**CAPITAL BUDETING**

**What does capital budgeting means ?**

The process in which a business determines whether projects such as building a new plant or investing in a long-term venture are worth pursuing. Oftentimes, a prospective project's lifetime cash inflows and outflows are assessed in order to determine whether the returns generated meet a sufficient target benchmark.     
  
Also known as "investment appraisal".

Ideally, businesses should pursue all projects and opportunities that enhance shareholder value. However, because the amount of capital available at any given time for new projects is limited, management needs to use capital budgeting techniques to determine which projects will yield the most return over an applicable period of time.   
  
Popular methods of capital budgeting include net present value (NPV), internal rate of return (IRR), discounted cash flow (DCF) and payback period.

**Valuation**

While working with capital budgeting, one is actually performing valuation.

|  |  |
| --- | --- |
| **In Valuation:** | **In Capital Budgeting:** |
| In valuation, cash flows are identified and discounted down to present value. | In capital budgeting, valuation techniques are used to analyze the impact of [real assets](http://www.studyfinance.com/lessons/capbudget/index.mv?page=02) instead of [financial assets](http://www.studyfinance.com/lessons/capbudget/index.mv?page=02). |

In capital budgeting just as in valuation, the emphasis is on cash flows—those cash flows at acquisition and every year thereafter for economic life of the project.

**Remember, in capital budgeting what is important is cash flow, not profits. The cash flows at acquisition are called**[***net investment***](http://www.studyfinance.com/lessons/capbudget/index.mv?page=02)**and those every year after are termed *net cash flows***.

**Net Investment**

|  |  |  |
| --- | --- | --- |
| **Net Investment** | = | Cost of New Project |
| + | Installation Costs |
| − | Proceeds From Sale or Disposal of Assets |
| ± | Taxes on Sale of Assets |

The amount of taxes and the way proceeds are taxed depends directly on the relationship between proceeds, the initial purchase price, and the book value of the item being replaced.

**Example 1:**

Assume a company buys a new tooling machine for $1,000,000, installation costs net of taxes are $100,000, an existing asset has a book value of $200,000, and the company is in the 30% tax bracket.

**Sale of Asset for its Book Value:**

If an asset is sold for its book value, there is no tax effect.

Assume the company sells the existing asset for $200,000.

|  |  |  |
| --- | --- | --- |
| Cost |  | $1,000,000 |
| Installation | + | $100,000 |
| Proceeds | − | $200,000 |
| Taxes |  | $0 |
| **Net Investment** |  | **$900,000** |

Book value and market value are the same, so there is no tax effect.

**Example 2:**

Assume again that a company buys a new tooling machine for $1,000,000, installation costs net of taxes are $100,000, an existing asset has a book value of $200,000, and the company is in the 30% tax bracket.

**Sale of Asset for Less than Book Value:**

If a company disposes of an asset for less than its book value, it will experience a loss.  
This loss may result in tax savings.

Assume the company sells the existing asset for $75,000.

|  |  |  |
| --- | --- | --- |
| Cost |  | $1,000,000 |
| Installation | + | $100,000 |
| Proceeds | − | $75,000 |
| Taxes | − | $37,500 |
| **Net Investment** |  | **$987,500** |
|  |  |  |

Tax savings from loss = $37,500 ($200,000 − $75,000) × .30

**Example 3:**

Assume once more that a company buys a new tooling machine for $1,000,000, installation costs net of taxes are $100,000, an existing asset has a book value of $200,000, and the company is in the 30% tax bracket.

**Sale of Asset for More than its Book Value:**

This would result in additional taxes, since depreciation would be recaptured.

Assume the company sells the existing asset for $225,000.

|  |  |  |
| --- | --- | --- |
| Cost |  | $1,000,000 |
| Installation | + | $100,000 |
| Proceeds | − | $225,000 |
| Taxes | + | $7,500 |
| **Net Investment** |  | **$882,500** |
|  |  |  |

Taxes = $7,500 ($225,000 − $200,000) × 30%

**Net cash flows**

Net Cash Flows are the cash flows every year after a project is adopted.

|  |  |
| --- | --- |
|  | ΔProjected Earnings Before Taxes and Depreciation |
| − | ΔDepreciation |
| = | Change in Taxable Earnings (1−Tax Rate) |
| = | Earnings After Taxes |
| + | ΔDepreciation |
| = | Net Cash Flows |

|  |  |
| --- | --- |
|  | ΔEBTD |
| − | ΔDEPR |
| = | ΔEBT(1−t) |
| = | EAT |
| + | ΔDEPR |
| = | NCF |

– or –

ΔEBTD − ΔDEPR = ΔEBT(1−t) = EAT + ΔDEPR = NCF

Projected change in earnings before taxes and depreciation arises from costs savings or added returns to the company.

**Example 1:**

Your company is evaluating the purchase of a new project with a depreciable base of $100,000, expected economic life of 4 years and change in earnings before taxes and depreciation of $45,000 year 1, $20,000 year 2, $25,000 year 3 and $35,000 year 4. Assume straightline depreciation and a 20% tax rate.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Yr** | **ΔEBTD** | **−** | **ΔDEPR** | **=** | **ΔEBT(1−t)** | **=** | **EAT** | **+** | **ΔDEPR** | **=** | **NCF** |
| 1 | $45,000 | − | $25,000 | = | $20,000(.8) | = | $16,000 | + | $25,000 | = | $41,000 |
| 2 | $20,000 | − | $25,000 | = | −$5,000(.8) | = | −$4,000 | + | $25,000 | = | $21,000 |
| 3 | $25,000 | − | $25,000 | = | $0(.8) | = | $0 | + | $25,000 | = | $25,000 |
| 4 | $35,000 | − | $25,000 | = | $10,000(.8) | = | $8,000 | + | $25,000 | = | $33,000 |
|  |  |  |  |  |  |  |  |  |  |  |  |

The depreciation in this example is $25,000 per year. ($100,000 ÷ 4)

**Example 2:**

You have the following information available: Company is in 30% tax rate.

**Estimated Earnings:**

|  |  |  |
| --- | --- | --- |
|  | **Without New Project** | **With New Project** |
| 1 | $100,000 | $175,000 |
| 2 | $120,000 | $185,000 |
| 3 | $140,000 | $150,000 |

**Depreciation:**

|  |  |  |
| --- | --- | --- |
|  | **Without New Project** | **With New Project** |
| 1 | $10,000 | $50,000 |
| 2 | $10,000 | $60,000 |
| 3 | $10,000 | $70,000 |

In this case, you have to figure the differences in projected earnings and depreciation with and without the new project. What you're interested in is the incremental effect of the new project.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Estimated Earnings:**   |  |  |  |  | | --- | --- | --- | --- | |  | **Without New Project** | **With New Project** | **Difference** | | 1 | $100,000 | $175,000 | $75,000 | | 2 | $120,000 | $185,000 | $65,000 | | 3 | $140,000 | $150,000 | $10,000 | | **Depreciation:**   |  |  |  |  | | --- | --- | --- | --- | |  | **Without New Project** | **With New Project** | **Difference** | | 1 | $10,000 | $50,000 | $40,000 | | 2 | $10,000 | $60,000 | $50,000 | | 3 | $10,000 | $70,000 | $60,000 | | NOTE: There's probably no depreciation technique where we could get a depreciation schedule like this. This is just for purposes of illustration. | | | | |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Yr** | **ΔEBTD** | **−** | **ΔDEPR** | **=** | **ΔEBT(1−t)** | **=** | **EAT** | **+** | **ΔDEPR** | **=** | **NCF** |
| 1 | $75,000 | − | $40,000 | = | $35,000(.7) | = | $24,500 | + | $40,000 | = | $64,500 |
| 2 | $65,000 | − | $50,000 | = | $15,000(.7) | = | $10,500 | + | $50,000 | = | $60,500 |
| 3 | $10,000 | − | $60,000 | = | −$50,000(.7) | = | −$35,000 | + | $60,000 | = | $25,000 |

**Example 3:**

Your company is thinking about investing in a new project with a depreciable base of $160,000 and an expected economic life of 4 years. Use straight line depreciation. The project will eliminate the need for two workers making $35,000 per year each. Fringes and overtime for each of the employees are $4000 per year. Waste and defects, currently $50,000 per year, will be cut in half. Maintenance expenses will go up by $1000 per year, and insurance costs will go up by $2000 per year. The tax rate is 15%.

Here you have a word problem. Perhaps the most efficient thing to do would be to estimate what the company would be doing if they don't invest in the new project, what they would be doing if they do invest in the new project, and then figure the differences.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | **Without New Project** | | | **With New Project** | | **Difference** | | |
| Salaries | | | $70,000 | | | $0 | |  | | |
| Fringes & OT | | | $8,000 | | | $0 | |  | | |
| Waste | | | $50,000 | | | $25,000 | |  | | |
| Maintenance | | | ? | | | + $1,000 | |  | | |
| Insurance | | | ? | | | + $2,000 | |  | | |
| Total | | | $128,000 | | | $28,000 | | **$100,000** | | |
|  | | |  | | |  | |  | | |
|  | | |  | | |  | |  | | |
| **Yr** | | **ΔEBTD** | **−** | | **ΔDEPR** | **=** | | **ΔEBT(1−t)** | | **=** | **EAT** | | **+** | **ΔDEPR** | **=** | **NCF** |
| 1-4 | | $100,000 | − | | $40,000 | = | | $60,000(.85) | | = | $51,000 | | + | $40,000 | = | $91,000 |

**Capital budgeting techniques**

There are a number of capital budgeting techniques available to an analyst. For our purposes, we will only review *net present value* and *internal rate of return*.

**Net Present Value**

The Net Present Value technique involves discounting net cash flows for a project, then subtracting net investment from the discounted net cash flows. The result is called the Net Present Value(NPV). If the net present value is positive, adopting the project would add to the value of the company. Whether the company chooses to do that will depend on their selection strategies. If they pick all projects that add to the value of the company, they would choose all projects with positive net present values even if that value is just $1. On the other hand, if they have limited resources, they will rank the projects and pick those with the highest NPV's.

The discount rate used most frequently is the company's cost of capital.

**For Example:**

What would the net present value for a project with a net investment of $40,000 and the following net cash flows be if the company's cost of capital is 5%? NCFs for year one is $25,000, for year two is $36,000 and for year three is $5000.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Yr** | **Net Cash Flows** | **×** | **PVIF@5%** | **Discounted Cash Flows** |
| 1 | $25,000 | × | .952 | $23,800 |
| 2 | $36,000 | × | .907 | $32,652 |
| 3 | $5,000 | × | .864 | $4,320 |
| Total Discounted Cash Flows Discounted at 5% | | | | $60,772 |
| Less: Net Investment | | | | − $40,000 |
| **Net Present Value** | | | | **$20,772** |
| **Internal rate of return**  The discount rate often used in capital budgeting that makes the net present value of all cash flows from a particular project equal to zero. Generally speaking, the higher a project's internal rate of return, the more desirable it is to undertake the project. As such, IRR can be used to rank several prospective projects a firm is considering. Assuming all other factors are equal among the various projects, the project with the highest IRR would probably be considered the best and undertaken first.   IRR Example Let us illustrate finding Internal Rate of return with an example investment proposal. Let us say you were offered a series of cash inflows at the end of each of the next five years as in amounts of $40,000. Say the initial cash outlay for this proposal is $100,000.  At first we find NPV at two different interest rates, at the lower rate the NPV will be positive and the upper rate the NPV will be negative.   |  |  |  |  | | --- | --- | --- | --- | | **Year** | **Cash Flow** | **Present Value @ 26%** | **Present Value @ 31%** | | 0 | -100000 | -100000 | -100000 | | 1 | 40000 | 31746.03 | 30534.35 | | 2 | 40000 | 25195.26 | 23308.66 | | 3 | 40000 | 19996.24 | 17792.87 | | 4 | 40000 | 15870.03 | 13582.35 | | 5 | 40000 | 12595.26 | 10368.2 | |  | NPV | 5402.82 | -4413.57 |  Linear Interpolation Since at 26% the NPV is 5402.82 and at 31% the NPV is -4413.57, thus the actual IRR lies somewhere between 26% and 31% at which the NPV is zero. We will use linear interpolation as shown below to find the actual IRR value. **iL = 26%** **iU = 31%** **npvL = 5402.82** **npvU = -4413.57**  irr = iL + [(iU-iL)(npvL)] / [npvL-npvU] irr = 0.26 + [(0.31-0.26)(5402.82)] / [5402.82--4413.57] irr = 0.26 + [(0.05)(5402.82)] / [9816.39] irr = 0.26 + 270.141 / 9816.39 irr = 0.26 + 0.0275 irr = 0.2875 **irr = 28.75%** Thus we have approximated that the actual IRR value is in close proximity of 28.75%, however the actual IRR may just be slightly different from 28.75%. Using an IRR calculator we will find that the actual IRR to be equal to 28.649282902479%. | | | |  |

**CASH MAMAGEMENT**

**DEFINATION**

**cash management**, or **treasury management**, is a [marketing](http://en.wikipedia.org/wiki/Marketing) term for certain services offered primarily to larger business customers. It may be used to describe all bank accounts (such as [checking accounts](http://en.wikipedia.org/wiki/Checking_account)) provided to businesses of a certain size, but it is more often used to describe specific services such as [cash concentration](http://en.wikipedia.org/wiki/Cash_concentration), zero balance accounting, and [automated clearing house](http://en.wikipedia.org/wiki/Automated_clearing_house) facilities. Sometimes, [private banking](http://en.wikipedia.org/wiki/Private_banking) customers are given cash management services.

**Cash management services generally offered**

* **Account Reconcilement Services**: Balancing a checkbook can be a difficult process for a very large business, since it issues so many checks it can take a lot of human monitoring to understand which checks have not cleared and therefore what the company's true balance is. To address this, banks have developed a system which allows companies to upload a list of all the checks that they issue on a daily basis, so that at the end of the month the bank statement will show not only which checks have cleared, but also which have not. More recently, banks have used this system to prevent checks from being fraudulently cashed if they are not on the list, a process known as *positive pay*.
* **Advanced Web Services**: Most banks have an Internet-based system which is more advanced than the one available to consumers. This enables managers to create and authorize special internal logon credentials, allowing employees to send wires and access other cash management features normally not found on the consumer web site.
* **Armored Car Services (Cash Collection Services)**: Large retailers who collect a great deal of cash may have the bank pick this cash up via an armored car company, instead of asking its employees to deposit the cash.
* **Automated Clearing House**: services are usually offered by the cash management division of a bank. The Automated Clearing House is an electronic system used to transfer funds between banks. Companies use this to pay others, especially employees (this is how direct deposit works). Certain companies also use it to collect funds from customers (this is generally how automatic payment plans work). This system is criticized by some consumer advocacy groups, because under this system banks assume that the company initiating the debit is correct until proven otherwise.
* **Balance Reporting Services**: Corporate clients who actively manage their cash balances usually subscribe to secure web-based reporting of their account and transaction information at their lead bank. These sophisticated compilations of banking activity may include balances in foreign currencies, as well as those at other banks. They include information on cash positions as well as 'float' (e.g., checks in the process of collection). Finally, they offer transaction-specific details on all forms of payment activity, including deposits, checks, [wire transfers](http://en.wikipedia.org/wiki/Wire_transfer) in and out, ACH (automated clearinghouse debits and credits), investments, etc.
* **Cash Concentration Services**: Large or national chain retailers often are in areas where their primary bank does not have branches. Therefore, they open bank accounts at various local banks in the area. To prevent funds in these accounts from being idle and not earning sufficient interest, many of these companies have an agreement set with their primary bank, whereby their primary bank uses the [Automated Clearing House](http://en.wikipedia.org/wiki/Automated_Clearing_House) to electronically "pull" the money from these banks into a single interest-bearing bank account.
* **Lockbox - Retail:** services: Often companies (such as utilities) which receive a large number of payments via checks in the mail have the bank set up a post office box for them, open their mail, and deposit any checks found. This is referred to as a "lockbox" service.
* **Lockbox - Wholesale:** services: are for companies with small numbers of payments, sometimes with detailed requirements for processing. This might be a company like a dentist's office or small manufacturing company.
* **Positive Pay**: Positive pay is a service whereby the company electronically shares its [check register](http://en.wikipedia.org/wiki/Check_register) of all written checks with the bank. The bank therefore will only pay checks listed in that register, with exactly the same specifications as listed in the register (amount, payee, serial number, etc.). This system dramatically reduces check fraud.
* **Reverse Positive Pay**: Reverse positive pay is similar to positive pay, but the process is reversed, with the company, not the bank, maintaining the list of checks issued. When checks are presented for payment and clear through the Federal Reserve System, the Federal Reserve prepares a file of the checks' account numbers, serial numbers, and dollar amounts and sends the file to the bank. In reverse positive pay, the bank sends that file to the company, where the companies compares the information to its internal records. The company lets the bank know which checks match its internal information, and the bank pays those items. The bank then researches the checks that do not match, corrects any misreads or encoding errors, and determines if any items are fraudulent. The bank pays only "true" exceptions, that is, those that can be reconciled with the company's files.
* [**Sweep accounts**](http://en.wikipedia.org/wiki/Sweep_account): are typically offered by the cash management division of a bank. Under this system, excess funds from a company's bank accounts are automatically moved into a money market mutual fund overnight, and then moved back the next morning. This allows them to earn interest overnight. This is the primary use of money market mutual funds.
* **Zero Balance Accounting**: can be thought of as somewhat of a *hack*. Companies with large numbers of stores or locations can very often be confused if all those stores are depositing into a single bank account. Traditionally, it would be impossible to know which deposits were from which stores without seeking to view images of those deposits. To help correct this problem, banks developed a system where each store is given their own bank account, but all the money deposited into the individual store accounts are automatically moved or swept into the company's main bank account. This allows the company to look at individual statements for each store. U.S. banks are almost all converting their systems so that companies **can** tell which store made a particular deposit, even if these deposits are all deposited into a single account. Therefore, zero balance accounting is being used less frequently.

**Wire Transfer**: A wire transfer is an electronic transfer of funds. Wire transfers can be done by a simple bank account transfer, or by a transfer of cash at a cash office. Bank wire transfers are often the most expedient method for transferring funds between bank accounts. A bank wire transfer is a message to the receiving bank requesting them to effect payment in accordance with the instructions given. The

message also includes settlement instructions. The actual wire transfer itself is virtually instantaneous, requiring no longer for transmission than a telephone call.

* **Controlled Disbursement**: This is another product offered by banks under Cash Management Services. The bank provides a daily report, typically early in the day, that provides the amount of disbursements that will be charged to the customer's account. This early knowledge of daily funds requirement allows the customer to invest any surplus in intraday investment opportunities, typically money market investments. This is different from delayed disbursements, where payments are issued through a remote branch of a bank and customer is able to delay the payment due to increased float time.

In the past, other services have been offered the usefulness of which has diminished with the rise of the Internet. For example, companies could have daily faxes of their most recent transactions or be sent [CD-ROMs](http://en.wikipedia.org/wiki/CD-ROM) of images of their cashed checks.

Cash management services can be costly but usually the cost to a company is outweighed by the benefits: cost savings, accuracy, efficiencies, etc



**List of Cash Management Techniques**

**Accounts Receivable**

Many companies are too passive when it comes to collecting on overdue invoices. The money customers owe you plays a big role in your monthly cash flow, so it is important to develop a solid technique for tracking who owes your firm money, how much they owe and when the payment was due. Make sure your accounts receivable staff is taking a proactive approach to collecting on those unpaid bills, and ask for a weekly report showing the total amount outstanding, along with an explanation of why those payments have not been received. Building an accounts receivable database is one of the best ways to keep track of what you are owed. Once the tables have been created and the database has been designed, all your accounts receivable clerks need to do is press a button to open a query showing the details of each outstanding invoice.

**Track Expenses**

Whether you are running a business or a household, it is important to get a handle on expenses. Many business owners are so busy with day-to-day operations that they lose sight of the big picture. Getting a handle on the expenses associated with running your business is one of the best ways to manage--and maximize--your cash. Start by building a detailed report of every expense for the past month. Break each expense down into its appropriate category, i.e. rent, utilities, office supplies, etc., then analyze each category and look for ways to cut back. For instance, companies can save money on office supplies by contracting with a specific vendor and negotiating lower prices, rather than running to the office supply store down the street.

**Credit Lines**

Establishing a credit line with your lender is one way to manage cash flow and avoid shortfalls. Many companies set up a line of credit to cover those times when sales fall short or expenses run high. Companies can also use short term loans to provide the extra liquidity and cash management they need during the down months