1122MH_CH06 17/9/03 11:59 am Page 147

> "The countries of Europe are too small to give their peoples the prosperity that is now attainable and therefore necessary. They need wider markets.
>
> **Jean Monnet, 1943**

> By its size – the biggest in the world – the single market without frontiers is an invaluable asset to revitalise our businesses and make them more competitive. It is one of the main engines of the European Union.'
>
> **Jacques Delors, July 1987**

6 Market Size and Scale Economics

Market size matters. From its very inception in the 1950s, an important premise behind European economic integration was the belief that unification of European economies would – by allowing European firms access to a bigger market – make European firms more efficient and this, in turn, would allow them to lower prices, raise quality and gain competitiveness in external markets.

This chapter explores the economic logic of how European integration can lead to fewer, larger firms operating at a more efficient scale and facing more effective competition. The chapter also considers policy responses to these changes, notably the enforcement of rules that prohibit unfair subsidization of firms and rules restricting anti-competitive behaviour. In the EU, such policies are called, respectively, 'state aids' policy and 'competition policy'.

6.1 Liberalization, defragmentation and industrial restructuring: logic and facts

We start the chapter by verbally explaining the logic that links European integration to industrial restructuring before presenting some facts on mergers and acquisitions (M&As) and the effects on competition.

Europe's national markets are separated by a whole host of barriers. These included tariffs and quotas until the Common Market was completed in 1968 and tariffs between the EEC and EFTA until the EEC–EFTA free trade agreements were signed in 1974. Yet, even though intra-EU trade has been duty free for over three decades, intra-European trade is not as free as trade within European nations. Many technical, physical and fiscal barriers still make it easier for companies to sell in their local market than in other EU markets. While most of these barriers seem trivial or even silly when considered in isolation, the confluence of thousands of seemingly small barriers serves to substantially restrict intra-EU trade. As a result, EU firms can often be dominant in their home market while being marginal players in other EU markets (think of the European car market). This situation, known as market fragmentation, reduces competition and this, in turn, raises prices and keeps too many firms in business. Keeping firms in business is not, of course, a bad thing in itself. The problem is that this results in an industrial structure marked by too many, inefficient, small firms that can get away with charging high prices to cover the cost of their inefficiency. Due to the absence of competition, poor and/or low-quality services and goods may also accompany the high prices (think of the European telephone service before liberalization).

Tearing down these intra-EU barriers defragments the markets and produces extra competition. This 'pro-competitive effect', in turn, puts pressure on profits and the market's response is 'merger mania'. That is, the pro-competitive effect squeezes the least efficient firms, prompting an industrial restructuring where Europe's weaker firms merge or get bought up. In the end, Europe is left with a more efficient industrial structure, with fewer, bigger, more efficient firms competing more effectively with each other. All this means improved material well-being for Europeans as prices fall and output rises. In some industries, restructuring may be accompanied by a sizeable re-allocation of employment, as firms cut back on redundant workers and close inefficient plants and offices (a painful process for workers who have to change jobs). In other industries, however, liberalization can unleash a virtuous circle of more competition, lower prices, higher sales and higher employment.

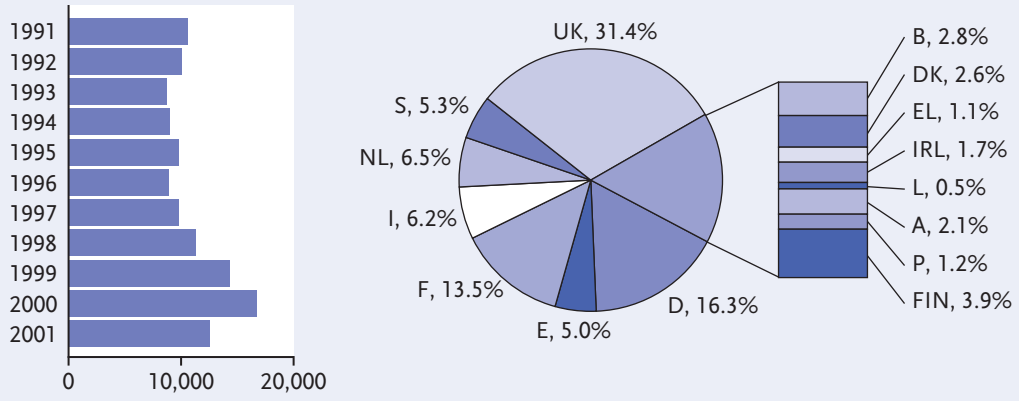
In the remainder of the chapter we work through the logic of what was just presented informally. Schematically, the steps can be summarized as: liberalization → defragmentation → pro-competitive effect → industrial restructuring. The result is fewer, bigger, more efficient firms facing more effective competition from each other.

6.1.1 Some facts

As shown in the left panel of Fig. 6-1, the number of mergers and acquisitions (M&As) in the EU15 remained at a high steady level of about 10 000 operations per year until 1997 when the number started climbing steadily to a record total of 12 557 operations in 2000. In terms of the total value of deals, however, the EU figure climbed steadily and rapidly from 1991 to 2000, from about 100 billion euros to 2400 billion euros. The number and value were lower in 2001, reflecting the slowdown in economic activity, but at over 10 000 operations, it was still a considerable number.

It is interesting to note that much of this M&A activity consists of the mergers of firms within the same Member State, e.g. German firms buying other German firms. Indeed, at the end of the period, about 55 per cent of all operations were of this 'domestic' type. The remaining 45 per cent of the deals involved a non-domestic firm. This 45 per cent is split between operations where one

1122MH_CH06 17/9/03 11:59 am Page 149



NOTE: **The left panel shows the evolution of the number of mergers and acquisitions involving EU15 firms. The right panel shows the distribution of all operations from 1991–2001 by Member State.**

SOURCE: **Data is drawn from *European Economy*, Supplement A, No.12, December 2001 downloadable from http://europa.eu.int/comm/economy_finance/publications/supplement_a_en.htm**

FIGURE 6-1: MERGERS AND ACQUISITIONS (M&AS) INVOLVING EU15 FIRMS, 1991–2001

firm was a non-EU firm (24 per cent), where one firm was located in another EU nation (15 per cent) and operations where the counterparty's nationality was not identified (6 per cent).

The right panel of Fig. 6-1 shows the breakdown of firms by Member State. Two points are worth stressing. First, the distribution of M&A operations is quite varied. The big four economies (France, Italy, Germany and the UK) have the most operations, however, except for the UK, these nations' share of M&As activity is much lower than their share of the European economy. Italy, France and Germany together account for only 36 per cent of the M&As even though their economies account for 59 per cent of the EU15 economy. By contrast, many of the small EU15 members seem to have a share of M&A activity that is systematically higher than their share of the EU15's GDP. This link between domestic market size and the impact of integration on restructuring fits in with the basic logic described above. Stylizing the facts to make the point, we can say that the problem of a too-small market was most severe in the smaller EU members; integration produced the largest changes (large in proportion to their economy) in the smallest members. The second point comes from the exceptions to this rule. The EU has yet to harmonize rules on takeovers. Despite many years of trying, some members still have very restrictive takeover practices that make M&As very difficult while others, like the UK, have very liberal rules. The implication of this lack of harmonization is that the restructuring effects of integration have been felt very differently in the various Member States.

The sectoral composition of M&A activity (not shown in the figure) is also noteworthy. About two-thirds of all the activity in this period took place in service sectors, especially in banking. However, during the early years of the Single Market Programme (1986–92), the M&A activity was centred on manufacturing, with mergers often occurring in anticipation of liberalization that was scheduled (Commission, 1996). Interested readers can find a wealth of details on the nature of this activity in European Economy (2001).

This restructuring increased the level of concentration at the EU level. From 1987 to 1993, the share of the four largest firms in the EU's total market rose from 20.5 to 22.8 per cent, while this

measure of concentration at the national level fell. In short, defragmentation resulted in fewer firms at the EU level, but more even competition at the national level.

Econometric evidence from Allen, Gasiorek and Smith (1998) suggests that the Single Market Programme reduced price-cost margins by 4 per cent on average. This impact varied from quite high, e.g. –15 per cent in the office machinery sector, to quite small, e.g. –0.1 per cent in brewing. It is noteworthy that in the auto sector – a sector that was granted a bloc exemption from the Single Market Programme – the price-cost margin actually rose.

6.2 Theoretical preliminaries: monopoly, duopoly and oligopoly

To study the logic of European integration's impact on scale and competition we need a simple yet flexible framework that allows for imperfect competition. The framework we employ below – the *BE–COMP* diagram – assumes a knowledge of simple imperfect competition models, so by way of preliminaries, we briefly review the simplest forms of imperfect competition – monopoly, duopoly and oligopoly. Advanced readers may want to skip this section and move directly to the *BE–COMP* diagram in section 6.3, but since it introduces notation and basic concepts, even advanced readers may find it useful.

As usual, we start with the simplest problem – namely, the decision faced by a firm that has a monopoly. The monopoly case is easy because it avoids strategic interactions. When a firm is the only seller of a product, it can choose how much to sell and what price to charge without considering the reaction of other suppliers. The only restraint a monopolist faces is the demand curve. A downward-sloping demand curve is a constraint because it forces the monopolist to confront a trade off between price and sales; higher prices mean lower sales. When considering the impact of European integration on imperfectly competitive firms, we need to determine how various policy changes will alter prices and sales. The first step in this direction is to see what determines a monopolist's price and sales in a closed economy. The natural question then is: 'What is the profit-maximizing level of sales for the monopolist?'

An excellent way to proceed is to make a guess at the optimal level, say, Q' in leftpanel of Fig. 6-2. Almost surely this initial guess will be wrong, but what we want to know is whether Q' is too low or too high. To this end, we calculate the profit earned when Q' units are sold at the highest obtainable price, namely P'. The answer is A + B, since the total value of sales is price times quantity (area A + B + C) minus cost (area C).

Would profits rise or fall if the firm sold an extra unit? Of course, to sell the extra unit, the firm will have to let its price fall a bit to P''. The change in profit equals the change in revenue minus the change in cost. Consider first the change in revenue. This has two parts. Selling the extra unit brings in extra revenue (represented by areas D + E), but it also depresses the price received for all units sold initially (lowering revenue by an amount equal to area A). The net change in revenue – called 'marginal revenue' for short – is given by the areas D + E minus the area A. The change in cost – called marginal cost for short – is area E. Plainly, profit only increases if the extra revenue D – A + E exceeds the extra cost E. In other words, if the area D minus A is positive. As it is drawn, D – A appears to be negative, so marginal revenue is less than marginal cost at $Q' + 1$. This means that raising output from Q' would lower profits, so the initial guess of Q' turned out to be too high.

To find the profit-maximizing level using this trial-and-error method, we would consider a lower guess, say Q' minus 4 units, and repeat the procedure applied above. At the profit-maximizing level, marginal revenue just equals marginal cost. This level must be optimal since any increase *or* decrease in sales will lower profit. Increasing sales beyond this point will increase cost more than revenue, while decreasing sales would lower revenue more than cost. Both would reduce profit.

The right panel of Fig. 6-2 shows an easier way to find the point where marginal revenue equals marginal cost. The diagram includes a new curve, called the marginal revenue curve. This shows

1122MH_CH06 17/9/03 11:59 am Page 151

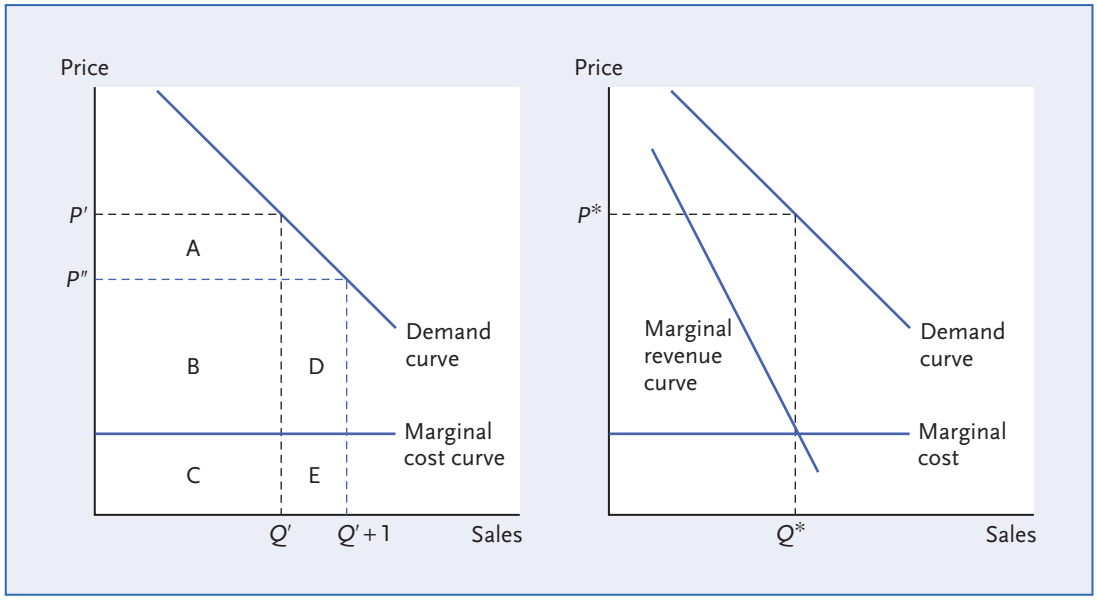


FIGURE 6-2: MONOPOLY PROFIT MAXIMIZATION GRAPHICALLY

how the marginal revenue (measured in euros) declines as the level of sales rises. (It declines since area A from the left panel gets very small for low levels of sales.) At the sales level marked Q^*, marginal revenue just equals marginal cost. The firm charges the most it can at this level of sales, and this is P^*. These are the profit-maximizing levels of sales and price.

LESSONS

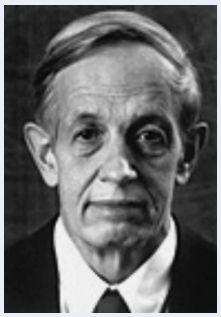
Several deep aspects of imperfect competition come through even in the monopoly case. First, in setting up the problem, we had to assume things about the firm's beliefs concerning the behaviour of other economic agents. In this case, the monopolist is assumed to believe that consumers are price-takers and that the trade-off between prices and sales depended only on the demand curve (rather than, for example, on the reaction of firms in other markets). Second, the critical difference between perfect and imperfect competition comes out clearly. As part of the definition, perfectly competitive firms are assumed to take the price of their output as given (a classic example is a wheat farmer who cannot set his own price; he just sells at the current market price). This means that such firms are assumed to be ignorant of the fact that selling more will depress the market price. In terms of the diagram, perfectly competitive firms ignore the area A, so they maximize profits by selling an amount where price equals marginal cost. Of course, any increase in sales would have some negative impact on price, so it is best to think of perfect competition as a simplifying assumption that is close to true when all firms have market shares that are close to zero. By stepping away from this simplification, imperfect competition allows firms to explicitly consider the price-depressing effect – area A – when deciding how much to sell.

6.2.1 Duopolist as monopolist on residual demand curve

The monopoly case is instructive, but not very realistic – most European firms face some competition. Taking account of this, however, brings us up against the strategic considerations

discussed above. The convention we adopt to sort out this interaction is the so-called Cournot–Nash equilibrium. That is, we assume that each firm acts as if the other firms' outputs are fixed. The equilibrium we are interested in is where each firm's expectations of the other firms' outputs turn out to be correct, i.e. no one is fooled. This no-one-fooled notion proves to be somewhat difficult to comprehend in the abstract but, as we shall see below, it is easy in specific applications.

Box 6-1: John Nash (1928–)



John Nash
www.nobel.se/economics

The brilliant but troubled creator of the Nash equilibrium concept is a mathematician whose career has attracted an unusual amount of public attention. Since Nash's path-breaking publications have been interspersed with period of paranoid schizophrenia, Hollywood found it easy to cast him in the cherished stereotype of a mad genius, making his life the subject of a big-budget movie entitled 'A Beautiful Mind' in 2001. The basis of the Nash equilibrium concept was his 1950 article entitled 'Non-Cooperative Games'. Just 27 pages long, it earned him the Nobel prize in economics in 1994. An autobiographical account of his life is on http://www.nobel.se/economics/laureates/1994/index.html.

The residual demand curve shortcut

Since firms take as given the sales of other firms, the only constraint facing a typical firm is the demand curve shifted to the left by the amount of sales of all other firms. In other words, each firm believes it is a monopolist on the shifted demand curve (we called the shifted demand curve the 'residual demand curve'). This realization is handy since it means that we can directly apply the solution technique from the monopolist's problem; the only change is that we calculate the marginal revenue curve based on the residual demand curve instead of the demand curve.

This trick is shown in Fig. 6-3 for a competition between two firms producing the same good – a situation that economists call 'duopoly'. For simplicity, we assume that the firms have the same marginal cost curves. Taking firm 2's sales as given at Q_2, firm 1 has a monopoly on the residual demand curve labelled RD_1. Firm 1's optimal output in this case is x_1' (since at point A_1, the residual marginal revenue curve, RMR_1, crosses the marginal cost curve MC). The right panel shows the same sort of analysis for firm 2. Taking firm 1's output as fixed at Q_1, firm 2's optimal output is x_2'.

Note that the situation in Fig. 6-3 is not an equilibrium. To highlight the importance of the difference between expected and actual outcomes, the diagram shows the solutions of the two firms when there expectation about the other firm's output *do not match the reality*. The consistent-expectations outcome, i.e. the Nash equilibrium, is shown in Fig. 6-4, but we first consider why Fig. 6-3 is not an equilibrium.

As drawn, x_1' and x_2' are not a Cournot–Nash equilibrium since the firms' actual output levels do not match expectations; firm 1 produces x_1', which is greater than what firm 2 expected (namely, Q_1), and likewise, firm 2 produces x_2', which is greater than what firm 1 expected (namely, Q_2). We

1122MH_CH06 17/9/03 11:59 am Page 153

can also see the problem by observing that the implied prices are not equal. If x_1' and x_2' were actually produced by the firms, then firms would not be able to charge the prices they expected to charge. In other words, this is not an equilibrium because the outcome is not consistent with expectations.

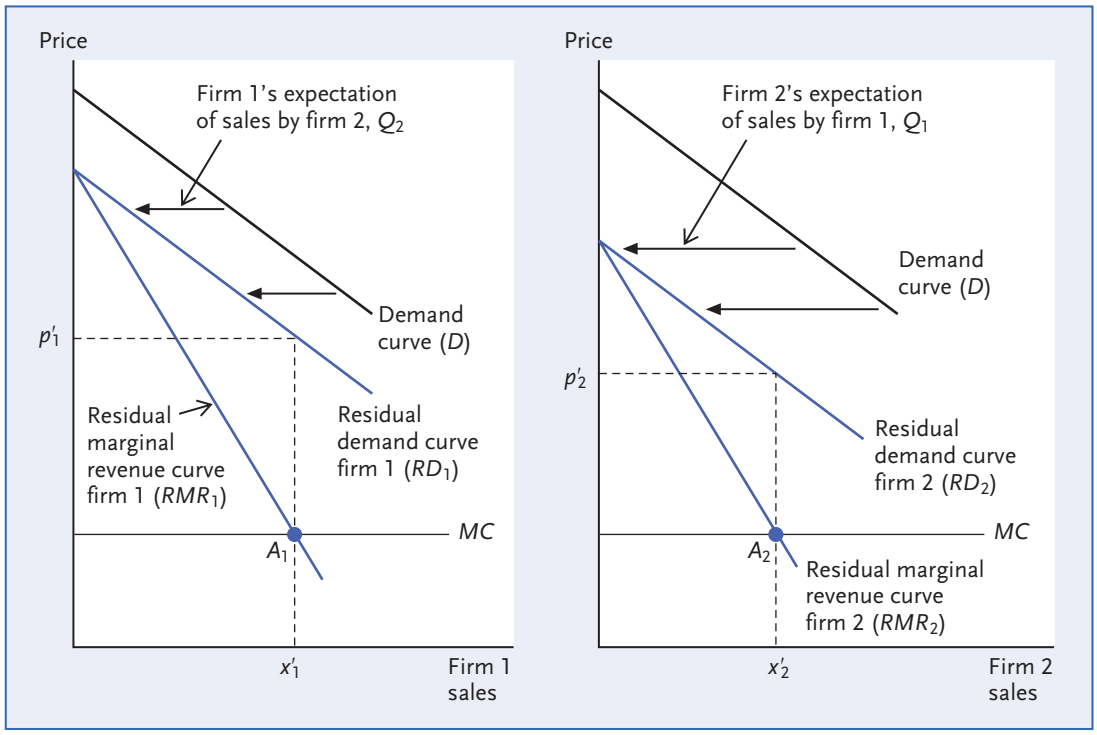


Figure 6-3: Duopolist as monopolist on residual demand: example of a non-equilibrium

Finding the expectations consistent equilibrium

How do we find the expectation-consistent set of outputs? The easiest way is to use the assumed symmetry of firms. In the symmetric equilibrium, each firm will sell the same amount. With this fact in mind, a bit of thought reveals that the residual demand curve facing each firm must be half of the overall demand curve. This situation is shown in the left panel of Fig. 6-4 for a duopoly. Some facts to notes are that: (i) the optimal output for a typical firm is x^*, given by the intersection of *RMR* and *MC*; (ii) the total sales to the market are $2x^*$ and at this level of sales the overall market price (given by the demand curve, *D*) is consistent with the price each firm expects to receive given the residual demand curve, *RD*; and (iii) the output of the identical firms are equal in equilibrium.

6.2.2 Oligopoly: Cournot–Nash for an arbitrary number of firms

While allowing for two firms was more realistic than just allowing for only one firm, studying the impact of European integration on mergers and acquisitions requires us to allow for an arbitrary number of firms. In economists' jargon, this situation is called an oligopoly. As it turns out, this situation is straightforward to deal with when firms are symmetric. The right panel of Fig. 6-4 shows the argument for the case of three firms.

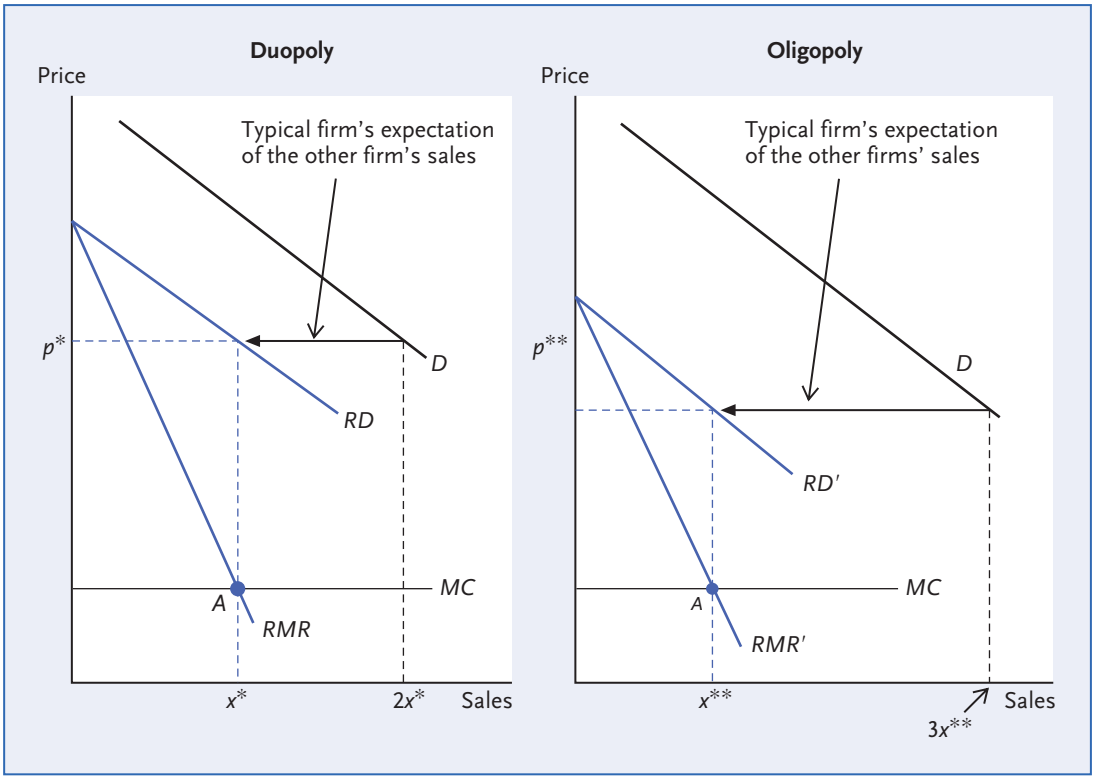


FIGURE 6-4: DUOPOLY AND OLIGOPOLY: EXPECTATION-CONSISTENT OUTPUTS

As more firms are competing in the market (here we consider three instead of two), the residual demand curve facing each one shifts inwards, so the residual marginal revenue curve also shifts inwards; the new curves are shown in the right panel as RD' and RMR'. The implications of this shift for prices is clear. The new $RMR = MC$ point occurs at a lower level of per-firm output and this implies a lower price. In equilibrium (i.e. where outcomes match expectations), each of the three firms produces an identical amount, identified as x^{**} in the diagram, and charges an identical price, p^{**}.

Given that we have worked through the 1, 2 and 3 firm cases, readers should be able to see what would happen as the number of firms continues to rise. Each increase in the number of competitors will shift in the RD facing each one of them. This will inevitably lead to lower prices and lower output per firm.

Of course, this analysis is just formalizing what most reader would expect. If one adds more competitors to a market, prices will fall along with the market share of each firm. As is so often the case, the brilliant concepts are simple.

6.3 The *BE–COMP* diagram in a closed economy

To study the impact of European integration on firm size and efficiency, the number of firms, prices, output and the like, it is useful to have a diagram in which all of these things are determined. The presentation of this diagram, which actually consists of three subdiagrams, is the first order of business. To keep things simple, we begin with the case of a closed economy. Advanced

1122MH_CH06 17/9/03 11:59 am Page 155

readers may find the mathematical appendix to this chapter helpful in understanding the diagrams.

The heart of the *BE–COMP* diagram is the subdiagram in which the number of firms and the profit-maximizing price-cost margin are determined. As usual, the equilibrium will be the intersection of two curves, the *BE* curve and the *COMP* curve. We start by presenting the *COMP* curve.

6.3.1 The *COMP* curve

It is easy to understand that imperfectly competitive firms charge a price that exceeds their marginal cost; they do so in order to maximize profit. But how wide is the gap between price and marginal cost, and how does it vary with the number of competitors? These questions are answered by the *COMP* curve.

If there is only one firm, the price-cost gap – what we call the 'mark-up' of price over marginal cost – will equal the mark-up that a monopolist would charge. If there are more firms competing in the market, competition will force each firm to charge a lower mark-up. We summarize this 'competition-side' relationship between the mark-up and the number of firms as the '*COMP* curve' shown in Fig. 6-5. It is downward sloped since competition drives the mark-up down as the number of competitors rises. We denote the mark-up with the Greek letter μ, pronounced mu, since 'mu' is an abbreviation for **m**ark-**u**p. The curve is in Fig. 6-5 as a downward-sloping curve, reflecting the fact that more competitors lowers the mark-up. We call it the *COMP* curve since the size of the mark-up is an indicator of how competitive the market is.

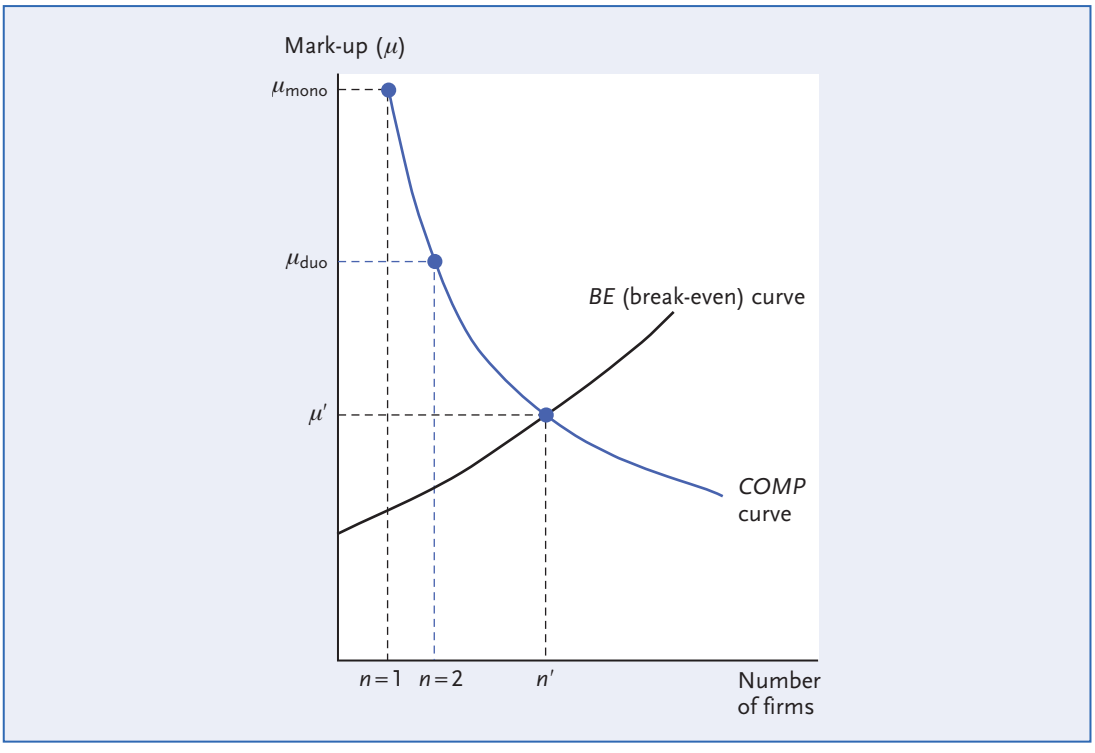


FIGURE 6-5: THE *COMP* AND *BE* CURVES

While this intuitive connection between price and marginal cost may suffice for some readers, extra insight is gained by considering the derivation of the *COMP* curve in more detail. This is done in Box 6-2.

Box 6-2: *COMP* curve in detail

Consider how the profit maximizing mark-up changes when the number of firms increases. To keep the reasoning concrete, consider an increase from 1 firm (the monopoly case) to 2 firms (the duopoly case).

The solid lines in the left panel of Fig. 6-6 show the usual problem for a monopolist, with the demand curve marked as *D* and the marginal revenue curve marked as *MR*. (See section 6.2, if you are not familiar with the monopolist case.) The profit-maximizing output, x_{mono}, is indicated by the point *A*, i.e. the intersection of marginal cost (marked as *MC* in the diagram) and marginal revenue (marked as *MR* in the diagram). The firm charges the most it can for the level of sales x_{mono}, i.e. p'. The price-marginal-cost mark-up (called the mark-up for short) equals $p' - MC$ as shown. We can also see the size of operating profit (i.e. profit without considering fixed cost) in the diagram since it is, by definition, just the monopolist mark-up times the monopoly level of sales x_{mono}. In the diagram this is shown by the area of the box marked by the points p', *A*′, *A* and *MC*.

When a second firm competes in this market, we have a duopoly rather than a monopoly. To solve this, we adopt the standard 'Cournot–Nash' approach of assuming that each firm

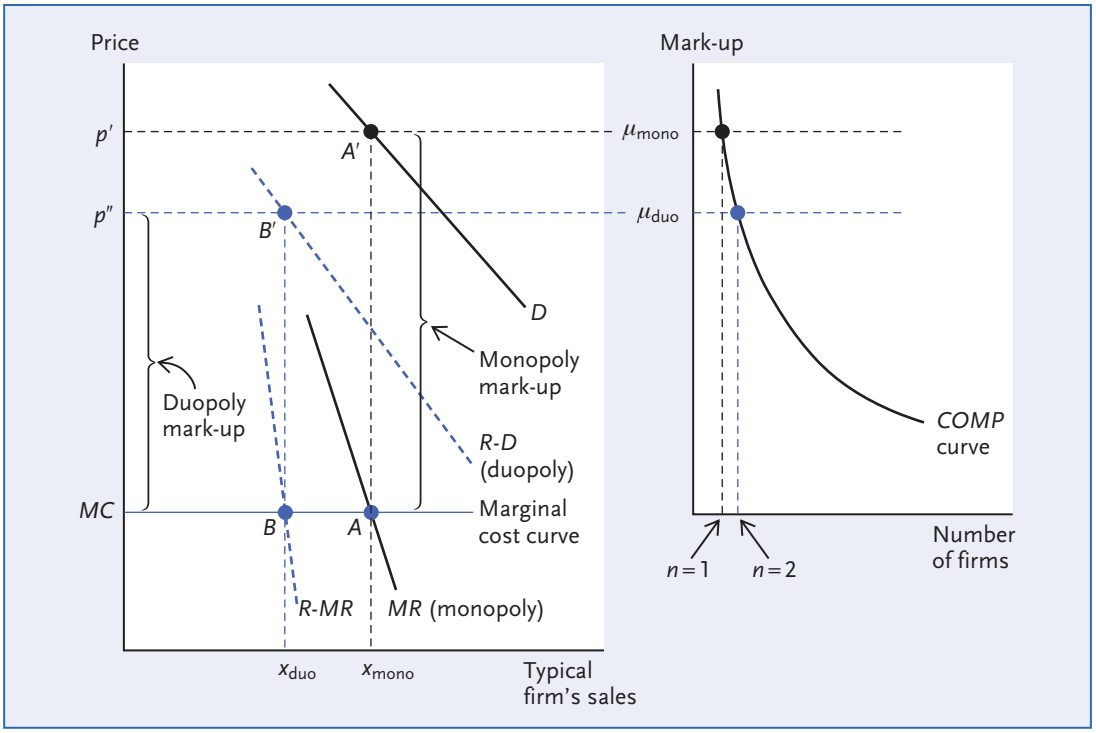


Figure 6-6: Impact of more firms on prices and price-cost mark-ups

1122MH_CH06 17/9/03 11:59 am Page 157

takes as given the output of the other firm(s). Practically speaking, this means that each firm acts as if it were a monopolist on the 'residual demand curve', i.e. the demand curve shifted to the left by the amount of other firms' sales (marked as *R-D* in the diagram). The exact equilibrium price and output are found by identifying the intersection of the residual marginal revenue curve (*R-MR*) and the marginal cost curve; again, firms charge the highest possible price for this level of sales, namely p''. In drawing the diagram, we have supposed that the two firms have identical marginal cost curves (for simplicity), so the outcome of the competition will be that each firm sells an equal amount. You can verify, that p'' is the price that the full demand curve, *D*, says would result if two times x_{duo} were sold.

The net result of adding an additional firm is that the price drops from p' *to* p'' and thus lowers the equilibrium mark-up. We also note that more competition lowers the level of sales per firm, although the sum of sales of the two competing firms exceeds the sales of a monopolist. Finally, note that adding in more firms lowers each firm's operating profit since it reduces the mark-up and sales per firm. The duopoly operating profit is the duopoly mark-up times x_{duo}; this is shown by the area p'', B', B, MC in the diagram.

Here we have looked only at the switch from one to two firms, but it should be clear that continuing to add in more firms would produce a similar result. As the number of firms rose, the residual demand curve facing each firm would shift inwards, resulting in a lower price, lower level of output per firm and, most importantly, in a lower price-cost margin, i.e. a lower mark-up. In the extreme, an infinite number of firms would push the price down to marginal cost, eliminating the price-cost margin and all operating profits; each firm would be infinitely small (this is why perfectly competitive firms are sometimes called atomistic).

6.3.2 The break-even (*BE*) curve

The mark-up and number of firms are related in another way, summarized by the *BE* curve.

When a sector is marked by increasing returns to scale, there is only room for a certain number of firms in a market of a given size. Intuitively, more firms will be able to survive if the price is far above marginal cost, i.e. if the mark-up is high. The curve that captures this relationship is called the 'break-even curve', or zero-profit curve (*BE* curve, for short) in Fig. 6-5. It has a positive slope since more firms can break even when the mark-up is high. That is to say, taking the mark-up as given, the *BE* curve shows the number of firms that can earn enough to cover their fixed cost, say, the cost of setting up a factory.

Again, this intuitive presentation of the *BE* curve will suffice for many readers, but might well raise questions in the minds of more advanced readers. These questions are addressed in Box 6-3.

Box 6-3: Derivation of the *BE* curve

While the positive link between mark-up and the break-even number of firms is quite intuitive, it is useful to study the relationship more closely. To keep the reasoning as easy as possible we consider the simplest form of increasing returns to scale, namely a situation where the typical firm faces a flat marginal cost curve *and* a fixed cost of operating. The fixed cost could represent, for example, the cost of building a factory, establishing a brand name, training workers, etc. This combination of fixed cost and flat marginal cost implies increasing returns since the typical firm's average cost falls as its scale of production rises, as is shown in the left panel of Fig. 6–7.

If a firm is to survive in this situation, it must earn enough on its sales to cover its fixed cost. The amount it earns on sales is called its 'operating profit', and this is simply the mark-up times the level of sales. For example, if the mark-up (i.e. price minus marginal cost) is 200 euros and each firm sells 20 000 units, the operating profit per firm will be 4 million euros. As we shall see, this simple connection between the mark-up, sales and operating profit makes it quite easy to figure out the number of firms that can break even at any given mark-up.

Since all firms are identical in this example, a given mark-up implies that the price will also be given, specifically it will equal the mark-up plus marginal cost. For example, if the mark-up is μ° as in the Fig. 6-7, then the price will be $p^\circ = \mu^\circ + MC$. At this price, the demand curve tells us that the level of total sales will be C°. Finally, we again use the symmetry of firms to work out the level of sales per firm; this will be total sales divided by the number of firms, which, in symbols, is C°/n. To see how many firms can break even when the mark-up is μ°, we turn to the left panel in the diagram. With a little thought, you should be able to see that a firm will make zero total profit (i.e. operating profit plus the fixed cost) when its average cost exactly equals the price. Using the average cost curve, marked as *AC* in the left panel, we see that the typical firm's average cost equals price when the sales of the typical firm equals x°. Because we know that sales per firm will be C°/n, we can work out the number of firms where the sales per firm just equals x°. In symbols, the break-even number of firms, call this n°, is where C°/n° equals x°.

It is instructive to consider what would happen if the mark-up were μ°, but there were more than n° firms, say n' firms, in the market. In this case, the sales per firm would be lower than x°, namely $x' = C^\circ/n'$, so the typical firm's average cost would be higher and this means that the average cost of a typical firm would exceed the price. Plainly, such a situation is not sustainable since all the firms would be losing money (earning operating profits that were too low to allow them to cover their fixed cost). This case is shown by the point *A* in the left panel of the diagram. The same point *A* can be shown in the right panel as the combination of the mark-up μ° and n'; we know that at this point, firms are not covering their fixed cost, so there would be a tendency for some firms to exit the industry. In the real world this sort of 'exit' takes the form of mergers or bankruptcies. The opposite case of too few firms is shown in the right and left panels as point *B*; here firms' average cost is below the price and so all are making pure profits (i.e. their operating profit exceed the fixed cost). Such a situation would encourage more firms to enter the market.

To work out all the points on the *BE* curve, we would go through a similar analysis for every given level of the mark-up. The logic presented above, however, makes it clear that the result would be an upward-sloped *BE* curve. (Advanced readers may be interested in seeing this proved in the mathematical appendix at the end of the chapter.)

6.3.3 Equilibrium prices, output and firm size

It is important to note that firms are not always on the *BE* curve since they can earn above-normal or below-normal profits for a while. In the long run, however, firms can enter or exit the market, so the number of firms rises or falls until the typical firm earns just enough to cover its fixed cost. By contrast, firms are always on the *COMP* curve since firms can change prices quickly in response to any change in the number of firms.

With this in mind, we are ready to work out the equilibrium mark-up, number of firms, price and firm-size in a closed economy using Fig. 6-8. The right panel combines the *BE* curve with the *COMP* curve. The intersection of the two defines the equilibrium mark-up and long-run number

1122MH_CH06 17/9/03 11:59 am Page 159

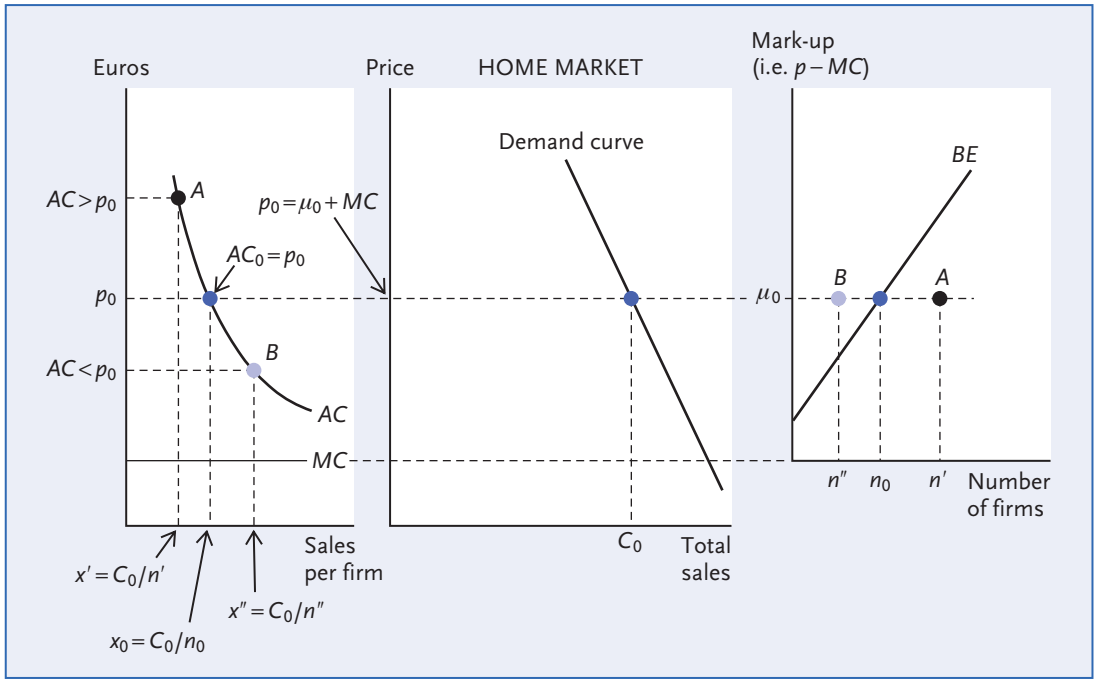


FIGURE 6-7: THE *BE* CURVE IN DETAIL

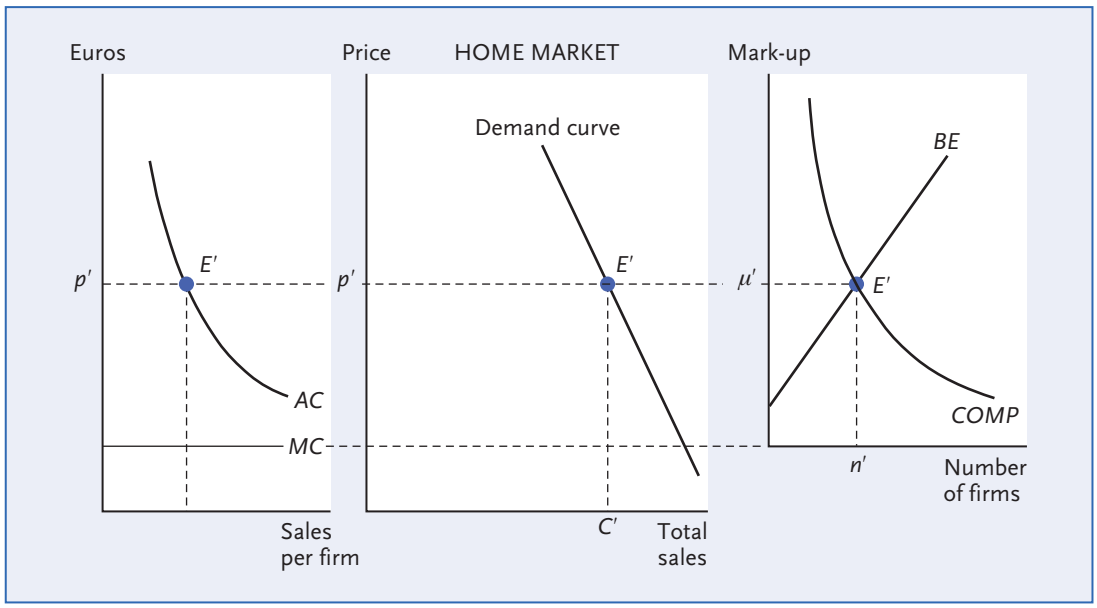


FIGURE 6-8: PRICES, OUTPUT AND EQUILIBRIUM FIRM SIZE IN A CLOSED ECONOMY

of firms. More specifically, the *COMP* curve tells us that firms would charge a mark-up of μ' when there are n' firms in the market, and the *BE* curve tells us that n' firms could break even when the mark-up is μ'. The equilibrium price is – by definition of the mark-up – just the equilibrium mark-up plus the marginal cost, *MC*. Using the *MC* curve from the left panel, we see that the equilibrium price is p' (this equals μ' plus *MC*). The middle panel shows the demand curve and this allows us to see that the total level of consumption implied by the equilibrium price is C'.

The left panel helps us to find the equilibrium firm size, i.e. sales per firm, which we denote as x. This subdiagram shows the average and marginal cost curves of a typical firm. As a little bit of reflection reveals, a typical firm's total profit is zero when price equals average cost (when price equals average cost, total revenue equals total cost). Since we know that total profits are zero at the equilibrium and we know the price is p', it must be that the equilibrium firm size is x' since this is where the firm's size implies an average cost equal to p'.

In summary, Fig. 6-8 lets us determine the equilibrium number of firms, mark-up, price, total consumption and firm size all in one diagram. With this in hand, we are now ready to study how European integration has sparked a wave of industrial restructuring.

6.4 The impact of European liberalization

European integration has involved a gradual reduction of trade barriers. The basic economic effects of this gradual reduction can, however, be illustrated more simply by considering a much more drastic liberalization – taking a completely closed economy and making it a completely open economy. To keep things simple, we suppose that there are only two nations, Home and Partner, and that these nations are identical. Since they are identical, we could trace through the effects looking at either market, but we focus on Home's market for convenience.

6.4.1 No-trade-to-free-trade liberalization

The immediate impact of the no-trade-to-free-trade liberalization is to provide each firm with a second market of the same size *and* to double the number of competitors in each market. How does this change the outcome?

The competition aspect of the liberalization is simple to trace out. The increased number of competitors in each market makes competition tougher. In reaction, the typical firm will lower its mark-up in each market to point *A* in Fig. 6-9.

The doubling of the market size facing each firm also has an important effect. The liberalization adds a new market for each firm, so it makes sense that more firms will be able to survive. To see how many more firms can survive, we work out the impact of the liberalization on the *BE* curve. As it turns out, the liberalization shifts the *BE* curve to the right, specifically to BE_{FT} as shown in the diagram. Why? Shifting *BE* to the right means that at any given mark-up more firms can break even. This is true since as the market size increases the sales per firm increases, thus providing a higher operating profit per firm at any given level of the mark-up.

The size of the rightward shift is determined without difficulty. If there were no change in the mark-up (there will be in the new equilibrium, but ignore this for the moment), then double the number of firms could break even since each firm would be selling the same number of units. In other words, the new BE curve must pass through the point marked '1' in the diagram; at point 1, the mark-up is μ', the number of firms is $2n'$, and logic tells us that this combination of μ and n would result in all firms breaking even. Point 1, however, is merely an intellectual landmark used to determine how far out the *BE* curve shifts. It is not where the economy would be right after liberalization since the mark-up would be pushed down to μ_A.

1122MH_CH06 17/9/03 11:59 am Page 161

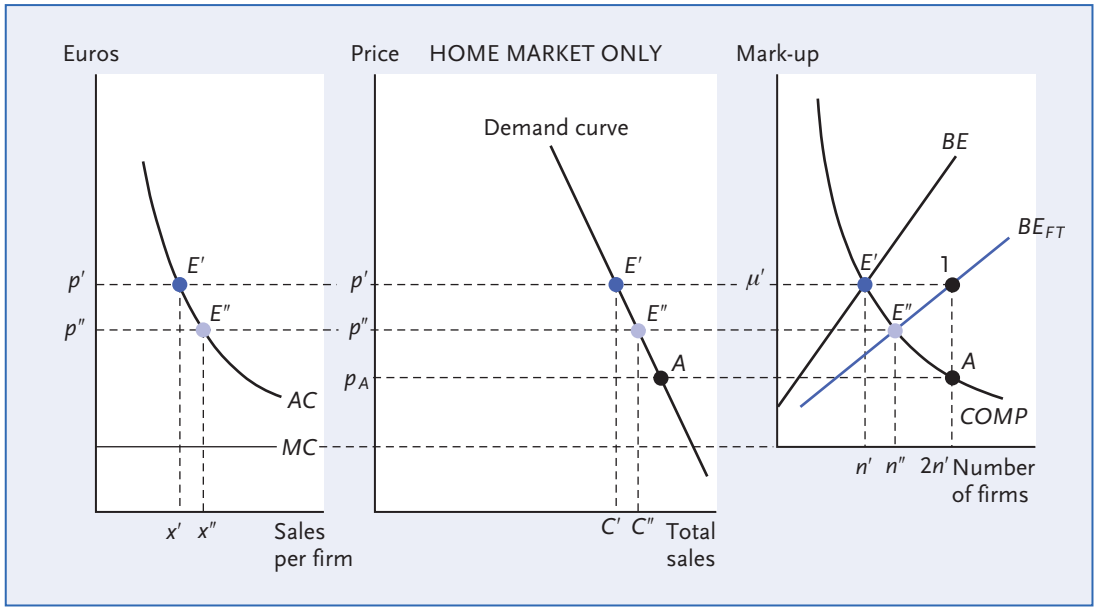


FIGURE 6-9: PRICES, OUTPUT AND EQUILIBRIUM FIRM SIZE WITH INTEGRATION

Because the increase in competition would immediately push down the mark-up to μ_A, the two newly integrated markets will initially be at a point that is below the BE curve. We know that all firms will be losing money at point *A* since the actual mark-up (μ_A) is less than what would be needed to have all $2n'$ firms break even. Now, this loss of profit is not a problem in the short run since firms only need to break even in the long run. Indeed, the profit losses are what would trigger the process of industrial restructuring that will eventually reduce the number of firms.

The corresponding effect on prices is shown in the middle diagram as the move from *A* to E''. Before explaining this, observe that the middle panel shows the demand curve for Home only, so the no-trade-to-free-trade liberalization does not shift the demand curve. The Foreign market has an identical demand, but since exactly the same thing goes on in Foreign, we omit the Foreign demand curve to reduce the diagram's complexity.

As mentioned above, the initial impact of the extra competition ($2n'$ firms selling to the Home market instead of n') pushes the equilibrium mark-up down to μ_A, so the price falls to p_A. Thus during this industrial restructuring phase, price would rise to p'' (from p_A), but this rise does not take the price all the way back to its pre-liberalization level of p'.

The impact of this combination of extra competition and industrial restructuring on a typical firm is shown in the left panel. As prices are falling, firms that remain in the market increase their efficiency – i.e. lower their average costs – by spreading their fixed cost over a larger number of sales. Indeed, since price equalled average cost before the liberalization and in the long run after liberalization, we know that the price drop is exactly equal to the efficiency gain. In the left panel, this is shown as a move from E' to E''. Increasing returns to scale are the root of this efficiency gain. As the equilibrium scale of a typical firm rises from x' to x'', average costs fall.

To summarize, the no-trade-to-free-trade liberalization results in fewer, larger firms. The resulting scale economies lower average cost and thus make these firms more efficient. The extra competition ensures that these savings are passed on to lower prices. It is useful to think of the integration as leading to two steps.

Step 1: Short term – Defragmentation and the pro-competitive Effect (from E' to A)
We start with the short-term impact, that is to say, the impact before the number of firms can adjust. Before the liberalization, each market was extremely fragmented in the sense that firms in each nation had a local market share of $1/n'$ and a zero share in the other market. After the liberalization, the market share of each firm is the same in each market, namely $\frac{1}{2}n'$. This elimination of market fragmentation has a pro-competitive effect, which is defined as a decrease in the price-cost mark-up. This is shown in the right panel of Fig. 6-9 as a move from E' to A. The short-term impact on prices and sales can be seen in the middle panel as a drop from p' to p^A.

Step 2: Long term – Industrial restructuring and scale effects (A to E'')
Point A is not a long-term equilibrium since the operating profit earned by a typical firm is insufficient to cover the fixed cost. We see this by noting that point A is below the BE curve and this tells us that the mark-up is too low to allow $2n'$ firms to break even. To restore a normal level of profitability, the overall number of firms has to fall from $2n'$ to n''. In Europe, this process typically occurs via mergers and buy-outs, but in some cases the number of firms is reduced by bankruptcies. As this industrial consolidation occurs, the economy moves from point A to point E''. During this process, firms enlarge their market shares, the mark-up rises somewhat and profitability is restored.

Welfare effects

The welfare effects of this liberalization are quite straightforward. The 4-sided area marked by p', p'', E', and E'' in the middle panel of Fig. 6-9 corresponds to the gain in Home consumer surplus. As usual, this gain can be broken down into the gain to consumers of paying a lower price for the units they bought prior to the liberalization, and the gains from buying more (C'' versus C'). Note that the exact same gain occurs in the Foreign market (not shown in the diagram).

As it turns out, this 4-sided area is Home's long-term welfare gain because there is no offsetting loss to producers and there was no tariff revenue to begin with. Firms made zero profits before liberalization and they earn zero profits after liberalization. Note, however, that this long-term calculation ignores the medium-term adjustment costs. These costs, which stem from the industrial restructuring, can be politically very important. Indeed, many governments attempt to thwart the restructuring by adopting a variety of policies such as industrial subsidies and various anti-merger and acquisition policies (discussed further below). We should also note that the welfare gains shown can be rather substantial. Roughly speaking, the percentage gain in real GDP equals the share of the economy affected (industry in the EU, for instance, accounts for about 30 per cent of output) times the percentage drop in price.

6.4.2 Slow and fast adjustments

The discussion above has shown that the integration initially leads to big price reduction and large profit losses. These profit losses are eliminated as the number of firms falls and profits are restored to normal levels. During this industrial restructuring process, prices rise slightly. This sequence of steps – sometimes called industry 'consolidation' or an industry 'shake-out' – is relevant to some industries, for example, air travel. Here Europe's liberalization has resulted in large profit losses for many European airlines and big price reductions for consumers. At first, airlines were reluctant to merge – largely because most airlines were government-owned and their governments were willing to use taxpayer euros to cover the losses. More recently, however, European airlines are rationalizing their costs by forming co-operative alliances. While the actual number of firms has not yet fallen, the number of planes flying a particular route is reduced. For example, before the two firms went bankrupt, co-operation between Swiss Air and Sabena meant

1122MH_CH06 17/9/03 11:59 am Page 163

that instead of having two planes flying the Geneva–Brussels route (one Swiss Air and one Sabena), only one plane flew. Nevertheless, Swiss Air called it a Swiss Air flight and Sabena called it a Sabena flight. Such 'code-sharing' arrangements are a way of achieving scale economies without actually eliminating a national carrier. Interestingly, both airlines eventually went bankrupt but the Swiss and Belgian governments stepped in to create replacement airlines, Swiss and SN Brussels Airlines.

In other industries, firms anticipate the increased competition and undertake the mergers and acquisitions quickly enough to avoid big losses. European banking is an example. The introduction of the euro and continuing liberalization of the banking sector means that European banks will have to become fewer and bigger in order to break even. However, instead of waiting for profit losses to become intolerable, banks have launched a record-breaking series of mergers and acquisitions. In terms of Fig. 6-9, this would look like a move from E' directly to E''.

6.4.3 Empirical evidence

There is ample empirical evidence that European industry is marked by fewer, bigger, more efficient firms since the Single Market Programme. For example, the 1996 Single Market Review by the European Commission presents several studies illustrating these trends (see Commission, 1996, for a brief review of this multi-volume study). Unfortunately, there is little direct evidence in Europe that it was caused by market integration, although this is what most economists believe is the obvious explanation. More direct evidence linking market size with efficiency and competition can be found in Campbell and Hopenhayn (2002). The authors study the impact of market size on the size distribution of firms in retail-trade industries across 225 US cities. In every industry examined, establishments were larger in larger cities. The authors conclude that their results support the notion that competition is tougher in larger markets and this accounts for the link between firm-size and market-size.

6.5 State aid

The reasoning laid out above immediately brings two questions to mind. First, as the number of firms falls, is there a tendency for the remaining firms to collude in order to keep prices high? Second, since industrial restructuring can be politically painful, is there a danger that governments will try to keep money-losing firms in business via subsidies and other policies? The answer to both questions is 'Yes'. There is a danger of collusion and there is a danger of governments thwarting the restructuring. In fact, both problems have arisen in an important way since the 1992 Single Market Programme. Fortunately, both problems were foreseen in the earliest discussions on European integration, so the 1957 Treaty of Rome adopted several measures to solve these problems.

In this section we address the problem of subsidies and the EU's solutions. The issue of competition policy is postponed to the next section.

6.5.1 Subsidies to prevent restructuring

The logic linking integration and industrial restructuring presumed that profit-losing firms would eventually leave the industry – that they would either be bought out by another firm, merged with other firms or, in rare cases, go bankrupt. All three of these exit strategies may involve important job losses, or at the very least an important reorganization that may require workers to change jobs or locations. Since job losses and relocations are painful, governments frequently seek to prevent them. For example, if the firm is government owned, trade unions may force the government to continue to shore up the money-losing enterprise. If it is privately owned, the government may provide subsidies through direct grants, or through long term loans that may not be repaid.

What we want to do here is to look at the economics of such subsidies – called 'state aid' in EU jargon – under two distinct scenarios. The first is where all governments provide such support. The second is where only one does.

EU-wide subsidies: thwarting the main source of gains

Start by supposing that both governments provide subsidies that prevent restructuring. To be concrete, we make the additional, more specific assumption that governments make annual payments to all firms *exactly* equal to their losses. Under this policy, all $2n'$ firms in the Fig. 6-9 analysis will stay in business, but, since no firms are making extraordinary profits, no new firms will enter. The economy, in short, remains at point A due to the anti-restructuring subsidies.

An insightful way to think about this subsidy policy is as a swap, in who pays for the inefficiently small firms. Before integration, prices were high, so consumers paid for the inefficiency. After liberalization, competition drives down the price but this comes at the cost of extra pay-outs from the national treasuries, so now the taxpayers bear the burden of the industry's inefficiency. The integration-plus-subsidies scheme shifts the burden of supporting inefficiently small firms from consumers to taxpayers.

Moreover, since all the firms stay in business, integration is prevented from curing the main problem, i.e. the too-many-too-small firms problem. Firms continue to be inefficient since they continue to operate at too small a scale. As a consequence, the subsidies prevent the overall improvement in industry efficiency that was the source of most of the gains discussed in the previous section.

Do nations gain from this liberalize-and-subsidize scheme? As it turns out both nations do gain overall, even counting the cost of the subsidies. We shall show this with a diagram, but before turning to the detailed reasoning, it is instructive to explain the deep reason for this result.

Imperfect competition is inefficient since it leads prices to exceed marginal costs. Recalling from Chapter 4 that the consumer price is a measure of marginal utility, the fact that price exceeds marginal cost implies that the gain to consumers from an extra unit would exceed the resource cost of providing the unit. In short, society tends to gain from an expansion of output when price exceeds marginal cost. Because of this, policies that increase output tend to improve welfare. In the jargon of public economics, the subsidy is a 'second-best' policy since it reduces the market-power distortion.

Note, however, that this reasoning is very partial. This sort of 'reactive' subsidies turns out to be a very bad idea in the long run. The subsidies are paid to prevent firms from adapting to changed circumstances. While the government may occasionally improve things by preventing change, a culture of reactive interventionism typically results in a stagnant economy. Staying competitive requires industries to change – to adapt to new technologies, to new competitors and to new opportunities. When firms get used to the idea that their governments will keep them in business no matter what, the incentive to innovate and adapt is greatly weakened. Firms with this sort of mindset will soon find themselves far behind their competitors.

Welfare effects of the liberalize-and-subsidize policy

To explain the welfare effects of the liberalize-and-subsidize policy, we refer to Fig. 6-10. The policy we consider freezes the economy at point A in the right and middle panels (this point A corresponds exactly to the point A in Fig. 6-9). We know that the price falls from p' to p_A and consumption rises from C' to C_A. Since the number of firms has not changed but total sales in each market (which must equal total consumption in each market) has increased, we know that the sales of each firm have increased somewhat, as shown in the left panel from x' to x_A. At this point, firms are losing money, but the government offsets this with a subsidy.

1122MH_CH06 17/9/03 11:59 am Page 165

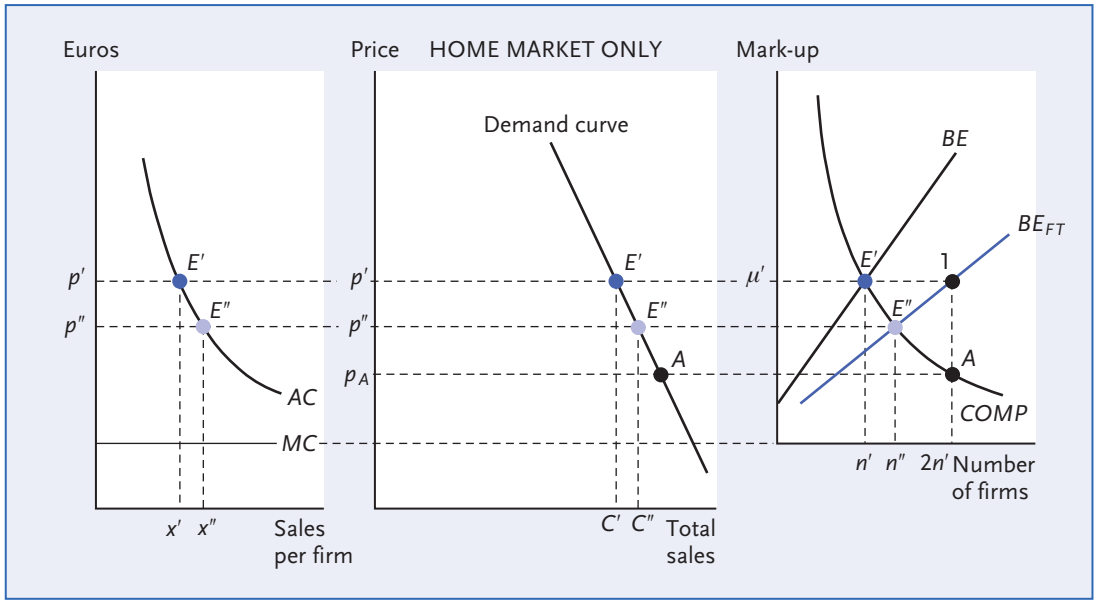


FIGURE 6-10: WELFARE ANALYSIS OF A LIBERALIZE-AND-SUBSIDISE POLICY

How big will the subsidy be? The easiest way to make this comparison is to adopt a roundabout approach. First, consider the total size of operating profit that the whole Home industry needs to cover all fixed cost before the liberalization. The answer is already in the middle panel. Before the liberalization, the industry broke even by selling a total of C' units at the price p'. The operating profit on this was the area **a** + **b** in the middle panel of the diagram, i.e. the gap between price and marginal cost times the units sold. After the liberalization, the industry's operating profit is area **b** + **c** (the new price-cost gap, $p_A - MC$, times the new sales, C_A). The drop in operating profit is thus area **c** minus area **a**. The subsidy we are considering would have to exactly offset the loss, so the subsidy would equal area **a** – **c**. With these facts established, we turn to the welfare calculation.

The consumer part of the welfare calculation is simple. Consumers see a lower price so consumer surplus rises by the area +**a** + **d**. To see the overall welfare effect, we subtract the subsidy, which equals **c** – **a**. The net welfare effect is **a** + **d** – (**a** – **c**) which equals **d** + **c**. We know this is right since this area is the gap between price and marginal cost summed over all the extra units consumed.

6.5.2 Only some subsidize: unfair competition

EU members' governments differ over how much they can or want to subsidize loss-making firms. Yet, when only some governments subsidize their firms, the outcome of the restructuring may be 'unfair' in the sense that it gets forced upon the firms in nations that do not subsidize, or stop subsidizing before the others. The real problem with this is that it may create the impression that European economic integration gives an unfair advantage to some nations' firms.

To examine this problem more closely while keeping the reasoning as tangible and simple as possible, we continue with the Fig. 6-9 example of two nations engaged in an extreme no-trade-to-free-trade integration. The integration moves each identical economy from the point E' to A. At A, all firms in both nations are losing money. Now suppose that restructuring takes, say, five years in the sense that after that time the number of firms has adjusted from $2n'$ to n''. In our simple

example, there is no way of telling which of the surviving firms will be Home firms and which will be Foreign firms. Symmetry suggests that half the remaining firms would be Foreign, but nothing in the example ensures that this is the case. This is where subsidies can make a big difference.

To be concrete, suppose that prior to the liberalization there were 10 firms in Home and 10 in Foreign, and that after restructuring there will be 12 firms in total. Furthermore, suppose that Home provides a five-year subsidy to all of its 10 firms, with the size of the subsidy being large enough to offset the liberalization-induced losses. The Foreign government, by contrast, is assumed to pursue a *laissez-faire* policy, i.e. it allows the market to decide which firms should survive – either because it believes in the market, or because it cannot afford the subsidies. In this situation, it is clear that 8 of the 10 Foreign firms will go out of business, while all 10 Home firms will survive. At the end of the five-year period, the Home government no longer needs to subsidize its firms since the exit of eight Foreign firms restores the industry to profitability.

From a purely economic perspective, the Foreign nation might have been the winner since having firms in our example brings nothing to national welfare (firms earn zero profit in the best of cases). The Home nation's subsidies were merely a waste of taxpayers' money. Two comments are relevant at this stage. First, this sort of conclusion shows that our simple example is actually too simplistic in many ways. For example, we did not consider the cost of workers having to switch jobs and possibly being unemployed for some time. Second, it shows that economics is only part of the picture.

From a political perspective, this sort of unfair competition would be intolerable. Indeed, if trade unions and business groups in Foreign anticipated that this would be the outcome, they might very well block the whole integration exercise. To avoid this sort of resistance to liberalization, the EU establishes very strict rules forbidding such unfair competition.

6.5.3 EU policies on 'state aids'

The EU's founders realized that the entire European project would be endangered if EU members felt that other members were taking unfair advantage of the economic integration (see Box 6-4 for an example of unfair competition in the EU energy market). To prevent this, the 1957 Treaty of Rome bans state aid that provides firms with an unfair advantage and thus distorts competition. Importantly, the EU founders considered this prohibition to be so important that they actually empowered the supranational European Commission to be in charge of enforcing the prohibition. Indeed, the Commission has the power to force the repayment of illegal state aid, even though the Commission normally has no say over members' individual tax and spending policies. For more information on EU state aid policy, see Box 6-5.

Box 6-4: Subsidies and unfair competition in the energy market

The market for electricity was one of the few markets left largely untouched by the sweeping liberalization of the EU's Single Market Programme between 1986 and 1992. Until the 1990s, the sector was dominated by government-owned or controlled firms, but as part of the general trend towards market-oriented policies, many EU members privatized their state-owned energy monopolies and opened their markets to foreign competition. These moves, however, were not part of a co-ordinated EU strategy. The resulting difficulties provide an excellent illustration of how important the EU's anti-state aid policy is to keeping European economic integration on track.

[1] This section is based on Bannerman (2002), which should be seen for further details.

1122MH_CH06 17/9/03 11:59 am Page 167

As with much of European industry, the energy sector was and still is marked by too many firms which are too small to be truly competitive. As in many other sectors, a process of consolidation and industrial restructuring has begun. Unlike other EU sectors, however, liberalization varies greatly across Member States. France is one of the most closed markets in two senses. It is difficult for foreign firms to supply French customers and the French energy monopoly Electricité de France (EdF) is tightly controlled by the government so it cannot be bought. Moreover, EdF receives various subsidies that give it an advantage in the market.

Other EU members feared that France had embarked on a cynical campaign of ensuring that EdF would be one of the survivors of the industrial restructuring that would inevitably come when energy was eventually liberalized. For example, France consistently opposed full liberalization of energy markets, and when the EU adopted a partial opening measure in which members were bound to open up their energy markets to third-party competition, France delayed passing the necessary laws. The real trouble began when EdF launched an aggressive campaign of expanding rapidly into the power markets of neighbouring Member States (Britain, Germany, Italy and Spain) while remaining a state-owned monopoly in its home market.

Such expansion would be unremarkable in other sectors, but the perception that EdF's moves were 'unfair' led other EU members to postpone or restrict their own liberalization efforts. For example, in 2001, German economy Minister Werner Mueller threatened to prevent the French state-owned power giant EdF from importing electricity into Germany as long as France did not open up its power market to foreign companies. Italy had a similar reaction after EdF began to take over the Italian company Montedison. As Italy's treasury Minister Vincenzo Visco explained, it was 'unacceptable to let a player with a rigged hand of cards join the game'. The Italian government quickly introduced measures designed to block further takeovers.

To prevent this action–reaction chain from ruining prospects for liberalization, the Commission launched a investigation in 2002 into EdF's state aid. In particular, it is looking into potentially anti-competitive state aid given to London Electricity (which EdF owns) in the form of low interest rates on loans backed by the French government. It is also looking into a five-year-old accounting arrangement under which EdF qualifies for unusually generous tax relief. Separate action is being taken against Gaz de France for failing to comply with EU liberalization rules.

This box is based mainly on BBC news stories dated 12 June 2001 and 16 October 2002 (see www.bbc.co.uk).

Box 6-5: EU state aid policy

The Treaty of Rome, formally called the Treaty Establishing the European Community, prohibits state aid that distorts competition in the EU. The Treaty defines state aid in very broad terms. It can, for instance, take the form of grants, interest relief, tax relief, state guarantee or holding, or the provision by the state of goods and services on preferential terms.

The reason for this prohibition is simple. As the Competition Directorate-General (the responsible department of the European Commission) writes in its excellent website:

> By giving certain firms or products favoured treatment to the detriment of other firms or products, state aid seriously disrupts normal competitive forces. Neither the beneficiaries of state aid nor their competitors prosper in the long term. Very often, all public subsidies achieve is to delay inevitable restructuring operations without helping the

1122MH_CH06 17/9/03 11:59 am Page 168

> recipient return to competitiveness. Unsubsidized firms who must compete with those receiving public support may ultimately run into difficulties, causing loss of competitiveness and endangering the jobs of their employees. Ultimately, then, the entire market will suffer from state aid, and the general competitiveness of the European economy is imperilled.
>
> (http://europa.eu.int/comm/competition/citizen/citizen_stateaid.html).

Some state aid, however, is allowed according to the Treaty since subsidies, when used correctly, are an essential instrument in the toolkit of good governance. The permitted exceptions include social policy aid, natural disaster aid and economic development aid to underdeveloped areas. More generally, state aid that is in the general interest of the EU is permitted. For example, the Commission has also adopted a number of bloc-exemption rules that explain which sorts of state aid are indisputable. These include aid to small and medium-sized enterprises, aid for training and aid for employment.

The Treaty charges the Commission with monitoring state aid and, indeed, the Commission has exclusive authority for evaluating state aid schemes of EU governments. As part of this, the Commission can require that aid that has already been granted by an EU member be repaid by receiving firms.

More information can be found in the fourth section of DG Competition's highly accessible document called '*Competition Policy in Europe and the Citizen*'. This can be downloaded from http://europa.eu.int/comm/competition/publications/.

A CONTENTIOUS EXAMPLE: AIRLINES IN TROUBLE

The Commission department (Directorate-General, or DG, in EU jargon) in charge of enforcing anti-competitive state aid, DG Competition, is frequently in the headlines.[1] Its decisions often produce loud protests from firms and/or workers who benefited from any state aid that the DG Competition judges to be illegal. Many recent examples can be found on DG Competition's website http://europa.eu.int/comm/competition/index_en.html, but an excellent example concerns the airline industry – an industry where there are clearly too many firms in existence and the tendency to subsidize is strong. Many European airlines are the national 'flag carrier' and as such are often considered a symbol of nation pride.

Consolidation of the European airline industry has been in the cards for years, but the problem was exacerbated by the terrorist attacks of 11 September 2001. The ensuing reduction in air travel caused great damage to airlines all around the world and led to calls for massive state aid. To prevent these subsidies from being used as an excuse to put off restructuring, the Commission restricted subsidies to cover only the 'exceptional losses' incurred when transatlantic routes were shut down immediately after 11 September. To date, the Commission has managed to resist the desire of several Member State governments to support their national airlines to the same extent that the US government has supported US airlines.

It is easy to see the logic of the Commission's stance. Low-cost airlines, such as Ryanair and EasyJet, have done well without subsidies. Moreover, artificial support for inefficient national carriers hinders the expansion of low-cost airlines. As Bannerman (2002) puts it:

> No-one will benefit from a return to spiralling subsidies, which damage the industry by encouraging inefficiency. Both consumers and taxpayers would suffer as a result. As for the national carriers, they would probably benefit from some market consolidation, creating fewer, leaner, pan-European airlines – although this process would need monitoring for its

1122MH_CH06 17/9/03 11:59 am Page 169

competitive effects on key routes. If the airline industry can use the crisis to create more efficient carriers, it will probably be the better for it. But this long-term view cuts little ice with workers who stand to lose their jobs, or with some politicians, for whom a flag carrier is a symbol of national pride. Unfortunately, the benefits of controlling state-aids occur mainly in lower fares and taxes, and are therefore widely diffused among the population. The costs, on the other hand, take the form of job losses, which hurt a small but vocal constituency.'

We now turn to addressing the next question raised by the analysis in section 6.4: 'As the number of firms fall, is there a tendency for the remaining firms to collude in order to keep prices high?'

6.6 Competition policy and anti-competitive behaviour

Collusion is a real concern in Europe and there are good reasons for thinking that the dangers of collusion rise as the number of firms falls. We therefore turn now to considering the impact of collusion. Because simplicity led us to explicitly assume away the possibility of collusion in section 6.4, our first job is to expand the *BE–COMP* framework to allow for the possibility.

6.6.1 Allowing collusion in the *BE–COMP* framework

The analysis surrounding Fig. 6-9 assumed that firms did not collude. Both before and after the integration, we assumed that firms engaged in 'normal' competition; the *COMP* curve was constructed on the assumption that each firm decided on how much to sell, taking as given other firms' sales. In other words, each firm decided its output individually; they did not collude on output. This assumption of 'normal' competition is quite reasonable for many industries, but it is not the behaviour that is most profitable for firms in the industry. If firms were allowed to collude, they could raise profits by reducing the amount they sell and raising prices. There are many, many forms of collusion in the world. The first form of collusion we consider is the simplest form to study. Instead of assuming no collusion on output, we consider the extreme opposite of perfect collusion on output.

Perfect collusion

If all firms could perfectly co-ordinate their sales, i.e. if they could act as if they were a single firm, they would limit total sales to the monopoly level. This would allow them to charge the monopoly price and to earn the greatest possible profit from the market. After all, the monopoly price–sales combination is – by definition – the combination that extracts the greatest profit from the market.

The hard part of collusion is finding a way to divide up the monopoly level of sales among the colluding firms. The problem is that because the price is so much higher than marginal cost, each firm would like to sell a little more than its share. To keep things simple, we assume that the firms manage the collusion by allocating an equal share to all firms. This type of behaviour can be illustrated in the *BE–COMP* diagram with the 'perfect collusion' line shown in Fig. 6-11. This line extends horizontally since it assumes that the market always equals μ_{mono} regardless of the number of firms. Note that the monopoly mark-up is given by the point on the COMP curve where $n = 1$. The equilibrium number of firms under perfect collusion is given by the point *A*.

Partial collusion

Perfect collusion, however, is difficult to maintain since the gains from 'cheating' on other colluders is quite high. To reduce the incentive to cheat, the actual degree of collusion may be milder than perfect collusion; this partial collusion restricts sales of all firms but not all the way back to the monopoly level, so the mark-up is lower than the monopoly mark-up but higher than the *COMP* mark-up. This makes it easier to sustain the collusion since the benefits from cheating are

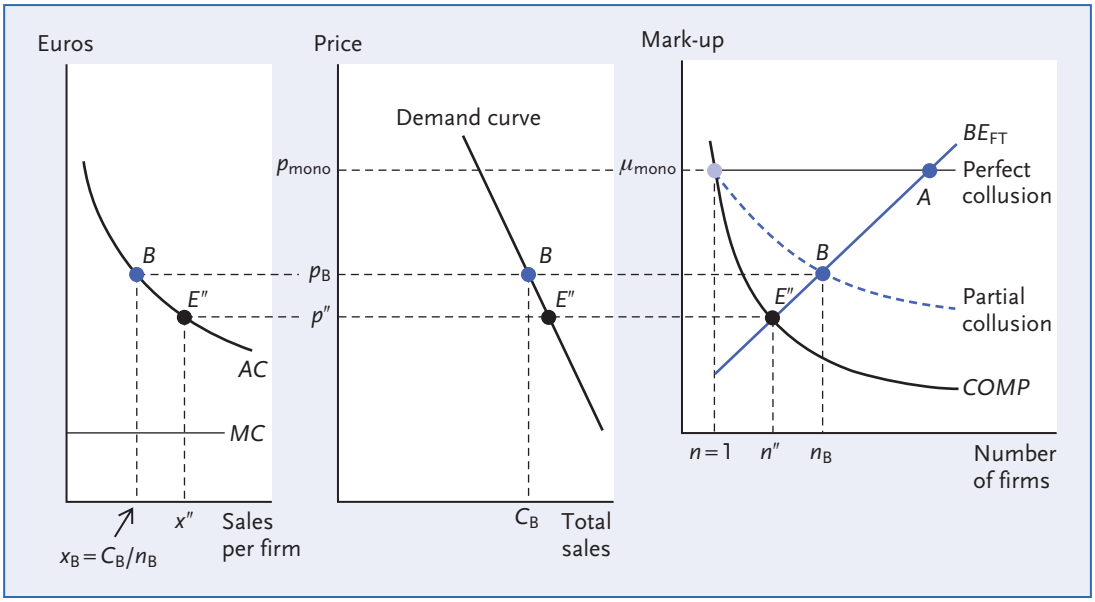


FIGURE 6-11: COLLUSION AND INDUSTRIAL RESTRUCTURING

not quite as large. But how much lower would the mark-up be under partial collusion? As it turns out, an understanding of advanced economics is needed to formalize this notion of 'partial collusion', so we do not address it here explicitly (see Mas-Colell, Whinston and Green, 1995, for an advanced treatment). Fortunately, the basic idea can be easily depicted in the diagram.

The curve labelled 'partial collusion' shows a level of collusion where the mark-up is somewhere between the monopoly mark-up and the no-collusion mark-up shown by the *COMP* curve. We do not specify exactly where it lies between the two, but this turns out to be unimportant for the qualitative analysis that we turn to next.

Now consider the implications of the partial collusion. If firms do manage to collude in this partial manner, the market will be able to support more firms. In particular, the equilibrium mark-up and number of firms would be identified by the point *B*. What are the economic implications of such collusion?

The first point is that collusion will not in the end raise firm's profits to above-normal levels. Even with partial collusion, the initial number of firms after liberalization, namely $2n'$, is too high for all of them to break even. Industrial consolidation proceeds as usual, but instead of the zero-profit level being reached when the number of firms has dropped to n'', the process halts at n_B, where the *BE* curve and the partial-collusion curve meet. Importantly, and quite naturally, prices are higher with collusion than they would be without collusion (i.e. p_B exceeds p''). This also means that total sales are lower with collusion, since demand diminishes as the price rises. These two facts, that total sales are lower and that there are more firms, tells us that firms will be smaller under collusion than they would be without collusion (x_B as opposed to x''). As the left panel of Fig. 6-11 shows, smaller firms mean higher average cost, i.e. less efficiency. The welfare cost of the collusion is measured by the four-sided area marked by p_B, p'', E'' and *B*.

To summarize, collusion prevents the full benefits of restructuring from occurring. By keeping too many firms in the market, anti-competitive behaviour thwarts part of the industry's adjustment that is the key to the gains from integration.

1122MH_CH06 17/9/03 11:59 am Page 171

6.6.2 EU policies on anti-competitive behaviour

As with state aid, the EU's founders were fully aware that integrating Europe's market might heighten the dangers of collusive behaviour. To prevent such problems, the Treaty of Rome prohibited any action that prevents, restricts or distorts competition in the common market and put the Commission in charge of enforcing these strictures.

Collusion in diagram 6-11 was a simple matter of keeping the mark-up artificially high, but the real world of collusion is radically more complex. Reflecting this complexity, the Commission's actions focus on two main axes:

- *Anti-trust and cartels.* The Commission works to eliminate behaviours that restrict competition (e.g. price-fixing arrangements and cartels) as well as to eliminate abusive behaviour by firms that have a dominant position in their market.

The two main types of prohibited behaviour are: restrictive business practices (prohibited by Article 81 of the EC Treaty) and abuse of a dominant position (prohibited by Article 82 of the EC Treaty). Restrictive business practices include a wide range of unfair practices by firms. For example, the Treaty explicitly outlaws: agreements that fix prices; agreements that allocate 'exclusive territories' to firms in order to reduce competition; and agreements that control production, marketing, R&D or investment. The Treaty also requires government monopolies of a commercial character to avoid discrimination based on the nationality of suppliers or customers.

- *Merger control* The Commission seeks to block mergers that would create firms that would dominate the market.

We stressed that the EU founders considered the control of such behaviour to be so important that they placed the power to enforce these rules in the hands of a supranational body, namely the European Commission. Even today, Commission decisions on matters of 'competition policy' are not subject to revision by the European Council or the European Parliament. This is an area where Member States truly did pool their sovereignty.

Investigation and fines

The Commission has extensive powers to investigate suspected abuses of competition law. These get into the news when, for example, Commission officials 'raid' the headquarters of an EU company suspected of anti-competitive behaviour. Such investigations are started by the Commission, either on its own initiative or in reaction to complaints of anti-competitive practices from companies, consumer organizations or individual consumers. Any individual can lodge a complaint; see http://europa.eu.int/comm/competition/citizen/citizen_complaints.html.

To give 'teeth' to the Commission's decisions, the Treaty empowers the Commission to prohibit anti-competitive behaviour, to issue injunctions against firms, and to impose fines on firms. These fines vary according to the size of the violation, ranging from nothing to millions of euros.

6.7 Summary

Three main points have been made in this chapter.

- One very obvious impact of European integration has been to face individual European firms with a bigger 'home' market. This produces a chain reaction that leads to fewer, bigger, more efficient firms that face more effective competition from each other. Understanding the economic logic driving this chain reaction is the main goal of this chapter. This logic can be summarized as follows. Integration defragments Europe's markets in the sense that it removes the privileged position of national firms in their national markets. As a result, all firms face more competition from other firms in their national market, but at the same time they have better access to the other EU markets. This general increase in

competition puts downward pressure on price-cost mark-ups, prices and profits. The profit-squeeze results in industrial restructuring, a process by which the total number of firms in Europe falls. The lower price and lower number of firms means that the average firm gets larger and this, in turn, allows firms to better exploit economies of scale. This efficiency increase, in turn, permits the firms to break even despite the lower prices.

- The industrial restructuring is often politically painful since it often results in layoffs and the closure of inefficient plants. Governments very often attempt to offset this political pain by providing 'state aid' to their national firms. Such state aid can be viewed as unfair and the perception of unfairness threatens to undermine EU members' interest in integration. To avoid these problems, the founders of the EU established rules that prohibited state aid that distorts competition. The Commission is charged with enforcing these rules.
- Industrial restructuring raises another problem that led the EU's founders to set out another set of rules. As integration proceeds and the number of firms falls, the temptation for firms to collude may increase. To avoid this, the EU has strict rules on anti-competitive practices. It also screens mergers to ensure that mergers will enhance efficiency. Again, the Commission is charged with enforcing these rules.

Self-assessment questions

1. Suppose that liberalization occurs as in section 6.4 and the result is a pro-competitive effect, but instead of merging or restructuring, all firms are bought by their national governments to allow the firms to continue operating. What will be the impact of this on prices and government revenues? Now that the governments are the owners, will they have an incentive to continue with liberalization? Can you imagine why this might favour firms located in nations with big, rich governments?

2. Use a 3-panel diagram, like Fig. 6-8, to show how the number of firms, mark-up and firm size would change in a *closed* economy if the demand for the particular good rose, i.e. the demand curve shifted out.

3. Using your findings from exercise 2, you should be able to consider the impact of a no-trade-to-free-trade integration between a large and a small nation, where size is defined by the position of the demand curve (the demand curve in the large nation will be further out than the demand curve for the small nation). To do this, you will need two of the 3-panelled diagrams of the Fig. 6-8 type to show the pre-integration situation. Then use a 3-panelled diagram of the Fig. 6-9 type to show what happens to prices, firm size and the number of firms in the integrated economy. Note that you will want to show both demand curves in the middle panel. As usual, assume that all firms have the same marginal cost. What does this analysis tell you about how integration affects firms in small nations versus large nations?

4. Consider a sequence of EU 'enlargements' where each enlargement involves a no-trade-to-free-trade addition of one more members. Specifically, suppose there are three initially identical economies, each of which looks like the one described in section 6.3. Initially, all nations are closed to trade. Now, consider a no-trade-to-free-trade integration between two of the nations (just as in section 6.4). Then consider a no-trade-to-free-trade integration of a third nation. (*Hint*: The second step will be very much like the integration between unequal-sized economies explored in exercise 3.) Calculate how much the third nation gains from joining and compare it to how much the existing 2-nation bloc gains from the third nation's membership. Who gains more in proportion to size: the 'incumbents' or the 'entrant'?

Essay questions

1. When the Single Market Programme was launched in the mid-1980s, European leaders asserted that it would improve the competitiveness of European firms *vis-à-vis* US firms. Explain how one can make sense of this assertion by extending the reasoning in this chapter.

1122MH_CH06 17/9/03 11:59 am Page 173

2. While the case for strengthening European-wide competition policy in tandem with the Single Market Programme is clear, is it obvious that this task should be allocated to the EU level instead of being left in the hands of Member States?
3. Some EU members allow their companies to engage in 'anti-takeover' practices. Discuss how differences in EU members' laws concerning these practices might be viewed as unfair when EU industry is being transformed by a wave of mergers and acquisitions.
4. Look on the web for information on the debate over harmonization of EU takeover rules. Try to use the logic presented in this chapter to explain why some nations resist harmonization.

Further reading: the aficionados corner

Consideration of imperfect competition and scale effects was made possible in the 1980s with development of the so-called new trade theory (Helpman and Krugman, 1985, 1989). The new theory was naturally applied to analysis of the Single Market Programme when it was first discussed in the mid-1980s. Many of the classic studies are contained in Winters (1992). Baldwin and Venables (1995) provides a synthetic, graduate-level survey of this literature.

An alternative presentation of the theory and a thorough empirical evaluation is provide by Allen, Gasiorek and Smith (1998b).

For a very accessible introduction to EU competition policy, see Neven, Seabright and Nutall (1996).

Useful websites

A large number of evaluations of the Single Market, most of which employ ICIR frameworks, can be found on http://europa.eu.int/comm/economy_finance/publications/, the document *The Internal Market: 10 Years without Frontiers* is especially useful. This site also posts the annual *State Aids Report* which provides the latest data on subsidies.

The website of DG Competition has several highly accessible accounts of EU competition policy and information on recent cases, see
http://europa.eu.int/comm/competition/.

References

Allen, C., M. Gasiorek and M.A.M. Smith (1998a) 'The competition effects of the Single Market', *Economic Policy*, London. Download from www.economicpolicy.org.
Allen, C., M. Gasiorek and A. Smith (1998b) 'European Single Market: How the programme has fostered competition', *Economic Policy*, 441–486.
Bannerman, E. (2002) *The Future of EU Competition Policy*, Centre for European Reform, London. Downloadable from http://www.cer.org.uk/publications/index.html.
Commission (1996) *The 1996 Single Market Review: Background Information for the Report to the Council and European Parliament*, Commission Staff Working Paper, Brussels. Download from http://europa.eu.int/comm/internal_market/en/update/impact/index.htm.
European Economy (2001) Supplement A, No.12, December. This contains many facts on the M&A wave. Download it from http://europa.eu.int/comm/economy_finance/publications/supplement_a_en.htm.
Mas-Colell, A., M. Whinston and J.R. Green (1995) *Microeconomic Theory*, Oxford University Press, New York.
Campbell, J. and H. Hopenhayn (2002) *Market Size Matters*, NBER Working Paper 9113, Cambridge, MA.
Winters, L.A. (1992) *Trade Flows and Trade Policies after '1992'*, Cambridge University Press, Cambridge.
Helpman, ■. and ■. Krugman (1985) ■■■.
Helpman, ■. and ■. Krugman (1989) ■■■.
Baldwin, ■. and ■. Venalles (1995) ■■■.
Neveu, ■., ■. Seabright and ■. Nutall (1996) ■■■.