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# Game Theory Basics

— the science of making decisions —

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# What is game theory?

It studies how people decide.

It studies decisions in many situations. In games (like chess), politics and business.

Its main areas of study include how decisions are affected by:

- Cooperation
- Conflict
- Finite games
- Infinite egames



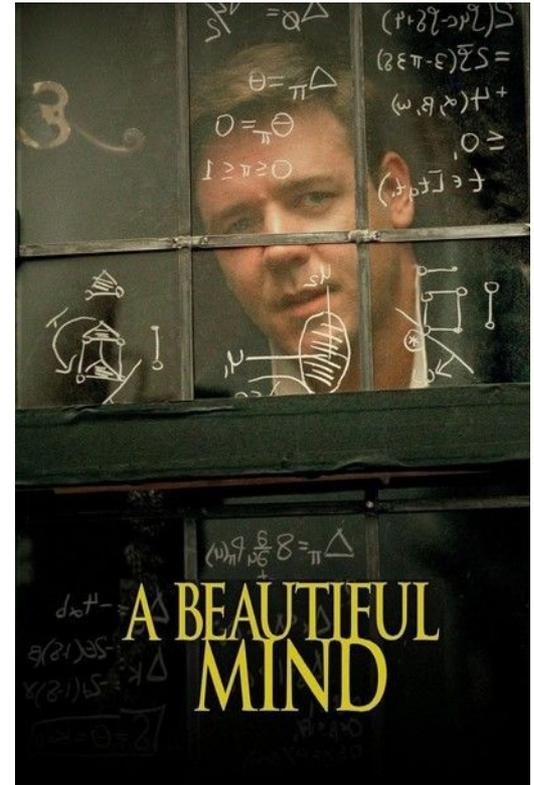
# What is game theory?

It's a theory, so it tries to explain and predict.

When there is both conflict and cooperation, what is the best choice for me?

**Game Theory** helps us understand:

- the options when there is conflict and cooperation;
- the consequences (or reward) of each choice.



# What is game theory?

Game theory says that ...

.... my best choice depends on  
*what I think* the other person will  
do.



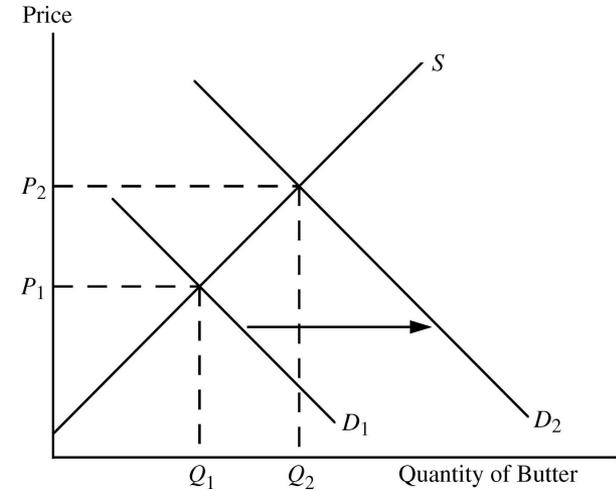
# Where did it come from?

Modern game theory comes from economics.

Long ago, people studied decisions in business. Main theory was **supply & demand**.

- People are rational. People make logical choices.

But that basic theory is **not really true**.



# Where did it come from?

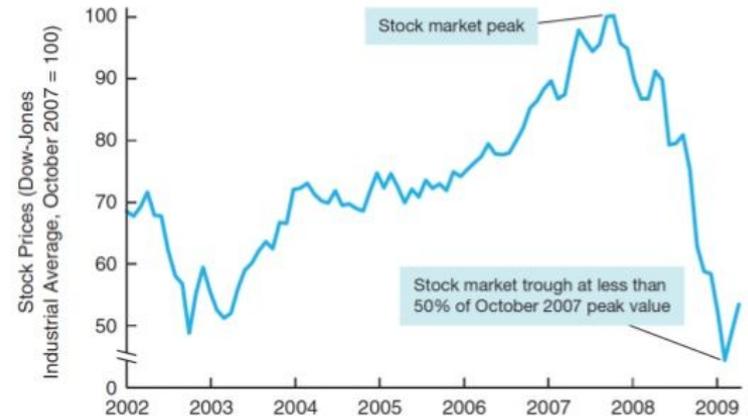
People are *not always logical*. They are *emotional*.

Plus ... supply & demand and rational choice are not accurate.

They didn't predict any major economic crash:

- 1929 Great Depression
- 1973 oil shock
- 1980 Japanese real estate crisis
- 1997 Asian currency crisis
- 2007 financial crisis

**Figure 5 Stock Prices and the Financial Crisis of 2007–2009**



Source: Dow-Jones Industrial Average (DJIA). Global Financial Data:  
[http://www.globalfinancialdata.com/index\\_tabs.php?action=detailedinfo&id=1165](http://www.globalfinancialdata.com/index_tabs.php?action=detailedinfo&id=1165).

# General Findings

People tend to use one of three strategies when making choices.

- **Dominator:** try to win, get the most, dirty tricks.
- **Angel:** high regard for the other person, sense of fair play.
- **Tit-for-tat:** change tactics according to what the other person does.



# Finite or Infinite Game?

Game theory also teaches us there are two kinds of games.

Understanding the difference helps us understand the world.

## Finite Games

- There are rules. People follow the rules.
- There is a winner and loser.
- The game has an end.
- Baseball and most businesses.



# Finite or Infinite Game?

## Infinite

- No fixed rules. Rules change.
- There is no winner or loser.
- The people who play are always changing.
- The purpose of playing is to wait until the other people drop out.
- People play to survive for the long term.
- For example, war on terror.
- Or think about Amazon.com. Is it just a bookseller now?



# Finite or Infinite: A Thinking Tool

## Question

- Think about current news.
- The USA and North Korea are making some dangerous threats.
- How does game theory help us to understand this situation?



# Conclusion

## Game theory benefits

- understand the way people think and act.
- helps us make smart choices.
- Helps us understand why some problems seem to continue.

