

EFFECTS OF INFLATION ON CAPITAL BUDGETING DECISIONS - AN ANALYTICAL STUDY

M. KANNADHASAN, MBA, MFT, M.Phil, (Ph.D)

Faculty, BIM, Trichy

INTRODUCTION

In today's complex business environment, making capital budgeting decisions are among the most important and multifaceted of all management decisions as it represents major commitments of company's resources and have serious consequences on the profitability and financial stability of a company. It is important to evaluate the proposals rationally with respect to both the economic feasibility of individual projects and the relative net benefits of alternative and mutually exclusive projects. It has inspired many research scholars and is primarily concerned with sizable investments in long-term assets, with long-term life.

The growing internationalisation of business brings stiff competition which requires a proper evaluation and weightage on capital budgeting appraisal issues viz. differing project life cycle, impact of inflation, analysis and allowance for risk. Therefore financial managers must consider these issues carefully when making capital budgeting decisions. Inflation is one of the important parameters that govern the financial issues on capital budgeting decisions.

Managers evaluate the estimated future returns of competing investment alternatives. Some of the alternatives considered may involve more risk than others. For example, one alternative may fairly assure future cash flows, whereas another may have a chance of yielding higher cash flows but may also result in lower returns. It is because, apart from other things, inflation plays a vital role on capital budgeting decisions and is a common fact of life all over the world. Inflation is a common problem faced by every finance manager which complicates the practical investment decision making than others. Most of the managers are concerned about the effects of inflation on the project's profitability. Though a double digit rate of inflation is a common feature in developing countries like India, the manager should consider this factor carefully while taking such decisions.

In practice, the managers do recognize that inflation exists but rarely incorporate inflation in the analysis of capital budgeting, because it is assumed that with inflation, both net revenues and the project cost will rise proportionately, therefore it will not have much impact. However, this is not true; inflation influences two aspects viz. Cash Flow, Discount Rate and hence this study is an attempt to analyse the issues in the area of effects of inflation on capital budgeting decisions for optimum utilisation of scarce resources. In discussing how the inflation effects on capital budgeting decisions, this paper has been divided into two parts. In the first part, discussion is about inflation, how to measure the inflation and the effects of inflation on GDP. In the second part, effects on inflation on capital budgeting decisions, comprising how to deal with expected and unexpected inflation while forecasting cash flows and determining the discount rate in particular.

1. OVERVIEW OF INFLATION

Everyone is familiar with the term ‘Inflation’ as rising prices. This means the same thing as fall in the value of money. For example, a person would like to buy 5kgs of apple with Rs. 100, at the present rate of inflation, say, zero. Now when the inflation rate is 5%, then the person would require Rs. 105 to buy the same quantity of apples. This is because there is more money chasing the same produce. Thus, Inflation is a monetary ailment in an economy and it has been defined in so many ways, which can be defined as “the change in purchasing power in a currency from period to period relative to some basket of goods and services.”¹.

When analysing Capital Budgeting Decisions with inflation, it is required to distinguish between expected and unexpected inflation. The difference between unexpected and expected inflation is of crucial importance as the effects of inflation, especially its redistributive effect, depend on whether it is expected or not. Expected inflation refers to the loss the manager anticipates in buying power over time whereas unexpected inflation refers to the difference between actual and expected inflation. If rate of inflation is expected, then the manager take steps to make suitable adjustments in their proposals to avoid the adverse effects which could bring to them.

Measuring Inflation: Inflation is measured by observing the change in the price of a large number of goods and services in an economy, usually based on data collected by government agencies. The prices of goods and services are combined to give a price index or average price level, the average price of the basket of products. The inflation rate is the rate of increase in this index; while the price level might be seen as measuring the size of a balloon, inflation refers to the increase in its size. There is no single true measure of inflation, because the value of inflation will depend on the weight given to each good in the index.

The common measures of inflation include²: Consumer price indexes (CPIs), Producer price indexes (PPIs), Wholesale price indexes (WPIs), commodity price indexes, GDP deflator, and Employment cost index. Table showing the rate of inflation in India (1995-2003)³ based on WPI, based on CPI and growth rate in GDP is given table 1.

TABLE 1
RATE OF INFLATION IN INDIA (1995-2003)

| Year | Based on WPI | Based on CPI | Growth rate in GDP |
|---------|--------------|--------------|--------------------|
| 1995-96 | 4.4 | 8.9 | 6.5 |
| 1996-97 | 5.4 | 10 | 4.8 |
| 1997-98 | 4.5 | 8.3 | 7.8 |
| 1998-99 | 5.3 | 8.9 | 7.3 |
| 1999- | 6.5 | 4.8 | 6.1 |
| 2000- | 4.9 | 2.5 | 4.4 |
| 2001- | 1.6 | 5.2 | 5.6 |
| 2002- | 4.4 | 3.2 | 4.4 |

Inflation and Gross Domestic Product (GDP): Inflation and GDP growth are probably the two most important macroeconomic variables. The Gross Domestic Product (GDP) is the key indicator used to measure the health of a country's economy. The GDP of a country is defined as the market value of all final goods and services produced within a country in a given period of time. Usually, GDP is expressed as a comparison to the previous quarter or year. For example, if the year-to-year GDP was up by 3%, it means that the economy has grown by 3% over the last year.

A significant change in GDP, whether increase or decrease, usually reflects on the stock market. The reason behind this is that, a bad economy usually means lower profits for companies, which in turn means lower stock prices. Investors really worry about negative GDP growth. Therefore growth in GDP reflects both on growth in the economy and price changes (inflation). GDP deflator is based on calculations of the GDP: it is based on the ratio of the total amount of money spent on GDP (nominal GDP) to the inflation corrected measure of GDP (constant price or real GDP). It is the broadest measure of the price level. Deflators are calculated by using the following formula⁴ :

$$\text{GDP Deflator} = \frac{\text{Nominal GDP}}{\text{Real GDP}} \times 100$$

Current price figures measure value of transactions in the prices relating to the period being measured. On the other hand, Constant price figures express value using the average prices of a selected year, this year is known as the base year. Constant price series can be used to show how the quantity or volume of goods has changed, and are often referred to as volume measures. The ratio of the current and constant price series is therefore a measure of price movements, and this forms the basis for the GDP deflator. The GDP deflator shows how much a change in the base year's GDP relies upon changes in the price level. It is also known as the "GDP implicit price deflator".

Because it isn't based on a fixed basket of goods and services, the GDP deflator has an advantage over the Consumer Price Index. Changes in consumption patterns or the introduction of new goods and services are automatically reflected in the deflator⁵.

2. INFLATION AND CAPITAL BUDGETING DECISIONS

Capital budgeting results would be unrealistic if the effects of inflation are not correctly factored in the analysis⁶. For evaluating the capital budgeting decisions; we require information about cash flows-inflows as well as outflows. In the capital budgeting procedure, estimating the cash flows is the first step which requires the estimation of cost and benefits of different proposals being considered for decision-making. The estimation of cost and benefits may be made on the basis of input data being provided by experts in production, marketing, accounting or any other department. Mostly accounting information is the basis for estimating cash flows. The Managerial Accountant's task is to design the organization's information system or Management Accounting System (MAS) in order to facilitate managerial decision making. MAS parameters have to be designed on the basis for commonalities in the decision process of executives involved in strategic capital budgeting decisions.

This has been emphasized by David F Larcker⁷ and examined whether executives have similar preferences regarding information which may be used in making strategic capital budgeting decisions. The results indicate that executives have similar informational preferences, the preferred information characteristics depend upon the stage of the decision, and environmental and organizational structure variables are not associated with an executive's informational preferences.

Inflation and Cash Flows: As mentioned above, estimating the cash flows is the first step which requires the estimation of cost and benefits of different proposals being considered for decision-making. Usually, two alternatives are suggested for measuring the 'Cost and benefits of a proposal *i.e.*, the accounting profits and the cash flows.

In reality, estimating the cash flows is most important as well as difficult task. It is because of uncertainty and accounting ambiguity⁸.

Accounting profit is the resultant figure on the basis of several accounting concepts and policies. Adequate care should be taken while adjusting the accounting data, otherwise errors would arise in estimating cash flows. The term cash flow is used to describe the cash oriented measures of return, generated by a proposal. Though it may not be possible to obtain exact cash-effect measurement, it is possible to generate useful approximations based on available accounting data. The costs are denoted as cash outflows whereas the benefits are denoted as cash inflows. The relation between cash flows and Accounting Profit is discussed in the subsequent Para, before a detailed discussion on effect of Inflation and cash flows is done.

Cash Flows Vs Accounting Profit: The evaluation of any capital investment proposal is based on the future benefits accruing for the investment proposal. For this, two alternative criteria are available to quantify the benefits namely, Accounting Profit and Cash flows. This basic difference between them is primarily due to the inclusion of certain non-cash items like depreciation. This can be illustrated in the Table2:

TABLE 2
A COMPARISON OF
CASH FLOW AND ACCOUNTING PROFIT APPROACHES

| Accounting Approach | | | Cash flow Approach | | |
|---------------------|-----|------|---------------------|-----|------|
| Particulars | Rs. | Rs. | Particulars | Rs. | Rs. |
| Revenue | | 1000 | Revenue | | 1000 |
| Less: Expenses | | | Less: Expenses | | |
| Cash Expenses | 400 | | Cash Expenses | 400 | |
| Depreciation | 200 | 600 | Depreciation | 200 | 600 |
| Earnings before Tax | | 400 | Earnings before Tax | | 400 |
| Tax @ 50% | | 200 | Tax | | 200 |
| Earning after Tax | | 200 | Earning after Tax | | 200 |
| | | | Add: Depreciation | | 200 |
| | | | Cash flow | | 400 |

Effects of Inflation on Cash Flows: Often there is a tendency to assume erroneously that, when, both net revenues and the project cost rise proportionately, the inflation would not have much impact. These lines of arguments seem to be convincing, and it is correct for two reasons. First, the rate used for discounting cash flows is generally expressed in nominal terms. It would be inappropriate and inconsistent to use a nominal rate to discount cash flows which are not adjusted for the impact of inflation. Second, selling prices and costs show different degrees of responsiveness to inflation⁹. Estimating the cash flows is a constant challenge to all levels of financial managers. To examine the effects of inflation on cash flows, it is important to note the difference between nominal cash flow and real cash flow. It is the change in the general price level that creates crucial difference between the two.

A nominal cash flow means the income received in terms rupees. On the other hand, a real cash flow means purchasing power of your income. The manager invested Rs.10000 in anticipation of 10 per cent rate of return at the end of the year. It means that the manager will get Rs.11000 after a year irrespective of changes in purchasing power of money towards goods or services. The sum of Rs.11000 is known as nominal terms, which includes the impact of inflation. Thus, Rs. 1000 is a nominal return on investment of the manager. On the other hand, (Let us assume the inflation rate is 5 per cent in next year. Rs.11000 next year and Rs.10476.19 today are equivalent in terms of the purchasing power if the rate of inflation is 5 per cent.) Rs.476.19 is in real terms as it adjusted for the effect of inflation. Though the manager's nominal rate of return is Rs. 1000, but only Rs. 476 is real return. The same has been discussed with capital budgeting problem.

ABC Ltd is considering a new project for manufacturing of toys involving a capital outlay of Rs.6 Lakhs. The capacity of the plant is for an annual production capacity 60000 toys and the capacity utilization is during the 3 years working life of the project is indicated below:

| | | | |
|----------------------|----|----|-----|
| Year | 1 | 2 | 3 |
| Capacity Utilization | 60 | 75 | 100 |

The selling price per toy is Rs.15 and contribution is 40 per cent. The annual fixed costs, excluding depreciation are to be estimated Rs.28000 per annum. The depreciation is 20 per cent and straight line method. Let us assume that in our example the rate of inflation is expected to be 5 per cent.

TABLE 3
A COMPARISON OF REAL CASH FLOW AND NOMINAL CASH FLOW

(Figures in Rupees)

| Particulars/ Year | 1 | 2 | 3 |
|----------------------|------------|------------|------------|
| Sales Revenue | 360000 | 450000 | 600000 |
| Less: Variable Cost | 216000 | 270000 | 360000 |
| Depreciation | 120000 | 120000 | 120000 |
| Fixed Cost | 28000 | 28000 | 28000 |
| Earnings before Tax | 4000 | 32000 | 100000 |
| Tax @ 50% | - | 16000 | 50000 |
| Profit after tax | - | 16000 | 50000 |
| Real Cash flow | 116000 | 136000 | 170000 |
| Inflation Adjustment | $(1.05)^1$ | $(1.05)^2$ | $(1.05)^3$ |
| Nominal Cash flow | 121800 | 149940 | 196796 |

Therefore, the finance manager should be consistent in treating inflation as the discount rate is market determined. In addition to this, a company's output price should be more than the expected inflation rate. Otherwise there is every possibility is to forego the good investment proposal, because of low profitability. And also, future is always unexpected, what will be the real inflation rate (may be more or less). Thus, in estimating cash flows, along with output price, expected inflation must be taken into account. In dealing with expected inflation in capital budgeting analysis, the finance manager has to be very careful for correct analysis. A mismatch can cause significant errors in decision making. Therefore the finance manager should always remember to match the cash flows and discount rate as mentioned below table 4.

TABLE 4
MATCH UP CASH FLOWS AND DISCOUNT RATE¹⁰

| Cash flows | Discount rate | Yields |
|-------------------|-----------------------|---------------|
| Nominal Cash flow | Nominal discount rate | Present Value |
| Real cash flow | Real discount rate | Present Value |

Inflation and Discount Rate: The discount rate has become one of the central concepts of finance. Some of its manifestations include familiar concepts such as opportunity cost, capital cost, borrowing rate, lending rate and the rate of return on stocks or bonds¹¹. It is greatly influenced in computing NPV. The selection of proper rate is critical which helps for making correct decision. In order to compute net present value, it is necessary to discount future benefits and costs. This discounting reflects the time value of money. Benefits and costs are worth more if they are experienced sooner. The higher the discount rate, the lower is the present value of future cash flows.

For typical investments, with costs concentrated in early periods and benefits following in later periods, raising the discount rate tends to reduce the net present value.

Thus, discount rate means the minimum requisite rate of return on funds committed to the project. The primary purpose of measuring the cost of capital is its use as a financial standard for evaluating investment projects.

Effects of Inflation on Discount Rate: Using of proper discount rate, depends on whether the benefits and costs are measured in real or nominal terms. To be consistent and free from inflation bias, the cash flows should match with discount rate. Considering the above example, 10 per cent is a nominal rate of return on investment of the manager. On the other hand, (Let us assume the inflation rate is 5 per cent, in next year), though the manager's nominal rate of return is 10 per cent, but only 4.76 percent is real rate of return. In order to receive 10 per cent real rate of return, in view of 5 per cent expected inflation rate, the nominal required rate of return would be 15.5%. The nominal discount rate (r) is a combination of real rate (K), expected inflation rate (α). This relationship is known as ***Fisher's effect***, which may be stated as follows:

$$r = (1+K) (1+ \alpha) - 1$$

The relationship between the rate of return and inflation in the real world is a tough task to explain than the theoretical relationship described above. Experience shows that deflation of any series of interest rates over time by any popular price index does not yield relatively constant real rates of interest. However, this should not be interpreted as the current rate of interest is properly adjusted for the actual rate of inflation, but only that it will contain some expected rate of inflation. Furthermore, the ability of accurately forecasting the rate of inflation is very rare¹².

IMPLICATIONS

It is noted from the above analysis; effects of inflation significantly influence the capital budgeting decision making process. If the prices of outputs and the discount rates are expected to rise at the same rate, capital budgeting decision will not be neutral. The implications of expected rate of inflation on the capital budgeting process and decision making are as follows:

- a. The company should raise the output price above the expected rate of inflation. Unless it has lower Net Present Value which may lead to forego the proposals and vice versa.
- b. If the company is unable to raise the output price, it can make some internal adjustments through careful management of working capital.
- c. With respect of discount rate, the adjustment should be made through capital structure.

CONCLUSION

It could be inferred from the above analysis that, effects of inflation are significantly influenced on capital budgeting decision making process. Though the inflation is a common problem, every finance manager encounters during their capital budgeting decision making process for optimum utilisation of scarce resources especially in two major aspects namely cash flow and discount rate. To examine the effects of inflation on cash flows, it is important to note the difference between nominal cash flow and real cash flow. It is the change in the general price level that creates crucial difference between these two. Therefore, the finance manager should take into cognizance the effect of inflation. Otherwise possibilities are more to forego the good investment proposal, because of low profitability.

Using of the proper discount rate depends on whether the benefits and costs are measured in real or nominal cash flows. To be consistent, the cash flows should match with discount rate. A mismatch can cause significant errors in decision making. There should be consistency in treating the inflation in the cash flows and the discount rate. It is very difficult to take decision, free from effect of inflation as it is highly uncertain. Therefore, use of Gross Domestic Product deflator may be ideal while taking CBD since, it would be more rational, and scientific and not on pick and choose method For projects or programs that extend beyond the six-year budget horizon, the inflation assumption can be extended by using the inflation rate for the sixth year of the budget forecast. The Administration's economic forecast is updated twice annually, at the time the budget is published in January or February and at the time of the Mid-Session Review of the Budget in July. Alternative inflation estimates, based on credible private sector forecasts, may be used for sensitivity analysis.

REFERENCES:

1. Aswath Damodaran (2001), “ Corporate Finance-Theory and Practice”, 2nd Edition, John Wiley & sons (Asia), Pte Limited, Singapore, pp 318-324
2. <http://en.wikipedia.org>
3. Ahuja K , “ Macro Economics”, 2nd Edition, S.Chand & Company Limited, New Delhi, pp 346-353
4. ibid 2.
5. www.investopedia.com
6. Khan M Y & Jain P K, (2004), “Financial Management-Text, problems and Cases”, 4th Edition, *Tata Mcgraw Hill Publishing Company Limited*, New Delhi, pp 450-559.
7. David F Larcker (1981), “ The perceived Importance of Selected Information Characteristics for Strategic Capital Budgeting Decisions’, *The Accounting Review*, Vol. LVI, No.3, pp519-538
8. Panday I M, (2000), “Financial Management”, 9th Edition, *Vikas Publishing House Private Limited*, New Delhi, pp 450-559.
9. Ibid 8.
10. Ibid 1.
11. Uri Benzion, Amnon Rapoport, Joseph Yagil (1989), “Discount Rates Inferred from Decisions: An Experimental Study”, *Management Science*, Vol. 35, No. 3, pp. 270-28.
12. Geoffrey T Mills (1996), “The impact of inflation on Capital Budgeting and working capital”, *Journal of financial and Strategic Decisions*, vol.9, No.1, spring, pp 79-87.