Investment Appraisal

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Introduction

Investment appraisal is the assessment of the rewards and implications of shareholders due to the policies that companies maintain when rewarding dividends. It assesses the value for money that shareholders experience, which requires certain techniques (such as NPV).

1 Shareholder Investment Appraisal

When any investment is made, the investor should take into account two things: the return they expect from the investment, and the risk inherent to the investment. There is a general correlation between the two. Generally, you assume that an investor is both *rational* and *risk averse*. *Rationality* describes the fact that a shareholder will not always immediately take the investment with the greatest monetary value - some investments might have more personal benefits, such as environmentally friendly choices. A *risk averse* investor is one who will, if presented with two potential investments with identical reward but differing risk, will pick the investment with the lower risk.

Shareholders make money from investments in two ways: share dividends, and the receipt of money from the sale of shares at the end of the investment. Hence, as risk is related to the unpredictable variability of returns from an investment, the consequences of the risks of a poor investment include no (or insufficient) payment of dividends, or the shares being worth less upon sale than they were at the time of purchase.

To quantify this performance, there are two possible routes. Internal measures can be gained from the results that the company discloses in its annual reports, which can provide valuable information to investors. These include accounting ratios such as *earnings per share*, *return on assets employed*, and *shareholder rate of return*. These are constructed from a number of metrics, including net profits, as well as the assets disclosed in the financial statements. External measures include things like the eventual level of dividends paid, as well as the fluctuations in share prices (as well as the absolute share price for larger companies).

In the UK, dividends are generally paid to shareholders in two batches:

interim payment occurs before the annual earnings of the company are calculated and are hence more speculative. These are generally distributed quarterly.

annual, or final, dividends are declared at the Annual General Meeting in the year.

The level of the total dividend paid is one of the things discussed in the AGM, and the directors can recommend to the shareholders that the payment will either stay the same as last year, increase when compared to the previous year, decrese, or even not be paid at all. The assessment of the total dividend payment over a given time scale is a good indicator of the confidence of the management of the company in its own ability to generate sustainable and increasing profits in the long term.

There are several questions that should be asked about the dividend policy.

- What amount of earnings should be retained, and reinvested, by the company? What will this be reinvested into?
- What proportion of earnings should be distributed to shareholders?
- How do these link to the management's ideas for the future direction of the company? This is also a good assessment of the quality of the long-term strategy of the management of the company.

1.1 Clientele Effect

The clientele effect refers to how some shareholders are attracted to shares based on the expected dividends. If these dividends decrease, then the shareholders sell their shares and move to companies with greater expected dividends, meaning the value of the company's shares will decrease - in general, the incentives attached to shares will affect their value. The clientele effect might influence the dividend policy a company uses. The *income clientele effect* describes how some shareholders require dividends as a source of regular income. This can include direct-investment pensioners, insurance companies, and institutional investors such as large scale pension funds. Both of these have extremely regular liabilities to meet.

The clientele effect is balanced by the fact that stock exchange dealers will likely prefer the capital gains over the dividend payments when the stocks are held only for a short period. Also, in the real world, there are different tax rules applied to share dividends, capital gains, and the general transaction costs for buying and selling shares. Overall, these effects result in a consistent dividend policy maintained by the company. Investors will be attracted to companies whose dividend policies fit their needs, and hence companies build up a clientele of shareholders who are accustomed to the behaviour of the company.

1.2 Information from Dividends

Dividends not only serve to make money in themselves, but also as an indicator of the financial status of the company. There is an asymmetry between shareholders and the management of the company; the management know the ins and outs of the financial status, both in the present and the projection for the future. The shareholders, however, have far less information to work with, as they only know what the company chooses to reveal in its financial statements. This means investors might read too far into signals that the company gives out, such as the choices that the company makes with regards to the dividends.

Shareholders are likely to see an increase in dividends as a favourable sign about the status of the company, or as an indication of good news or a great return on a company's investment. This indicates to shareholders that a company has favourable prospects. Likewise, the opposite might happen if the company reduces its dividends - this might signify financial troubles. If for whichever reason the company pays no dividends at all, this is a red flag for impending insolvency, bankruptcy and the resulting receivership. For these reasons it's vital that you don't give out misleading signals as this might cause some shareholders to jump ship which, due to the clientele effect, will reduce the value of your shares.

Additionally, with shares, the adage of *a bird in the hand is worth two in the bush* very much applies; that is, it's better to have certain dividends that might not amount to a great deal, than to risk potentially highly variable capital gains on stocks (that could possibly crash). A counter-argument to this is that there is an increased need to re-invest retained earnings - it's not a totally cost-free source of cash as shareholders aren't free to re-invest in other ventures while their balance is held in stocks. Again, in this case, the reward to the shareholder is proportional to the risk.

1.3 Current versus Future Value

A receivable worth £1 at some point in the future will generally be worth less than the equivalent amount in current money. Payments and receipts that occur in the near future are worth more than those in the more distant future - this is a consequence of *inflation* and is inherent to basically all monetary systems in the world. One way of representing this inflation is with a *financing cost*, representing some overhead attached to future money. For example, if the financing cost per year is 20%, then the value of future money n years into the future is $(1+0.2)^{-n}$.

Suppose there is an investment available at an interest rate of factor r. You currently have £k in cash. After n years, the *future value* of the investment is equal to £$k(1+r)^n$ - for example, if you have £100 in cash, and there is a 3-year investment with a compounding interest rate of 10%, then the future value of the investment is £$100(1+1.1)^3$, or £133.10. Similarly, calculation of the *present value* is just the reverse of calculating the *future value* - you're working backwards in time, so you want to divide by the interest rate, so the present value of the £k receivable that' sn years in the future at an interest rate of factor r per year is equal to $\frac{k}{(1+r)^n}$.

To make life easier, a table of *discount factors* can be used. This is just a table of the pre-calculated factors by which to multiply future investments - this is equal to the above formula for present value without multiplying by k. As an example of discount factors, consider a bond with a coupon of 10% for three years.

Consider the scenario with opportunity investment rates (ie. inflation rate) of 6% and 12% respectively. In which scenario should you accept? First, let's calculate the final value of the bond in future value:

$$100 \times (1 + 0.1)^3 = 133.10$$

For an opportunity investment rate of 6%, you have a present value of £$\frac{133.1}{(1+0.06)^3}$ =£111.75. For a rate of 12%, however, the present value is £$\frac{133.1}{(1+0.06)^3}$ =£94.74. Therefore, as the former case leads to a present value greater than the initial investment, you would take it - for the latter case, however, the current value of the return is less than £100, so this wouldn't be a worthwhile investment.

*The **coupon** of a bond is the yearly increase in value as a factor.*

Equally, an investor with a required rate of return of 12% would be indifferent to investing £94.74 today, or £133.10 in three years time - both are exactly equivalent in value, as the depreciation of the currency in three years time cancels out the increased value of the investment.

1.4 Case Study

A company is evaluating a two-year project investment, with an annual discount rate of 7%. The expected cash inflow for the first years is £40000, and £60000 for the second year. The discount factor can be calculated as 0.935 for the first year and 0.837 for the second year. What is the present value of the future cash flows? The answer is the sum of the future value of the two cash flows, with each multiplied by the appropriate discount factor:

$$40000 \times 0.935 + 60000 \times 0.837 = 89780$$

2 Investment Appraisal Techniques

While a qualitative approach can offer valuable insight, a more concrete approach is to use quantitative measures - much like with Accounting Ratios. This helps to give managers guidance in how to best invest long-term funds. Due to the long-term and high-value nature of most business investments, time management is critical, and there is no room for mistakes - reversal is nigh on impossible. Such investments involve large-risk, large-reward situations where a big sum in invested initially, with the expectation of an even bigger sum at the end of the investment. Please note that most large businesses use some mix of all of the investment appraisal techniques, perhaps some internally developed technique. Contrast this to smaller businesses which will generally use only one of these techniques, or perhaps even none - and just use the gut feeling of the manager.

2.1 Technique: Net Present Value

NPV is a baseline technique used to determine quantitatively whether an investment is worthwhile. It considers the costs, and potential benefits, of investment decisions and makes some allowance for the timing and duration of an investment. It takes into account *every* cash flow over the lifetime of the investment, and due to the absolute nature of the calculations (it does not present a relative value) you can compare investments of differing structure, duration, magnitude and scale: the NPV simply presents the overall return in today's money of an investment that ends some time in the future.

First, bear in mind that any *immediate* cash flows are assumed to take place in the zero-th year; that is, they have not depreciated at all. With all investments, interest must be taken into account. Investments are only worthwhile if the benefit exceeds the opportunity cost (where opportunity cost includes inflation and depreciation). Risk is an important consideration during investment appraisal, due to the scale of funds and the length of timescales involved.

When using NPV to weigh up the relative advantages of different potential investments against one another, you are considering all of the costs and benefits of each investment opportunity, and allowing for the timing of the costs in the investment. This includes appreciating that cash inflow is usually delayed from the initial outflow; and an amount £x paid now is more valuable than an amount £x paid later on.

Every investment appraisal technique is accompanied by a *decision rule*. This is a rule which uses the quantitative value of the technique, and with a simple choice, produces a yes-no-indifferent answer as to whether the investment should be taken. For NPV, the decision rule is as follows. If an organisation wants to make money from an investment, it should only invest if the net present value is *greater* than zero. If the NPV = 0, then you make no money from it (but waste time that could be spent on other, more worthwhile, investments).

__Risk__ refers to the inherent possibility that the actual outcome might differ from the expected outcome. Higher risk indicates a higher probability of this occurring. All investments are inherently risky; confidence can be built in an investment through a number of means and measures, but risk is fixed and cannot be removed. We can only use the fact that riskier investments generally correlate to potentially more rewarding investments.

The calculation of the NPV is simple. You calculate the present value of each and every cash inflow, and from that, subtract the present value of every cash outflow. In other words, the NPV is equal to the sum of the discounted cash flows involved in the investment. The present value of the cash outflows is usually straightforward to calculate, as an investment typically has the outflow at the start of the investment - ie. year zero, so the future value is equal to the present value. However, calculating the present value of the cash inflow requires the use of the discount factors mentioned previously.

For the case study performed previously, we calculated the present value of the cash inflows as £87980. If the initial cash outflow (the initial investment) was £80000, then the NPV would be equal to £7980; this means the investment produces a net gain in cash for the company in both present and future terms, so the investment is worthwhile; if the initial cash outflow was, say, £90000, then the NPV would be negative, meaning the investment is objectively not worthwhile.

All positive NPVs enhance the wealth of the shareholders - the greater the NPV is, the more valuable it is to shareholders, and hence the more objectively worthwhile the investment is. Of course, calculating the NPV therefore involves good estimating skills as to the expected future cash inflow, as the calculation for the NPV is reliant on these. The act of discounting the future value of the inflows and outflow to a figure for the present value serves to bring all of the figures to a common reference point - today. **It would be equally valid to calculate and compare the value of the cash inflows and outflows at any common time during the investment; for example, work out the future value of all of the inflows and outflows right as the investment finishes, in effect calculating the final inflated value of the investment.**

The benefits of NPV include the fact that it's a figure that shareholders can make sense of. The higher the NPV, the greater the reward and therefore the greater value it is to shareholders. It takes *all* relevant factors into account, including both in/outflow timings *and* values. It provides clear signals as to the value of the investment, and as a bonus, is also simple to use and understand. This makes it quite a good method.

2.1.1 Dealing with Risk

Investors require increasing compensation for riskier investments. To deal with risk in an investment, sensitivity analysis helps to identify which factors in an investment can influence the viability of the project more than others - in other words: which variable, when altered, causes the greatest change in the Net Present Value of the investment? To work this out, you identify a range of possible outcomes, identify what change in variables can cause each outcome, and subsequently assign a probability to each outcome to assess the overall risk. This might involve working out how low-high each variable can go before reducing the NPV to zero (and hence negating the viability of the project). If the probability of a negative outcome is higher, then the investment is more sensitive to change and is therefore riskier.

Several factors affecting the sensitivity of NPV calculations may include (and will vary, depending on the nature of the project):

- Annual sales volume, if applicable to the investment.
- Lifetime of the project.
- The initial outlay involved, and the overall scale of the project.
- The operating and financing costs involved; do you need to constantly put money into the project, or does it just involve a single initial outlay?

Each factor should be examined in turn to find the most extreme value it can take before the NPV of the project is reduced to zero. To aid in calculating the risk-weighted investment you can calculated a weighted average of each outcome's expected cash flow, multiplied by the estimated probability of that outcome.

2.2 Technique: Payback Period

The *payback period* is the length of time that it takes for the cash outflow for the initial investment to be repaid by the cash inflows that the investment generates. The *decision rule* says that projects with a payback period *less* than the defined max period are acceptable - and the ones that minimise the PP are more desirable. The maximum period is set by the business by experience.

Working out the payback period is easy - eg. if the outlay is £120k, and you make £40k the first year, £70k the second year and £80k the third year, you can calculate the payback period as 40+70+10 (up to 120) divided by the remainder of the final year.

PP is good because is concentrates on projects with an early return on cash, as well as being cautious in how it deals with risk (what if the project ends early? you want to make as much money as soon as possible). It's easy to understand too, which is another benefit.

However, it ignores the time value of money, and ignores cash flows *after* the payback rate which can be short-sighted - it doesn't always provide a clear yes-or-no answer and should be paired with some other method. It also relies on a subjective payback period (which is only accurate if the management has experience with this technique) and makes no attempt to maximise wealth. For example, two projects could both have the same payback period, but one project could continue to produce cash, whereas the other might stop afterward. Likewise, one project could pay back most of the cash immediately and then slow down, but the other project might only pick up closer to the payback period. The payback period techniques does not tell you either of this.

2.3 Technique: Accounting Rate of Return

This is the average accounting *profit* from the project expressed as a percentage of the investment:

$$\text{ARR} = \frac{\text{average annual operating profit}}{\text{investment}}$$

Where the investment in the equation is the cash outflow at the outset of the investment.

The investment reflects the average of the capital outlay and the residual value. The decision rule is that projects with an ARR above some *defined* minimum are acceptable. The greater the ARR, the more valuable the project. Note that profit is not the same as cash flow. The main difference between profit and cash flow is *depreciation*, being a reduction in value of the asset during its use, which is determined by its *residual value*. In this example, a *straight line* method of depreciation is applied, and a zero residual value assumed. For this module, the straight line method assumes a constant depreciation (absolute) each year, so it reaches zero after some amount of time.

Hence, the *profit* can be calculated as the *cash flow* for the year, minus some constant value for depreciation, again per year. Then, the ARR uses the *average* annual operating profit - rather than cumulative. Therefore the ARR tells you the profitability potential year-on-year. The limitation of ARR is that it cannot recognise when a yearly profit is negative (ie. cash flow not enough to offset depreciation). All ARR can do is crudely rank a set of projects based on how profitable they are on a yearly basis. It also ignores the time value of money and takes no account of the riming of the cash flows.

It ignores absolute values and doesn't reflect shareholder wealth - eg. small-scale might be ranked higher than a more lucrative large-scale project (as the value is relative to the initial investment). Compared to the MPV method which gives you some measure of the *net* return to shareholders, a relative amount might be less useful. Finally, it depends on the profit of the company which relies on a subjective accounting estimate of the depreciation of values.

However, one of the main benefits of ARR is that it is based on profit - which is a standard accounting measure. It is simple to use and interpret, and takes into account *all* of the profits - so if a particularly bad year is projected, then the ARR will reflect this in the percentage. Good accounting should take both absolute and relative measures into consideration so the ARR should be appreciated - just not on its own.

2.4 Internal Rate of Return

This measure is an extension to MPV - it gives an additional but similar measure. The IRR is the discount rate (compensation rate?) at which the present value of the cash flow generated by the project is equal to the present value of the invested capital (ie. the NPV is zero). It's similar to NPV in the sense that it discounts future cash flows, The IOR is also a measure of the maximum acceptable risk for the project - the discount rate which yields the NPV of zero indicates the maximum discount rate at which the project is worthwhile, as the NPV gives you an absolute measure of the yield of the project; ie. the net return visible to shareholders. Where there are competing projects, the one with the higher IRR is to be preferred, as this means the project can suffer a larger discount value before it becomes unprofitable within the given time frame.

The main way to calculate the IRR is iteration (assuming a straight line relationship between discount rate and NPV).

Assuming the expected cost of capital gives a positive Net Present Value, then another higher cost of capital is selected is the hopes of producing a negative NPV. The IRR lies between the two costs of capital (basically repreated interval bisection - is there a closed-form approach?) In this calculation, the discount value is compounded year on year - eg. for a discount rate of 0.1, the discount factor is $(1+0.1)^{\text{-year}}$. This calculation process is called *interpolation*.

Another way of doing this is to work out for a given change of 1%, or 0.1% in the interest rate, how much is the NPV scaled by? This will allow you to get close to zero very quickly without doing a boatload of iterations.

When the internal rate of return of the project is greater than the cost of the capital then the project should be accepted. If the IRR is equal to the cost of capital then the project offers no cash return to the owner but might still be embarked upon for other reasons.

IRR is inferior to NPV, but it still takes the timing of cash flows into account. If you have non-conventional cash flows then the IRR might not be accurate or there may be more than one.

2.5 Overall

All 4 methods are used a lot, but NPV and IRR are showing increased use over time - larger businesses tend to be more sophisticated in that they may use a combination of measures.

3 Share Valuation

Several models exist to value shares based on their expected dividend streams in the future. SEE SLIDE 30

For a share that pays constant dividends into perpetuity, then the present value is the dividend per annum divided by the required rate of return (as a percentage). For example, for a share paying £5 per year, with an expected rate of return of 5% then the present value is $\frac{5}{0.05} = 100$ pounds. The *dividend growth model* accounts for growing dividends. This gives the present value of the share as the expected dividend for the next period, divided by the (required rate of return, minus the expected future growth rate).

3.1 Share Issues

The distribution of shares to investors is called *issuing*, and there are three primary types.

Public issues are direct invitations by a company for new potential investors to buy shares in the company. This widens the share ownership in the business, but has the downside of incurring the advertising costs and any associated legal overhead.

Private issues are invitations to specially selected investors, such as financial institutions. These aim to concentrate the ownership of shares to between only a few people. These are cheap due to the reduced advertising cost and, in recent years, are making up an increasing proportion of new company shares.

Right issues are made to existing shareholders to raise money for new ventures or to generate liquidity in times of need .The vast majority of share issues are of this type: company law dictates that shares to be issued for cash must initially be offered to existing shareholders - more so to those who already own a lot of shares, for example one new share for £2 for each 3 shares currently held.

These shares must be offered at a price *below* the market value of existing shares. The **value** of a rights offer is the difference between the public going rate of shares, and the *ex-rights* price. The ex-rights price is the weighted average price of both the old shares, and the new lower-cost shares, according to how much of each there are. For example, if there were originally 900 shares at £5.00 each, and a right issue was offered of 300 shares at £3.50 each, then the ex-rights price is equal to $\frac{900\times 5+300\times 3.50}{1200}$ =£4.625. Hence, the value of that rights issue is $5-4.625$ =£0.375 per share.

4 Other Sources of Finance

- Government assistance, in the form of grants and tax incentives.
- *Business angels* who are wealthy individuals who aim to seed the development of companies they deem to have potential at an early stage of their development.
- *Venture capital firms* is long-term capital for non-listed small and medium sized businesses. These businesses have higher rates of risk (and therefore return), hence the term venture. The venture capitalist often requires a position in the Board of Directors as a term in the agreement, allowing them to control the direction of the business in a way they deem intelligent.