Andreas Krause

Stock valuation models

- We will investigate how the value of stocks can be determined and will also apply the same ideas as for the valuation of stocks to determine which investments a company should pursue.
- We will then investigate what the implications are if prices are reflecting information available to investors.

The importance of stock valuation

- Stock valuation is one of the most important tasks when making investment decisions
- If the current price is below its value, then a stock is undervalued and purchasing it should generate excess profits
- If the current price is above its value, then a stock is overvalued and selling it should generate excess profits
- Stock valuation is also relevant in mergers & acquisitions as well as initial public offerings

The importance of stock valuation

→ Stock valuations are important for making investments, but also for investment banks when advising on mergers and acquisitions or the pricing of newly issued shares.

- For investment decisions into stocks, it is important to know the value of such stocks. It is comparing the value of a stock with its current price that allows investors to make investment decisions that are profitable.
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  - We speak of undervaluation if the price of the stock is below its value.
  - If an investor buys a stock that is undervalued, he would buy a good below its value and should be able to generate excess profits.
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  - We speak of overvaluation if the price of the stock is above its value.
  - If an investor sells a stock that is overvalued, he would sell a good above its value and should be able to generate excess profits.
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  - The same principles apply when advising on mergers and acquisitions, if the price paid for a company is below its value, the merger should be completed.
  - In initial public offerings (IPOs) the offer price is often based on the valuation of the company.

→ It is therefore important to gain an understanding on the principle of how stocks are valued.

Theory and practice of stock valuation

- Many techniques to value stocks have been developed, often based on practical experience
- A stock might be valued by looking at the valuation of other stocks, after making suitable adjustments
- We will here look at a basic valuation of stocks based on the benefits that accrue to their owners

Theory and practice of stock valuation

→ Probably in not many areas of finance do theory and practice diverge as far as in the valuation of stocks.

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  - We have a range of methods to value stocks, based on many different premises, some more concerned with the long-term value of stocks and the dividends they pay, other focus on more short-term values based on the price at which a stock might be re-sold. We will be focussing here on the long-term value and the importance of dividends.
  - Many other models are based on practical experience rather than having a sound theoretical foundation.
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  - One way stocks are often by looking at the value of other, similar stock and use their valuation as the basis for the valuation of the stock concerned.
  - Of course, adjustments to these stocks are made where differences exist, such as the amount of profits they generate, the risks theya re taking, or their growth prospects.
- Here we will focus on the most basic valuation looking at the payments stocks make to investors, their dividends, and we will use this as the basis for the value of the stock.

→ The method of discounted cash flows is the one that is theoretically the soundest method to determine the long-run value of stocks.

Discounted Cash Flows

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→ We will now see how we can use dividends to value stocks.

Valuation using discounted cash flows

- Stocks should be valued using the present value of future dividends or earnings
- While past performance can give an indication of future prospects, the analysis is based on future prospects only
- ? You find that two stocks have different price-earnings ratios, does this imply that at least one of the stocks is mispriced?
- ! The stocks might have different risks and hence different discount rates, or their earnings might have different growth rates

- → Now that we have derived the main results of the model, as far as relevant for us, we will briefly discuss some implications as well as limitations of this model. This will allow us to interpret the model in its context of the initial problem and enables us to apply it appropriately in a realistic context.
- The value of a stock is simply the present value of all future dividends, where the discount factor is determined by the expected return obtained from asset pricing models.
- Often stock valuations are based on the past performance of stocks, but it is the future prospects that are important; nevertheless the past performance can provide information about what to expect from the future, but in many cases adjustments will have to be made. This might be new opportunities the company has to grow, or their absence, but also changes to the risks companies are taking.
- [?] It is common to compare the price-earnings ratio of companies as a rough guide to their relative valuation. If two companies have different price-earnings ratios, does this imply that at least one of them is mispriced?
- [!] The price-earnings ratio of companies are not all the same. It is driven by the expected returns of the company, which in turn is given by the risks the company is exposed to as asset pricing theory shows; there will also be the future growth of earnings that can be different. Either or both of these aspects can cause the price-earnings ratios to differ without either of the stock having to be mispriced. However, they could also both be mispriced.
- → Stocks can be valued by looking at their future profits and risks they take to achieve these profits.

Stock prices reflecting information

- Stocks are valued using the present value of future expected dividends or earnings
- To form such expectations, information on the company's future prospects have to be formed
- This information is incorporated into the stock value and should then be reflected in the stock price
- We will evaluate how stock prices evolve if information is included accurately into stock prices

Stock prices reflecting information

→ With stock valuations relying on the assessment of future profits, information is important when conducting such valuations. We will now look the impact it has on stock price if stocks reflect this information correctly.

- We have seen that the basis of the stock valuation are future expected dividends or earnings, this it is based on values that are not yet knows as they lie in the future.
- Expectations can only be based on the use of information about how the company will perform in the future.
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    - The idea is that this information will be informing the expected future dividends or earnings and thus the stock value.
    - This value should then be reflected in the price at which the stock is traded in the market.
- We will now look at the implications for the evolution of stock prices if information is accurately reflected in them.

→ This investigation will require us to introduce the concept of market efficiency.

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Market efficiency

→ Market efficiency is very important concept in financial markets as it makes the connection between the value of assets and the price at which they are traded in markets.

Absence of autocorrelation

- In efficient markets, stock returns should have no autocorrelation
- Any autocorrelation in information should be anticipated and the stock price adjust accordingly

? You observe that a market is not efficient, can you make profits using this knowledge?

! Profits can only be made by investors that have access to information, otherwise it would be impossible to develop a trading strategy

Absence of autocorrelation

→ Now that we have derived the main results of the model, as far as relevant for us, we will briefly discuss some implications as well as limitations of this model. This will allow us to interpret the model in its context of the initial problem and enables us to apply it appropriately in a realistic context.

- We have seen that in efficient markets, stock prices should have no autocorrelation.
- Even if information were autocorrelated, for example bad news is typically followed by more bad new, this would be fully anticipated by investors on receiving the first bad news and the reaction to the following bad news emerging be smaller than it normally would or be followed by a positive reaction if it is absent; this means that the average reaction in the next time period is zero.
- [?] If you know a market is not efficient, does that mean you can make profits?
- [!] In order to exploit any inefficiency of the market, an investor needs to have information. Without information, the investor would not know how to make use of the fact that the price is not reflecting the value of the asset accurately.

→ Market efficiency is a key concept in finance as only in efficient markets do prices coincide with the value of assets. An implication of market efficiency is that prices are showing no serial correlation.

Defining profitable investments

- Companies require capital to pursue investments from which they obtain earnings
- Only profitable investments should be pursued and we will discuss the criterion to assess whether an investment is profitable
- Making investments will affect the company value and we will determine the size of this effect

Defining profitable investments

→ We can now use the ideas developed for valuing stocks to assess investment decisions by companies.

- Investments require companies to use capital and these investments will then yield earnings which should cover the costs of providing the capital used for the investment.
- Of course, only profitable investments should be made. We will use ideas based on the valuation of stocks to assess whether an investment is actually profitable.
- We will then also look at the impact investment decisions have on the value of the company.

→ Assessing investment decisions by companies is also often called 'Investment appraisal' in the corporate finance literature.


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Investment decisions by companies

→ We will now look at how to determine the investment(s) that are worth pursuing, assuming the aim is to increase the value of the company.

Investment decisions and financing

- Whether investment are pursued should be assessed by using Net Present Value
- The Net Present Value will depend on the way an investment is financed

? A company announces a new investment that was well anticipated by investors, how much should the stock price increase?

! The stock price should not change as it was anticipated and in an efficient market this information should already have been included into the stock price

Investment decisions and financing

→ Now that we have derived the main results of the model, as far as relevant for us, we will briefly discuss some implications as well as limitations of this model. This will allow us to interpret the model in its context of the initial problem and enables us to apply it appropriately in a realistic context.

- The decisions criterion to use whether an investment should be taken is the NPV; if it is positive the investment should betaken and if it is negative it should not be taken.
- The way an investment is financed will affect the NPV as the WACC will differ. However, the Miller-Modigliani theorem on capital structure irrelevance suggests that under certain conditions, the effects cancel each other out and the NPV of the investment is not affected by the way the investment is financed. This is an area of capital structure theory which explores these questions.
- [?] We have an announcement for an investment that was long expected by investors. Assuming it to be an investment with a positive NPV, how would the stock price react as it is announced?
- [!] The investment is not new information, it was in the public domain for a while. If we therefore assume that market are efficient, this information should already be included into the stock price. Therefore, the reaction when announcing it should be very small. The stock price might only move slightly upwards as any remaining uncertainty about whether the investment is really forthcoming is eliminated. Thus overall the stock price reaction should be close to nil.

→ Investments should be made if the Net Present Value is positive and if not all such investments can be pursued, those taken that provide the largest combined NPV.

Summary

- Stock valuation and valuing individual investments by companies are driven by the present value of future earnings
- The discount factor depends on who the earnings accrue to
- The Weighted Average Cost of Capital is used if they accrue to the company
- The cost of equity is used if they accrue to equity holders
- If markets are efficient, stock prices cannot be predicted

Summary

- → We can now summarize the key results we have obtained about the valuation of stocks.
- Stock valuations and the valuation of investments are driven by the present value of future earnings in both cases. Expectations about future earnings need to be formed and an appropriate discount rate be determined that accurately reflects the costs of the investors and the company, respectively.
- The discount factor will depend on who the beneficiary of the earnings is, for stock valuation the dividends or earnings belong to the equity owners who oare only exposed to the equity component of the company, while for investments it accrues to the company.
- If the earnings belong to the company, it needs to be considered how the investment has been financed as that determines the costs the company faces and that need to be recovered; therefore the WACC are used.
- For equity holders investing into stocks of the company, only the cost of equity are relevant as the investor has only bought equity and does not hold any debt in the company.
- We also saw that in efficient markets, returns are not serially correlated and therefore cannot be predicted by investors.
- → We have to note that in particular for the valuation of stocks other valuation methods have been developed and the methodology will always depend on the purpose; to some degree this is also true for valuing company investments. A company might be valued for the purpose of investment as we have done here, but it might also be valued in the context of a merger, in which case synergy effects arising from the merger need to be considered; stock valuations might also be used to value companies in times distress with the aim of liquidating the whole company or a sizeable part of their assets, which will affect the valuation. Company investments might also have strategic importance, such as entering anew market with an initial product and while this specific investment might not be profitable, it might open the market for subsequent investments. Hence, valuation needs to be seen in the context of the purpose.

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Andreas Krause
Department of Economics
University of Bath
Claverton Down
Bath BA2 7AY
United Kingdom

E-mail: `mnsak@bath.ac.uk`