

Corporate Investment Policy: What is the Cost of Capital?

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1. Overview

The standard textbook approach (see, for example, Gitman, 1994, chs 9-10, or Peterson, 1994, chs 9 and 14) to capital investment decisions is straightforward: the firm should undertake an investment if and only if the expected return on that investment exceeds the opportunity cost of the funds used to pay for the investment. What is this opportunity cost? Again, textbooks have a ready answer: it is the expected return available on securities that (i) are traded in financial markets and (ii) have the same risk as the firm's investment. Thus, a firm should commit funds to an investment if and only if the expected return on that usage of the funds exceeds the expected return obtainable from investing the funds in financial market securities bearing the same risk. The rationale for this rule follows from the fact that suppliers of capital to the firm could just as easily invest this capital in financial markets, so they will not willingly accept an expected return from the firm that is less than what they could obtain themselves in those markets. If the firm were to make investments that did in fact offer a lower expected return, then shareholders would attempt to withdraw their funds invested in the firm, thereby causing a fall in the share price and a reduction in firm value.

The expected return obtainable from investing the funds in equivalent financial market securities is commonly known as the investment's weighted-average cost of capital (WACC), or, more simply, its cost of capital. In the textbook world, therefore, the minimum-acceptable expected rate of return on capital investment is simply the WACC. More precisely, the stream

of expected future profits earned by the investment must be such that the investment yields at least its WACC; otherwise it should not proceed.

Unfortunately, this simple approach ignores most recent (and some not so recent) developments in corporate finance research; in particular, it overlooks the important roles of market dynamics and frictions. Put very briefly, we now know that, in many cases, the costs of investment consist not only of direct "cash costs", but also of indirect costs that arise out of departures from the static and frictionless world of textbooks.¹ Although these indirect costs may involve no direct cash outlay, they are nevertheless real economic costs that add to the total quantum of capital employed by the investment, and therefore on which it must earn its cost of capital. But if the investment is to earn WACC on its *total* investment cost, then clearly it must earn more than WACC on its direct (cash) investment cost.

A concrete example may assist in illustrating this idea.

Example 1

Suppose a proposed new investment costs \$1 million and its WACC is estimated to be 10% per annum. Then, according to the textbook world, the investment must have annual expected profits of at least \$1.1 million if it lasts for one year, or at least \$100,000 if it is a perpetuity. But now suppose that the launching of the investment creates additional indirect costs of \$500,000. Then the total cost of investment is not \$1 million, but \$1.5 million. Consequently, the investment must have annual expected profits of at least \$1.65 million if it lasts for one year, or at least \$150,000 if it is a perpetuity. In the latter case, the expected return on the direct investment cost *only* (i.e., the \$1 million) is not 10%, but 15%; in the former case it is 65%! Clearly, requiring an investment to have an expected return of only 10% (its WACC) may not come even close to returning the cost of the capital employed in that investment.

¹ Note that this has nothing to do with synergies, whereby the launching of a new investment affects the expected profits of existing lines of business. Synergies are easily incorporated within the textbook framework; the indirect costs of investment due to market dynamics or frictions are not.

In Example 1, the minimum-acceptable expected rate of return on capital investment is 15% if the investment is a perpetuity, or 65% if it lasts one year. In either case, the minimum-acceptable expected rate of return is not the WACC (10%), but rather what is sometimes known as the *user cost of capital* (UCC). The UCC measures the expected return that is required on capital investment *if that investment is to adequately cover all its capital costs, both direct and indirect*. In a static and frictionless market environment, the UCC and WACC are equivalent. But, when investment decisions have dynamic implications, or when markets have embedded frictions, then the UCC generally exceeds the WACC. Consequently, it is the former, not the latter, that firms must seek to recover from their investments.

I explore this idea in greater detail throughout the rest of this paper. In section 2, I provide a review of the textbook approach to determining investment decisions and its underlying assumptions. In sections 3 through 5, I demonstrate how departures from these assumptions can lead to different investment criteria. Finally, in section 6, I argue that the nature of the regulated firm requires a different investment criterion from that specified in textbooks, even when the underlying assumptions of the textbook approach are otherwise satisfied.

2. Review of the textbook approach

The conventional textbook approach to capital investment decisions states that an investment project is acceptable (i.e., increases shareholder wealth) if and only if its net present value (NPV) is positive - the so-called NPV rule. To calculate the NPV, the project manager has to, first, forecast the project's cashflows and, second, discount these at a rate that reflects the price charged by capital markets for the risk of the cashflows, otherwise known as the project's weighted-average cost of capital (WACC).² Clearly, the project's NPV is positive if and only if its expected return exceeds its WACC. In this case, the project's minimum-acceptable expected rate of return on investment is exactly equal to its WACC.

² I henceforth use the term "cashflows" rather than "profits" as the former has a precise meaning that describes the variable of interest more accurately than does "profits". However, nothing essential is lost if the reader intuitively thinks "profits" wherever he/she sees "cashflows".

Now take a step back and recall the underlying rationale for this approach. Because suppliers of capital to the firm are (or potentially could be) financial market participants, the cost of supplying capital to the firm is the foregone opportunity to invest the funds in financial market securities of similar risk. Thus, to decide whether or not a firm's new project is a good investment, it is necessary to determine what value the project would have *if it were currently available in financial markets*. Financial markets care only about the size, timing, and risk of the cashflows generated by an investment, so if the project manager can "purchase" these cashflows (by investing in the new project) more cheaply than investors could purchase them in financial markets (so that the project's NPV is positive, or, equivalently, its expected return exceeds its WACC), then the new project makes existing shareholders wealthier. Note the consequent implication: a new project makes shareholders wealthier not by offering some fundamentally new set of future cashflows, but rather by enabling them to obtain an existing set of future cashflows more cheaply.

According to this view, a project is just a collection of cashflows; the business and source of the project is immaterial. All that matters is whether the project's expected return is commensurate with its financial market risk. Thus, in the absence of synergies between the project and the firm's existing investments, the impact on shareholder wealth is simply equal to the project's NPV, irrespective of the firm that undertakes it.

Often overlooked, however, are the assumptions underlying this approach. These include:

- A. Either financial markets are complete or, if they are not complete, the project is spanned (i.e., can be replicated) by existing market securities.
- B. Financial markets are frictionless.
- C. The firm's investment environment is static.

Assumption A states that financial markets offer a complete set of risk-bearing claims. What this means is that any future risky cashflow stream can be constructed using some combination

of existing securities. As a result, the project's future cashflow stream can be perfectly replicated by a suitable combination of existing assets.³ This seems innocuous, but it is in fact crucial. To see why, suppose the project could *not* be replicated by existing securities. Then its introduction adds to the set of investment opportunities. This changes the relative prices of all securities that are currently available and, consequently, the value of the firm's existing assets.⁴ In this case, the change in shareholder wealth is equal to the project's NPV *plus or minus* the change in the value of the firm's existing assets. That is, the firm requires the project to cover not just the WACC, but also the change in the firm's existing capital value.

Although this observation is important for understanding the quicksandish foundation of modern capital budgeting methods, it provides little guidance as to what might constitute a better method. Indeed, without spanning, the whole capital budgeting edifice collapses: the introduction of a new project changes the underlying market pricing structure, so the value of the project at the time of introduction depends on how it changes investment opportunities *after* it has been introduced. But its effect on investment opportunities depends partly on its value at the time of introduction, and so the whole process becomes locked in an infinite loop. In the remainder of this paper, I therefore assume that the spanning assumption is satisfied and concentrate on the effects of relaxing the other assumptions.

Assumption *B* requires that there be no fees, transactions charges, or other impediments to the raising of the funds needed to finance investment. If such costs exist, then the firm requires the project to cover not just the WACC, but also the costs of the financing friction. An obvious example of such a friction is the administrative costs of issuing new securities, but these are relatively minor. As I shall explain in subsequent sections, other less obvious costs are potentially more significant.

Assumption *C* ensures that investment today has no effect on the present value of future investment opportunities. If this is not the case, then the firm requires the project to cover not just the WACC, but also the costs of any fall in the value of the future opportunities.

³ For practical purposes, this usually means finding a single "comparable" firm or asset. Note also that this explains why a positive NPV comes entirely from cost savings.

⁴ In the popular mean-variance model, this corresponds to an expansion of the efficient frontier, which leads to a change in the market portfolio and hence in the systematic risk of all assets.

To summarise, any failure of assumptions *B* and *C* creates additional costs of investment. To justify investment, the project must therefore offer an expected return that covers not only its direct investment costs (the WACC), but also these indirect costs. In short, the user cost of capital (UCC) exceeds the WACC. In the remaining sections, I provide specific examples of the failure of assumptions *B* and *C* and the effect of these on the UCC.

3. Dynamic Investment Opportunities in Frictionless Markets

As Myers (1977) and others point out, the value of any firm can be thought of as having two components: the value of its existing assets-in-place *and* the value of its real growth options. Real growth options are projects that the firm has not yet undertaken, but may do so at some time in the future. For example, an airport may own land that allows it to build an additional runway if future air traffic demand warrants. Similarly, an online bookseller builds up a client list that it can then use in the marketing of other products in the future. Although these are not yet assets-in-place, and are thus intangible, they nevertheless offer a positive probability of positive future cashflows and thus are incorporated in today's stock price (see Brealey et al., 2000, p75).

This simple categorisation has profound implications for optimal investment policy, as first noted by McDonald and Siegel (1986) and subsequently popularised by Dixit and Pindyck (1995). As they point out, if the firm has growth options that can be exercised today *or in the future*, then investment today not only incurs the usual direct cost, but also the indirect cost of sacrificing, or "using up", a valuable growth option. That is, when the firm invests, it gives up the opportunity to invest at a later date, i.e., it can't subsequently make exactly the same investment again in the future, so the growth option disappears. Because this opportunity is valuable, its sacrifice represents an additional cost of investment. In effect, firm value increases by the amount of the project's NPV, but falls by the amount of the growth option value since this no longer exists. Consequently, to justify investment, the UCC exceeds the WACC by an amount sufficient to cover the capital cost of the growth option.⁵

⁵ This analysis applies to an unregulated firm. Guthrie (2002) shows that the differential is even greater for a regulated firm considering the introduction of a new technology.

The standard textbook approach implicitly assumes that either growth options do not exist or, if they do exist, they never evaporate. In other words, investment projects are either "now-or-never" or, if they are not, then they are fully reversible. If the project has to be started today, then there is no opportunity to wait and therefore no opportunity cost to investing today. In this case, the only cost of investment is the WACC and the textbook rule applies. If the project can be delayed, but is fully reversible, then (i) it can be launched again tomorrow if economic conditions are better then (i.e., launching today doesn't preclude launching again in the future) and (ii) its cost can be fully recovered tomorrow if economic conditions turn out to be worse then (i.e., launching today does not entail an irretrievable loss). Thus, there is no possibility of the decision to invest today turning out to be "wrong", so there is again no opportunity cost to investing today and again the textbook rule applies. However, most projects will have neither timing inflexibility nor perfect reversibility.

The point being made here is that the WACC applies to a static world; it does not generally capture the full costs of investment when investment decisions have a dynamic element. In a static world, the opportunity cost of investment in the project is simply the foregone opportunity to invest *today* in an equivalent asset in the financial markets. In a dynamic world, the opportunity cost of investment in the project is the foregone *opportunity* (but not obligation) to invest *today or in the future* in the equivalent asset. In other words, the static cost is a financial market security; the dynamic cost is a call option on that security. Since a call option is equivalent to a leveraged position in the underlying security, the expected return on the option is greater than that on the asset. Ergo, the user cost of capital in a dynamic environment exceeds the WACC.

What determines the UCC in the presence of growth options? There are three principal factors. First, because delay of investment means that all cashflows are received later, and thus have lower present value, the opportunity cost of investment today is higher when current interest rates are low. Second, investment delay is more valuable when the project is expected to become more valuable over time. Third, and most importantly, greater uncertainty about the project's prospects provides an incentive to wait in order to obtain more information. Thus, low interest

rates, high expected growth, and high uncertainty all increase the gap between the UCC and the WACC.

Example 2

Dixit and Pindyck (1994, p153) estimate the dynamic costs of investment for the "typical" firm (based on historical US data) and find that these are, on average, about equal to the direct cash costs. Thus, returning to Example 1, the total cost of investment is not \$1 million, but \$2 million. Consequently, given the WACC of 10%, the investment must have annual expected profits of at least \$2.2 million if it lasts for one year, or at least \$200,000 if it is a perpetuity. In the latter case, the UCC is 20%; in the former case it is 120%!⁶

The discussion to this point has emphasized the fact that investment *destroys* growth options and this destruction must be included as part of the costs of investment. However, investment can also create options. For example, investment today may provide an option to expand the project if things go well; or it may provide an option to abandon the project in exchange for a salvage value if things go badly. In these sorts of cases, investment dynamics *reduce* the costs of investment and thus drive a *negative* wedge between the UCC and the WACC. This raises an obvious question. Might not these dynamic costs and benefits basically offset each other, thereby resurrecting the standard textbook rule?

Ross (1995) and Dixit and Pindyck (1994) argue that actual firm behaviour suggests the additional costs significantly outweigh the additional benefits. As Dixit and Pindyck put it (p7): "Observers of business practice find that hurdle rates are typically three or four times the (WACC)." Since the hurdle rate is the UCC plus any internal premium controlling for overly optimistic cashflow projections, the latter premium would have to be large indeed to account for the entire difference between the hurdle rate and the WACC.

⁶ The perpetuity case corresponds to $\theta = 2$ in the terminology of Evans and Quigley (2002).

Dixit and Pindyck's (1994) conclusion is based on the work of Summers (1987) and Poterba and Summers (1995). Summers surveyed the investment practices of the 200 largest firms in the FORTUNE 500 and found UCCs ranging from 8 to 30%, with a median of 15% and a mean of 17%. Given that the riskless rate of interest at this time was around 4%, these estimates seem far above any reasonable WACC. Poterba and Summers surveyed FORTUNE 1000 firms and found a mean UCC of 17.5%. They noted that, by contrast, the long-run mean equity return was 11% and the long-run mean debt return was 5.5%, so the mean UCC significantly exceeded any plausible WACC.

Partly because of empirical facts such as these, and partly because of their compelling theoretical foundations, the importance of real growth options for the optimal investment policy is now widely recognised. Although their significance continues to be ignored by some introductory textbooks, more advanced texts routinely offer in-depth analysis and conclude that real growth options drive a wedge between the UCC and the WACC. For example, Brealey et al (2000, p649) note that growth options can "explain why managers are sometimes reluctant to commit to positive NPV projects." Amram and Kulatilaka (1999, p3) make the same point more forcefully:

"The current set of valuation and decision-making tools just doesn't work for the new business realities... Real options is an important way of thinking about valuation and strategic decision-making, and the power of this approach is starting to change the economic 'equation' of many industries."

Or Copeland and Antikarov (2001, pvi):

"In ten years, real options will replace NPV as the central paradigm for investment decisions."

Finally, one common objection to the recognition of real growth options in investment analysis is that it is just too complicated and requires unrealistic assumptions. This is simply not true. As Arnold and Shockley (2002) and Copeland and Antikarov (2001) point out, the valuation of real growth options requires nothing more than the complete markets assumption

that is also required of the textbook NPV rule. In other words, if you reject the inclusion of real options in investment analysis, then you must also reject the standard textbook approach!

4. Market Frictions I: Total Risk and Dynamic Investment Opportunities

In the previous section, investment in a project today extinguished the opportunity to invest in (or abandon) that project in the future. Since such flexibility is valuable, its elimination adds to the cost of investment, thereby driving a wedge between the UCC and the WACC. In this section, I argue that market frictions can have a similar effect: investment in a project today restricts the opportunity to invest in *other* projects in the future, thereby raising the total cost of investment in today's project.

Recall that in the standard textbook framework, the project's value to shareholders is the same irrespective of the firm that undertakes it. This occurs because capital markets charge a price only for bearing *systematic* risk; unsystematic risk is diversifiable and therefore cannot command a premium. Consequently, the WACC reflects systematic risk, but not unsystematic risk. As the systematic risk of a project is, by definition, independent of the firm taking the project, so is the WACC and, therefore, the present value of the expected cashflows. The unsystematic, or firm-specific, risk of the project could obviously vary from firm to firm, but this has no effect on the project's value.

This conclusion is critically dependent on the assumption of frictionless markets. When frictions are present, significant changes in total risk (*systematic plus unsystematic*) can have an adverse effect on the firm's ability to finance future investment. There are several reasons for this:

1. First, as discussed by Stulz (1999), when a firm's total risk becomes significant, employees, suppliers, and customers become less certain that their contracts with the firm will ultimately be honoured. For such stakeholders, this risk cannot easily be diversified, so they become more reluctant to enter into these contracts in the first place. Consequently, firms with significant total risk have to pay more for services from suppliers and employees, or offer lower prices to customers. This reduces the future funding available to the firm from internal sources.

2. Second, firms with a significant probability of financial distress have, as Jensen and Meckling (1976) show, an incentive to "bet the house". Because of limited liability, shareholders cannot lose more than 100% of their investment. Thus, if the bet forces the firm into default, the losses are shared with debtholders. On the other hand, if the "bet" pays off, most of the gains accrue to shareholders. Because of this moral hazard incentive, banks and other suppliers of debt capital become reluctant to lend to firms with high total risk. This reduces the future funding available to the firm from external sources.
3. Third, when a leveraged firm has significant total risk, the principal effect of issuing new equity is to make the debt safer. Thus, if the new shareholders require a fair return on their investment, then the cost of this must be borne by the old shareholders. Consequently, the old shareholders are reluctant to issue new equity. This further reduces the future funding available to the firm from external sources.

By reducing the future funding available to the firm, a significant increase in total risk makes it unable to take advantage of valuable investment opportunities that it could have exploited if its financial position were stronger. The greater probability of this occurring in the future reduces the value of those opportunities now, i.e., the value of its growth options fall. Therefore, investment in a project that materially raises the total risk of the firm changes firm value not only by the NPV, but also by the fall in value of the future investment opportunities. As a result, investment in the project is justified if and only if the NPV exceeds the fall in value of the future investment opportunities. Equivalently, the UCC exceeds the WACC.

Of course, in frictionless markets, good projects can always obtain funding, so there is no possibility of a future funding shortfall. But, as Stulz (1999, p9) points out, "In the real world, such costless recapitalization is a dream."

Example 3

Froot (1999) argues that a good example of the effects of total risk on firm decisions is provided by the catastrophe reinsurance industry. The volatility of returns on catastrophe reinsurance are very high, but these risks are diversifiable and thus, according to the standard view, firms offering such policies should not command a risk premium, i.e., their

UCC should be the riskless rate of interest. In fact, they require huge risk premia. For example, in 1996, Berkshire Hathaway agreed to sell \$1.05 billion of reinsurance to the California Earthquake Authority. The probability of Berkshire Hathaway having to pay anything was estimated at 1.7%, but the premium was \$113 million - 633% of the expected loss! According to the standard capital budgeting model, the premium should have been less than \$17.85 million. This is a stark illustration that firms will not take gambles that textbooks say they should.

To reiterate, increases in total risk make it more likely that a firm will be unable to undertake future valuable investment opportunities and hence such increases are part of the cost of the project that gives rise to them. Therefore, for investment in the risk-increasing project to proceed, the firm's current shareholders require that the project cover this additional cost. This drives a wedge between the UCC and the WACC.

5. Market Frictions II: Information Asymmetries

Up until now, a positive difference between the UCC and the WACC has required the existence of real growth options. However, the Nobel Prize winning insights of Akerlof (1970), applied to capital investment decisions by Myers and Majluf (1984) and Greenwald et al (1984), show that the UCC can exceed the WACC even when there are no growth options. The fundamental principle can be phrased as "bad investment projects drive out good", or, more precisely, projects have to earn more than their WACC because the market cannot distinguish good projects from bad projects and thus require compensation for this risk.

Suppose the firm has a "one-off, now-or-never" investment opportunity. If not started today, this project completely evaporates. Suppose also that firm insiders know more about the project than investors, and that the latter are aware of this. In this case, there is a "lemons" problem. Investors know that the firm has an incentive to issue new securities when the information possessed by firm insiders reveals the firm's existing securities to be over-valued. Thus, investors fear the worst whenever the firm actually attempts to issue new securities in order to pay for the project, and so require a higher expected return as compensation. The true

(i.e., full-information) cost of capital is the WACC, but the cost charged to the firm by the market (the UCC) is greater than the WACC. As a result, the project will not proceed unless its expected return covers not just its WACC, but also the additional cost of having to issue under-priced securities.

In frictionless markets, there are no information asymmetries, so this problem does not arise. This raises the question of why such a friction might occur. Why, for example, does the firm simply not reveal the missing information to the market so that it doesn't have to issue under-priced securities? Two possibilities exist. First, the cost of doing so may exceed the cost of under-pricing. Second, doing so may reveal commercially-sensitive information to competitor firms.

To reiterate, informational asymmetries cause the market to under-price new security issuances, thereby adding to the cost of the project if the firm has insufficient internal funds to finance the necessary investment. Therefore, for investment in the project to proceed, the firm's current shareholders require that the project cover this additional cost. This drives a wedge between the UCC and the WACC.

6. Market Frictions III: The Regulated Firm

Kolbe, Tye and Myers (1993) point out that, even in the absence of dynamic investment opportunities and the usual market frictions, regulated firms incur an additional investment cost not encountered by unregulated firms and thus face a UCC that exceeds the WACC. This occurs because regulated firms are typically constrained to earn no more than the WACC on their investment rate base. That is, once the project is under way, the regulated firm is allowed to charge prices that allow it to earn the WACC on allowed investment expenditure. However, at the time of investment, the regulated firm faces the additional risk that the regulator may subsequently disallow inclusion of some of the investment in the rate base. Subsequently, the firm earns exactly the WACC if the entire investment is allowed, but it earns less than the WACC if some of the investment is disallowed. For *any* positive probability of disallowance, the firm must therefore have an *expected* rate of return that is less than the WACC. Investment will not, therefore, proceed because providers of capital expect to receive a return less than what

they require. Only if the firm is allowed to earn more than the WACC on its rate base is investment worthwhile.

Note that this result has nothing to do with whether or not the regulatory risk is diversifiable. Even if the regulator decision is a coin toss (and so completely diversifiable in large portfolios), the result remains unaltered. This is because the regulatory risk lowers the actual expected return on the investment, regardless of whether or not the required rate of return (the WACC) changes.

Suppose, for example, that the demand for the project's output is guaranteed, so the project is riskless and its cost of capital is the riskfree rate of interest. Now suppose also that the firm taking the project is regulated. The regulatory decision is a coin toss, so the WACC is still the riskless rate. If all of the investment is allowed in the rate base, the firm earns the riskless rate of return. If some of it is disallowed, however, the firm earns the riskless return only on the allowed portion, so the *total* return is less than the riskless rate. Ex ante, the *expected* return on the investment is less than the riskless rate, so investment will not proceed.

Example 4

Suppose that the project has guaranteed demand of $Q = 100$ units for one year. The investment cost is \$100 and the regulator sets the price P so that the firm earns the riskless interest rate of 10% on the allowed level of investment. There is a 50% probability that the regulator will disallow 50% of the \$100.

If the entire investment is allowed, $P = \$1.1$ and the firm earns 10% on the investment of \$100. If 50% is disallowed, the rate base is \$50 and $P = \$0.55$. In this case, the firm *loses* 45% on the investment of \$100. The expected return is therefore $(1/2)(10) + (1/2)(-45) = -17.5\%$. Clearly, investment will not proceed if the firm is allowed to only earn its WACC (10%) on allowed investment. In fact, investment is justifiable (i.e., the firm's expected return on investment equals its WACC of 10%) if and only if the allowed return r satisfies

$$0.5\{\$100(1+r)\} + 0.5\{\$50(1+r)\} = \$110$$

which yields

$$r = 46\frac{2}{3} \%$$

which is significantly greater than the WACC. The effect of regulatory risk is to drive a wedge between the project's UCC (r) and its WACC.

An alternative way of thinking about this situation is to draw an analogy with the real growth options story. When it invests, the regulated firm effectively *gives* the regulator an "option" (to appropriate some of the firm's profits). This "gift" increases the cost of investment so, ex-ante, investment in the project increases shareholder wealth if and only if NPV is not only positive, but also sufficiently positive to cover the cost of the "gift". Equivalently, the project's UCC must exceed its cost of capital by an amount sufficient to cover the cost of the option that is given away.

To reiterate, when a regulated firm invests, it gives away an option-like claim on the project's profits. Consequently, the value of this claim must be included in the cost of investment. This drives a wedge between the UCC and the WACC.

7. Conclusion

The standard textbook approach to capital investment is fundamentally flawed. Even if one is prepared to accept the spanning assumption, the existence of market frictions and/or dynamic investment opportunities cause the total costs of investment to exceed the direct costs. This, in turn, lowers the expected return (on the direct costs) below the investment's cost of capital. Consequently, the value-maximising firm requires an expected return that exceeds the cost of capital by an amount sufficient to cover the indirect costs of investment. Only in the restricted number of very special cases where these indirect costs are zero does the textbook model apply. As Stulz (1999) points out, to blithely assume that such cases are the norm is to ignore everything we have learned in corporate finance in the last 30 years.

In general, the indirect costs of investment will be positive if:

- (a) the timing of investment is flexible, or
- (b) the investment carries significant risk, or
- (c) little is known about the quality of the investment, or
- (d) the investment is subject to regulatory review.

In any of these cases, the total, or user, cost of capital exceeds the conventional cost of capital.

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