

Andreas Krause



Market crashes

# Sudden unexplained loss in asset values

- ▶ We observe occasionally stock markets lose value significantly within a very short period of time
- ▶ The loss in value cannot be attributed to new information emerging
- ▶ There is also no sudden change in the investment behaviour of investors
- ▶ Such a situation is known as a market crash
- ▶ It is mostly observed in stock markets, but it also occurs in real estate, exchange rates, and commodities

# Overvaluations and crashes

- ▶ Market crashes are often difficult to explain and while it is often obvious ex-post that the assets were overvalued, this was not always seen at the time
- ▶ At other times, markets are significantly overvalued and everyone is aware of this, but no crash occurs
- ▶ We will look at models that explain such overvaluations and how these are corrected
- ▶ We will also will seek to explain the emergence of a crash without much new information arriving in the market

# Rationality and overvaluation

- ▶ Many assets are frequently overvalued, while under-valuations are rarely found
- ▶ We will see why it is rational to invest into an overvalued asset
- ▶ Overvalued assets will eventually lead to a crash, but this explanation is left to the second model



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Rational bubbles

# Bursting bubbles

- ▶ Investors purchase overvalued assets in the anticipation of selling it at an even higher price, making it a rational decision
- ▶ Overvalued assets will sooner or later crash and return to their fundamental value, but this risk is compensated
- ? You observe that based on your analysis, rental properties are significantly undervalued and the undervaluation seems to increase, as negative bubbles cannot occur, how can this be explained?
- ! Your assessment must be agreed with by the market overall for a deviation from the fundamental to be classified as a bubble; in this instance your assessment might not be shared by the wider market, whether you are correct or not

# Modelling demand for assets

- ▶ Stochastic bursting of bubbles is unsatisfactory as an explanation of such significant events
- ▶ As prices are driven by demand and supply in the market, we should investigate these factors for an explanation
- ▶ Dividing investors into informed investors and uninformed investors allows us to introduce hedging by investors
- ▶ We will see how hedging by uninformed investors can lead to market crashes



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Hedging and market crashes



# Hedging can cause crashes

- ▶ If hedging is widespread after a prolonged market rise, the demand for assets is non-monotonous
- ▶ Small negative information can cause a large drop in asset prices
- ? Markets rise and fall over time, but not every time a crash occurs, why would markets most of times move slowly?
- ! We need a large amount of hedging and this hedging has to be at roughly the same strike price, only then do we observe a crash, if either conditions is not fulfilled, markets move smoothly, which is the case most of times

## Summary of key results

- ▶ Asset prices will increase rapidly during a bubble to compensate investors for the risk of the bubble bursting
- ▶ Such bubbles might be bursting based on minor events if the demand is non-monotonous in the price
- ▶ Hedging can cause such non-monotonous demand, provided it is a significant fraction of the market
- ▶ Market crashes can be caused by minor informational events that would not affect the fundamental value of the asset significantly



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