the political and economic conditions in Iraq, which did not witness political and economic stability throughout the period that followed the year of occupation.

2- The instability of the exchange rate during the relevant period, which is normal for a country suffering from political problems and wars with terrorism, and the consequent spending is increasing.

3- It was noted that the change in interest rates is large between the short and the other, which were considered long, despite the short period, and this is a case that reflects the anxiety that banking institutions were suffering from, and therefore hesitation in granting loans and the tendency to raise the interest rate.

4- The changes that occurred in the macroeconomic variables that were adopted to calculate the equivalent coefficient of assurance had a major role in reducing the coefficient of certainty to 81%.

5- The present value of the cash flows of the project after the adjustment by the equivalent coefficient of certainty exceeded the amount of the invested capital and thus achieved an acceptable net present value.

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