Andreas Krause

Risk Management

Difficulties of risk management

- Investors are exposed to risks which can cause them significant losses
- Investors may want to address such risks by taking measures to reduce them
- Risk management is a complex process that requires a detailed assessment of the risks an investor is exposed to
- Knowledge of the assets invested in, their interactions, and the factors influencing their future prices are essential
- Abstracting from these requirements, we will explore some basic principles of risk management for investors

Managing and eliminating risks

- The aim of risk management can be to either limit the amount of risk that is taken or prevent losses
- Limiting the exposure to risk does not prevent unexpected losses from occurring
- To eliminate risks, derivatives have been developed, but they are not always available
- We will look at the a way investors can limit the risks they are taking, but still exposing them to larger losses, and for strategies in which large losses are eliminated

Value-at-Risk is widely used

- One of the most common risk measures used in banks is Value-at-Risk due to regulatory requirements
- Regulators favour expected shortfall, a closely related concept, to which the same principles can be applied
- Many investors have also adopted Value-at-Risk, or expected shortfall, as their risk management tool
- We will look into the way Value-at-Risk can be used to manage the exposure to risks, but it will not allow to eliminate them

Andreas Krause

Value-at-risk

Managing risks with Value-at-Risk

- Value-at-Risk focusses on potential losses and allows investors to limit the likelihood of making large losses, but such losses can still occur
- Using Value-at-Risk can give guidance on how to adjust a portfolio of assets to reduce the risks that are taken

? If you observe a loss that exceeds your Value-at-Risk, does this mean your Value-at-Risk estimate is wrong?

! Losses larger than the Value-at-Risk occur a fraction c of times and it is therefore expected that losses larger than the Value-at-Risk are observed; not observing such losses would indicate that the estimate is too high

Eliminating risks without derivatives

- Hedging with derivatives is a common way to eliminate risks, but for many investors such derivatives do not exist
- Derivatives are not readily available for small stocks, emerging markets, and most alternative investments
- Investors can still obtain protection from losses through portfolio insurance
- In portfolio insurance investments are conducted in a specific way to eliminate risks

Portfolio insurance

Andreas Krause

Risk elimination through limited investment into risky assets

- Constant Proportion Portfolio Insurance is one way investors can eliminate risks, it allows investors to avoid losses beyond a set limit
- Investors adjust the amount of risky assets held constantly to ensure that any losses they may incur still allow the minimum value to be reached

? Using Constant Proportion Portfolio Insurance will eliminate any risk and the value of the investment in the future is known, is this correct?

! Constant Proportion Portfolio Insurance limits the losses, but there remains an uncertainty about how much the investment is worth at the end of the time horizon; there will still be volatility in the final value

Summary of key results

- Measuring risk can allow investors to use their results to manage these risks, but losses beyond what is expected can nevertheless be observed
- Risk management is not primarily about eliminating risks, but about determining risk levels that are consistent with the risk-preferences of investors
- There are investment strategies, beyond the use of derivatives, that allow investors to limit any losses they make
- Such portfolio insurance will require specific investment strategies to be followed and these might not be suitable for all investors

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

E-mail: mnsak@bath.ac.uk