Week 8
Market Failure due to Market Imperfections

Monopoly

Suppose that commodity X is produced under monopolistic conditions, while Y is produced under competitive conditions. Then, $p_X > MC_X, p_Y = MC_Y$. This implies that: $MRT_{XY} = \frac{MC_X}{MC_Y} < \frac{p_X}{p_Y}$. Since, in consumption:

$MRS^A_{XY} = MRS^B_{XY} = \frac{p_X}{p_Y}$ it follows:

$$MRT_{XY} < MRS^A_{XY} = MRS^B_{XY} \qquad (1)$$

Consequently, the rate at which producers are able to transform commodity Y into commodity X *is less* than the rate at which consumers are willing to substitute commodity X for commodity Y. Consequently, labour and capital are being misallocated since *too little* of X is being produced[1].

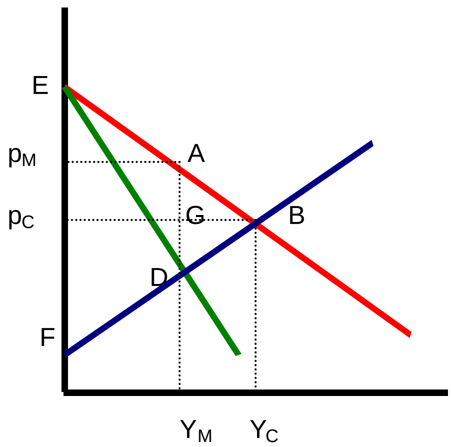


Figure 7:
Welfare Losses from Monopoly

[1] Consumers are prepared to give up MRS_{XY} units of Y for an additional unit of X. Producers, however, have to reduce production of Y by only MRT_{XY} units in order to produce an additional unit of X. So consumers would be better off if an additional unit of X is produced since they are willing to give up more of Y than they need to.

The loss in consumers' surplus is $p_M ABp_C = p_M AGp_C$ + AGD. The gain in producer's surplus is $Fp_M AD$ - $p_c BD = p_M AGp_C$ – DGB. So, the *net loss due to monopoly* is ($p_M AGp_C$ + AGD) –($p_M AGp_C$ – DGB) = AGD + DGB = ABD. The area of the triangle ABD – whose area measures the net loss from monopoly – is known as the *deadweight loss* from monopoly (Harberger, 1954).

Natural Monopoly

A 'natural monopoly' arises when average cost declines over the relevant range of demand. When a natural monopoly exists for a particular commodity, it is the price elasticity for that commodity which determines whether, or not, the existence of the natural monopoly has implications for public policy.

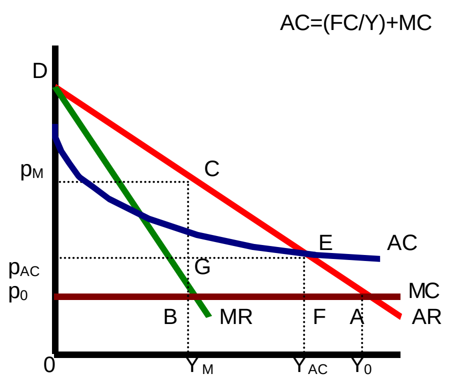


Figure 8:
Natural Monopoly

Source: Weimer and Vining (1999), p. 102

In Figure 8, AC = (FC/Y) +(VC/Y). It is assumed that MC=VC/Y=constant so that: AC=(FC/Y)+MC. FC=$p_{AC}EFp_0$. The profit-maximising output and price are Y_M and p^M, respectively. Monopoly profit is total revenue ($0p_M CY_M$) less VC ($0p_0 BY_M$) less FC ($p_{AC}EFp_0$). Hence, monopoly profit = $p_0 p_M CB$ – FC.

At the competitive output, p_0=MC and the firm makes a loss equal to FC when it is producing the competitive output, Y_0. Comparing the competitive to the monopoly outcome, profit under monopoly is higher by $p_0 p_M CB$, but consumers' surplus under monopoly is lower by $p_MCAp_0 = p_0p_MCB$ + ABC. Hence, the net loss from the natural monopoly is the area of the triangle **ABC**.

However, public policy regulation which forced the monopoly to price competitively would drive it out of business since at p_0,Y_0 it would not be covering its costs. Suppose the firm were allowed to price at average, instead of marginal cost. Then the regulated price and output are p_{AC} and Y_{AC}, respectively. The gain in consumers' surplus is now $p_{AC}p_MCE = p_{AC}p_MCG$ + GCE and loss in profits to the producer is simply monopoly profit: p_0p_MCB – FC = $p_{AC}p_MCG + P_0p_{AC}GB - (P_0p_{AC}GB$ + BGEF). So, comparing the gain in consumers' surplus to the loss in profits, the net gain from (average cost) regulation, *compared to monopoly*, is GCE + BGEF = **BCEF**. Consequently, in moving from efficient pricing (p_0, Y_0) to average cost pricing (p_{AC}, Y_{AC}) the net loss is only **AEF**.

Industries with low barriers to entry and decreasing average costs are said to be *contestable* markets: there is competition *for* the market even though there is no competition *in* the market (Baumol, Panzar and Willig, 1982). A natural monopolist who is in a contestable market is likely to price near average cost in order to deter potential entrants. An important issue in the context of contestable markets is the role of installed capital as a barrier to entry. For example, the postal service may be a decreasing returns industry but, in the absence of initial capital investment as a deterrent to entry, it may be highly contestable (Sorkin, 1980).

X-Inefficiency

Leibenstein (1976) and Franz (1988) developed the concept of *X-inefficiency* to describe a situation in which a firm, because of lack of competition, does not operate at the minimum costs that are technically feasible. For example, a charge made against publicly owned industries is that they do not have incentives to operate at minimum cost. Consequently, privatising an industry (or 'contracting out' certain parts of its operation) may deliver benefits in terms of lower costs of production.

Figure 9 shows that, in the absence of *X*-inefficiency, the gain in consumers' surplus in moving from the monopoly (p_m, Y_m) to the competitive (p_c, Y_c) outcome is: $p_c p_m BA$ and the loss in monopoly profits is: $p_c p_m BC$. So the net social gain from the move is the area **ABC**. Under X-inefficiency, the MC curve is higher and the net social gain of the move from X-inefficiency monopoly to the competitive outcome is the area **AGE.** Consequently, the net social gain in moving from '*X*-inefficient' monopoly to 'minimum cost' monopoly is **GEBC**.

The *X*-inefficient monopoly in producing Y_X, incurs an 'extra' cost of $p_c MC_x FG$. If this extra cost represents the deployment of real resources (more workers than needed) then it should be regarded as a social loss and added to GEBC, the deadweight loss from *X*-inefficiency. On the other hand, if the extra cost of $p_c MC_x FG$ arises because of higher salaries and wages then it should be regarded as rent.

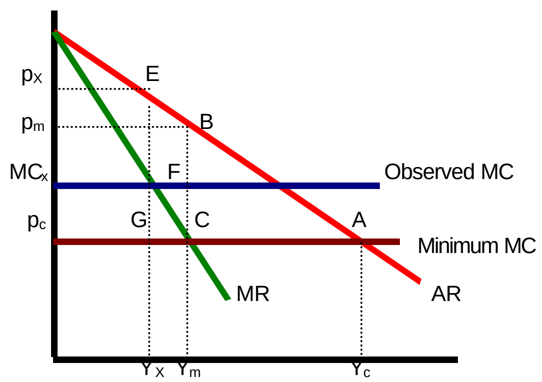
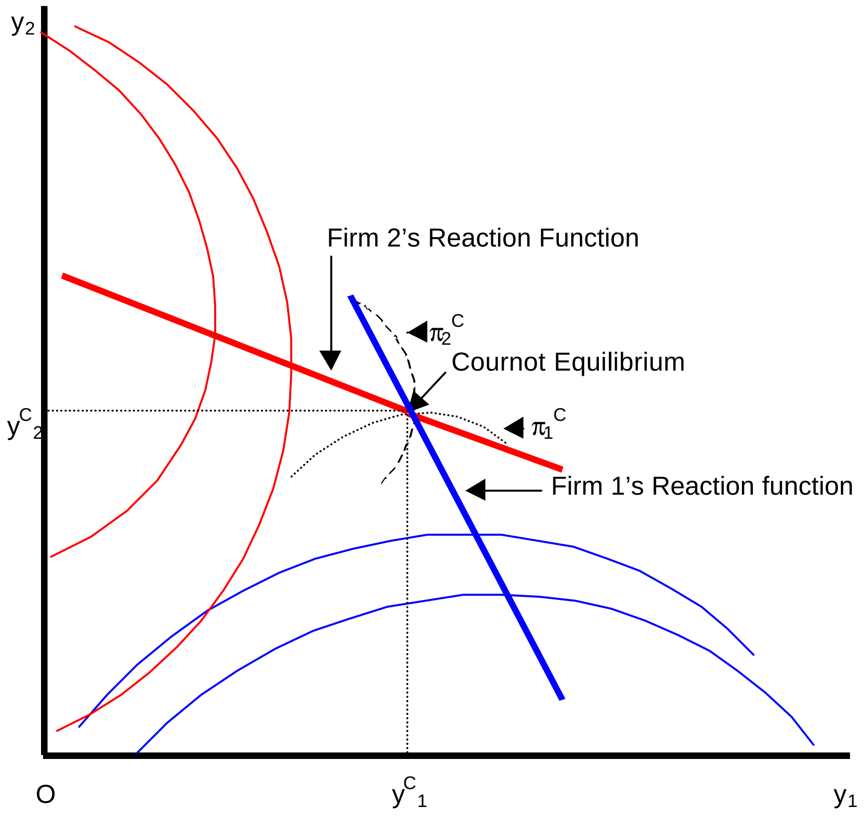


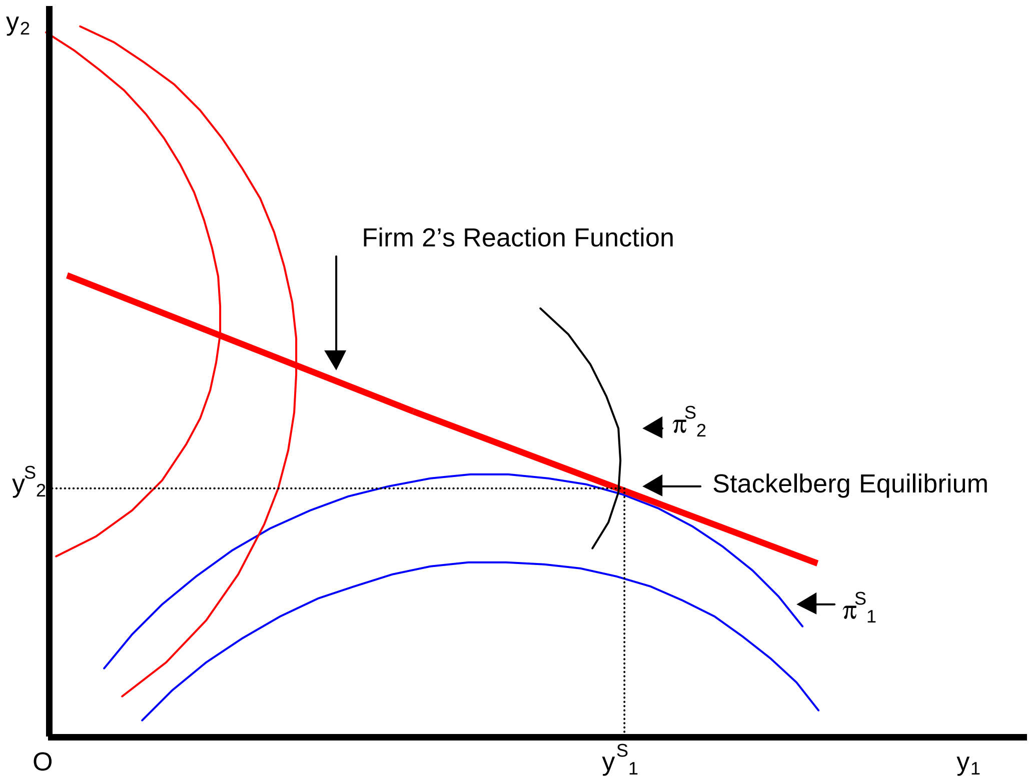
Figure 9:
X-Inefficiency in Monopoly

Source: Weimer and Vining (1999), p. 106



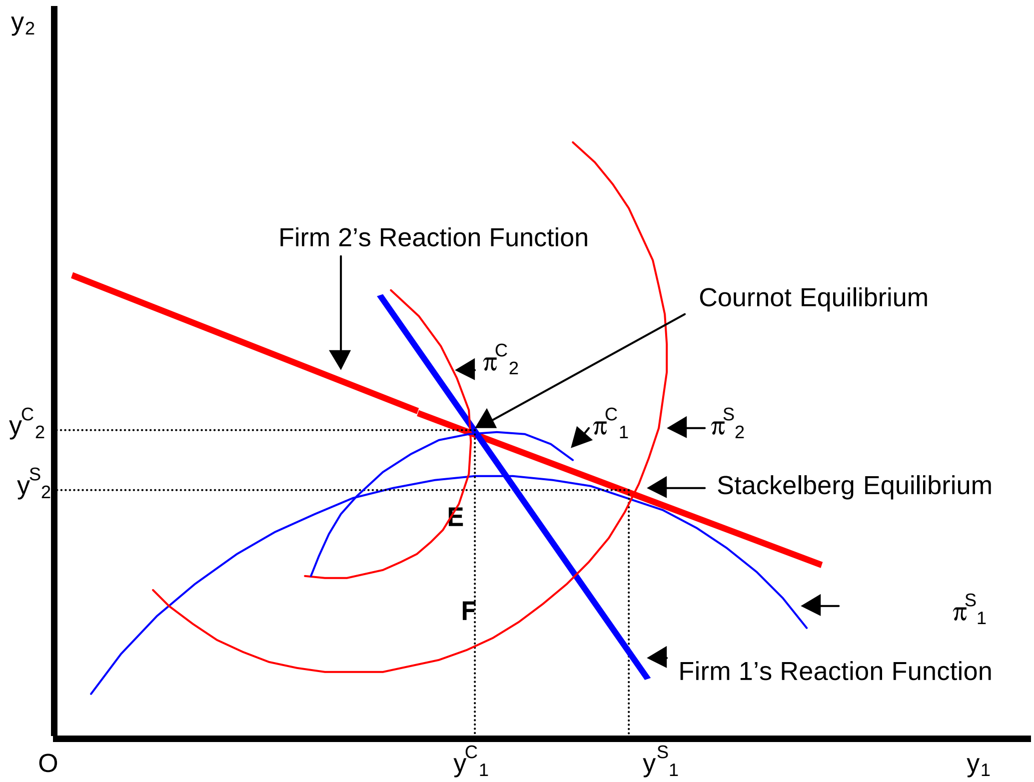
Oligopoly: Cournot Equilibrium

$Y=y_1+y_2$ is industry output: price (p) depends on Y
$\pi_1=p(Y)-C(y_1)=p(y_1+y_2)- C(y_1)$ and $\pi_2=p(Y)-C(y_2)=p(y_1+y_2)- C(y_2)$
The iso-profit curves for firm 1 are the y_1,y_2 combinations that yield the same π_1
The iso-profit curves for firm 2 are the y_1,y_2 combinations that yield the same π_2
Lower iso-π curves represent *higher* levels of profit
Each firm chooses its π-maximising output, **given the output of the other firm.**
This is the basic assumption of the Cournot model
Firm 1's reaction function shows firm 1's π-maximising y_1, given y_2: $R_1(y_2)$
Firm 2's reaction function shows firm 2's π-maximising y_2, given y_1: $R_2(y_1)$
Equilibrium will occur at the point where reaction functions intersect: this represents the Cournot equilibrium
At this point, firm 1 will produce y^C_1 and earn profits π^C_1 and firm 2 will produce y^C_2 and earn profits π^C_2
NB: For stability firm 1's reaction function *must be steeper* than that of firm 2 (as in diagram)



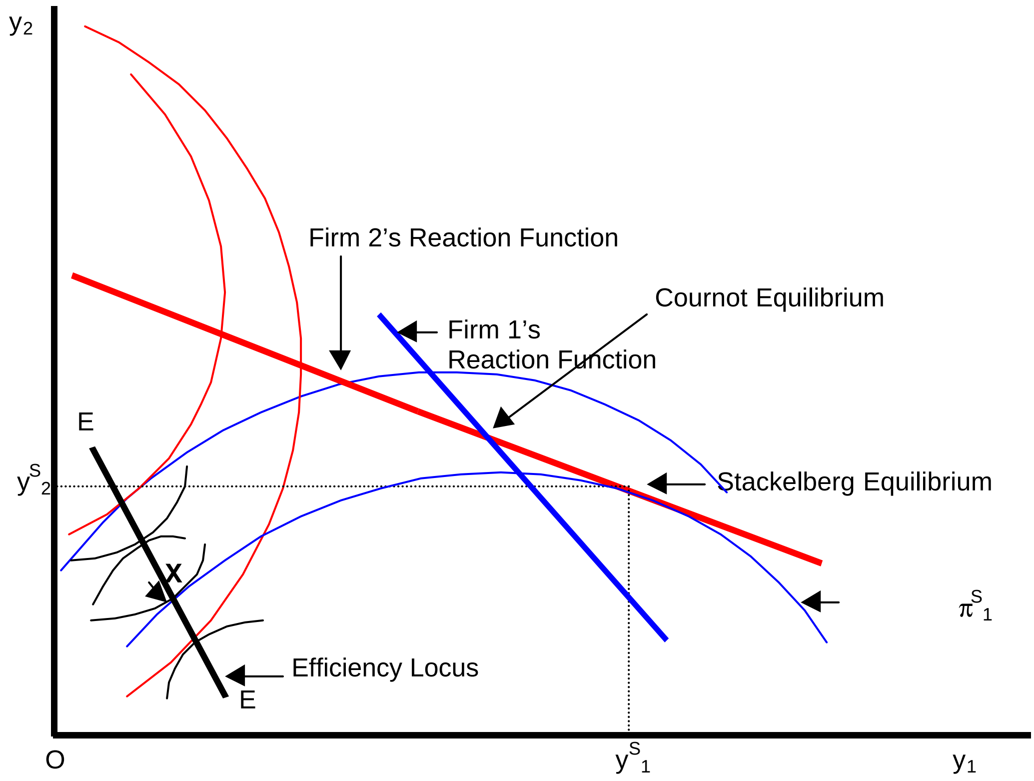
Oligopoly: Stackelberg Equilibrium

$Y=y_1+y_2$ is industry output: price (p) depends on Y
$\pi_1=p(Y)-C(y_1)=p(y_1+y_2)-C(y_1)$ and $\pi_2=p(Y)-C(y_2)=p(y_1+y_2)-C(y_2)$
The iso-profit curves for firm 1 are the y_1,y_2 combinations that yield the same π_1
The iso-profit curves for firm 2 are the y_1,y_2 combinations that yield the same π_2
Lower iso-π curves represent *higher* levels of profit
In the Stackelberg model, one firm is the **leader** (1)and the other firm is the **follower** (2)
The leader knows that if its sets an output, y_1 then firm 2 will set output according to its reaction function: that is, $y_2=R_2(y_1)$
Firm 1 chooses $y_1$its π-maximising output, **given the reaction function of the follower.**
This is the basic assumption of the Stackelberg model
Equilibrium will be where firm 2'reaction function is tangential to firm 1's iso-π curve.
At this point, firm 1 will produce $y^S{}_1$ and earn profits $\pi^S{}_1$ and firm 2 will produce $y^S{}_2$ and earn profits $\pi^s{}_2$



Inefficiency of Cournot and Stackelberg Equilibrium

All y_1,y_2 combinations in area **E** are more efficient than the Cournot equilibrium: every point in E offers both firms higher profits than at Cournot equilbirium.
All y_1,y_2 combinations in area **F** are more efficient than the Stackelberg equilibrium: every point in F offers both firms higher profits than at Stackelberg equilbirium.



Oligopoly Collusion and the Efficiency Locus

The Efficiency locus maps out the points of tangency between the iso-π curves: at a point on the locus (X) no firm can increase its profits without reducing the profits of the other firm. The location on EE will depend on the relative strength of the two firms.