Market Power and Efficiency

Christian W. Bach

University of Liverpool & EPICENTER

UNIVERSITY OF LIVERPOOL

Introduction

- One basic idea of competition policy: *monopolies (more generally market power)* ***adversely*** *affect welfare.*
- Indeed, it can be argued microeconomically that there is an inverse relationship between market power and welfare from a static viewpoint.
  ("allocative inefficiency and possibly productive inefficiency")
- However, the dynamic analysis is less clear-cut, as the prospect of market power is an incentive for firms to invest and innovate.
- Competition policy is thus not concerned with market power *per se*, but rather with distortions of the competitive process.
- Competition policy needs to guarantee that (potential & actual) competitors are able to challenge firms with large market power.
- Besides, protecting inefficient firms and to prolong their life artificially would also be detrimental from a welfare perspective.
  ("Competition policy is not tantamount to defending competitors")

Market Power

- **Market power** = ability of a firm to raise price above marginal costs of production.*(Note that marginal cost pricing obtains under perfect competition as well as with Bertrand competition.)*
- Possible measure: Lerner index.
- An unchallenged monopolist enjoys the highest possible market power, where the monopoly price can be seen as an upper bound of pricing.
  (Note that the monopoly price might also be set under full collusion of several firms.)
- The notion of market dominance used in EU competition law does not have a direct economic equivalent, but can be interpreted as a firm having a large degree of market power.

Agenda

- Allocative Efficiency
- Productive Efficiency
- Dynamic Efficiency
- Public Policies
- Does the Market Tame a Monopoly?

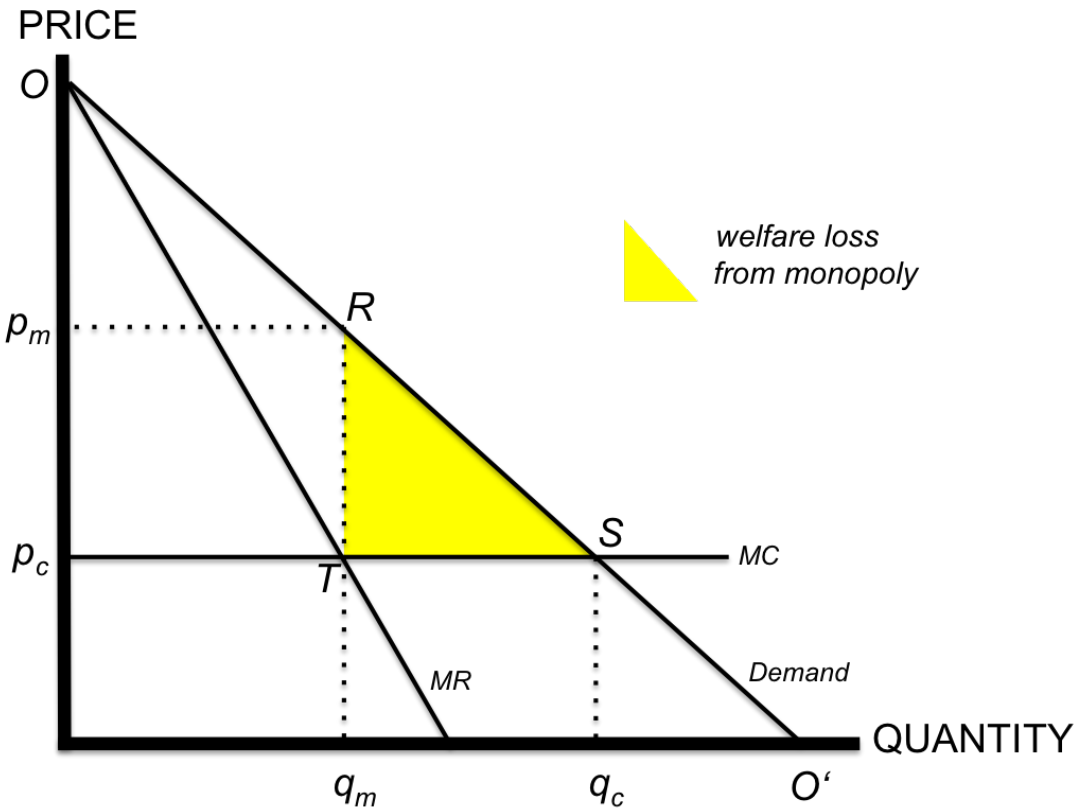
Agenda

- **Allocative Efficiency**
- Productive Efficiency
- Dynamic Efficiency
- Public Policies
- Can the Market Tame a Monopoly?

Market Power Reduces Static Welfare

- Main argument
  - Prices above marginal costs entail higher producer surplus.
  - However, this cannot compensate the lower consumer surplus due to the higher prices
  - Both compared to the **competitive benchmark**.
- Assumptions
  - Technologies (costs) are given.
  - The most efficient technology available is used.

Graphical Analysis with Linear Demand and Constant Marginal Costs



Graphical Analysis with Linear Demand and Constant Marginal Costs

- Welfare = consumer surplus + producer surplus
- Welfare under perfect competition / Bertrand: triangle Op_cS
  (Op_cS also equals consumer surplus, as firms incur zero profits.)
- Welfare under monopoly: area Op_cTR
  (Op_cTR equals consumer surplus Op_mR plus producer surplus p_mp_cTR: the monopolist cannot appropriate all consumer surplus)
- Deadweight loss: triangle RTS
- Allocative inefficiency is usually taken to mean deadweight loss.

Determinants Of The Deadweight Loss

- Note that a welfare loss occurs not only for the monopoly price, but for any price above marginal costs.
  (The higher the price – or the stronger the market power – the larger the welfare loss.)

- The deadweight loss depends on the price elasticity of demand.
  (The ability of the monopolist to charge higher prices – and the corresponding deadweight loss – increase in the price inelasticity of demand.)

- The absolute value of the deadweight loss depends on the size of the market (intercept of demand O).
  (Parallel-shifting demand OO' towards the origin decreases the deadweight loss of monopoly in absolute terms.)

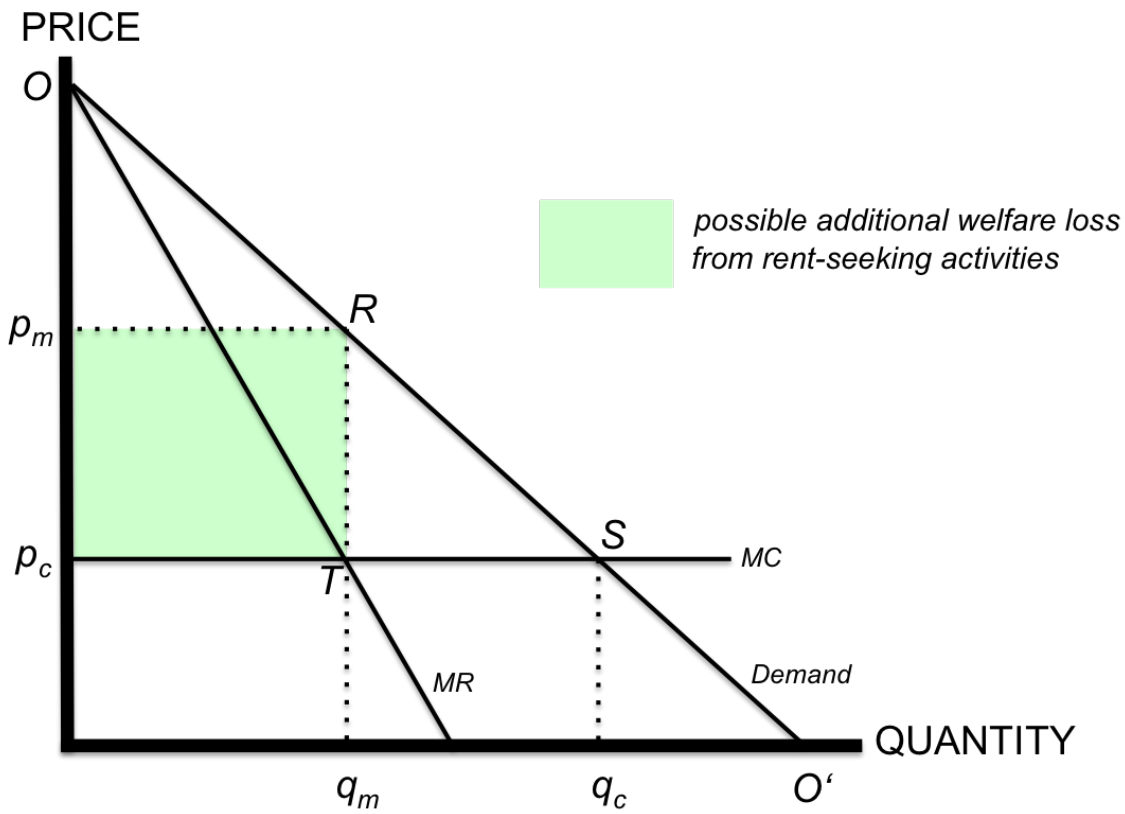
Two Fundamentally Opposed Interests

- Relative to monopoly, competition increases net welfare, but does lead to no Pareto improvement.
- Producers will try to lobby for more protection and less competitive pressure.
- Consumers will try to lobby for more competition.

Rent-Seeking Activities May Increase The Inefficiency

- Allocative inefficiency might in fact understate the actual negative effects of monopoly.
- Indeed, firms might try to use political influence and lobbying to keep or increase their market power.
- In this process, resources are used, which could instead be put to more productive use.
- Hence, rent-seeking activities enlarge the expected welfare loss from monopoly
- maximal amount of these additional inefficiences: area $p_m p_c TR$.

Rent-Seeking Activities May Increase The Inefficiency: Illustration



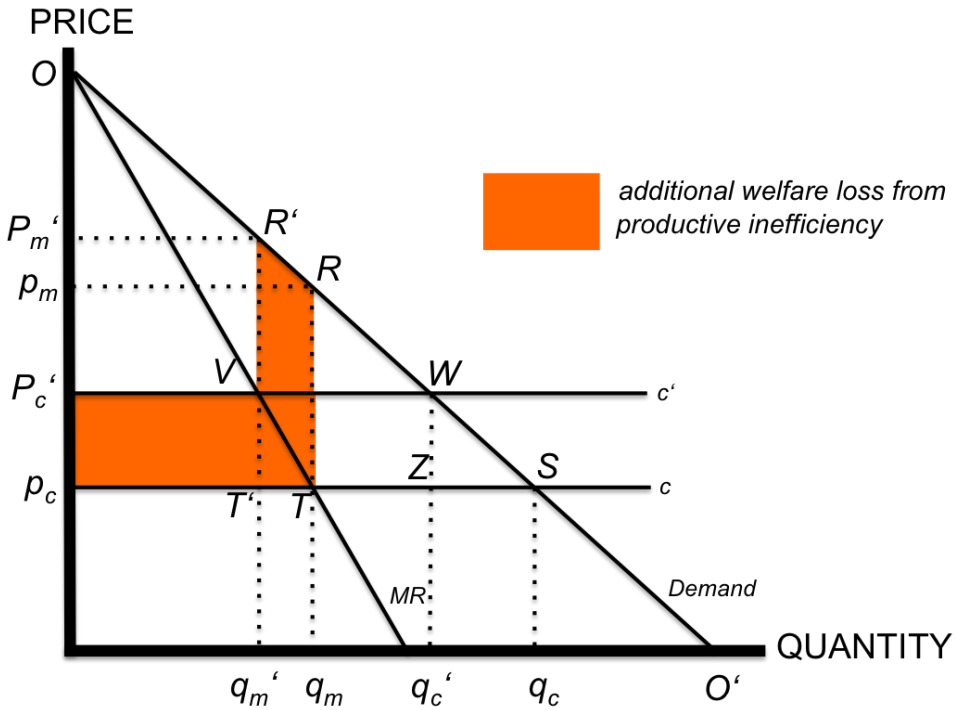
Agenda

- Allocative Efficiency
- **Productive Efficiency**
- Dynamic Efficiency
- Public Policies
- Can the Market Tame a Monopoly?

Productive Efficiency

- Efficiency assumption: does a monopoly really use the most efficient technology / cheapest possible way for production?
- Productive inefficiency: welfare loss due to a firm operating with higher costs under monopoly *(more generally market power)* than under competition.
- Two main arguments for higher costs under monopoly
  - Managers have less incentive to make effort.
  - Lack of market selection due to the absence of competition makes it more likely for inefficient firms to persist.

Welfare loss



- Suppose that a monopolist incurs marginal cost $c' > c$, where c denotes the marginal cost if the market were more competitive.
- Welfare loss: $R'T'S + p_c'VT'p_c$
- Welfare loss due to allocative inefficiency assuming $c' = c$, i.e. no cost effects: RTS.
- Additional welfare loss due to productive inefficiency: $R'T'RT + p_c'VT'p_c$ (coloured area).

Managerial Slack as a Reason for Productive Inefficiency

- Managerial inefficiencies and thus higher costs can emerge with the "quiet life" facilitated by monopoly or market power.
- Although not conclusive, there exists some evidence that firms' productivities are higher in more competitive markets.
- e.g. Nickell (1996)'s study of 700 UK manufacturing firms:
  - The larger the market share, the lower the firm's productivity level.
  - The stronger the competition, the higher productivity growth.

Darwinian Mechanism As Ensuring Productive Efficiency: Competition Selects Efficient Firms

- A Darwinian mechanism (general idea)
  - In industries with both more efficient firms and less efficient firms, competition will force the inefficent firms to exit
  - Consequently, welfare improves, as output will be produced at a lower cost.
- Under monopoly such a Darwinian mechanism is absent.
- Implication for competition policy: if less efficient firms were protected or subsidized, then market competition would be prevented from selecting the best firms, which would result in higher prices and lower welfare.

Darwinian Mechanism as a Reason for Productive Efficiency: A Model

- Suppose a homogenous good industry with quantity competition.
- Firms have different efficiency levels (different technologies).
  - The industry has n firms and let $k \in [0, 1]$ be some fraction.
  - There exist nk firms with high marginal cost c_h.
  - There exist $n(1-k)$ firms with low marginal cost $c_l < c_h$.
- Inverse demand is given by $p = 1 - Q$, where $Q = \sum_{i \in L} q_i + \sum_{j \in H} q_j$ is aggregate output, and L resp. H denote the set of low-cost resp. high-cost firms.
- Profit functions

$$\pi_i = \big(1 - Q - c_l\big) q_i \text{ for all } i \in L$$

and

$$\pi_j = \big(1 - Q - c_h\big) q_j \text{ for all } j \in H$$

Darwinian Mechanism as a Reason for Productive Efficiency: A Model

- First-order conditions

$$-2q_i + 1 - c_l - \sum_{k \neq i} q_k = 0 \text{ for all } i \in L$$

$$-2q_j + 1 - c_h - \sum_{k \neq j} q_k = 0 \text{ for all } j \in H$$

- Focusing on the symmetric solution, i.e. firms of a given type produce the same output at equilibrium, yields

$$q_l(q_h) = \frac{1 - c_l - nkq_h}{1 + n(1-k)} \quad \text{and} \quad q_h(q_l) = \frac{1 - c_h - n(1-k)q_l}{1 + nk}$$

- Equilibrium quantities then obtain as

$$q_l^* = \frac{1 - c_l + nk(c_h - c_l)}{1 + n} \quad \text{and} \quad q_h^* = \frac{1 - c_h - n(1-k)(c_h - c_l)}{1 + n}$$

Darwinian Mechanism as a Reason for Productive Efficiency: A Model

- Equilibrium price

$$p^* = \frac{1 + nkc_h + n(1-k)c_l}{1+n}$$

- Suppose that competition drives the inefficent firms out of the market, i.e. $c_h > p^*$, which is equivalent to:

$$c_h > \frac{1 + n(1-k)c_l}{1+n(1-k)}$$

- The following equilibrium-after-exit in the market with only $n(1-k)$ low-cost firms then obtains (i.e. $q_h^* = 0$).

$$q_l^{**} = \frac{1-c_l}{1+n(1-k)} \quad \text{and} \quad p^{**} = \frac{1+n(1-k)c_l}{1+n(1-k)} < p^*$$

Darwinian Mechanism as a Reason for Productive Efficiency: A Model

- Conclusions of the model:
  - Despite the decrease in the number of firms, the industry price decreases due to the exit of the inefficent firms.
  - Exit is beneficial, because it allows a reallocation of output from inefficient to efficient firms.
  - Welfare is improved through a reduction in the market price.
  - The model also suggests that promoting competition by increasing the number of firms in an industry does not necessarily improve welfare.
- Thus, Darwinian policy conclusions are tricky:
  too few firms is undesirable (absence of competitive pressure),
  however too many firms incl. the inefficient ones too.

Trade-Off between Allocative and Productive Efficiency

- As market power decreases with the number of firms in the industry, one might be tempted to conclude that the larger the number of firms the higher the welfare.
  1. This is not the case with inefficient firms. (cf. Darwinian model)
  2. This is also not the case, however, if firms incur fixed costs.
- The presence of **fixed costs** induce a general trade-off:
  - More firms entail more competition and lower prices, which increases consumer suprlus (allocative efficiency).
  - More firms entail a duplication of fixed costs, which represents a loss in terms of (static) productive efficiency
- The net effect on welfare is ambiguous.

Implication for Competition Policy

- It should be about defending competition and not about defending competitors, which are less efficient or which induce a multiplication of fixed costs.
- Typically, in sectors with very high fixed costs (e.g. network industries), regulated monopolies have been admitted.

Trade-Off between Allocative and Productive Efficiency: A Model

- Suppose a homogenous good industry with n symmetric firms competing in quantities.
- Cost functions $C = cq + F$, where c denotes marginal cost and F denotes fixed cost.
- Market demand $p = 1 - Q$, where p denotes market price and $Q = \sum_{i=1}^{n} q_i$ denotes aggregate output.
- Profit maximization of firm i

$$\max_{q_i} \pi_i = (1 - q_i - \sum_{j \neq i} q_j) q_i - c q_i - F$$

yields the following first-order conditions

$$q_i = \frac{1 - c - \sum_{j \neq i} q_j}{2}$$

Trade-Off between Allocative and Productive Efficiency: A Model

- The symmetric equilbrium then obtain as

$$q^* = \frac{1-c}{n+1} \quad \text{and} \quad p^* = \frac{1+nc}{n+1}$$

- Note that, if n increases, then the market price p^* decreases and the aggregate output $Q = nq^*$ increases: consumer surplus thus rises with the number of firms.
- However, a larger number of firms entails an inefficient multiplication of fixed costs.
- Formally, welfare is negatively affected, as the aggregate producers' profit $PS = \frac{n(1-c)^2}{(n+1)^2} - nF$ is decreasing with n.
- Therefore, a policy aiming at maximizing the number of firms in the industry could counter economic efficiency, as the net effect on welfare is ambiguous.

Agenda

- Allocative Efficiency
- Productive Efficiency
- **Dynamic Efficiency**
- Public Policies
- Does the Market Tame a Monopoly?

Dynamic Efficiency

- So far static (in)efficiencies have been considered.
  - Allocative inefficency: monopolists *(more generally firms with market power)* charge too high prices.
  - Productive inefficency: monopolists *(more generally firms with market power)* do not adopt the most efficient technology available i.e. too high costs.
- Dynamic efficiency refers to the extent to which a firm introduces new products or production-processes over time.
  - A monopolist may have lower incentives to innovate.
  - However, firms under competition are also unlikely to make investments unless they can expect to appropriate them.

Lower Incentives to Innovate for a Monopolist: The Argument

- Suppose that a monopolist can adopt a process innovation at fixed cost F, which reduces current marginal cost c_h to $c_l < c_h$.
- The innovation is made only if $\pi_l - \pi_h > F$, where π_l resp. π_h denote the profits with the new resp. old technology.
- Consider the same decision for a firm in a competitive industry, where all firms incur the same marginal cost c_h, the price thus is $p = c_h$, and firms make zero profit.
- Suppose that one firm can adopt the process innovation protected by a patent at fixed cost F, and that it is drastic, i.e. the monopoly price with c_l is lower than c_h.
- The innovation is made only if $\pi_l > F$.
- Thus, the monopolist has lower incentives to innovate, only considering the "additional" profit by the innovation, than a competitive firm, considering the whole profit by the innovation.

Lower Incentives to Innovate for a Monopolist: A Model

- Consider a monopolist operating at cost c_h and facing linear demand $q = 1 - p$.
- For fixed cost F a technology can be adopted to decrease marginal cost to $c_l = c_h - x$ with $x \in [0; c_h]$.
- The monopolist first decides whether to innovate and then sets its price.

Lower Incentives to Innovate for a Monopolist: A Model

- Scenario without innovation:
  - $\max_p (p - c_h)(1 - p)$
  - Hence, $p^* = \frac{1+c_h}{2}$ and $\pi_h = (p^* - c_h)(1 - p^*) = \frac{(1-c_h)^2}{4}$.
- Scenario with innovation:
  - $\max_p (p - c_l)(1 - p) = (p - c_h + x)(1 - p)$
  - Hence, $p^{**} = \frac{1+c_h-x}{2}$ and $\pi_l = (p^{**} - c_l)(1 - p^{**}) = \frac{(1-c_h+x)^2}{4}$.
- Therefore, the monopolist will innovate if

$$\pi_l - \pi_h > F \quad \text{i.e.} \quad \frac{x}{4}\big(x + 2(1 - c_h)\big) > F$$

Lower Incentives to Innovate for a Monopolist: A Model

- Now, consider a duopoly producing homogeneous goods at marginal cost c_h and facing linear demand $q = 1 - p$.
- The firm charging the lower price will face all demand, and in case of equal prices market demand is equally shared.
- For fixed cost F a technology can be adopted to decrease marginal cost to $c_l = c_h - x$ with $x \in [0; c_h]$.
- The duopolists first simultaneously decide whether to innovate and then simultaneously set their prices.

Lower Incentives to Innovate for a Monopolist: A Model

- Price stage of the game:
  - Case 1: both firms innovate, incur marginal cost $c_l = c_h - x$, and the Bertrand equilibrium with equal prices at $p = c_h - x$ and zero profits obtains.
  - Case 2: both firms do not innovate, incur marginal cost c_h, and the Bertrand equilibrium with equal prices at $p = c_h$ and zero profits obtains.
  - Case 3: only one firm innovates and two subcases ensue:
    - Subcase i "drastic innovation": $p^m < c_h$ and hence the innovator sets $p^m = \frac{1+c_h-x}{2}$, gets all of the market demand, and makes profit $\pi_{c_l}^{dr} = (p^m - c_l)(1 - p^m) = \frac{(1-c_h+x)^2}{4}$.
    - Subcase ii "non-drastic innovation": $p^m > c_h$ and hence the innovator sets $p = c_h - \epsilon$, gets all of the market demand, and makes profit $\pi_{c_l}^{ndr} = (c_h - c_l)(1 - c_h) = x(1 - c_h)$.

Lower Incentives to Innovate for a Monopolist: A Model

- Innovation stage of the game:
  - Case 1: firms anticipate a profit of $-F$, if they both innovate.
  - Case 2: firms anticipate a profit of 0, if neither innovates.
  - Case 3: only one firm innovates:
    - Subcase i "drastic innovation": the innovator anticipates a profit of $\pi_{c_l}^{dr} - F$ and the non-innovator of 0.
    - Subcase ii "non-drastic innovation": the innovator anticipates a profit of $\pi_{c_l}^{ndr} - F$ and the non-innovator of 0.

Lower Incentives to Innovate for a Monopolist: A Model

- Soluition by Subgame Perfect Equilibrium (SPE):
  - Subcase i "drastic innovation":
    - If $\pi_{c_l}^{dr} \geq F$, i.e. $(1 - c_h + x)^2 \geq 4F$, then the only SPEs are, where only one firm innovates.
    - If $\pi_{c_l}^{dr} < F$, i.e. $(1 - c_h + x)^2 < 4F$, then no firm innovates at a SPE.
  - Subcase ii "non-drastic innovation":
    - If $\pi_{c_l}^{ndr} \geq F$, i.e. $x(1 - c_h) \geq F$, then the only SPEs are, where only one firm innovates.
    - If $\pi_{c_l}^{ndr} < F$, i.e. $x(1 - c_h) < F$, then no firm innovates at a SPE.

Comparison of the two Market Structures in terms of Innovation

- Note that the market structure *per se* does not affect the occurence of innovation.
- However, there exist equilibria such that innovation occurs under duopoly but not under monopoly.
- If $\frac{(1-c_h+x)^2}{4} < F$ resp. $x(1-c_h) < F$, then no innovation occurs under either market structure.
- If $\frac{x\left(x+2(1-c_h)\right)}{4} < F \leq \frac{(1-c_h+x)^2}{4}$ resp. $\frac{x\left(x+2(1-c_h)\right)}{4} < F \leq x(1-c_h)$, then innovation occurs under duopoly but not under monopoly.
- If $F \leq \frac{x\left(x+2(1-c_h)\right)}{4}$, then innovation occurs under both market structure.
- Thus, the model suggests that a monopolist's incentive to innovate might be lower than for a firm facing competition.

Market Power as an Incentive for Innovation

- Innovations are stimulated by the expectation to appropriate R&D-investment through market profits.
- Consider again the competitive industry, where all firms incur the same marginal cost c_h, the price thus is $p = c_h$, and firms make zero profit.
- However, suppose compulsory licensing for process innovations.
- In this case, no firm has an incentive to innovate: due to diffusion of the technology all firms would charge $p = c_l$ and make zero profit.
- The fixed cost F of the innovation could never be recovered, and hence no innovation will arise under competition.

Implications for Competition Policy

- A monopoly (or a cartel) is worse than competitive market structures with regards to stimulating innovation.
- Accordingly, measures should be taken to restore competition in markets where there is none.
- However, "prohibiting" monopoly or forcing diffusion of innovations is problematic, as this eliminates dynamic incentives.
- Also, choosing the "right" level of competition is difficult: indeed, with too much competition, the incentive to invest and innovate might be reduced, as the expectation to succeed is smaller.

Implications for Competition Policy

- More generally, market power thus plays an important role in maintaining the firms' incentives to innovate, invest, introduce new goods, and improve product quality, etc.
- Eliminating market power should thus not be an objective of competition policy.

Guaranteeing Market Power as an Incentive for Innovation: A Model

- Consider a duopoly with firms 1 and 2 producing homogeneous goods at marginal cost c and facing linear demand $q = a - p$.
- The total cost function for a firm is $c_i = (c - x_i - lx_j)q_i + x_i^2$ where x_i is firm i's R&D investment and $i, j \in \{1, 2\}$ such that $i \neq j$.
- Here R&D takes the form of a (deterministic) process innovation.
- There exists R&D spillovers in the form of $l \in [0; 1]$.
- The duopolists first simultaneously choose their R&D investment and then simultaneously set their prices.

Guaranteeing Market Power as an Incentive for Innovation: A Model

- Note that equilibria where both firms innovate can be ruled out, since at least one firm could not recover its R&D costs.
- Suppose that the innovation is non-drastic: $c - lx < p^m = \frac{a+c-x}{2}$ i.e.

$$x < \frac{a-c}{1-2l}$$

- Hence, the innovator sets the price $p^* = c - lx - \epsilon$.
- To find the optimal R&D level x of the innovator consider its profit $\pi_{inno} = \big((c-lx)-(c-x)\big)(a-c+lx) - x^2 = x(1-l)(a-c+lx) - x^2$

$$x^* = \frac{(1-l)(a-c)}{2-2l(1-l)}$$

(innovation level with spillovers)

Guaranteeing Market Power as an Incentive for Innovation: A Model

- Now suppose that an innovation is protected by a patent: $l = 0$.
- The innovator then sets the price $p^{**} = c - \epsilon$.
- To find the optimal R&D level x of the innovator consider again its profit $\pi'_{inno} = c(a-c) - (c-x)(a-c) - x^2$

$$x^{**} = \frac{a-c}{2} \qquad \textit{(innovation level with patents)}$$

- As $x^{**} > x^*$ for all $l > 0$ it holds that R&D is higher under patents.

Guaranteeing Market Power as an Incentive for Innovation: A Model

- This (simple) model suggest that a patent (yielding the innovating firm some market power) improves welfare.
- Because of spillovers, R&D is a public good.
- Since firms cannot appropriate their R&D efforts, they invest less in R&D than what would be optimal for society.
- The patent removes the negative externality given by the spillovers and restores the incentive to do R&D.
- Due to homogeneous goods and price competition, the modelled competition is fierce and has a strong impact on R&D returns.

Agenda

- Allocative Efficiency
- Productive Efficiency
- Dynamic Efficiency
- **Public Policies**
- Does the Market Tame a Monopoly?

Considerations for Public Policies

- Conclusion so far: market power reduces allocative efficiency.
- However, there is no clear-cut relation between market power and productive efficiency *("fixed costs")* resp. dynamic efficiency *("investment & innovation")*.
- Hence, the complete elimination of market power cannot be an objective of competition policy.
- In fact, the existence of some market power helps competition.
- The prospect of market power induces firms to use more efficient technologies, improve their product qualities, introduce new product varieties, etc.
- In general, public policies should maintain **incentives to invest**.

Property Rights Protection: Ex Ante vs. Ex Post

- Trade-Off between ex ante efficiency and ex post efficiency for the authorities:
  - preservation of the firms' incentives to innovate. *("ex ante")*
  - once firms have innovated it would be better if all firms in the economy had access to the innovation. *("ex post")*
- A time-consistency problem ensues for the authorities.
- Patents and other intellectual property rights are ways for governments to commit not to expropriate innovators ex post.
- A firm then knows that for a certain period of time it can exploit investment results.
- Property rights protections thus form **incentives to invest**.

Property Rights Protection: Optimal Patent Design

- There is a vast literature on the intricate problem of patent design: optimal breadth and optimal length.
- Problem of too broad protection: discouraging for rivals to introduce innovations, only vaguely related to the patented one.
- Problem of too narrow protection: rivals might make small and artificial incremental innovation without patent infringement.
- Problem of too long protection: impossibility for rivals to challenge the incumbent innovator with new discoveries or to adopt the innovation and become more efficient.
- Problem of too short protection: not enough appropriability for innovators as incentive.

Essential Facilities: Tension between Property Rights Protection and Access

- Any input which is deemed necessary for all industry participants for operation and which is not easily duplicated can be seen as an essential facility (e.g. airport slots, phone network, etc.).
- It is not easy to judge whether an input is "necessary", since inputs often give their owners some competitive advantage.
- It is also not straightforward to judge how costly and difficult reproduction shoul be to qualify as "not easily duplicated".
- Caution is needed before access is granted too generously: obliging access is an infringement of property rights.
- Investment could decrease elsewhere, as potential expropriation discourage firms from introducing new inputs and facilities.
- There is an important difference between firms having invested and firms having obtained the right without risk or payment.

Price Setting as Property Rights

- Price controls and price caps are principally in contrast with competition policy.
- Generally price controls and price caps are provided only to regulatory authorities but not to competition commissions.
- Yet many competition laws (e.g. Art. 82 EU Treaty) allow the intervention, if prices set by a dominant firm are "too high".
- From an economic viewpoint this can be seen critically.
- Deciding if a price is too high is rather arbitrary.
- Even if it were established that a price is too high, then why should a firm be punished for it: the **sources for its dominant position** should be examined.

Possible Sources for a Dominant Position

- Past illegal behaviour (e.g. collusion, predation): the authority should rather file against the infringement of respective competition law.
- Present legal entry barriers: the sector should be subjected to regulation, since market forces are not free to operate.
- Past investments, innovations, advertising, business luck, etc: there exists no reason for punishment.
- Similarly, targeting firms that are "too profitable" is not sound.
- High prices and high profits may be an indication that it is worth looking at the industry (e.g. collusion, predation), but they cannot by themselves justify intervention.

Agenda

- Allocative Efficiency
- Productive Efficiency
- Dynamic Efficiency
- Public Policies
- **Does the Market Tame a Monopoly?**

Does the Market Tame a Monopoly?

- There is the view that market mechanisms prevent even a monopolist from exercising market power.
- For instance, a durable good monopolist cannot keep prices high, as consumers anticipate reduced prices in the future.
- Also, if there is free entry, the monopolist refrains from setting high prices, as this would trigger entry. *("contestable markets")*
- Accordingly, market power is concluded to be less troublesome.
- However, there are also arguments against this view such as sunk costs, switiching costs, network externalities, and anti-competitive practices.
- This indicates that market forces alone are unlikely to always reduce market power.

Durable Good Monopolist Argument: Intuition

- Coase (1972): a durable good (e.g. car) producer might price at marginal cost even if enjoying monopoly power.
- Suppose that a monopolist is facing two consumer groups with different valuations for the durable good it sells.
- The monopolist will want to first charge a high price to the high-valuation consumers, and once these have bought the good then charge a low price to the low-valuation consumers.
- Note that due to durability the high-valuation consumers do not buy again in a later period.
- Yet, the high-valuation consumers anticipate the price reduction, and delay their purchase (if waiting costs are not too high).
- Hence, the monopolist cannot sell at a high price initially.

Durable Good Monopolist Argument: Intuition

- Suppose now many consumers with continuous valuations for the good between its marginal cost and the monopoly price.
- The monopolist then has in continuous periods an incentive to reduce the price to sell to those who have not bought previously.
- Since each consumer thus expects the eventual price reduction to marginal cost, every purchase is postponed until then.
- Therefore, the monopolist actually loses all its market power.
- In conclusion, the crucial issue here is that the monopolist is hurt by its flexibility to change prices in future periods: commitment problem to not lower prices in later periods.

Durable Good Monopolist Argument: Instruments to Alleviate the Commitment Problem

- Contractual clause: if the monopolist ever decreases the price, then reimbursements of the difference are made.
- Leasing: a price decrease would then hurt the monopolist as it reduces the value of a good it owns (but moral hazard problems).
- Scarcity: the monopolist does not flood the market of a good after the introductory periods.
- External reasons: delayed purchase costs of consumers, increase of potential buyers over time, etc.

Contestable Markets Theory: Intuition

- Monopoly power is likely to only be a temporary situation, as the existence of profits would attract the entry of new firms and erode market power.
- Even if at some point the static deadweight loss was large, from a dynamic viewpoint the overall loss would be much smaller.
- If this were to be the case, there would be **little scope for competition policy**, since market forces would re-establish a favourable social outcome without the need of anti-trust actions.

Contestable Markets Theory: Argument (Cf. Baumol et al., 1982)

- Consider a homogeneous good industry with a technology accessible to the incumbent monopolist and potential entrant.
- Total cost of production: fixed cost F plus variable cost cq.
- The market is large enough so that the monopolist makes sufficient profits to recover F.
- A Reductio argument shows that actually not monopoly pricing but average cost pricing obtains:

$$p^* = AVC = c + \frac{F}{q}$$

Contestable Markets Theory: Argument (Cf. Baumol et al., 1982)

- Firstly, suppose that the monopolist sets $p > AVC$.
- The monopolist would then obtain positive profits, which would attract a new entrant.
- It would charge a slightly smaller price and get all the market.
- Hence, the monopolist cannot set $p > AVC$ in equilibrium.
- Secondly, suppose that the monopolist sets $p < AVC$.
- The monopolist would incur losses due to the fixed costs.
- Hence, the monopolist cannot set $p < AVC$ in equilibrium.

Contestable Markets Theory: Argument (Cf. Baumol et al., 1982)

- There are at least two problems to contestable markets theory.
- Firstly, it is unrealistic that the monopolist sticks to pre-entry prices when entry occurs.
- Also, the potential entrant knows that the incumbent can lower its price and this makes actual entry less attractive.
- Secondly, it is neglected that the entrant incurs sunk costs to start production in the new sector.
- Hence, exit would induce losses for the entrant if the monopolist reacts (even if only so after some time).
- It can be concluded though that potential entry can constrain the market power of incumbents if entry is cheap and rapid.

Monopoly and Free Entry

- Recent results in oligopoly theory show that free entry may not be enough to guarantee that market power decreases.
- Concentration under free entry even with ex ante identical firms.
- It may be difficult for entrants to challenge incumbents:
  - sunk costs
  - switching costs
  - network effects
  - exclusionary practices

Concentration Despite Free Entry: Sunk Costs

- Suppose that many firms might enter an industry.
- They are endowed with the same technology and have to incur the same fixed sunk cost for entering.
- The entry decision is taken simultaneously.
- If only one firm enters, profits are large and outweigh fixed costs.
- If several firms enter, competition will be fierce so that fixed costs cannot be covered by any firm.
- Then, monopoly arises at equilibrium.
- Intuitively, the expectation of intense competition prevents more than one firm from operating in the industry.

Concentration Despite Free Entry: Model

- Consider a homogeneous good duopoly with two identical firms.
- First stage: simultaneous decisions on enter or not.
- If a firm enters, it incurs (sunk) fixed cost F.
- Second stage: Bertrand competition.
- Solution concept: (pure strategy) subgame perfect equilibrium.

Concentration Despite Free Entry: Second Stage

- There are three possible cases to consider.
- Firstly, both firms have entered: both firms' profits are zero due to Bertrand competition.
- Secondly, only one firm has entered: its profits are the monopoly ones and the other firm's profits are zero.
- Thirdly, no firm has entered: both firms' profits are zero.

Concentration Despite Free Entry: First Stage

		Firm 2: *Enter*	Firm 2: *Not*
Firm 1: *Enter*		$-f, -f$	$\pi_M - f, 0$
Firm 1: *Not*		$0, \pi_M - f$	$0, 0$

- There exist two pure strategy equilibria: $(Enter, Not)$ and $(Not, Enter)$, i.e. only one firm actually enters.
- Hence, **despite free entry** a monopoly arises in the market and the monopolist earns supra-competitive profits.

Switching Costs Impeding Entry

- Switching to a new product can entail transaction costs (e.g. new bank account) and learning costs (e.g. new software).
- The existence of switching costs effectively differentiates goods which would otherwise be perceived as perfectly identical.
- In fact, products that are ex ante identical after a purchase become ex post differentiated.
- With switching costs incumbents with a large base of customers have a significant advantage over entrants.
- Important price cuts are needed by entrants to attract customers.
- Hence, free entry does not guarantee market power to decrease.

Switching Costs Impeding Entry

- A systematic ban of contracts and practices involving switching costs would be difficult, as there might be other than anticompetitive motivations to them.
- However, authorities should check that firm-created switching costs do not prevent competition in markets.
- For instance, in monopoly deregulation it has to be made sure that consumers are not locked-in by artificial switching costs (e.g. number portability with provider change).

Network Effects Impeding Entry

- In network industries, consumers derive utility from the number of other consumers who choose the same product.
- If most consumers have already bought a product, it is difficult for new firms to attract demand.
- Network effects are mainly of two types:
  1. In physical (or communications) networks a consumer's utility increases directly with the number of other consumers of the same good (e.g. telephones).
  2. In virtual (or hardware-software) networks a consumer's utility increases indirectly with the number of other consumers of the same good due to the effects on a complementary product (e.g. credit cards and acceptance).
- Hence, consumers face coordination problems, since they need to base their choices on what they expect others to do.

Network Effects Impeding Entry

- It may be difficult for new entrants to challenge incumbents in network industries.
- It is not enough to provide a better product or to offer a lower price, as a crucial component of utility is given by the number of (current and future) users.
- If the new product violates compatibility, then the firm has to convince prospective buyers that enough others will buy it.
- The more consumers already locked-in with the current standard, the more difficult will be this task.
- A possible policy for authorities is to enforce compatibility.
- Such measures remain **problematic** though: ex post the imposition of interoperability is beneficial to competition, but ex ante it has adverse effects on innovation.

Exclusionary Practices Impeding Entry

- In markets with sunk costs or switching costs, or network effects, it is difficult for entrants to challenge incumbents, even if the latter do not behave strategically.
- With **strategic behaviour** of incumbents things become even more difficult for entrants.
- Different practices by incumbents with market power are possible to deter entrants: investing in extra capacity, setting prices below cost, market flooding with different product specifications, foreclosing access of rivals to crucial inputs, bundling, price discrimination, tying, etc.
- Authorities should be vigilant and intervene whenever monopolists impede entry via practices whose profitability derives only from keeping entrants off the market.
- This issue is important yet difficult, as it is often hard to separate genuine competitive strategies from predatory ones.