Discounting Rate: A Matter of Common Sense Rather than a Theoretical Problem

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Abstract

Different rates proposed by several authors to discount cashflows of given projects are discussed. The paper starts by reviewing what the objectives of an evaluation are and later presents the different discount rates suggested by the authors. After a theoretical but fundamentally logical analysis it is concluded that there is no universal discount rate that can be used in all situations; to do so would disregard both the fact that an evaluation can have different objectives and that the environment in which projects will be carried out and companies will develop is unique in each case.

Introduction

Future investment evaluations should fulfill three fundamental objectives:

Ob1 - to accept or reject different proposals
Ob2 - to select the best alternative for a given project
Ob3 - to choose the best projects based on the available budget.

In Ob1, a comparison of the project yardsticks against the profitability, risk and liability guidelines set by the company should be made. In Ob2, different alternatives for the same project should be compared in order to choose the most convenient. Finally, in Ob3, a selection of the best ones - among all the possible investments- is made so as to conform an optimum business portfolio, taking into consideration the available budget. Both comparisons - Ob2 and Ob3 - are also made by means of the yardsticks.

Although there is some disagreement among the project evaluators as to which yardsticks to use, the most rational position from the technical point of view, for low risk projects, is to use Payout Time and Maximum Exposure for measuring risks and liabilities, and Present Worth and Investment Efficiency for capital yield. Maybe the most controversial issue is at what rate these yardsticks should be calculated.

Thus, Capen and others [1] propose three different rates: cost of capital, corporate cutoff rate and future reinvestment rate. The authors define cost of capital as the rate at which the investment will be financed, including own funds among the financing sources. The corporate cutoff rate is defined as the minimum yield rate the company has established for accepting the project. As to the reinvestment rate, the authors present their doubts over which rate to consider: the rate at which all future company funds will be put to work or the rate at which the funds generated solely as a result of the project under evaluation will be put to work?. After stating their supportive arguments in favor of both stances, they quite honestly declare that their position is still undefined. Finally, for comparative purposes - Ob2 and Ob3 - they recommend the use of the reinvestment rate.

Following the same line of thought, Salomon [2] suggests using the cost of capital for accept/reject decisions - Ob1 - and the reinvestment rate for comparative purposes - Ob2 and Ob3. On the other hand, Stermole and Stermole [3] propose two rates: financial cost of capital, equivalent to Capen's cost of capital, and the opportunity cost of capital, defined as the rate of the project to be carried out if the one under analysis is rejected. They recommend the use of the first rate in the hypothetical case of overabundance of capital, and the second one when, as is usually the case, the availability of capital is limited.

Lastly, other evaluators refer to a cutoff rate similar to that suggested by Capen, not always correctly and accurately defined but associable to a yield that will allow debt repayment as well as obtaining a marginal profit.

The Ideal Discount Rate

If correctly analyzed, the preceding proposals all seem to be logical since they start with an irrefutable premise: work is done and risk is taken in order to make a profit so that tomorrow there will be more funds than today. However, and based on the different rates defined, one may think that this is a case of confronted positions. Is this really so? To answer this question different proposals will be analysed in relation to the three basic goals of an evaluation.

Project acceptance/rejection (Ob1). Three different rates are proposed as acceptance/rejection criterion:

- corporate cutoff rate (CCR)
- cost of capital (CC)
- opportunity cost of capital (OCC)

The corporate cutoff rate is logical by definition. If work is done and risk is taken to make a profit, it is logical to demand from the investment sufficient return to at least repay debts and compensate risks. Thus, it should be ensured that external creditors will be paid the agreed rate. At the same time, there should remain a profit such as to make shareholders think that the risk they are taking is being compensated. Under these premises, CCR would be a cost of capital defined as:

$$CCR = LR \times f_{ex} + MY \times f_{eq} \quad (1)$$

where:

$LR =$ *loan rate (tax effects included)*
$f_{ex} =$ *external capital / total capital ratio*
$MY =$ *minimum yield desired by shareholders*
$f_{eq} =$ *equity / total capital ratio = 1 - f_{ex}*

For a given time, f_{ex} is determined by the corporate strategy and LR by the markets. On the other hand,

$$MY = R_0 + P_r \quad (2)$$

where:

$R_0 =$ *market interest rate for zero risk*
$P_r =$ *minimum desired premium for the taken risk*

Thus, the conventional definition of CCR will coincide with the cost of capital as proposed by Capen and Salomon, among others, on the condition that the cost of capital be calculated considering the minimum yield desired by shareholders and not the yield actually obtained. This acceptance/rejection results in the acceptance of projects with a yield lower than the company's average, but others with higher yields are also accepted. A composite of these should be an average cost of capital higher than the minimum corporate cutoff rate and, as illustrated further on, equivalent to the company's reinvestment rate.

Equations (1) and (2) show one way to visualize the CCR; but there is also another equally logical way to do so. Assuming the case of a company with n potential projects and a limited budget, it would prioritize the projects based on a decreasing yield order (Fig. 1). Then, the company would make up its portfolio by selecting the highest yield projects until the entire budget is used up. In this way, when a new project is evaluated it will compete with the lowest yield project among all of those previously selected. This project is the alternative opportunity investment and its rate is that proposed by Stermole for accepting projects when capital availability is scarce. Should there be more capital available, companies, in their eagerness for growth, would accept all low risk projects that would at least ensure payment of debts. Thus, for zero risk projects, P_r would tend to be zero and the CCR would be very similar to the loan rate LR.

Therefore, different positions that initially seemed to confront each other are actually entirely coherent and will lead to the same decisions when used in conjunction with logic and common sense.

Comparison of alternatives or projects (Ob2 and Ob3). Two apparently different rates are usually proposed for these purposes. As indicated above, Capen and Solomon recommend the use of the corporate reinvestment rate. Thus, the selected project will be the one which maximizes the future funds at a given time horizon (Capen uses the expression "down the road"). Other authors propose using cost of capital, as defined earlier.

Assuming that the funds generated by the company are fundamentally used to undertake new investments (reinvestment of undistributed earnings), paying dividends to the shareholders and making good on financial debts, the conclusion should follow that, in the long run, the average reinvestment rate and the average cost of capital are equivalent, because should the company reinvest at a higher rate, it will generate more dividends and the cost of capital will grow.

This demonstrates that, once again, there is total correspondence between both criteria, on the condition that, this time, cost of capital be calculated using the actual retribution to shareholders rather than the minimum desired one used for acceptance/rejection.

But there is a matter for discussion still pending: what reinvestment rate should be used?. The one at which all future company funds will work or the one at which the funds generated solely as a result of the project under analysis will work?.

In general - as correctly supported by Capen - there are no significant differences between both rates. But in some cases they will differ: For instance, if new funds change neither the capital market situation nor the company position in that market they will work at a rate equal to the rate at which existing funds are already working. But if on the contrary, the investment under analysis is so significant as to change, per se, the whole company's reinvestment rate, then not only should the new rate be used in calculating the project yarsticks but the effect of the new rate on the company´s other business should also be considered.

It is necessary to first analyze all the circumstances and possible changes the market may present and their relationship to the project and then decide which figure to use as the reinvestment rate.Therefore the author's proposal is to be open minded and use reasoning rather than recipes, common sense over dogmatism. Nothing is entirely absolute, and everything is closely tied to the circumstances surrounding the action.

Then... What Would Be The Recipe?

Years ago, the author put a great deal of effort into an attempt to prepare a list of presciptions containing yardsticks and rates to be used in different situations. Luckily, the task was never completed because each new case that was brought for analysis did not fit entirely into any of the categories that had been previously established.. If the attempt to make this prescription list had been succesful, in time it would have also become frustrating, for such a list is not possible. Luckily in a sense, the chances of being able to contemplate all the different alternatives this dynamic world offers are far too remote. There are no prescriptions; there are guidelines, based on sound theoretical considerations which should be applied using common sense. There is only one recipe to prevent errors, and that is to dismiss entirely the concept of recipes. This means that each new evaluation should be seen under a new, untainted light, with no preconceived ideas, with special emphasis on the particular environments of the project and the company. Do not skip any stage and do not repeat what was done yesterday without first ensuring that what yesterday was right for Project A should also be valid today for Project B.

Conclusions

- There are different rates proposed in the technical literature for project funds discounting.
- Which one to use will depend on the purpose of the evaluation and on the company's and the project's environments.
- Many times apparently different rates coincide when you analyze them carefully.
- There is no such thing as a set of recipes that can contemplate the full range of variables present in reality.
- The only recipe is to use logic and common sense.

Nomenclature

CC = cost of capital
CCR = corporate cutoff rate
f_{eq} = equity / total capital ratio
f_{ex} = external capital / total capital ratio
LR = loan rate (tax effects included)
MY = minimum yield desired by shareholders
OCC = opportunity cost of capital
P_r = minimum desired premium for the taken risk
R_0 = market interest rate for zero risk

Acknowledgement

References
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2. Solomon, E.: "The Arithmetic of Capital Budgeting Decisions", The Managment of Corporate Capital, Free Press, dist.by Macmillan Co., New York (1959)
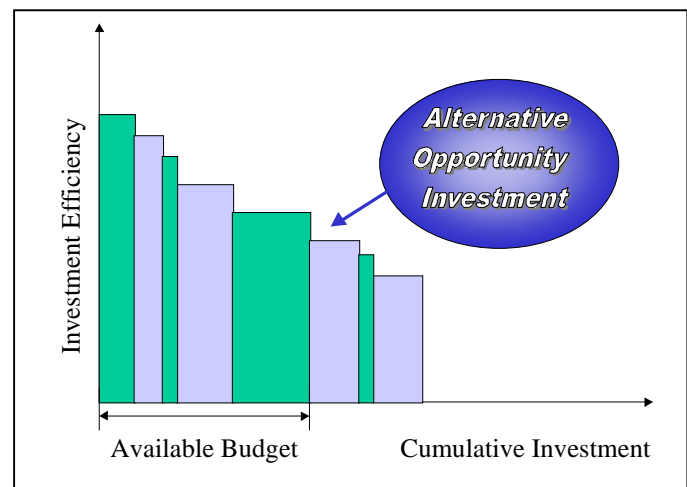3. Stermole, F.J. and Stermole, J.M.: "Economic Evaluation and Investment Decision Methods", Investment Evaluations Corporation, 8th edition (1993) 218

Fig 1 – Alternative Opportunity Investment Definition