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Market efficiency

- Market efficiency, in short that asset prices reflect available information, is one of the key concepts in finance. We will look at briefly at what implications market efficiency has for the acquisition of information by traders and whether markets can actually be efficient.
- We will also look at how we can assess whether investors seeking to exploit any informational advantage they may have over other traders, are actually performing better than those who do not make use of any information. We will therefore look at way to measure the performance of investors.

Information acquisition

- Some investors may want to acquire information to make additional profits
- Information will be costly and the additional profits should cover these costs
- Their trading behaviour will affect asset prices and may reveal some of the information
- If information is revealed through their behaviour, this might reduce their profits

Information acquisition

- → Investors or traders having different information is an important element in the theory of financial markets and is the driver of much of the trading activity that is observed.
- ▶ Not all investors will be able to acquire information as they might have no access to such information or they do not have the skills to analyse the information they have obtained. However, other investors will have this access and the requisite skills to interpret information; some of these might want to actually acquire the information, while others might not want to do so.
- ▶ The reason that not all investors might want to acquire information is that information is costly and the profits the exploitation of the information they have acquired should at least cover the costs. These costs might be higher than the additional profits for some investors and they therefore do not acquire information.
- ▶ As investors use the information to trade, their behaviour will move asset prices as supply and demand change in response to their trading. These movements of asset prices will reveal some of their information to other investors.
- ▶ With some of the information revealed due to asset prices moving, the profits of informed investors will be reduced.
- → We will look at how this information revelation affects the willingness of investors to acquire information.

Performance of investments

- If investors are generating higher profits, they do not necessarily perform better
- To assess the performance of an investor, the risks they are taking need to be taken into account
- Investors can exploit differences between asset values and prices only if they generate sufficiently high returns
- We will look at how such returns can be evaluated

Performance of investments

- → Using information will also affect the returns investors generate and we will see how we can assess the performance of investors and compare them with other investment strategies.
  - Investors having acquired information may generate higher profits, but this does not necessarily mean that they are performing better.
  - We also need to consider the risks they are taking in achieving these returns. Investors taking higher risks should be compensated for by obtaining higher returns and we need to look at this trade-off between risk and return to assess whether trading on information was economically profitable.
  - Differences between asset values and actual prices can only be exploited if the profits, and hence returns, are sufficiently high to compensate for any additional risks they may have taken.
  - We will assess returns investors generate and see how we can assess whether this return represents an increase in economic value.
- → Such an assessment is important to judge whether the costs that have been spent on any information have been sufficiently compensated.

Definition of market efficiency

A market is efficient if prices include all relevant information

Weak form efficiency Prices reflect information from past prices

Semi-strong form efficiency Prices reflect all publicly available information

Strong form efficiency Prices reflect all available information, including private information

Definition of market efficiency

→ We will briefly define the key concept of market efficiency.

- In its simplest form, a market is said to be efficient if the prices include all relevant information, thus the price is such that all when a single person has access to all information available and based on this information determine the value of the asset, it would be the same as the price at which it is currently traded. The concept of efficient market is different from Pareto-efficiency, which is allocative efficiency, market efficiency is an informational efficiency.
- Depending on which information we include, there are different forms of efficiency. The least information is required in weak form efficiency, where only past prices are used as information. Thus all trading patterns arising from technical trading should be reflected in the price and profits from technical trading should not be possible.
- In semin-strong efficient markets, we add all publicly available information. Here information from annual reports, company disclosures, newspaper reports, and similar sources of information should be included into the price. In semi-strong form efficient markets a fundamental analysis of the stock value, such as value investing or investing into cyclical stocks, should not be profitable.
- Finally, in strong form efficiency all available information should be reflected in the price, including any private information a single investor might have become aware. In such a market, acquiring information would nt be profitable.

→ We will now explore how costly information acquisition and market efficiency can be mutually exclusive.

Information acquisition and market efficiency

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→ We will look at a basic model that will explain why markets cannot be perfectly efficient if information is costly.

Implications of market efficiency

- If markets are efficient, no one can make profits from information, making costly information acquisition unprofitable
- This leads to the paradox that markets which are too efficient, cannot exist

? If a market is not perfectly efficient, would all investors acquire information?

! Firstly, the inefficiency must be large enough such that information costs can be recovered, and secondly if all investors are informed, they will have no one to trade with

→ We can now look at some of the implications of the results we have obtained.

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  - From the definition of market efficiency, it is clear that in an efficient market, no investor can make profits when using information they have acquired as they prices instantly reflect this information.
  - Thus if information is costly, investors would not be able to recover these costs.
- If markets are too efficient, or even fully efficient, they do not allow investors to generate profits they need to cover any information costs, making it not rational to acquire information. Without information being acquired, market prices cannot reflect them; this leads to the paradox that efficient market cannot exist as with efficient markets no information would be acquired.
- [?] Assume a market is not efficient, does that mean now everyone who is capable of acquiring information will do so?
- [!]
  - If the market is nearly efficient, the price will so close to the value of the asset that profits are too small to cover the costs of acquiring information. In this case no investor will acquire any information.
  - There is another paradox, in that if all traders are informed and agree on the value of the asset, they will all want to take the same action, thus buy or sell, respectively. This leaves them with no one to trade with. Thus not every trader can be informed, we need some traders to remain uninformed.

→ As soon as information is costly, markets cannot be informationally efficient. Furthermore, we cannot have all investors to be equally informed.

The importance of performance measurement

- If exploiting market inefficiencies, investors could generate higher returns than holding the asset
- However, relying on information is also risky as information can be wrong
- We need to take into account the risks investors take to assess if they are generating economic profits

The importance of performance measurement

→ Even if investors can make use of their information as markets are not efficient and not all investors are efficient, they might not make an economic profit, even neglecting information costs.

- As long as the information an investor holds is reliable, the investor should be able to make profits and thus generate higher returns than those investors not holding the information.
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  - Relying on information is risky as the behaviour of other investors, and thus the future price, cannot be perfectly predicted.
  - It may also be that the information turns out to be either wrong, or it is superseded by new information before prices could adjust and any profits could be realised.
- If we assume that investors are risk averse, they might be worse off due to the increased risk, even if the returns they are generating are higher.

→ To assess the performance of invesyors using their information, we need to consider the return they generate, but also the risk.

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Performance evaluation

→ We will now look at two key measures to assess the performance of investors and how they take into account different types of risks.

Assessing investment performance

- Investors need to take into account the risks of their trading strategies to determine whether they are profitable
- Which performance measure is chosen, will depend on the risk that is relevant to an investor

? After taking into account the systematic risks taken, an investor shows a higher return than the market. Is he able to exploit market inefficiencies?

! The investor might have taken on additional risks that need to be compensated. While it looks like the investor is successful, it might be compensation for idiosynratic risks

Assessing investment performance

→ We can now look at some of the implications of the results we have obtained.

- To assess the profitability of a trading strategy to exploit any informational advantages, we need to take into account the risks investors take when pursuing this trading strategy. It is only once we have adjusted for the risk investors are taking that we can evaluate the performance of a trading strategy.
- We have seen that different risks can be relevant, systematic risk only or systematic and unsystematic risk combined, and we need to choose the performance measure accordingly.
- [?] Suppose you have a trader that shows a higher return than the market, even accounting for different systematic risks, does this trader make economic profits and is therefore able to exploit their informational advantage?
- [!] If we only take into account systemic risk, this would be true; but the trader most likely will also be exposed to idiosyncratic (unsystematic) risk and the higher return might be the result of taking on this risk. Therefore, if we are concerned about the total risk of the investment strategy rather than only its systematic risk, we have to take this additional risk into account and the result might change.

→ Thus the evaluation of the performance of investment is made more complicated by the need to establish which kind of risk is relevant and the performance measure has then to be chosen accordingly.

Summary of key results

- Efficient markets do not allow investors to generate profits and efficient markets cannot exist.
- Even if markets are not efficient, investors need relevant information to make profits
- With relevant information, they can make economic profits only if they do not take on too much additional risk

Summary of key results

→ We can now summarize some key results.

- In efficient markets investors holding the relevant information could not make any profits, making it impossible to recover any costs of acquiring information. Hence under realistic conditions, markets cannot be fully efficient.
- If markets are not efficient, profits can only be generated if information is held, it is not sufficient for a market to merely be inefficient for investors to be able to make profits; they always need relevant information.
- Even when holding relevant information, it is not guaranteed they make economic profits as they might take on additional risks, arising from imperfect information. These additional risks need to be taken into account when assessing the performance of investors.

→ We have seen that markets cannot be fully efficient and that having information in an inefficient markets is not a guarantee for making (economic profits).

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