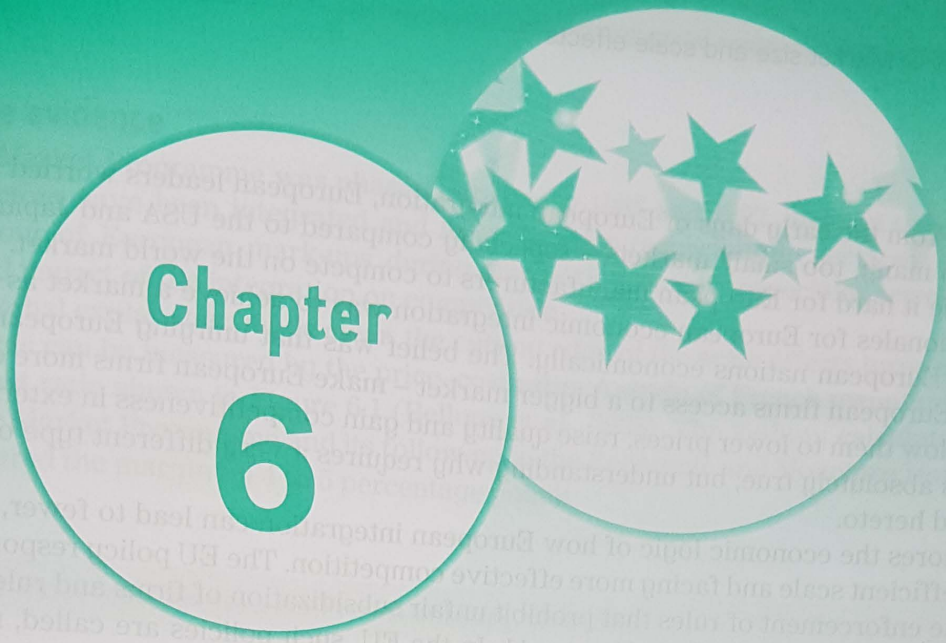


Chapter

6

Market size and scale effects

Chapter Contents

Introduction

Market size matters. From the early days of European integration, European leaders worried that Europe had a problem of 'too many, too small' markets – especially compared to the USA and Japan – and that this shortcoming made it hard for European manufacturers to compete on the world market. Thus one of the key economic rationales for European economic integration was to achieve a market as large as the USA's by integrating European nations economically. The belief was that unifying 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. As it turns out, this is absolutely true, but understanding why requires a very different type of economics than we have covered hereto.

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 EU policy responses to these changes – notably the enforcement of rules that prohibit unfair subsidization of firms and rules restricting anti-competitive behaviour – are studied in Chapter 11. In the EU, such policies are called, respectively, 'state aids' policy and 'competition policy'.

6.1 Liberalization, defragmentation and industrial restructuring: logic and facts

Before turning to more structured economic logic organized around diagrams, it is helpful to start with a 'word picture', or plain-language explanation of the logic that links European integration to industrial restructuring before presenting some facts on mergers and acquisitions (M&As) and the effects on competition. Plain language is often not enough in economics since the logical interconnections and interactions that take place in markets tend to defy the linearity of language. To really understand these, diagrams are needed, but it helps to start with words alone.

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 more than three decades, trade among European nations is not as free as it is within any given nation. 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, which, 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 it 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. Owing 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 whereby Europe's weaker firms merge or are bought out. Ultimately, Europe is left with a more efficient industrial structure, with fewer, bigger, more efficient firms competing more effectively with one another. 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 reallocation 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 this 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 one another.

6.1.1 Some evidence

The Single Market Programme was phased in between 1986 and 1992, and has continued to deepen since as more sectors have been integrated and more barriers (especially in services) have been eliminated. The behaviour of European mark-ups during this period is thus especially important in revealing the fundamental impact of the integration on competition.

As the verbal explanation made clear, the cutting edge of the scale effects turns on the pro-competitive effect and this can be measured by the price–cost ratio. A study of French manufacturing data calculated the price–cost ratio shown in Figure 6.1 (Bellone et al., 2008). The authors calculate that implementation of the Single Market Programme and its follow-up in the Economic and Monetary Union treaty (Maastricht Treaty) lowered the margin by 4 to 5 percentage points.

Figure 6.1 Price–cost margins for French industry, 1986–2004

Econometric evidence from Allen et al. (1998a, 1999b) suggests that the Single Market Programme reduced price–cost margins by 4 per cent on average, in line with the estimate for France. This impact varied from quite high, for example −15 per cent in the office machinery sector, to quite small, for example −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.

Another study, Badinger (2007), used data on 10 EU Member States over the period 1981–99 for each of three major industry groups (manufacturing, construction and services) and 18 more detailed industries to test whether the EU's Single Market Programme reduced firms' price–cost mark-ups, that is, had a pro-competitive effect. He found mark-up reductions for aggregate manufacturing and construction. In contrast, mark-ups have risen in most service industries since the early 1990s. He suggests that this latter finding confirms the weak state of the Single Market for services and suggests that anti-competitive defence strategies have emerged in EU service industries.

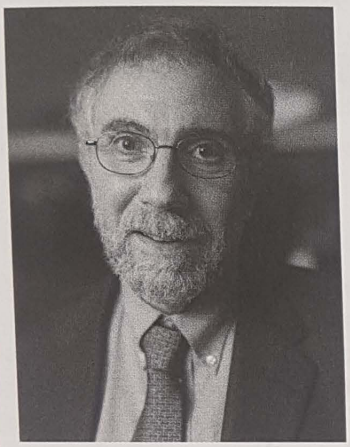
More recently, Chen et al. (2009) found evidence of a pro-competitive effect from economic integration using disaggregated data for EU manufacturing over the period 1989–99. They found that foreign import penetration has a strong competitive effect, with prices and mark-ups falling and productivity rising.

Interestingly, the Global Crisis, which started in September 2008, had a massively negative impact on European mark-ups, as econometric work by Weche and Wambach (2018) shows. The mark-ups have recovered since the crisis but are still below the levels they were in 2007. The same authors show that the evolution of mark-ups matches the evolution of profitability of firms.

6.2 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 sub-diagrams, is the first order of business. To keep things simple, we begin with the case of a closed economy. The diagram is an extensive elaboration of one originally used by Nobel Laureate Paul Krugman (see Box 6.1).

Box 6.1 Paul Krugman (1953–)



Building on the work of John Nash, Paul Krugman introduced imperfect competition and increasing returns to international trade theory. This introduction profoundly changed the way we think of international trade, so much so that the literature he started is now called the 'new trade theory' (even though Krugman did his early work on this in 1979!).

The *BE–COMP* diagram, which is inspired by a diagram that Krugman called the *PP–CC* diagram, is most closely related to his work with James Brander, a professor at the University of British Columbia (Brander and Krugman, 1983), which focuses on imperfect competition as a cause of trade.

Photo: M.Olsson, Copyright © Nobel Media AB (2008) Nobelprize.org.

The heart of the *BE–COMP* diagram is the sub-diagram 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.

6.2.1 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. But how much would a monopolist charge – or more specifically, how much more would a monopolist charge beyond the cost of producing an extra unit (i.e. the marginal cost)? The pricing decision for a monopolist involves a very simple trade-off. If the monopolist raises the price, customers will buy fewer units. That means a higher profit per unit sold (since raising the price increases the price–cost gap), but few units sold. There is a gain on one hand (higher profits per unit sold) and a loss on the other hand (fewer units sold). The monopolist balances these two offsetting effects in choosing the most profitable price.

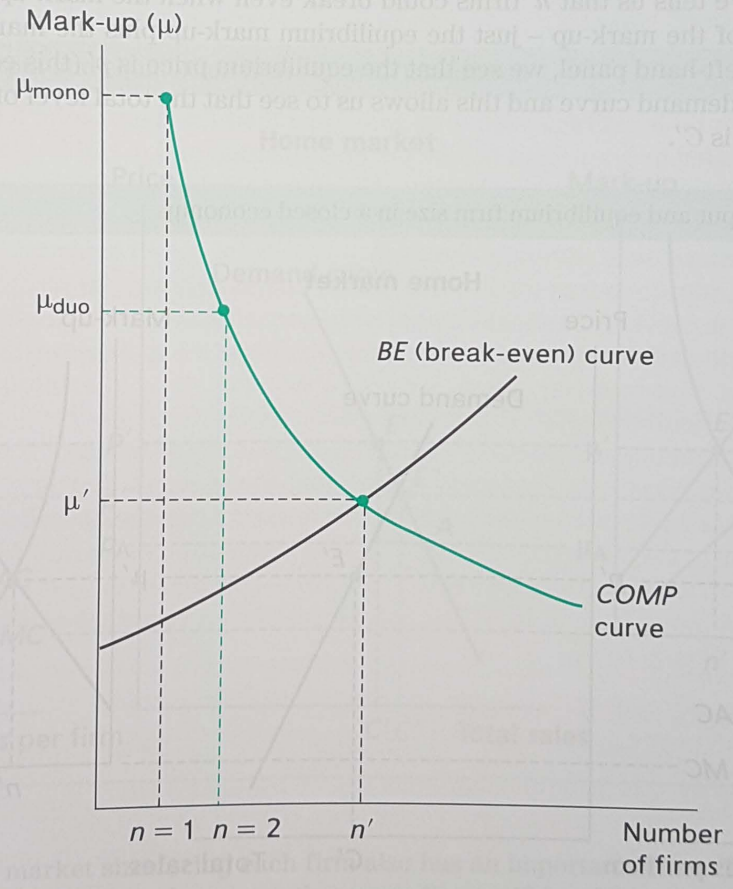
Several deep aspects of imperfect competition come through even in the monopoly case. First, the critical difference between perfect and imperfect competition comes out clearly. As part of the definition, perfectly competitive firms are assumed to take the price of their output as given (a classic example 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, so perfectly competitive firms maximize profits by selling an amount where price equals marginal cost. Since all the other firms are doing the same, price gets driven down to marginal cost. What changes when the firm is not a monopolist, but rather faces competition from other firms?

It is intuitively plausible that more competition among firms will result in lower prices, lower price–cost gaps, and thus lower profits, but how much lower? The best way to think about answering this question is

to revisit the fundamental trade-off facing an imperfectly competitive firm. On the upside (for the firm), a higher price means higher profits per unit sold. On the downside for the firm, the higher price means lower sales. When the firm is a monopolist, the 'lower sales' part comes only from the demand curve sloping downwards. When the firm faces competitors, the 'lower sales' part also includes sales lost to competitors. Or to put it differently, when a firm faces competition, the downside of raising prices is worse, so the firm will optimally choose a lower price. What is more, the more competitors the firm faces the steeper is the loss of sales to competitors, thus the lower the price chosen by the firm. We can also phrase this in terms of price–cost mark-ups so it fits into the COMP diagram.

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 Figure 6.2. It is downward-sloping since competition drives the mark-up down as the number of competitors rises, as explained above. We denote the mark-up with the Greek letter μ, pronounced mu, since 'mu' is an abbreviation for 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 6.2 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 the Annex.

6.2.2 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 room for only 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, that is, 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 Figure 6.2. 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.

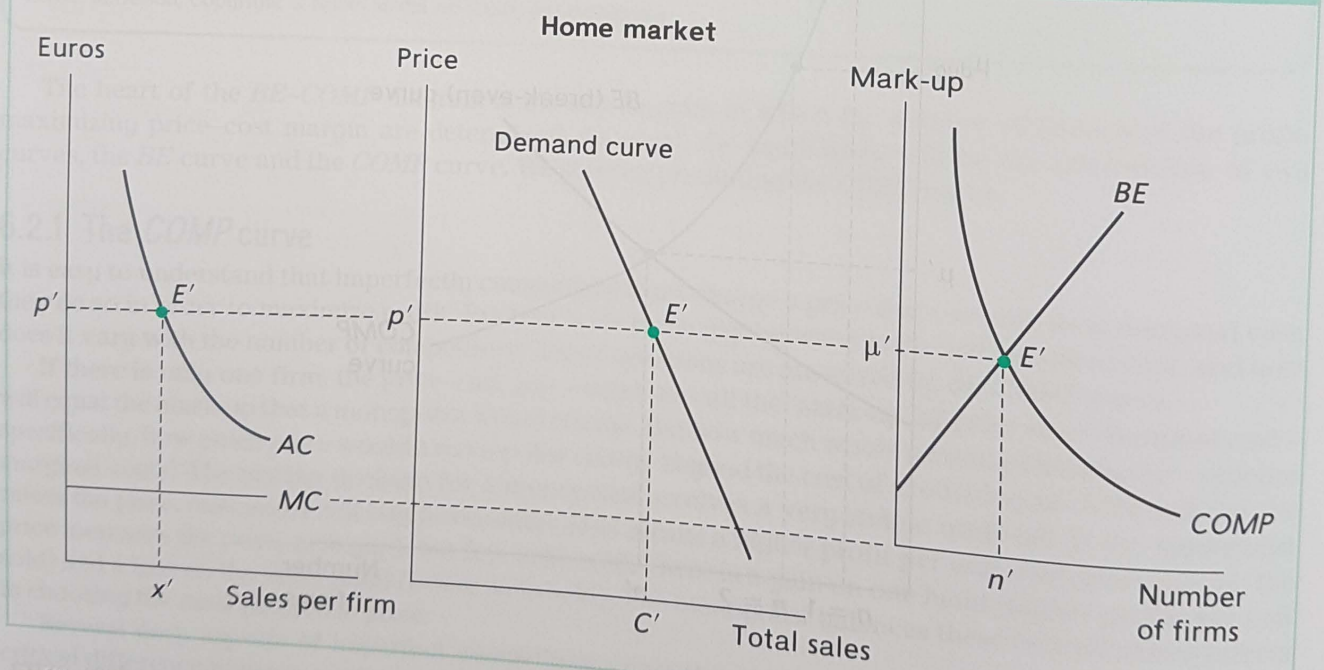
Again, this intuitive presentation of the *BE* curve will suffice for many readers, but might well raise questions in the minds of more advanced readers. These questions are addressed in the Annex.

6.2.3 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 Figure 6.3. The right-hand panel combines the *BE* curve with the *COMP* curve. The intersection of the two defines the equilibrium mark-up and long-run number 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-hand 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'.

Figure 6.3 Prices, output and equilibrium firm size in a closed economy



The left-hand panel helps us to find the equilibrium firm size, that is, sales per firm, which we denote as x'. This sub-diagram 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, Figure 6.3 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.

6.3 The impact of European liberalization

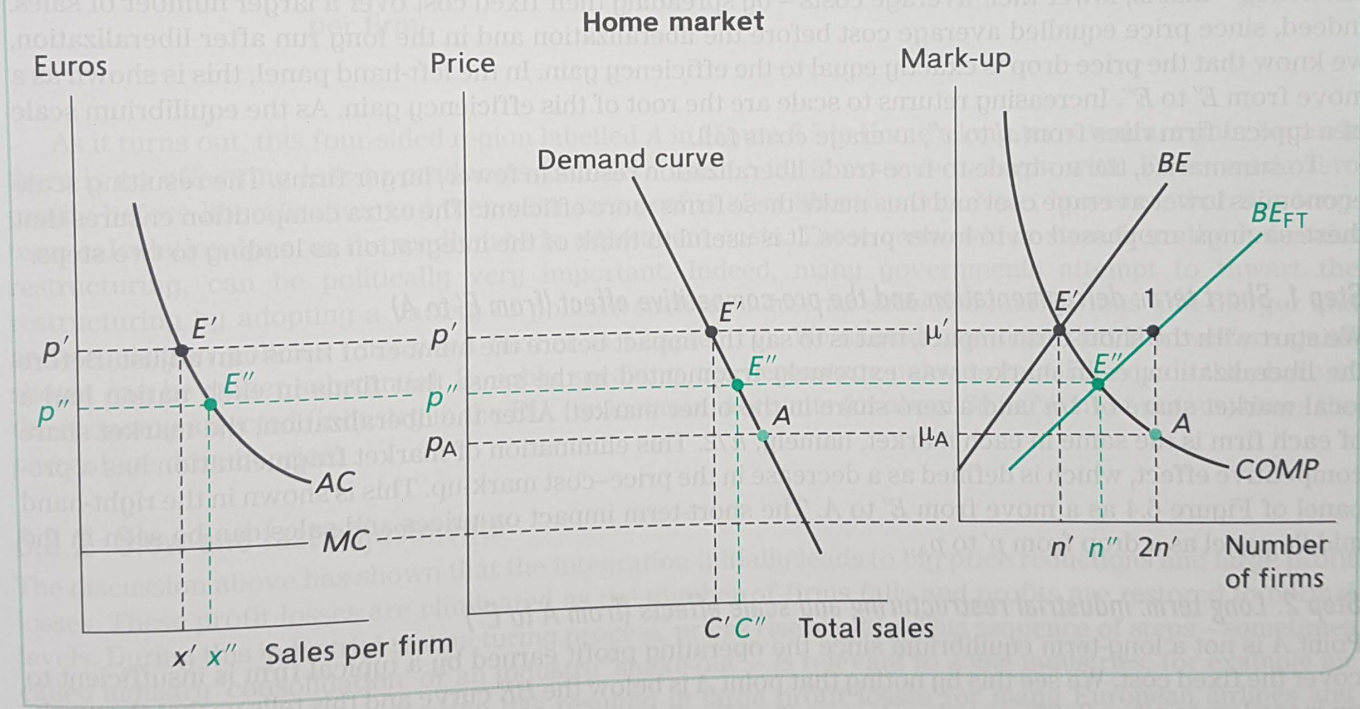
European integration has involved a gradual reduction of trade barriers. The basic economic effects of this gradual reduction can, however, be illustrated more simply by considering a much more drastic liberalization – taking a completely closed economy and making it a completely open economy. To keep things simple, we suppose that there are only two nations, Home and Foreign, 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.

6.3.1 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 Figure 6.4.

Figure 6.4 Prices, output and equilibrium firm size with integration



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 increase, thus providing a higher operating profit per firm at any given level of mark-up.

The size of the rightward shift is determined without difficulty. If there were no changes 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 immediately be pushed down to μ_A.

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 need only 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 E' to A and then 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, the 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-hand panel. As prices are falling, firms that remain in the market increase their efficiency – that is, 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-hand 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, $n'/2$. 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-hand panel of Figure 6.4 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.

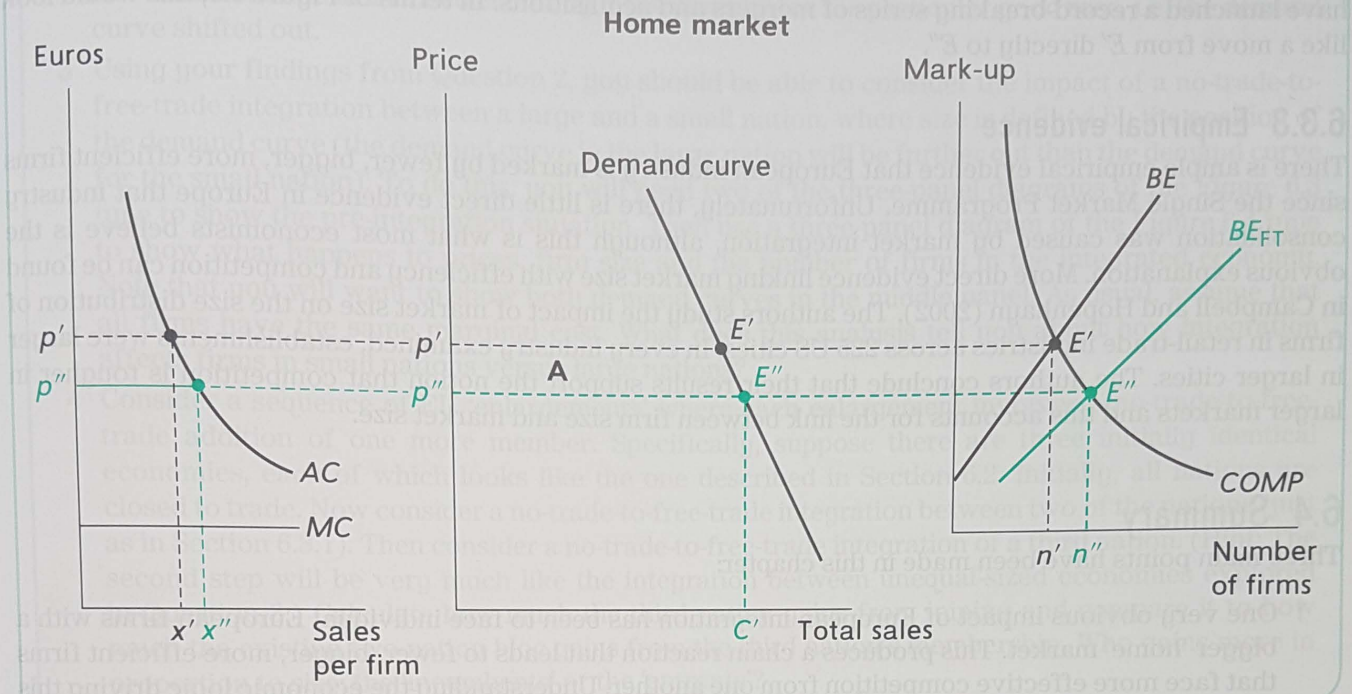
Step 2. Long term: industrial restructuring and scale effects (from A to E″)

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 four-sided area marked by p', p'', E' and E'' in the middle panel of Figure 6.5 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).

Figure 6.5 Welfare effects



As it turns out, this four-sided region labelled *A* in Figure 6.5 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 anti-acquisition policies (discussed further in Chapter 11). 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.

6.3.2 Slow and fast adjustments

The discussion above has shown that the integration initially leads to big price reductions 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 cooperative 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, cooperation between Swiss Air and Sabena meant 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 mean 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 Figure 6.5, this would look like a move from E' directly to E''.

6.3.3 Empirical evidence

There is ample empirical evidence that European industry is marked by fewer, bigger, more efficient firms since the Single Market Programme. Unfortunately, there is little direct evidence in Europe that industry consolidation 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.

6.4 Summary

Three main points have been made in this chapter:

1 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 one another. 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 prices 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.

2 The industrial restructuring is often politically painful since it frequently 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. These rules are covered in Chapter 11.

3 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 they will enhance efficiency. Again, the Commission is charged with enforcing these rules. These rules are also covered in Chapter 11.

Self-assessment questions

1 Suppose that liberalization occurs as in Section 6.3 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 three-panel diagram, like Figure 6.3, 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 Question 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 three-panel diagrams of the Figure 6.3 type to show the pre-integration situation. Then use a three-panel diagram of the Figure 6.4 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 member. Specifically, suppose there are three initially identical economies, each of which looks like the one described in Section 6.2. 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 6.3.1). 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 Question 3.) Calculate how much the third nation gains from joining and compare it to how much the existing two-nation bloc gains from the third nation's membership. Who gains more in proportion to size: the 'incumbents' or the 'entrants'?

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.

2 Has the strategy of defragmenting Europe's markets worked in the sense of promoting bigger, more efficient firms facing more effective competition? Choose an industry, for example telecoms, chemicals, pharmaceuticals or autos, and compare the evolution of the EU industry with that of the USA or Japan. You can find information on these and many more industries on the Commission website: https://ec.europa.eu/growth/sectors_en.

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 Describe the historical role that the scale economies argument played in the economic case for deeper European integration. Start with the Spaak Report and the Cockfield Report, Completing the Internal Market, White Paper, COM(85) 310 final.

References and further reading

References

Allen, C., M. Gasiorek and A. Smith (1998a) 'European Single Market: how the programme has fostered competition', *Economic Policy*, 13(24): 441–86.

Allen, C., M. Gasiorek and A. Smith (1998b) 'The competition effects of the Single Market in Europe', *Economic Policy*, 13(27): 439–86.

Badinger, H. (2007) 'Has the EU's Single Market programme fostered competition? Testing for a decrease in markup ratios in EU industries', *Oxford Bulletin of Economics and Statistics*, 69(4): 497–519.

Bellone, F., P. Musso, S. Antipolis, L. Nesta and F. Warzynski (2008) 'L'effet pro-concurrentiel de l'intégration européenne: une analyse de l'évolution des taux de marge dans les industries manufacturières françaises', OFCE, N° 2008–09, Paris.

Brander, J. and P. Krugman (1983) 'A "reciprocal dumping" model of international trade', *Journal of International Economics*, 15 (November): 313–21.

Campbell, J. and H. Hopenhayn (2002) *Market Size Matters*, NBER Working Paper 9113, Cambridge, MA.

Chen, N., J. Imbs and A. Scott (2009) 'The dynamics of trade and competition', *Journal of International Economics*, 77(1): 50–62.

Weche, J. and A. Wambach (2018) 'The fall and rise of market power in Europe', ZEW Discussion Paper No. 18-003, January, Mannheim.

Further reading: the aficionado's corner

Consideration of imperfect competition and scale effects was made possible in the 1980s with development of the so-called new trade theory:

Helpman, E. and P. Krugman (1985) *Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition and the International Economy*, MIT Press, Cambridge, MA.

Helpman, E. and P. Krugman (1989) *Trade Policy and Market Structure*, MIT Press, Cambridge, MA.

The new theory was naturally applied to the analysis of the Single Market Programme when it was first discussed in the mid-1980s. Many of the classic studies are contained in:

Winters, L.A. (1992) *Trade Flows and Trade Policies after '1992'*, Cambridge University Press, Cambridge.

A synthetic, graduate-level survey of this literature is provided by:

Baldwin, R. and A. Venables (1995) 'Regional economic integration', in G. Grossman and K. Rogoff (eds) *Handbook of International Economics*, North-Holland, New York.

An alternative presentation of the theory and a thorough empirical evaluation are provided by:

Allen, C., M. Gasiorek and A. Smith (1998a) 'European Single Market: how the programme has fostered competition', *Economic Policy*, 13(24): 441–86.

Other useful works are:

Brander, J. and P. Krugman (1983) 'A "reciprocal dumping" model of international trade', *Journal of International Economics*, 15 (November): 313–21.

Mas-Colell, A., M. Whinston and J.R. Green (1995) *Microeconomic Theory*, Oxford University Press, New York.

Useful websites

A large number of evaluations of the Single Market, most of which employ ICIR frameworks, can be found on http://ec.europa.eu/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.

Annex: Details on the *COMP* and *BE* curves

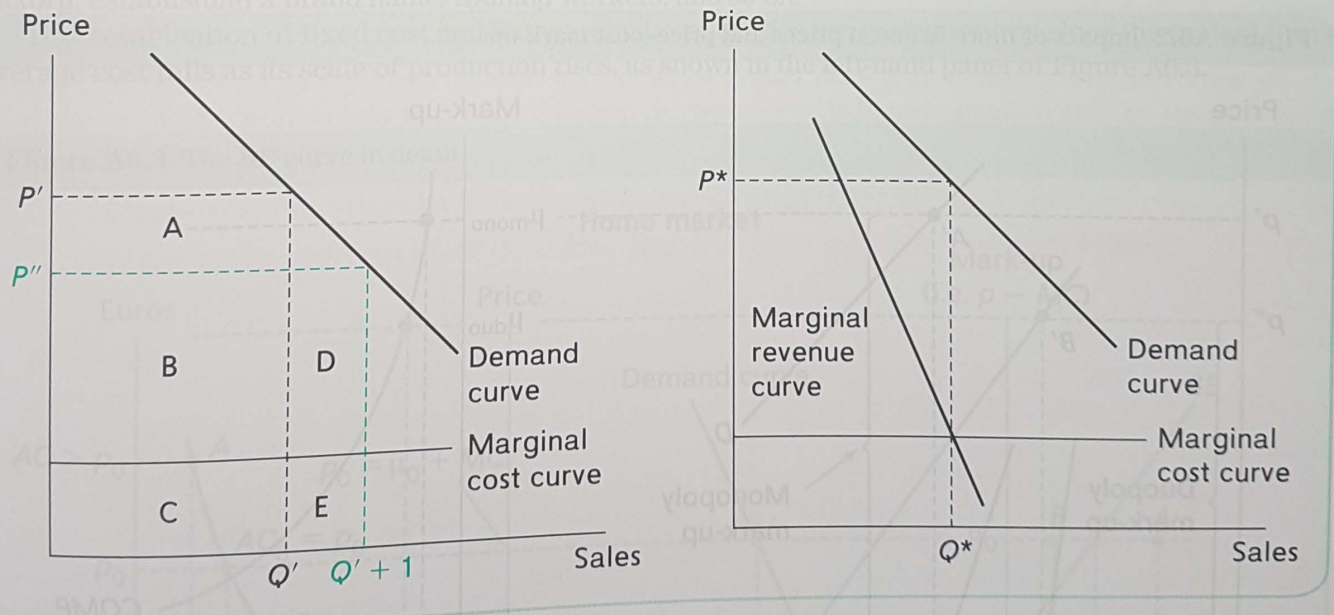
A6.1 *COMP* curve in detail

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 employed – the *BE–COMP* diagram – assumed a knowledge of simple imperfect competition models. Here we provide a brief introduction, starting with the simplest forms of imperfect competition – monopoly, duopoly and oligopoly.

The simplest imperfect competition problem is 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. The first step in this direction is to see what determines a monopolist's prices 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 the left-hand panel of Figure A6.1. 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).

Figure A6.1 Monopoly profit maximization shown graphically



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 area A. The change in cost – called marginal cost for short – is area E. Plainly, profit increases only if the extra revenue (D + E – A) exceeds the extra cost E, that is, if D – 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.

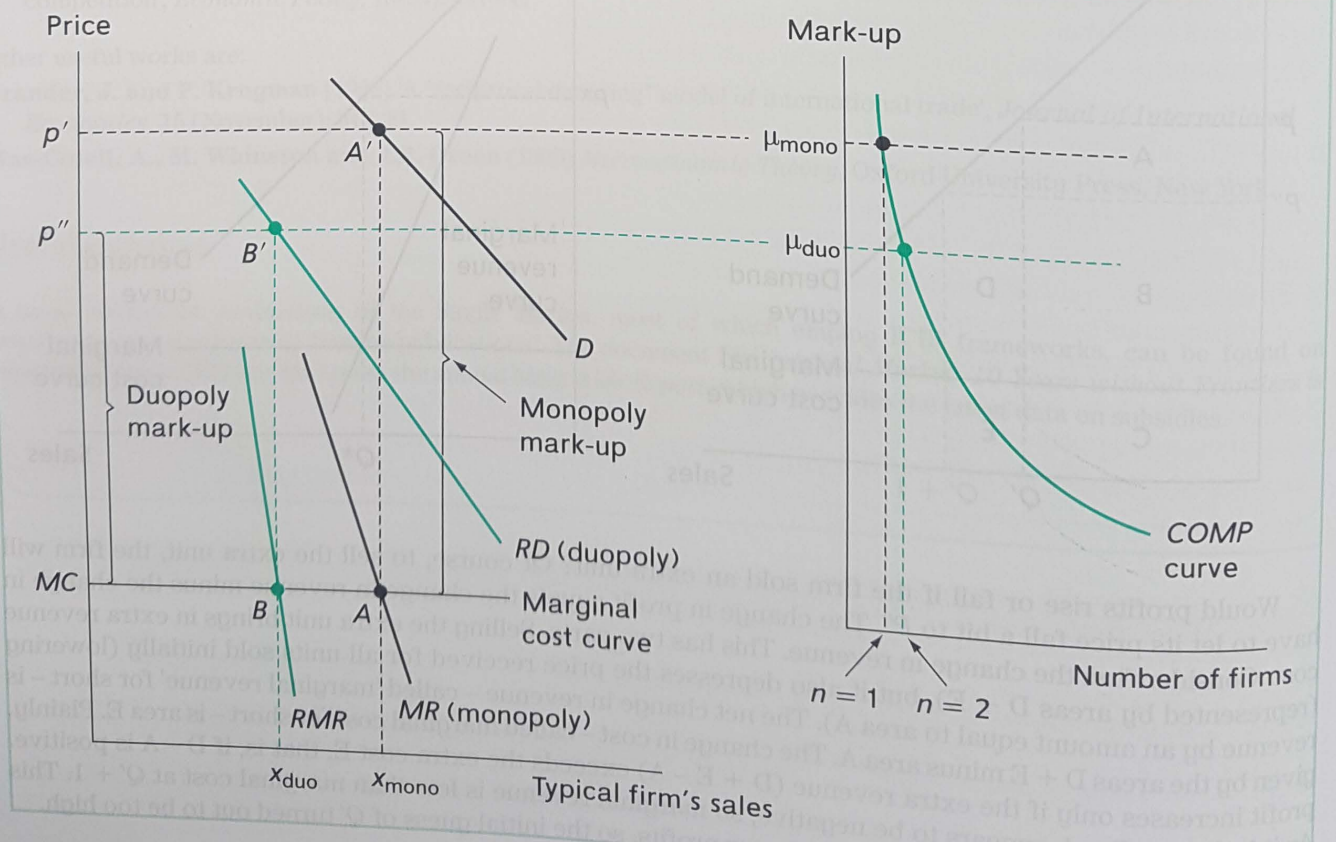
The right-hand panel of Figure A6.1 shows an easier way to find the point at which marginal revenue equals marginal cost. The diagram includes a new curve, called the marginal revenue curve. This shows how the marginal revenue (measured in euros) declines as the level of sales rises. (It declines since area A from the left-hand 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.

The next step is to consider how the profit-maximizing mark-up changes when the number of firms increases. To keep the reasoning concrete, consider an increase from one firm (the monopoly case) to two firms (the duopoly case).

The solid lines in the left-hand panel of Figure A6.2 show the usual problem for a monopolist, with the demand curve marked as D and the marginal revenue curve marked as MR. The profit-maximizing output, x_{mono}, is indicated by the point A, that is, 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, that is, 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 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

Figure A6.2 Impact of more firms on prices and price–cost mark-ups



demand curve', that is, the demand curve shifted to the left by the amount of other firms' sales (marked as *RD* in the diagram). The exact equilibrium price and output are found by identifying the intersection of the residual marginal revenue curve (*RMR*) 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.

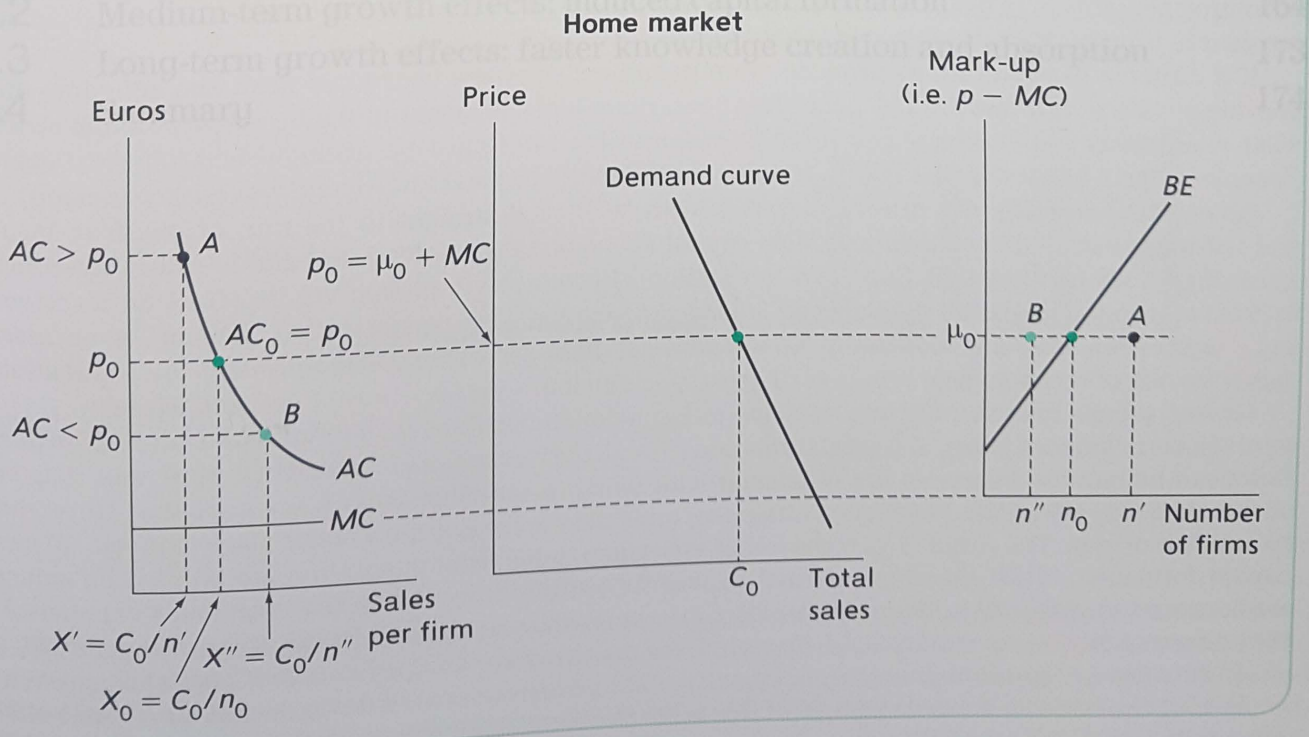
Here we have looked only at the switch from one to two firms, but it should be clear that continuing to add in more firms would produce a similar result. As the number of firms rose, the residual demand curve facing each firm would shift inwards, resulting in a lower price, lower level of output per firm and, most importantly, a lower price–cost margin, that is, 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).

A6.2 *BE* curve in detail

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 in which 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, and so on.

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 shown in the left-hand panel of Figure A6.3.

Figure A6.3 The *BE* curve in detail



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 and each firm sells 20,000 units, the operating profit per firm will be €4 million. 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_0 as in Figure A6.3, then the price will be $p_0 = \mu_0 + MC$. At this price, the demand curve tells us that the level of total sales will be C_0. 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_0/n. To see how many firms can break even when the mark-up is μ_0, we turn to the left-hand 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-hand panel, we see that the typical firm's average cost equals price when the sales of the typical firm equal x_0. Because we know that sales per firm will be C_0/n, we can work out the number of firms where the sales per firm just equal x_0. In symbols, the break-even number of firms, call this n_0, is where C_0/n_0 equals x_0.

It is instructive to consider what would happen if the mark-up were μ_0, but there were more than n_0 firms, say, n' firms, in the market. In this case, the sales per firm would be lower than x_0, namely, $x' = C_0/n'$, 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 point A in the left-hand panel of the diagram. The same point A can be shown in the right-hand panel as the combination of the mark-up μ_0 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-hand panels as point B; here, firms' average cost is below the price and so all are making pure profits (i.e. their operating profit exceeds 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 mark-up. The logic presented above, however, makes it clear that the result would be an upward-sloping BE curve.