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Inflows refer to any amount that enters the investment, such as deposits, dividends, or earnings. Cash outflows include any fees or charges that are subtracted from the balance. The payback period is commonly used by investors, financial professionals, and corporations to calculate investment returns. Capital budgeting is a key activity in corporate finance. One of the most important concepts every corporate financial analyst must learn is how to value different investment or operational projects to determine the most profitable project or investment to undertake. Corporate financial analysts do this with the payback period. Calculating the payback period is useful in financial and capital budgeting, but this metric also has applications in other industries and for individuals. It can be used by homeowners and businesses to calculate the return on energy-efficient technologies such as solar panels and insulation, including maintenance and upgrades. Some analysts favor the payback method for its simplicity. Others like to use it as an additional point of reference in a capital budgeting decision framework. The payback period ignores the time value of money (TVM), unlike other methods of capital budgeting. Money is worth more today than the same amount in the future because of the earning potential of the present money. Most capital budgeting formulas, such as net present value (NPV), internal rate of return (IRR), and discounted cash flow, consider the TVM. It must include an opportunity cost if you pay an investor tomorrow. The TVM is a concept that assigns a value to this opportunity cost. The payback period disregards the time value of money and is determined by counting the number of years it takes to recover the funds invested. The payback period would be five years if it takes five years to recover the cost of an investment. This period doesn't account for what happens after payback occurs. 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Investors might use payback in conjunction with return on investment (ROI) to determine whether to invest or enter a trade. Corporations and business managers also use the payback period to evaluate the relative favorability of potential projects in conjunction with tools like IRR or NPV. Under payback method, an investment project is accepted or rejected on the basis of payback period. Payback period means the period of time that a project requires to recover the money invested in it. Itis mostly expressed in months and years. Unlike net present value , profitability index and internal rate of return method, payback method does not take into account the time value of money. A modified variant of this method is the discounted payback method which considers the time value of money. You can read about that variant here. According to payback method, the project that promises a quick recovery of initial investment is considered desirable. If the payback period of a project is shorter than or equal to the managements maximumdesired payback period, the project is accepted, otherwise rejected. For example, if a company wants to recoup the cost of a machine within 5 years of purchase, the maximum desired payback period of the company would be 5 years. The purchase of machine would be desirable if it promises a payback period of 5 years or less. Whennet annual cash inflow is even (i.e., same cash flow every period), the payback period of the project can be computed by simply dividing the initial investment by the annual inflow of cash, as shown by the following formula: \*The denominator of the formula becomes incremental cash flow if an old asset (e.g., machine or equipment etc.) is replaced by a new one. Delta Company is planning to purchase a machine known as machine X. Machine X would cost \$25,000 and would have a useful life of 10 years with zero salvage value. The expected annual cash inflow of the machine is \$10,000. Required: Compute payback period of machine X and conclude whether or not the machine would be purchased if the maximum desired payback period of Delta company is 3 years. Since the annual cash inflow is even in this project, we can simply divide the initial investment by the annual cash inflow to compute the payback period. It is shown below. Payback period = \$25,000/\$10,000 = 2.5 years According to payback period analysis, the purchase of machine X is desirable because its payback period is 2.5 years which is shorter than the maximum payback period of the company. Due to increased demand, the management of Rani Beverage Company is considering to purchase a new equipment to increase the production and revenues. The useful life of the equipment is 10 years and the companys maximum desired payback period is 4 years. The inflow and outflow of cash associated with the new equipment is given below: Initial cost of equipment:\$37,500 Annual cash inflows: Sales: \$75,000 Annual cash Outflows: Cost of ingredients:\$45,000Salaries expenses:\$13,500Maintenance expenses:\$1,500 Non cash expenses: Depreciation expense:\$5,000 Required: Should Rani Beverage Company purchase the new equipment? Use payback method for your answer. Step 1: In order to compute the payback period of the equipment, we need to workout the net annual cash inflow by deducting the total of cash outflow from the total of cash inflow associated with the equipment. Computation of net annual cash inflow: \$75,000 (\$45,000 + \$13,500 + \$1,500)= \$15,000 Step 2: Now, the amount of investment required to purchase the equipment would be divided by the amount of net annual cash inflow (computed in step 1) to find the payback period of the equipment. = \$37,500/\$15,000=2.5 years Depreciation is a non-cash expense and therefore has been ignored while calculating the payback period of the project. According to payback method, the equipment should be purchased because the payback period of the equipment is 2.5 years which is shorter than the maximum desired payback period of 4 years. Where funds are limited and several alternative projects are being considered, the project with the shortest payback period is preferred. It is explained with the help of the following example: The management of Health Supplement Inc. wants to reduce its labor cost by installing a new machine in its production process. For this purpose, two types of machines are available in the market Machine X and Machine Y. Machine X would cost \$18,000 where as Machine Y would cost \$15,000. Both the machines can reduce annual labor cost by \$3,000. Required: Which is the best machine to purchase according to payback method of project analysis?(Hint: Consider the reduction in cost as equivalent to cash inflow). Payback period of machine X: \$18,000/\$3,000 = 6 yearsPayback period of machine Y:\$15,000/\$3,000 = 5 years According to payback method, machine Y is more desirable than machine X because it has a shorter payback period than machine X. In above examples, we have assumed that the projects generate even or consistent cash inflow. However, it generally does not happen as many projects mostly generate uneven or inconsistent cash inflow. When projects generate inconsistent or uneven cash inflow (i.e., different cash inflow in different periods), the simpleformula given above cannot be used to determine the payback period. In such situations, we need to compute the cumulative cash inflow and then apply the following formula: An investment of \$200,000 is expected to generate the following cash inflows in six years: Year 1:\$70,000Year 2:\$60,000Year 3:\$55,000Year 4:\$40,000Year 5:\$30,000Year 6:\$25,000 Required: Compute payback period of the investment. Should the investment be made if management wants to recover the initial investment in 3 years or less? (1). Because the cash inflow is uneven, the payback period formula cannot be used to compute the payback period. We can compute the payback period by computing the cumulative net cash flow as follows: Payback period = 3 + (15,000\*/40,000)= 3 + 0.375= 3.375 years \*Unrecovered investment at start of 4th year: = Initial cost Cumulative cash inflow at the end of 3rd year= \$200,000 \$185,000= \$15,000 The payback period for this project is 3.375 years whichis longer than the maximum desired payback period of the management (3 years). The investment in this projects therefore not desirable. Some advantages and disadvantages of payback method are given below. An investment project with a short payback period promises a quick inflow of cash. It is therefore, a useful capital budgeting method for cash poor firms. A project with short payback period can improve the liquidity position of the business quickly. The payback period is important for the firms for which liquidity is very important. An investment with short payback period makes the funds available soon to invest in another project. A short payback period reduces the risk of loss caused by changing economic conditions and other unavoidable reasons. Payback period is very easy to compute and apply. The payback method does not take into account the time value of money. It does not consider the useful life of the assets and inflow of cash that the project may generate after its payback period. For example, two projects, project A and project B, both require an initial investment of \$5,000. Project A generates an annual cash inflow of \$1,000 for 5 years whereas project B also generates an annual cash inflow of \$1,000 but for 7 years. It is clear that the project B is going to be more profitable than project A, but according to payback method, both the projects are equally desirable, because both have a payback period of 5 years (= \$5,000/\$1,000). Practice exercises and problemsPractice quizzes Help us grow by sharing our content How to Calculate Payback PeriodThe payback period is a fundamental capital budgeting tool in corporate finance, and perhaps the simplest method for evaluating the feasibility of undertaking a potential investment or project.Conceptually, the payback period is the amount of time between the date of the initial investment (i.e., project cost) and the date when the break-even point has been reached.The break-even point (BEP) refers to the threshold at which the amount of revenue produced by the project is equal to the associated costs.While there certainly are exceptions (i.e., projects that necessitate significant time before generating sustainable profits), a large portion of companies especially those that are publicly traded tend to be more short-term oriented and focus on near-term revenue and earnings per share (EPS) targets.For a public company, the stock price of the company could falter if near-term sales or profitability goals are not met, as the market is unlikely to uphold the current valuation just because management claims to be operating with a longer-term horizon in mind.Each company will internally have its own set of standards for the timing criteria related to accepting (or declining) a project, but the industry that the company operates within also plays a critical role.In addition, the potential returns and estimated payback time of alternative projects the company could pursue instead can also be an influential determinant in the decision (i.e. opportunity costs).What is a Good Payback Period?As a general rule of thumb, the shorter the payback period, the more attractive the investment, and the better off the company would be.Shorter Payback Period The earlier the cash flows from a potential project can offset the initial investment, the greater the likelihood that the company or investor will proceed with pursuing the project.Longer Payback Period In contrast, the longer it takes for a project to pay for itself, the less attractive the project becomes as it implies reduced profitability.Why? The sooner the break-even point is met, the more likely additional profits are to follow (or at the very least, the risk of losing capital on the project is significantly reduced).A longer payback time, on the other hand, suggests that the invested capital is going to be tied up for a long period.Thus, the project is deemed illiquid and the probability of there being comparatively more profitable projects with quicker recoveries of the initial outflow is far greater.Payback Period FormulaIn its simplest form, the formula to calculate the payback period involves dividing the cost of the initial investment by the annual cash flow.Payback Period = Initial Investment Cash Flow Per YearWhere:Initial Investment Cash Outflow in Period 0Cash Flow Per Year Annual Cash Flow GeneratedIllustrative Payback Period ExampleFor instance, lets say you own a retail company and are considering a proposed growth strategy that involves opening up new store locations in the hopes of benefiting from the expanded geographic reach.The essential question being answered from the calculation is, Given the cost of opening up new store locations in different states, how long would it take for revenue from those new stores to pay back the entire amount of the investment?If opening the new stores amounts to an initial investment of \$400,000 and the expected cash flows from the stores would be \$200,000 each year, then the period would be 2 years.So it would take two years before opening the new store locations has reached its break-even point and the initial investment has been recovered.Years to Break-Even FormulaBut since the payback period metric rarely comes out to be a precise, whole number, the more practical formula is as follows.Payback Period = Years Before Break-Even + (Unrecovered Amount Cash Flow in Recovery Year)/Where:Years Before Break-Even The number of full years until the break-even point is met. In other words, it is the number of years the project remains unprofitable.Unrecovered Amount The negative balance in the year preceding the year in which the cumulative net cash flow of the company exceeds zero.Cash Flow in Recovery YearThe amount of cash flow produced by the company in the year that the initial investment cost has been recovered and is now turning a profit.Payback Period CalculatorWell now move to a modeling exercise, which you can access by filling out the form below. 1. Payback Period Calculation ExampleFirst, well calculate the metric under the non-discounted approach using the two assumptions below.Initial Investment = \$10 millionCash Flows Per Year = \$4 millionOur table lists each of the years in the rows and then has three columns.The first column (Cash Flows) tracks the cash flows of each year for instance, Year 0 reflects the \$10mm outlay whereas the others account for the \$4mm inflow of cash flows.Next, the second column (Cumulative Cash Flows) tracks the net gain/(loss) to date by adding the current years cash flow amount to the net cash flow balance from the prior year.Hence, the cumulative cash flow for Year 1 is equal to (\$6mm) since it adds the \$4mm in cash flows for the current period to the negative \$10mm net cash flow balance.The third and final column is the metric that we are working towards and the formula uses the IF(AND) function in Excel that performs the following two logical tests.The current years cumulative cash balance is less than zeroThe next years cumulative cash balance is greater than zeroIf the two are true, that means the break-even occurs in between the two years and therefore, the current year is selected.But because there is likely a fractional period that we cannot neglect, we must divide the cumulative cash flow balance for the current year (negative sign in front) by the cash flow amount of the next year, which is then added to the current year from earlier.The screenshot below shows the formula in Excel.From the finished output of the first example, we can see the answer comes out to 2.5 years (i.e., 2 years and 6 months).By the end of Year 2, the net cash balance is negative \$2mm, and \$4mm in cash flows will be generated in Year 3, so we add the two years that passed before the project became profitable, as well as the fractional period of 0.5 years (\$2mm /\$4mm). 2. Discounted Payback Period Calculation AnalysisMoving onto our second example, well use the discounted approach this time around, i.e. accounts for the fact that a dollar today is more valuable than a dollar received in the future.The three model assumptions are as follows.Initial Investment = \$20 millionCash Flows Per Year = \$6 millionDiscount Rate = 10.0%The table is structured the same as the previous example, however, the cash flows are discounted to account for the time value of money.Here, each cash flow is divided by (1 + discount rate) ^ time period. But other than this distinction, the calculation steps are the same as in the first example.In closing, as shown in the completed output sheet, the break-even point occurs between Year 4 and Year 5. So, we take four years and then add -0.26 (\$1mm /\$3.7mm), which we can convert into months as roughly 3 months, or a quarter of a year (25% of 12 months).The takeaway is that the company retrieves its initial investment in approximately four years and three months, accounting for the time value of money.

## Payback period calculation. How do i calculate the payback period. What is payback period in financial management. Payback period formula. How to calculate payback period in excel.

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