

Suppose that in an industry there are currently at least two firms that sell identical products, and that they are earning collusive profits. What will be the likely effects on the ability to maintain collusion of: (a) an increase in the number of firms; (b) a rise in the real interest rate; (c) an anticipated one-period increase in industry demand; and (d) the introduction of a leniency programme? (Consider each factor separately.)

Use real world cases

- Collusion is when firms agree to limit output or increase prices to increase their own profit, to the detriment of the consumers.
- Set up the model:
 - o Model it like an infinitely repeated prisoners dilemma where cooperation means keeping prices high/output low and defection means lowering prices/increasing output.
 - o By the Folk Theorem, it is possible for collusion to be sustained with an SPE-strategy such as grim trigger, with firms that are sufficiently patient.
- (a) an increase in the number of firms will make it harder to sustain collusion, it will require each firm to be more patient:
 - o Show using maths that patience δ needs to be higher than $1 - 1/n$ (assuming Bertrand model, n firms, no fixed costs, identical products, no capacity constraints, punishment gives payoff 0).
 - o Therefore, as n rises it becomes more difficult to sustain collusion/firms need to be more patient
- (b) a rise in the real interest rate will make it more difficult to sustain collusion, as firms will be less patient:
 - o The patience is tied to the real interest rate r : $\delta = 1/(1+r)$.
 - o An increase in r will mean that patience δ will be lower. As a result, future profits will become less valuable relative to current profits.
 - o As a result, defecting will become more profitable.
- (c) an anticipated one-period increase in industry demand will make it harder to sustain collusion as it increases the one-off benefit of defecting:
 - o With a grim-trigger strategy, defecting can be done only once as in every subsequent moment, you will be punished.
 - o For defection to be profitable, the one-time profits need to be higher than the all discounted future profits together.
 - o A one-period increase in industry demand will make defection very profitable, without increasing the discounted future profits.
 - o Therefore, defecting might become profitable enough to where it is more valuable than sustained collusion.

- (d) the introduction of a leniency programme will make it harder to sustain collusion:
 - o Leniency programmes are programmes which exempt the first firm to report a cartel from punishment.
 - o There are two incentives to report for firms:
 - There is always a possibility that the authorities catch the firms, so to avoid punishment they can use the leniency programme.
 - Reporting another firm will impose costs onto their competitors, which can indirectly lead to higher profits.