

WEEK 5: COLLUSION AND CARTELS

Core Industrial Organisation (ECO-7030A)

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COLLUSION

- I. Collusion in a dynamic environment (tacit collusion): Grim-trigger strategies.
- II. Dynamic collusion: Bertrand and Cournot models.
- III Variations on the classical set-up (variable demand, unobservable actions).
 - A. Demand varies with time.
 - B. Firms do not observe the actions taken by the competitors.

CARTELS

- IV History of cartel law in the US and Europe.
- V Types of cartels.
- VI Cartel enforcement in the EU and US.

Part I. A dynamic environment: Grim-trigger strategies

- We want to use a more micro founded approach: the repeated games approach.
- Here, acting in line with the cartel policy will be a voluntary, free, decision of each firm.
- No exogenous commitment assumed.
- The firm will obey cartel policy because it is optimal here and now.

THE SETTING

- Two firms offer perfect substitutes produced at constant marginal cost c .
- The firms compete repeatedly over time, $t = 1, 2, \dots, +\infty$.
- At each period t , the firms repeat the classical static game of price or quantity setting.
- A strategy is a contingent action plan—a function of the firm's (potentially very complex) information set.
- An information set contains everything that a given firm has observed up till period t .

PRESENT DISCOUNTED PROFITS

- Future periods are discounted by the factor δ so that present discounted profits at period t are given by

$$\sum_{s=t}^T \delta^{s-t} \pi_{is}(\sigma_{1s}, \sigma_{2s}),$$

where

$$\pi_{is}(\sigma_{1s}, \sigma_{2s}),$$

is firm i 's profit in period s given that the two firms' actions are respectively σ_{1s} and σ_{2s} .

- The firms maximize their present discounted profits in every period.

Question: Can the firms use strategies that allow them to increase their profits w.r.t. the competitive stage game outcome? For example, acting jointly as a monopoly and sharing monopoly profits?

ONE EQUILIBRIUM: PLAY NASH EVERY PERIOD

- As a first observation, note that there is an equilibrium in which in each period, firms play the Nash equilibrium of the static game.
- Suppose that each firm's strategy is to play the stage game Nash equilibrium in each period irrespective of past play.
- Clearly, if firm i follows this strategy, then firm j 's best response is to follow it as well: i.e., statically best respond in every period, i.e. play Nash every period.

ONE EQUILIBRIUM: COLLUSION

- But there are also more interesting equilibria featuring collusive behaviour.
- Define *maximal collusion* as firms *jointly acting as a monopoly*.
- We are going to show the following result.

Proposition *When competition is repeated over an infinite horizon, maximal collusion can be sustained by the so-called Grim-Trigger strategy as long as firms have a sufficiently large discount factor.*

PROVE COLLUSION AS AN EQUILIBRIUM

PROOF

Step 1: Consider a putative equilibrium featuring the so-called Grim-Trigger strategy. It is given as follows:

- i) Firm i chooses the action that maximizes total/aggregate cartel profits as long as both firms have always done so in previous periods (so-called *cooperation phase*).
- ii) If some firm deviated in some past period from the aggregate profit maximizing action, firm i plays the Nash action of the stage game forever (so-called *punishment phase*).

PROVE COLLUSION AS AN EQUILIBRIUM CONT'D

Step 2: Consider payoffs in such an equilibrium:

- When both firms play the cooperative profit maximizing action, they each obtain

$$\pi^c = \frac{\pi^m}{2},$$

where π^m is the per-period monopoly profit.

- When one firm plays the cooperative action and the other optimally deviates, the deviating firm obtains

$$\pi^d.$$

- When both firms play the Nash equilibrium of the static game, both firms obtain

$$\pi^n.$$

- Under both quantity and price competition, it holds true that

$$\pi^d > \pi^c > \pi^n.$$

PROVE COLLUSION AS AN EQUILIBRIUM CONT'D

Step 3: We now look into a firm's incentive to deviate from the collusive strategy.

- A firm is going to compare the immediate profit from deviating to the future losses arising from the ensuing deviation.
- To check deviation incentives, we put ourselves in the shoes of firm i and assume that firm j is following the Grim-Trigger strategy.
- We check whether firm i has an incentive to stick to the Grim-Trigger strategy, by considering separately the case: 1) where the firm is in the punishment phase, and 2) the case where it is in the cooperative phase.

PROVE COLLUSION AS AN EQUILIBRIUM CONT'D

Step 4: *Suppose we are in the punishment phase.*

Firm j is playing the stage game Nash equilibrium action in every period, so that firm i has an incentive to also play this action in all future periods (it is the stage game best response).

PROVE COLLUSION AS AN EQUILIBRIUM CONT'D

Step 5: *Suppose we are in the cooperative phase.* If firm i follows the Grim-Trigger strategy, it obtains π^c in all subsequent periods (no punishment is triggered). So the present discounted value of following Grim Trigger is

$$V^c = \pi^c + \delta\pi^c + \delta^2\pi^c + \dots = \frac{\pi^c}{1 - \delta}.$$

If firm i on the other hand deviates, it will obtain π^d in the deviation period and π^n in all subsequent periods (as punishment will be triggered). So the present discounted value of deviating is given by

$$V^d = \pi^d + \delta\pi^n + \delta^2\pi^n + \dots = \pi^d + \delta\frac{\pi^n}{1 - \delta}.$$

COLLUSION

TACIT COLLUSION WITH GRIM-TRIGGER STRATEGIES

PROVE COLLUSION AS AN EQUILIBRIUM CONT'D

Clearly, firm i prefers to follow the Grim-Trigger strategy if and only if

$$\begin{aligned}V^c &\geq V^d \Leftrightarrow \\ \frac{\pi^c}{1-\delta} &\geq \pi^d + \delta \frac{\pi^n}{1-\delta} \Leftrightarrow \\ \pi^c &\geq (1-\delta)\pi^d + \delta\pi^n \Leftrightarrow \\ \pi^c - \pi^d &\geq \delta(\pi^n - \pi^d) \Leftrightarrow \\ \pi^d - \pi^c &\leq \delta(\pi^d - \pi^n).\end{aligned}$$

COLLUSION

TACIT COLLUSION WITH GRIM-TRIGGER STRATEGIES

PROVE COLLUSION AS AN EQUILIBRIUM CONT'D

If we solve the previous equation for δ , we obtain:

$$\delta \geq \frac{\pi^d - \pi^c}{\pi^d - \pi^n} \equiv \delta_{\min}$$

where $\delta_{\min} \in (0, 1)$. ■

PROVE COLLUSION AS AN EQUILIBRIUM CONT'D

- The role of δ is very intuitive. The benefit of deviating is in the short term, while the cost materializes in the long term.
- The relative sizes of

$$\pi^d - \pi^c$$

and

$$\pi^d - \pi^n$$

clearly also play a role.

- Note that we used the fact that firms observe deviations from the collusive outcome. This is not necessarily a realistic assumption.

PROVE COLLUSION AS AN EQUILIBRIUM CONT'D

- We focused on conditions for the existence of an equilibrium in which firms share the monopoly profit. It can be shown that any individual profit level in the range

$$\left[\pi^n, \frac{\pi^m}{2}\right]$$

can be achieved for a high enough discount factor. This is to some extent a problem, because it means that the theory is not predictive, as it produces too many predictions.

Part II. Dynamic collusion

Two applications: Bertrand and Cournot models

COLLUSION

TACIT COLLUSION WITH GRIM-TRIGGER STRATEGIES

PROVE COLLUSION AS AN EQUILIBRIUM UNDER BERTRAND

We here obtain the following result:

Proposition (*Price competition*) Assume that competition is repeated over an infinite horizon and that firms compete via prices. Assume constant marginal costs. Assume even split of demand in case of equal price. Given n firms, maximal collusion can be sustained by the Grim-Trigger strategy as long as $\delta \geq 1 - \frac{1}{n}$.

PROVE COLLUSION AS AN EQUILIBRIUM UNDER BERTRAND CONT'D

PROOF

Step 1: We start with the case of two firms.

In the cooperative phase, firms set the monopoly price p^m and each gets

$$\pi^c = \frac{\pi^m}{2}.$$

The maximal deviation profit is clearly to set $p^d = p^m - \varepsilon$ and thereby obtain

$$\pi^d = \pi^m - \varepsilon,$$

which is arbitrarily close to π^m given that ε is arbitrarily small.

In the punishment phase, firms revert to the one-stage equilibrium price $p^n = c$ and thus obtain

$$\pi^n = 0.$$

COLLUSION

TACIT COLLUSION WITH GRIM-TRIGGER STRATEGIES

PROVE COLLUSION AS AN EQUILIBRIUM UNDER BERTRAND CONT'D

Step 2: If we substitute these values into the condition on the discount factor, we obtain

$$\delta_{\min}^{Bert} = \frac{\pi^m - \left(\frac{\pi^m}{2}\right)}{\pi^m} = \frac{1}{2}.$$

PROVE COLLUSION AS AN EQUILIBRIUM UNDER BERTRAND CONT'D

Step 3: We now extend the result to the case of n firms engaging in price competition. Here, the deviation profit π^d remains equal to π^m but the total collusive per period profit is now shared among n firms, so

$$\pi^c = \frac{\pi^m}{n}$$

So we have:

$$\delta_{\min}^{\text{Bert}}(n) = \frac{\pi^m - \left(\frac{\pi^m}{n}\right)}{\pi^m} = 1 - \frac{1}{n}$$

Note that the critical discount factor is now increasing in n , i.e. it is increasingly difficult to sustain collusion as the number of firms on the market increases. ■

PROVE COLLUSION AS AN EQUILIBRIUM UNDER COURNOT

We here obtain the following result:

Proposition (*Quantity competition*) Assume that competition is repeated over an infinite horizon and that firms compete via quantities. Assume identical linear marginal costs c . Assume inverse demand given by $P(q) = a - q$. Given n firms, maximal collusion can be sustained by the Grim-Trigger strategy as long as

$$\delta \geq \delta_{\min}^{\text{Cournot}}(n) \equiv \frac{(n+1)^2}{n^2 + 6n + 1}.$$

Proof in next slides.

PROVE COLLUSION AS AN EQUILIBRIUM UNDER COURNOT CONT'D

PROOF

Step 1: The monopoly quantity is given by

$$q^m = \frac{a - c}{2}.$$

So that monopoly profits are

$$\pi^m = \frac{(a - c)^2}{4}.$$

It follows that the collusive profit is

$$\pi^c = \frac{\pi^m}{n} = \frac{(a - c)^2}{4n}.$$

On the other hand, we know that the Cournot Nash equilibrium profit level is

$$\pi^n = \frac{(a - c)^2}{(n + 1)^2}.$$

Step 2: We now want to compute the optimal deviation profit. If all other firms set a quantity q , the best deviation quantity z maximizes

$$z(a - z - (n - 1)\frac{q^m}{n} - c).$$

From the first-order condition, we find

$$z^* = \frac{1}{2}(a - (n - 1)\frac{q^m}{n} - c).$$

Substituting for this value into the profit function, we obtain

$$\pi^d(z^*) = \frac{1}{4} \left(a - (n - 1)\frac{q^m}{n} - c \right)^2.$$

Now, given that $\frac{q^m}{n} = \frac{a-c}{2n}$, we have

$$\pi^d(z^*) = \frac{(n + 1)^2}{16n^2} (a - c)^2.$$

PROVE COLLUSION AS AN EQUILIBRIUM UNDER COURNOT CONT'D

Step 3: We may now use the obtained quantities π^c , π^d , π^m and plug them into the expression for the minimal discount factor. We thus obtain

$$\delta_{\min}^{\text{Cournot}}(n) = \frac{\pi^d - \pi^c}{\pi^d - \pi^n} = \frac{\frac{(n+1)^2}{16n^2} (a-c)^2 - \frac{(a-c)^2}{4n}}{\frac{(n+1)^2}{16n^2} (a-c)^2 - \frac{(a-c)^2}{(n+1)^2}} = \frac{(n+1)^2}{n^2 + 6n + 1}$$

Note that the above quantity increases in n . ■

STICK AND CARROT STRATEGY (INTUITION)

- In repeated Cournot competition, reverting to the Nash equilibrium is not the harshest possible punishment as it yields positive profits.
- It seems possible to construct harsher punishment strategies that in turn will allow to sustain collusion for lower discount factors.
- There is a constraint though: punishment strategies must be credible, i.e. those involved must be willing to carry them out.
- In other words, in order to construct harsher punishments one needs to encourage firms to stick to the punishment strategy that they are supposed to implement.

COLLUSION

III VARIATIONS ON THE CLASSICAL SET-UP (VARIABLE DEMAND, UNOBSERVABLE ACTIONS)

III Variations on the classical set-up (variable demand, unobservable actions)

DEMAND FLUCTUATIONS AND INFORMATION ASYMMETRY

- The underlying environment that we have studied is very simplified.
- What about economic fluctuations?
- What about information asymmetry? Does one always observe others' behaviour?
- We now examine two particularly relevant variations of the basic model.
- Variation 1: Demand varies over time.
- Variation 2: Firms do not observe the action taken by the competitor.

COLLUSION WITH FLUCTUATING DEMAND

- This follows the Rotemberg and Saloner (1986) model.
- Market demand fluctuates. There are two demand states, good and bad. Demand is either given by $Q_G(p)$ or by $Q_B(p)$ and $Q_G(p) > Q_B(p)$ for all p .
- The good state happens with probability $\frac{1}{2}$, iid each period.
- Both firms observe the state of demand before choosing a price.
- Firms compete in prices (Bertrand).
- Homogeneous goods, and both firms have constant marginal cost c .

COLLUSION WITH FLUCTUATING DEMAND CONT'D

- We look for conditions under which the fully collusive outcome is implementable.
- Note that this outcome is going to be given by a set of prices (p_G, p_B) , i.e. one price for each demand state.
- We shall let firms use the Grim-Trigger strategy (which already ensures maximal punishment under price competition).

COLLUSION WITH FLUCTUATING DEMAND CONT'D

We obtain the following result:

Proposition *Under uncertainty about demand and Bertrand duopolistic competition, the critical discount factor under which maximal collusion is achievable is larger than under certainty about demand.*

COLLUSION WITH FLUCTUATING DEMAND CONT'D

PROOF

Step 1: We start by considering incentives in the punishment phase. In this phase, sticking to Nash behaviour is trivially incentive compatible, by a standard argument.

COLLUSION WITH FLUCTUATING DEMAND CONT'D

Step 2: We now consider incentives in the collusive phase. In this phase, firms set monopoly price p_s^m in state s . Denoting by π_s^m the monopoly profit in state s , firms make profit $\frac{\pi_s^m}{2}$ in state s in the collusive phase. So in the collusive phase, the present discounted profit from sticking to collusion is:

$$\begin{aligned}V^C &= \sum_0^{\infty} \delta^t \left(\frac{1}{2} \frac{\pi_B^m}{2} + \frac{1}{2} \frac{\pi_G^m}{2} \right) \\&= \frac{1}{1-\delta} \left(\frac{1}{2} \frac{\pi_B^m}{2} + \frac{1}{2} \frac{\pi_G^m}{2} \right) \\&= \frac{1}{1-\delta} \frac{\pi_B^m + \pi_G^m}{4}.\end{aligned}$$

NB: Note that the present discounted profit from sticking to the agreement is independent of s .

COLLUSION WITH FLUCTUATING DEMAND CONT'D

Step 3: We now look at the present discounted profit from deviating in the collusive phase. A deviation leads to the monopoly profit in the corresponding period and 0-profits in all future periods. So we have

$$V_s^D = \pi_s^m.$$

For a deviation to not be profitable in state s , we need:

$$V_s^D \leq \frac{\pi_s^m}{2} + \delta V^C.$$

COLLUSION WITH FLUCTUATING DEMAND CONT'D

Step 4: Using the formulas that we have for V^C and V_s^D , a deviation is not advantageous in the collusive phase in state s if and only if

$$\frac{\pi_s^m}{2} \leq \frac{\delta}{1-\delta} \frac{\pi_B^m + \pi_G^m}{4}$$

which rewrites as

$$2(1-\delta)\pi_s^m \leq \delta\pi_B^m + \delta\pi_G^m$$

Clearly, the condition for no deviation is more stringent in the good state, as the value of deviating is larger, while the severity of punishment is independent of the state.

COLLUSION WITH FLUCTUATING DEMAND CONT'D

Full collusion is thus sustainable if and only if:

$$\begin{aligned} 2(1 - \delta)\pi_G^m &\leq \delta\pi_B^m + \delta\pi_G^m \\ \Leftrightarrow \\ \delta &\geq \delta^* \equiv \frac{1}{1 + \underbrace{\frac{\pi_B^m + \pi_G^m}{2\pi_G^m}}_{\in (\frac{1}{2}, 1)}} \end{aligned}$$

Recall now that under certain demand and Bertrand duopolistic competition, the fully collusive outcome was implementable given $\delta \geq \delta^{Bert} = \frac{1}{2}$. ■

COLLUSION WITH FLUCTUATING DEMAND AND ASYMMETRIC INFORMATION

- We now consider the so-called Green-Porter (1984) model.
- We always assumed until now that firms observe deviations of other firms from the collusive outcome.
- But in many situations, this is not realistic. A firm may not observe the price or the quantity set by another firm directly.
- We shall assume that firms do not observe two aspects: 1) the demand in each period and 2) the action picked by its competitor(s).
- Low profit therefore now has 2 possible causes:
 - low demand
 - or being cheated by the collusion partner(s).

COLLUSION WITH FLUCTUATING DEMAND AND ASYMMETRIC INFORMATION CONT'D

- Consider the case of two firms. Products are perfect substitutes, with constant marginal cost c . Firms set prices.
- There are two demand states, bad and good.
- The high demand state happens with probability $1 - \alpha$. Demand is i.i.d over time.
- In the bad state, demand is 0.
- In the good state, demand is positive if $p = c$, i.e. $Q(c) > 0$ and demand is strictly decreasing in price.
- Monopoly price in good state is p^m , ensuring profits π^m .
- Key aspect: If a firm cannot sell at a given point in time, this may be due:
 - either to the state being bad
 - or to a low price set by the rival.

COLLUSION WITH FLUCTUATING DEMAND AND ASYMMETRIC INFORMATION CONT'D

We obtain the following result

Proposition *If $\delta > \frac{1}{2(1-\alpha)}$, there is a maximally collusive equilibrium featuring the following strategy.*

- *Starting at $t = 1$, firms set the collusive price p^m until the first period in which they make 0-profits.*
- *After the first period where 0-profits were made, they set price equal marginal cost c for T periods.*
- *At period $T + 1$ periods of punishment, revert to the collusive price p^m .*
- *As soon as 0-profits are made again, revert to setting price equal marginal cost for T periods.*

COLLUSION WITH FLUCTUATING DEMAND AND ASYMMETRIC INFORMATION CONT'D

In this equilibrium, firms know that they are all following the equilibrium strategy and that none is deviating. Nevertheless, finite phases of maximal collusion and finite phases of punishment alternate, where each phase of punishment is initiated by a bad realization of demand within a collusive phase.

The equilibrium is somewhat paradoxical: firms punish though they know that there was no deviation. But this is necessary to discourage deviation.

COLLUSION WITH FLUCTUATING DEMAND AND ASYMMETRIC INFORMATION CONT'D

The general insight of the result:

- Collusion is still sustainable despite the non-observability of deviations.
- BUT it is sustainable under *more demanding conditions* than in an environment where deviations are immediately observable (which is the case examined in the previous model with fluctuating demand).

COLLUSION WITH FLUCTUATING DEMAND AND ASYMMETRIC INFORMATION CONT'D

PROOF

Step 1: Consider the following strategy profile:

- Set the collusive price p^m until you make 0-profits.
- After the first period where 0-profits were made, set price equal marginal cost c for T periods.

We now want to show that such a strategy profile can constitute an equilibrium.

COLLUSION WITH FLUCTUATING DEMAND AND ASYMMETRIC INFORMATION CONT'D

Step 2: *Incentives in the punishment phase:* Here, a deviation is not profitable as firms are playing the myopic Nash equilibrium.

COLLUSION WITH FLUCTUATING DEMAND AND ASYMMETRIC INFORMATION CONT'D

Step 3: *Incentives in the collusive phase:* Let V^C denote the expected present value of a firm's profits at date t if the game is in the collusive phase:

$$V^C = (1 - \alpha)\left(\frac{1}{2}\pi^m + \delta V^C\right) + \alpha(0 + \delta V^P), \quad (1)$$

Above, note that either demand is high (with probability $1-\alpha$) or it is low. Above, V^P is the present value when entering the punishment phase, and it is given by:

$$V^P = 0 + 0 + \dots + 0 + \delta^T V^C. \quad (2)$$

Simply keep in mind that firms revert to competitive pricing (and 0-profits) for T periods.

COLLUSION WITH FLUCTUATING DEMAND AND ASYMMETRIC INFORMATION CONT'D

Firms should not have an incentive to deviate in the collusive phase, so we should have:

$$V^C \geq (1 - \alpha)(\pi^m + \delta V^P) + \alpha V^P,$$

which can be rewritten as

$$(1 - \alpha)\delta (V^C - V^P) \geq (1 - \alpha)\frac{1}{2}\pi^m, \quad (3)$$

Obviously, to discourage deviation in the collusive phase, the punishment scenario must be sufficiently unattractive.

COLLUSION WITH FLUCTUATING DEMAND AND ASYMMETRIC INFORMATION CONT'D

If we substitute the value of V^P into (1), we have:

$$\begin{aligned}V^C &= (1 - \alpha)\left(\frac{1}{2}\pi^m + \delta V^C\right) + \alpha\delta^{T+1}V^C \\ \Leftrightarrow \\ V^C &= \frac{(1 - \alpha)\frac{1}{2}\pi^m}{1 - (1 - \alpha)\delta - \alpha\delta^{T+1}}.\end{aligned}$$

Which furthermore, using (2), yields

$$V^P = \delta^T \frac{(1 - \alpha)\frac{1}{2}\pi^m}{1 - (1 - \alpha)\delta - \alpha\delta^{T+1}}.$$

COLLUSION WITH FLUCTUATING DEMAND AND ASYMMETRIC INFORMATION CONT'D

Using the obtained expressions for V^C and V^P , we may thus rewrite (3) as follows:

$$2(1 - \alpha)\delta + (2\alpha - 1)\delta^{T+1} \geq 1.$$

So, summarizing, we are now looking for a T that maximizes

$$V^C = \frac{(1 - \alpha)\frac{1}{2}\pi^m}{1 - (1 - \alpha)\delta - \alpha\delta^{T+1}}$$

subject to the incentive compatibility constraint

$$2(1 - \alpha)\delta + (2\alpha - 1)\delta^{T+1} \geq 1.$$

Very intuitively, V^C is decreasing in T , so we look for the lowest T that satisfies the constraint.

COLLUSION WITH FLUCTUATING DEMAND AND ASYMMETRIC INFORMATION CONT'D

Note first that if $\alpha \geq \frac{1}{2}$ (bad state is more likely than good state), then the incentive constraint is violated for any T .

Note second that for $\alpha < \frac{1}{2}$, increasing T indeed helps relax the IC constraint. It is easily seen that one needs

$$(1 - \alpha)\delta > \frac{1}{2}$$

for collusion to be possible above some threshold level of T . ■

Cartels

IV History of cartel law

WHAT IS A CARTEL

- There is strategic interdependence between businesses in concentrated markets.
- These circumstances can often lead to a collusive outcome (e.g. higher prices) but this outcome is ‘unstable’ and contingent on market conditions.
- In these circumstances there is a temptation for businesses to *openly collude* —i.e. jointly act as a monopolist. This is what we call a cartel.
- For example, businesses come together to agree what price they should charge. They state their agreement in writing and/or recording.
- Why do you think societies want to limit businesses colluding on what price to charge? What is the problem with it?

CARTEL DEFINITIONS

Informal association or arrangement involving two or more competing companies. In a cartel, the members discuss and exchange information about their businesses or reach agreements about their future conduct, with the intention of limiting competition between them and increasing their own prices or profitability.

Cartels are generally conducted covertly and will inevitably involve one or more of the “hard core” restrictions of competition law: price fixing, bid rigging (collusive tendering), the establishment of output restrictions or quotas and/or market-sharing. Therefore, they will almost certainly be found to have a negative effect on competition and to have no countervailing benefits.^a

^a[https://uk.practicallaw.thomsonreuters.com/0-381-9658?transitionType=Default&contextData=\(sc.Default\)&firstPage=true](https://uk.practicallaw.thomsonreuters.com/0-381-9658?transitionType=Default&contextData=(sc.Default)&firstPage=true)

HISTORY ANTITRUST LAW IN THE US

- Formation of trusts in the end of the 19th century.
- Technology: Dramatic improvement in transportation and communication (railways, telegraph lines, telephone services).
- Finance: Formation of stock and bond markets.
- Economies of scale and scope.
- In the late nineteenth century in the US, organization of cartels and trusts were widespread.^a
- Final consumers, farmers and small industrial firms (suppliers) were hurt by higher prices.
- Farmers and small businesses had enough political power and public sympathy to lead to the creation of antitrust laws in many US states.

^a A trust is a fiduciary arrangement that allows a third party, or trustee, to hold assets on behalf of a beneficiary or beneficiaries.

HISTORY ANTITRUST LAW IN THE US CONT'D

- Sherman Antitrust Act 1890.
- Clayton Act 1914.
- Federal Trade Commission (FTC) Act 1914.
- Department of Justice created in 1870, but opened its Antitrust Division only in 1933.
- Let's see a video that brings us back in time
<https://www.youtube.com/watch?v=NssfPApe5iQ>.

HISTORY ANTITRUST LAW IN THE US CONT'D

Sherman Act (1890):

- Section 1 prohibits contracts, combinations and conspiracies which restrain trade and prescribes imprisonment and fines for violators.
- Section 2 prohibits monopolisation, attempts to monopolize and conspiracies to monopolize any part of trade or commerce among the several states or with foreign nations
- During the first decade of life, enforcement of the Sherman Act was not very strict.
- Cartels are deemed as 'per se' illegal and can be subject to criminal law.

HISTORY COMPETITION LAW IN EUROPE

- Two different levels of jurisdiction:
 - National
 - Supra-national.
- Many European countries did not have proper competition laws until very recently (in the nineties).
- Two different traditions: German and English.

HISTORY COMPETITION LAW IN EUROPE: GERMANY

- Cartels seen as an instrument to control the instability created by cut-throat competition and price warfare.
- Freedom of contracting: price agreements were legal and enforceable in the courts.
- Anti-cartel action was taken only in certain extreme cases (complete monopoly).
- By 1905: 385 cartels.
- By 1923: 1500 cartels.
- The first Cartel Law was introduced in 1923 as a reaction to hyper-inflation.
- The first strict Competition Law was introduced in 1957.
- The Federal Cartel Office (Bundeskartellamt) was established in 1958.

HISTORY COMPETITION LAW IN EUROPE: THE UK

- The Profiteering Act of 1919 did not have a well-defined concept of unreasonably high profits.
- Monopolies and Restrictive Practices Act 1948.
- Restrictive Trade Practices Act 1956.
- Monopolies and Merger Act 1965.
- Office for Fair Trade (OFT) was established in 1973.
- Objectives of anti-monopoly law were never clear
 - “public interest”?
 - The Secretary of State for Industry had discretion on whether to accept or reject the OFT recommendations → Politics!
- Penalties and tools of enforcement were missing until 1998. Later, fines (up to 10% of sales) and search power introduced.
- Competition Act 1998 (brought the UK law almost in line with the EU law).
- Competition Commission established in 1999.
- Competition and Markets Authority was launched in 2013, replacing The Competition Commission and OFT.

HISTORY COMPETITION LAW IN EUROPE CONT'D

- 1951: Treaty of Paris
 - Created the European Coal and Steel Community (ECSC).
 - Prohibits trade barriers, discriminatory and other restrictive practices capable of distorting competition among the six countries (France, Germany, Italy, and the Benelux Countries).
 - Reasons:
 - The desire of reducing the danger of German power by making available to others essential inputs such as coal and steel.
 - Trying to mimic the US principle of free competition.
 - Competition was not an end in itself, but was intended as a way to promote economic progress and welfare of Europeans (objective of the EC as stated by Article 2).
- Treaty of Rome (1957) and its modifications (1992, 2009).

HISTORY COMPETITION LAW IN EUROPE CONT'D

- Articles 81 (now 101) and 82 (now 102) of the Treaty of the European Communities.
- Direct applicability, i.e., directly enforceable by national courts.
- DG Comp enforces these articles following the directives of the Commissioner responsible for competition law.
- The Court of First Instance (CFI) has since 1989 jurisdiction in all actions brought against the decisions of the EC.
- The European Court of Justice (ECJ) decides on appeal actions brought against the judgements of the CFI.

HISTORY COMPETITION LAW IN EUROPE CONT'D

The following shall be prohibited as incompatible with the common market.

- All agreements between undertakings, decisions by associations of undertakings and concerted practices which may affect trade between member states and which have as their object or effect the prevention, restriction or distortion of competition within the common market, and in particular, those which:
 - (a) Directly or indirectly fix purchase or selling prices or any other trading conditions;
 - (b) Limit or control production, market, technical development, or investment;
 - (c) Share markets or sources of supply.

V Types of cartels

PRICE FIXING

- Competitors illegally agree the price for, or discounts on, goods or services.
- Forms of fixing prices:
 - Hold prices firm.
 - Eliminate or reduce discounts.
 - Adopt a standard formula for computing prices.
 - Maintain certain price differentials between different types, sizes, or quantities of products.
 - Adhere to a minimum fee or price schedule.
 - Fix credit terms.
 - Not advertise prices.

SIGNS OF PRICE FIXING

- Identical prices may indicate a price-fixing conspiracy, especially when:
 - Prices stay identical for long periods of time.
 - Prices previously were different.
 - Price increases do not appear to be supported by increased costs.
 - Discounts are eliminated, especially in a market where discounts historically were given.
 - Vendors are charging higher prices to local customers than to distant customers. This may indicate local prices are fixed.

THE LYSINE CARTEL

- One of the most high-profile cartels to be uncovered in recent times.
- Result of undercover investigations by the US DoJ, with assistance from an informant.
- Five companies including Archer Daniels Midland (ADM) had colluded on lysine prices worldwide for 3 years.

THE LYSINE CARTEL

What happened?

- On the 23rd of June in 1992 top level representatives of the 4 largest lysine producing companies met in the Nikko Hotel (nowadays called Hyatt Regency) in Mexico City.
- Orchestrated by ADM's vice-president Michael 'Mick' Andreas, they agreed to gradually raise the price of lysine from the then \$0.69 per pound to \$1.20.
- The price of lysine did go up —not immediately, but eventually it reached the \$1.20 level and remained there until 1995.
- This meant that throughout this period anyone buying lysine had to pay a highly inflated price —potentially up to 70% more than before the cartel.
- Andreas had already done this before with citric acid, where they successfully hiked up the world price of citric acid by more than 40%.

CARTELS

TWO VIDEOS ON THE LYSINE CARTEL

THE LYSINE CARTEL CONT'D

- The anatomy of a price fixing cartel:

<https://www.youtube.com/watch?v=2w4pdDkYEAg>

- ... and the real deal <https://youtu.be/DPXTsPS-hyw>

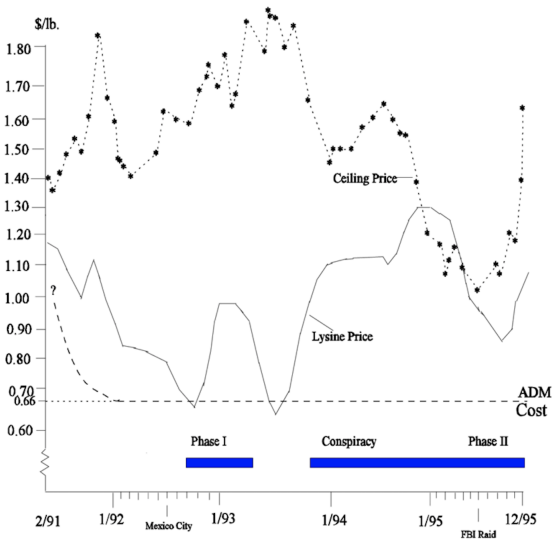
THE LYSINE CARTEL CONT'D

- Brazen or lawless nature of the conspirators.
- Fear of detection.
- Use of covers (e.g. Trade Associations).
- (Global) Price fixing.
- Use of (Worldwide) volume-allocation agreements.
- Audits and the use of score sheets.
- Adoption of compensation schemes.
- Coordination of budget meetings.

CARTELS

LYSINE CARTEL PRICE

THE LYSINE CARTEL CONT'D



THE LYSINE CARTEL CONT'D

- DoJ obtained convictions for price fixing.
- All corporate members pleaded guilty → ADM fined \$100M.
- DoJ prosecuted four lysine executives in 1998 → 3 convicted (<http://community.corpwatch.org/adm/pages/players.php>)
- Companies also investigated and fined by the antitrust divisions in Brazil, Canada, European Union.
- Treble-damages class action —settled in 1996.
- More than 40 civil antitrust suits filed.
 - 400 plaintiffs.
 - ADM paid \$38 million to settle mismanagement suits by its shareholders.
 - 15 additional suits filed by farmers, consumers etc. \$80 to \$100 million recovered in damages.

APPLE E-BOOK CARTEL

- <https://youtu.be/1HRXMs8tL6g>

APPLE E-BOOK CARTEL CONT'D

- Five book publishing companies (Hachette Book Group, HarperCollins Publishers, Macmillan Publishers, Penguin Group, and Simon & Schuster, Inc.) had around 50% of the e-book publishing market.
- Amazon had around 90% of the e-book retail market.
- Amazon used a \$9.99 price for most of the new and bestseller books —used it as a loss-leader.
- The publishers got the same revenue (irrespective of the retail price), yet they were upset because they claimed that this low price reduced profits for more expensive hardcopies.

APPLE E-BOOK CARTEL CONT'D

- In 2010 came the iPad, and Apple's attempt to enter the lucrative e-book market.
- The e-book market:
 - In June 2009, the book industry as a whole was estimated to be \$35 to \$42 billion in size.
 - Trade books —books distributed to the general public —comprising \$12.5 billion of that.
 - Although trade e-books were only \$100 million or so at that time, predictions put the e-book market size at \$1 billion by 2010 (today it is over \$30 billion).
- Beginning on December 8, 2009, Apple's senior VP of Internet Software and Services, Eddy Cue, contacted the Publishers to set up meetings for the following week.

APPLE E-BOOK CARTEL CONT'D

- “We can sell the majority of e-books between \$9.99 and \$14.99, with new releases being \$12.99 to \$14.99.
- In return we all sign an agency model in which Publishers control the price of the e-books with Apple receiving a 30% commission.
- Plus we do a MFN clause (most favoured nation), which means we won't charge a higher price than what you set to other retailers.”

APPLE E-BOOK CARTEL CONT'D

- “Apple’s goal was to avoid price competition with Amazon, since under the agency model, the publishers would likely set the same price everywhere.
- Apple switched to using the MFN clause because it solved the price competition problem more elegantly, encouraging rather than requiring the publishers to move other e-book retailers to the agency model.
- Why was this? Without across-the-board agency pricing, the MFN clause meant that publishers would earn far less money any time another e-book retailer lowballed a price and Apple matched it. The only rational reaction for the publishers was to move all retailers to agency pricing, so the same book was for sale at the same price everywhere”

APPLE E-BOOK CARTEL

- There is nothing inherently illegal with the agency model, price tiers, or an MFN clause. The problem comes when they are combined in negotiation with six publishers that between them control 50% of the book market.
- After five of the publishers signed Apples deal, they immediately went to Amazon (and Google) to switch to the agency model. Amazon (and Google) was understandably upset about this, due to the loss of pricing control, but had no choice but to accept in the end.
- Once the agency model was in place, ebook prices from those publishers rose immediately. Roughly two weeks after the move, prices at Amazon rose 14.2 percent for new releases, 42.7 percent for New York Times bestsellers, and 18.6 percent overall.

APPLE E-BOOK CARTEL CONT'D

- All five publishers settled with the Department of Justice, agreeing to terminate existing contracts with Apple and other e-book retailers, and renegotiate contracts that do not prevent retailers from discounting e-book prices.
- Apple eventually settled the lawsuit by agreeing to pay \$400 million to consumers.

CHOCOLATE CARTEL

- <https://youtu.be/gWnuf6ehRXQ>

- Collusive tendering that involves competitors illegally agreeing on who will win a tender.
- Types:
 - Bid Suppression: In bid suppression schemes, one or more competitors who otherwise would be expected to bid, or who have previously bid, agree to refrain from bidding.
 - Cover Bidding (also known as “complementary” or “courtesy” bidding): competitors agree to submit bids that either are too high to be accepted or contain special terms that will not be acceptable to the buyer (designed to give the appearance of genuine competitive bidding).
 - Bid Rotation: All conspirators submit bids but take turns being the low bidder.
 - Subcontracting: Competitors who agree not to bid or to submit a losing bid frequently receive subcontracts or supply contracts in exchange from the successful low bidder.

CARTELS

THE UK CONSTRUCTION CARTEL BACKGROUND

- The construction sector is widely reported as one of the most corrupt globally.
- The construction industry has always been highly susceptible to collusion. Why?
 - Nature of tenders: lowest bidder wins it all
 - Relatively small number of bidders
 - Tenders and their winners are publicly advertised —full transparency.

- The OFT imposed fines totalling £129.2 million on 103 construction firms in England which it has found had colluded with competitors on building contracts.
- The OFT concluded that the firms engaged in illegal anti-competitive bid-rigging activities on 199 tenders from 2000 to 2006, mostly in the form of ‘cover pricing’.
- List of infringements available at
https://webarchive.nationalarchives.gov.uk/ukgwa/20140402142426/http://www.offt.gov.uk/shared_offt/business_leaflets/general/table-of-infringements.pdf.

- In the tendering rounds, the lowest bidder faced no genuine competition because all other bids were cover bids, leading to an even greater risk that the client may have unknowingly paid a higher price.
- The OFT also found instances where successful bidders had paid an agreed sum of money to the unsuccessful bidder (known as a ‘compensation payment’). These payments between £2,500 and £60,000 were facilitated by the raising of false invoices.
- The infringements affected building projects across England worth in excess of £200 million including schools, universities, hospitals, and numerous private projects from the construction of apartment blocks to housing refurbishments.

- The member firms agree only on how to share the market.
- Each firm then operates only in one area or region agreed without encroaching on the others' territories acting like local monopolies.
- E.g. agreement between Du Pont (American) and Imperial Chemical (English) for the former to have exclusive selling rights for their products in North America (except for British colonies) and the latter in the British Empire.

- The firms in a market-sharing cartel can also operate in the same geographic area by deciding which is to fill each particular contract.
- These market-sharing cartels are likely to be unstable due to cheating.
- E.g. Luxembourg beer cartel (EC), which consisted of a written agreement signed in 1985 by which the parties agreed not to supply beer to any customer (hotels, cafés, restaurants and beer wholesalers) which was tied to another party by an exclusive purchasing agreement.

VI Cartel enforcement in the EU and US

- Over time, DoJ significantly increased the number and severity of criminal sanctions.
- Prison time of up to five years.
- Extradition of non-nationals based solely on antitrust charges.
- Strong focus on the prosecution of foreign executives, since 1999.

- More jurisdictions introduced criminal legislation.
- Imposed in some European countries, e.g. UK, Ireland, Denmark, Romania, France, Estonia.
- Prison sentences are rare.
- Leniency programme suffers from inflation of fine reductions.

- DoJ implemented the leniency programme first in 1978 and then revised it in 1993.
- Through the leniency programme, corporations or individuals can avoid criminal prosecution, including substantial fines and imprisonment, if they are the first to:
 - Report cartel conduct to the Division
 - Take steps to end their participation in the conduct
 - Admit to their crimes
 - Cooperate with the Division's investigation
 - Satisfy the other commitments outlined in the policies.

- The European Leniency Programme (LP) was launched in 1996 (revised in 2002 and 2006).
- This programme grants immunity or reduction of fines to individual firms that are members of a cartel, in exchange for the initial reporting of the cartel and/or relevant cooperation with the Commission during a cartel investigation.

- Companies that have participated in illegal cartels have a limited opportunity to avoid or reduce a fine.
- Competition authorities operate leniency policies whereby companies that provide information about a cartel in which they participated might receive full or partial immunity from fines.
- A video on how leniency works
https://www.youtube.com/watch?v=PcWxCb_dtYA.

- Type A corporate immunity:
 - First to apply, no pre-existing civil or criminal investigation.
 - 100% immunity + automatic “blanket” criminal immunity for current and former employees that cooperate.
- Type B discretionary corporate immunity/leniency:
 - First to apply after an investigation has begun but before the Statement of Objections (SO) is issued.
 - Up to 100% reduction + possible “blanket” criminal immunity for all current and former employees that cooperate, or for specific individuals.

- Individual criminal immunity:
 - Type A —guaranteed, Type B, discretionary (public interest test applies) and must add significant value to the investigation.
 - Employer no longer eligible for Type A immunity, but if the first company to apply, Type B discretionary immunity/leniency could be granted.
- Type C corporate leniency:
 - Applicant not the first to apply or a coercer.
 - Discretionary reduction of up to 50%.
 - Criminal immunity on a case by case subject to a public interest test.
- All types of immunity/leniency subject to conditions.

- Cartel discovery:
 - 25% of the cartels convicted in the US are then investigated in the EU
 - At least another 20% were convicted by US and EU authorities in the same year
 - Remaining cases discovered by reporting of customer or rival firm
 - Under the Commission's initiative, perhaps by observing the evolution of prices.
- Cartel conviction:
 - On average, 35 cartel members a year convicted
 - Of these, 22 received penalty reduction
 - Over half of the firms in cartels fined (since 1998) received a fine reduction
 - 11% of cartel members received full immunity
 - The majority of cartel members (83%) convicted only once
 - There are repeated offenders (recidivist firms): *Akzo Nobel* involved in 9 cartels; *Mitsubishi* in 5.
- Leniency reductions:
 - Share of firms receiving leniency reduction grew from 34% in 2009 to 82% in 2013
 - In some cases (e.g., auto parts), all firms got leniency
 - The average leniency reduction was 38% before 2008 to 56% after 2008.

²Marvao, Catarina. "The EU leniency programme and recidivism." Review of Industrial Organization 48.1 (2016): 1-27.

Thank you for listening. See you
next term.