Profit maximization is a basic tenet of micro.

But is it realistic?

Not always, because management is separated from ownership.

Recipients of profits are not the agents whose decisions determine profit levels.

Managers objectives differ from those of shareholders.
If shareholders are willing to control managers, there is the problem of \textit{asymmetric information}.

\textbf{Agency theory} is the area of economics that deals with this type of strategic interaction.

A separate issue we will be interested in is what determines a firm's size.

We'll look at this in two ways:
Basic Micro: More on the Firm

- **Vertical Integration**
  - Use the firm or the market to obtain inputs.
  - Each alternative has its own incentive problems.

- **Horizontal Extension**
  - How much of a given product to produce.
  - How many different products to offer.
  - The size is usually determined by where AC is minimized.
Games and Strategy

- Often it is the case where firms face the problem of **interdependent decision making**.
- We’ll model/study this as if the firms were playing a **game**.
- A **game** is a model that depicts situations of **strategic behavior**.
- Here, a payoff for one agent will depend on its own activities as well as the actions of other agents.
This situation introduces the consideration of the optimal choice for a player.

This will depend on what it conjectures other players will do.

A game will consist of 3 things:

1. a set of players
2. a set of rules
3. a set of payoff functions of each combination of strategies.

For each combination of strategies by each player the respective matrix cell shows payoffs for each player.

This is what we refer to as **normal form**.
Here we are assuming both players choose their strategies simultaneously.

In many situation this is not realistic, but it’s ok if when decisions are made neither player knows what the other's choice is.

Later we’ll look at games where the assumption of sequential decision making is more appropriate.
For a given game, we are interested in deciding what strategies we expect players to choose.

We say that a player has a **dominant strategy** when it is strictly better than any other strategy regardless of the other player’s strategy choices.

If a player has a dominant strategy and is rational we would expect him/her to choose it.

Here we do not even need to assume knowledge of the other players payoffs.

In many games, there is what we will refer to a **prisoner’s dilemma**.
Games and Strategy

- In most games, there are no dominant strategies.
- This requires a different approach to solving the game in the sense of predicting what will happen.
- We define a **dominated strategy** as one whose payoff is inferior to another strategy regardless of what the other player does.
- We expect a rational player to not choose a dominated strategy.
- As we’ll see, solutions to games can be found by successively eliminating dominated strategies.
However, the assumptions necessary behind iterative elimination of dominated strategies are much stronger than before.

Unlike in the dominant strategies case where we assumed that players are rational.

We are now assuming that each player assumes the other player is rational...

and believes that the other player believes that the first player is rational.

So now it no longer suffices that players are rational.

We also need to assume that players believe that other players are rational.
There are many games where there are no dominant nor dominated strategies.

So we need a different approach to say what we expect to happen.

In these games a players optimal strategy depends on what the other player chooses.

We therefore need a conjecture by Player 1 about Player 2’s strategy and vice versa.
This gives us a “solution” to the game:

- It is where players choose their optimal strategies given their conjectures of what other players do.
- And where such conjectures are consistent with other players choices.
- This situation is what we’ll refer to as a Nash equilibrium.
- The use of the word equilibrium is appropriate in the sense no player can unilaterally improve his/her payoff by changing strategy.