Entry Costs

- We can relate our previous results to the cost structure of firms in a given industry.
- The cost structure we just imposed is an extreme case where average cost is always decreasing.
- To explore the relation between increasing returns to scale and market structure (i.e. level of concentration) we need a measure of the degree of scale economies.
- One such measure we discussed earlier on was the minimum efficient scale.
- Recall this is the scale at which a firm’s AC is close to the minimum.
- In the simple model $C = F + cq$, AC is minimized at $c$. 

The MES is the minimum scale such that average cost is equal to sum number, say $c'$. Equating $AC$ to this number we get:

$$MES = \frac{F}{c' - c}$$

Note this is proportional to $F$ so we can get a relationship to $\hat{n}$.

Specifically, if $MES$ doubles, the number of firms decreases by a factor of the square root of 2.

Note also if both market size and $MES$ both double, the equilibrium number of firms does not change.
An alternative measure of increasing returns is the coefficient of scale economies, which is simply the ratio of average costs to marginal costs.

Recall if this ratio exceeds 1 we have scale economies, and we can relate the degree of scale economies to the concentration level in the industry.

With our simple cost structure we have

$$\frac{AC}{MC} = 1 + \frac{F}{cq}$$

The greater $F$ is the greater scale economies are, and we also know, the smaller the number of firms in equilibrium.

So concentration is greater the the greater the degree of scale economies.
MES and scale economies are examples of barriers to entry.

There are examples of industries and countries where the relationship between size and concentration does not agree with our results.

One example is the beer industry where the US and Portugal had similar structures despite the large difference in the sizes of their respective economies.

Why is the actual number of firms much less than our model predicts?

In this specific industry, advertising matters a lot and is not accounted for in our model.

Advertising expenditure are a large fraction of sales revenue in both countries.
In fact, the percentage of sales is similar in both countries and since sales are much larger in the US, so is the advertising expenditures.

So to enter the US industry and compete with the likes of Pissy and Pissier, a potential new entrant must pay a much greater entry cost than in Portugal.

So this is an example of entry costs being endogenous to market size.

This will add quite a wrinkle to our previous model.

Specifically, if entry costs are increasing with market size we have an extra reason why the equilibrium number of firms does not increase proportionately to market size.

So the number of firms would increase more slowly even if there was not an increase in competition.
Advertising is just one example of endogenous entry costs.

Two other important ones are bidding for a government license and R and D expenditures.

The former can be illustrated with a simple auction model.

Say the government of some country decides to allocate one license to only for the right to develop a new technology.

The revenues for the firm that gets the license are denoted by $S$ and the entry costs by $F$.

Suppose that upon paying this fixed cost, each firm must bid for the right to exploit the license.
Bids are made simultaneously and the highest bid gets the license.

If there is more than one entrant, then the bidding game is similar to the Bertrand competition.

Now it is the highest bid, not the lowest price that wins.

By analogy to Bertrand, the equilibrium is for all firms to bid the value of the license $S$.

So like in Bertrand the equilibrium profit is 0.

So no firm will enter the bid if it expects another firm to enter, and this regardless of market size.
This is the exact opposite to if the license were allocated by a lottery.

There the equilibrium number of firms is $S/F$.

In that setting the only entry cost, $F$, is exogenous.

So this tells us that if entry costs are endogenous, there is a weaker relationship between the number of firms in equilibrium and market size.

These conclusions can be tested empirically by plotting concentration levels versus size for high and low advertising industries.

The results are quite striking in the sense that the relationship is much flatter for advertising intensive industries.
We can conclude this chapter by relating the notion of free entry to social welfare.

If certain conditions of the free market fail then it is not necessarily the case that free entry is desirable from the perspective of economic efficiency.

To illustrate, suppose first there are \( n \) firms each producing \( q_n \) so total output is given by \( nq_n \).

Then suppose a new firm enters so the output produced by each firm declines to \( q_{n+1} \), so total output is \((n + 1)q_{n+1}\).

It may be the case that the increase gross surplus is smaller than the gross profit earned by the latest entrant.

This will imply a divergence between the private and social incentives for the entry of \( n + 1 \) firm.
Specifically, free entry could result in excessive entry.

This is because part of the profits earned are taken from incumbent firms, resulting in a transfer that does not correspond to a benefit to society.