

*Chapter 8*  
**The Competition of Competition Rules**

in

**THE NEW SYSTEMS COMPETITION**

Hans-Werner Sinn

CESifo

Ifo Institute for Economic Research  
&  
University of Munich  
Center for Economic Studies

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## *Chapter 8*

# The Competition of Competition Rules

### **A Tottering Creed**

Europe, indeed the whole world, is now at the start of a new stage of development in which the landscape of its firms is being redrawn. The common European market has been created, and international competition has become far more intense in the process of globalization than anyone could have anticipated. In the years to come the business world will be completely restructured. Economists have been astonished by the increasingly frequent news reports about mega-mergers and strategic alliances which previously would have been quite unthinkable. Former bitter rivals are now amalgamating and creating conglomerates that occupy large shares of markets. European companies, in particular, have been caught up in the wave of mergers. When Switzerland allowed the merger of Schweizerische Bankgesellschaft and Schweizerischer Bankverein under the new name United Bank of Switzerland (UBS) it paved the way for the largest bank of Europe, and when Bavarian Hypo and Bavarian Vereinsbank were allowed to merge, Europe's third biggest bank was formed. Other merger and acquisition cases of major importance were in the US the merger of Mobil Corp. and Exxon Corp. (the world's largest deal in 1998), in the UK of SBC CableComms and TeleWest Communications plc and in Japan of Sanyo and Toshiba (in the field of batteries production). At the same time, privatized state firms are not dismantled as they should be for a truly competitive solution, but are left intact by the national authorities so as to consciously create international players. Electricité de France, Spanish Telefonica or Deutsche Post are only three examples out of many.

The general attitude among politicians and company boards is that it is time to prepare for globalization and that the risk of coming too late must be avoided. The conglomerate that gets into position first can occupy ground before the others come. It enjoys a first-mover advantage, forcing its followers to content themselves with the share of the market that remains.

In this situation, the national antitrust authorities face considerable pressure to distance themselves from their old, established ideas and to remove the existing obstacles for mergers and strategic alliances. Domestic competition is now taking second place to international competition, and this is forcing the national antitrust authorities to behave like competitors themselves.

It was the credo of *ordo liberalism* that, although an unconstrained competitive market economy would be able to ensure an efficient allocation of resources, this type of economy would be inherently unstable.<sup>1</sup> The competing firms would always have an incentive to merge, because, by doing so, they could reduce supply, increase prices and raise profits. A cartel authority would be necessary to stabilize the competition and it would do so by prohibiting collusion, take-overs and mergers. Competition could only function if it was subject to strict rules enforced by the state. Antitrust laws and federal cartel offices were established as a result of this way of thinking.

The *ordo liberal* recommendations obviously make sense in a closed economy. A government which endeavours to maximize the welfare of its citizens will try to establish effective monopoly controls in order to produce a workable form of competition. The question is, how will this incentive structure change in the era of globalization? How will the forces of systems competition influence the behaviour of the cartel authorities and the decisions of the legislators, if these legislators are concerned with the welfare of their own people? Has an *ordo liberal* economic policy any chance of surviving in systems competition?

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<sup>1</sup> See Eucken (1952) as well as Berle and Means (1932).

Interest in ordo liberal policies has already waned as a result of the globalization of the economy. Warnings about domestic mergers are usually pushed aside by arguing that international competition is fierce and that the domestic industries must be armed against this competition. The ordo liberal creed is tottering.

It is, however, not quite clear whether a retreat from the ordo liberal way of thinking is really wise from a national point of view. The defenders of the ordo liberal school argue that it would not be in the national interest to loosen the antitrust legislation but to keep the national competitive forces intact, even if other countries allowed their companies to merge and increase their market power. Sticking to a strict competitive policy would serve the national interest more than the creation of national conglomerates, regardless of what the other countries are doing.

If this view is correct and generally shared, systems competition in terms of antitrust legislation will not result in the erosion of the competitive system in Europe. The landscape of European firms will stay as diversified as it is, and due to the wider markets, the European economy would be even closer to the ideal of a competitive equilibrium among private firms than when the borders were harder to penetrate than today. Systems competition would support the private competitive system.

If, instead, the other view that the individual country gains by creating global players prevails, ordo liberal antitrust policies would not survive a process of systems competition. Systems competition in antitrust legislation would not support the private competitive system but would result in a different kind of equilibrium whose properties are not very well understood by economists.

This book does not take an ultimate stand on this issue. However, there is a problem, and the purpose of this final chapter is to make the reader aware of it and trigger off further discussion. After reviewing the textbook oligopoly model, alternative model assumptions will be presented

in the following sections which support the one view and then the other, and an attempt will be made to describe what would happen if the national authorities allowed their companies to engage in a race for good starting positions by helping them to become global players and by quickly dismantling their antitrust laws. We will see that the allocative outcome of such a race will not be that bad, after all.

### **Regulating the Monopoly**

Before analysing the competition between competition rules, it will be useful to briefly review the *ordo liberal* arguments for putting restrictions on setting up cartels and on company mergers. Restricting cartels is necessary because competitive firms always have an incentive to merge to the disadvantage of the consumer. The cartel reduces the quantity it sells and thus raises prices. Whether this will cause revenue to rise or fall is not clear. However, costs will fall because of the reduction in sales and production. The consumers get the worst of the bargain. They pay higher prices, and their surplus becomes smaller. On balance, setting up a cartel is a loss for society because the cartel gains less than the consumers lose. *Ordo liberal* policy prevents this from happening by prohibiting cartels and mergers.

To reserve the complications for the analysis of systems competition, the analysis begins with the simplest version of the textbook monopoly model with  $n$  identical firms, linear demand, constant marginal cost  $c$ , and homogeneous products. The individual firm  $i$  chooses its quantity supplied,  $x_i$ , under the Cournot-Nash assumption that it has no influence on the quantities planned by other firms but can influence the common market price  $P$  to a limited extent through its own actions. A market equilibrium is reached when the market clears and all quantities are

chosen so that no supplier has any incentive to change its quantity.<sup>2</sup> The goal of firm  $i$  is to maximize profits,

$$\max_{x_i} P(X) \cdot x_i - cx_i \quad , \quad i = 1, \dots, n,$$

where

$$X = \sum_{i=1}^n x_i$$

is the total quantity sold. Given this quantity, a linear demand function determines the market price

$$P(X) = b \cdot (K - X) + c \quad ; \quad b, K, c = \text{const.} > 0, \quad (8.1)$$

where  $-b$  is the slope of the demand curve and  $K$  the quantity that would be sold in a competitive market. To simplify later steps of the analysis, the demand curve has been expressed in a somewhat unusual mathematical form, showing how the price is composed by the marginal cost  $c$  and a mark-up which depends on the free range up to the competitive quantity which is not covered by the actual output,  $K - X$ .

With perfect competition it would be true that

$$P(X) = c \quad (\text{perfect competition})$$

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<sup>2</sup> As Kreps and Scheinkman (1983) have shown, the Cournot-Nash model also can be substantiated very well in a two-step game structure, where first the capacities are determined, and then the prices are set as in a Bertrand competition.

and therefore

$$X = K. \quad (\text{perfect competition})$$

However, with a finite number of firms,  $n$ , competition is not perfect. In a Cournot oligopoly the profit maximizing conditions for problem (8.1) are

$$P(X) + P'(X)x_i = c, \quad i = 1, \dots, n. \quad (8.2)$$

These say that the marginal revenue equals the marginal cost of production. The marginal revenue from the sale of one more unit of the product is equal to the price at which this unit can be sold minus the reduction in revenue resulting from the fact that the sale of the extra unit is only possible if the infra-marginal units are also sold at a lower price. It is expressed by the term  $P'(X)x_i$  which is negative because  $P' < 0$ .

The reduction in revenue with the infra-marginal units obviously implies that  $P(X) > c$ ; that is, that price is above marginal cost and the quantity sold is below the competitive quantity  $K$ , indicating a welfare loss. The effect is stronger the larger the market share of the individual firm, because the share of the total detriment resulting from the price reduction that the individual firm has to bear is larger. This can be seen at once when it is considered that (8.2) implies a symmetrical equilibrium in which

$$n x_i = X, \quad i = 1, \dots, n.$$

Equation (8.2) then becomes

$$P(X) + \frac{1}{n} P'(X) \cdot X = c \quad (8.3)$$

where  $1/n$  is the market share of one firm. Applying equation (8.1), it follows from (8.3), with a little transformation, that aggregate output is

$$X = \frac{1}{\frac{1}{n} + 1} K. \quad (\text{Cournot oligopoly}) \quad (8.4)$$

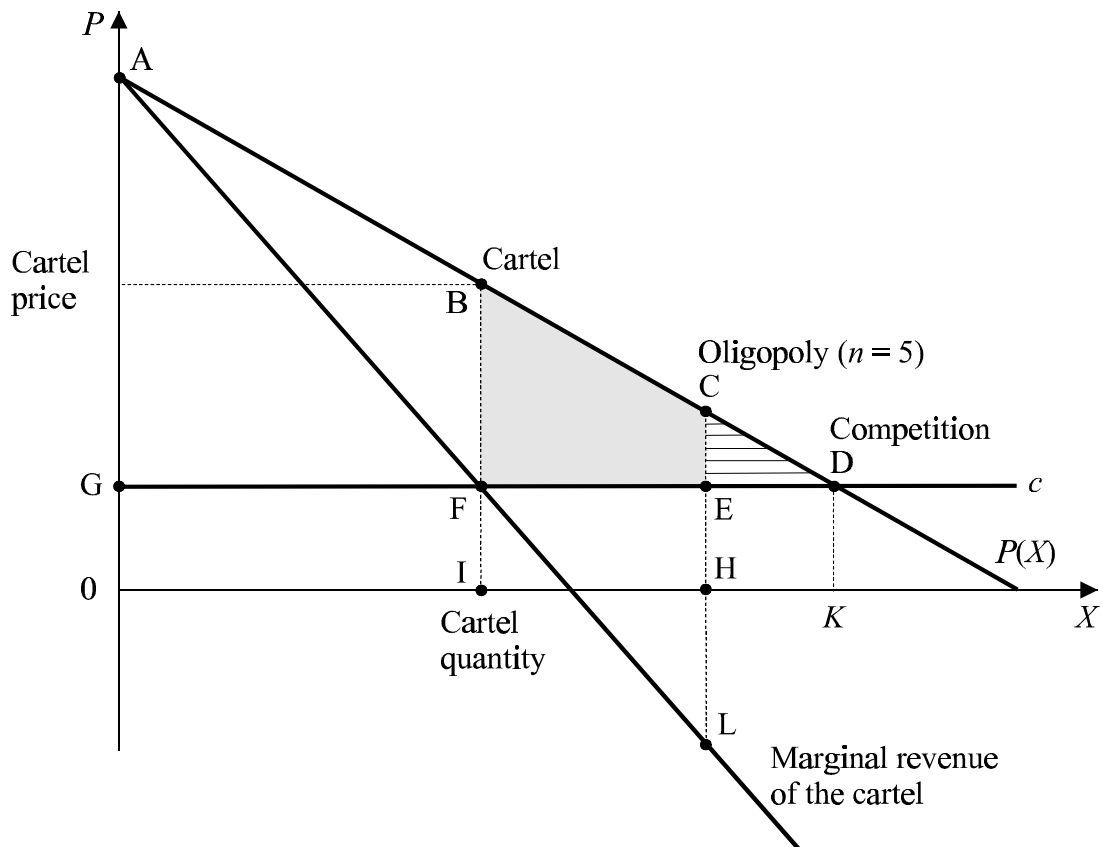
This expression shows that, with linear demand, the quantity sold is a falling function of the market share of the single firm. In the extreme case of a monopoly,  $1/n = 1$ , the quantity sold is half the competitive quantity,  $X = K/2$ , and in the other extreme where the market share approaches zero,  $1/n \rightarrow 0$ , it is equal to the competitive quantity,  $X = K$ .

The deeper reason for this implication of alternative market shares is a negative pecuniary externality the single firm imposes on other firms by forcing them to lower their price if it decides to increase its sales by a unit. The smaller the market share the larger is this pecuniary externality and the larger is the single firm's incentive to deviate from the monopoly quantity that would maximize the joint profits of all firms: the better functions the market economy.

Unfortunately, the externality can be internalized if firms merge or establish a cartel. With perfect collusion, there is no externality, and with a linear demand curve and constant marginal costs, only half the competitive quantity is produced.

Figure 8.1 illustrates these relationships. In a price-quantity diagram it shows the marginal cost curve  $c$ , the demand curve  $P(X)$  and the marginal revenue curve for the cartel. The last mentioned graphs the left-hand side of equation (8.3) for the case where  $n = 1$ . With the

particular linear demand curve (8.1), the marginal revenue curve starts at the same place on the ordinate as the demand curve (i.e. at point A) and it is twice as steep as the latter. In the cartel optimum, F, the marginal revenue equals the marginal cost and the mark-up above the marginal cost is BF. With an oligopoly of five suppliers, on the other hand, the mark-up is only CE and the quantity sold exceeds the monopoly quantity by the amount IH.



**Figure 8.1** The ordo liberal creed.

Setting up the cartel benefits the suppliers because profit increases by the area FEL. (Since the revenue can be measured by the area under the marginal revenue curve and cost by the area under the marginal cost curve.) At the same time social welfare falls. Social welfare can be defined as the sum of all economic rents, which are equal to the difference between the consumers' maximum willingness to pay, the area under the demand curve, and the production costs which are given by the area under the marginal cost curve. With perfect competition, where price equals marginal cost, social welfare is measured by the triangle ADG, with the oligopoly (here with five members) it is measured by the area ACEG, and with the cartel it is measured by the area ABFG. Establishing a cartel obviously brings about a reduction in the total surplus of BCEF, although profit, which is part of this total, increases. The cake is smaller but the producers can cut themselves an absolutely bigger piece of it.

The economic inefficiency of setting up a cartel is the basis of the ordo liberal creed. The economy can be protected from the damaging effects of monopolizing the market by means of effective antitrust controls. In the present example, antitrust regulation would prevent welfare from falling by the area BCEF.

### **The Advantage of Forming a Common Market**

Let us now try to mimic with the model set up above the creation of a common European market. Suppose that all countries followed ordo liberal policies before European integration, and that market segmentation is now abolished. Creating the common market will intensify competition, given the national antitrust laws, and it may lead to an abolishment of these laws. These two effects will be studied one by one. This section studies the implications of joining the markets, given the antitrust laws, and the remainder of the chapter is devoted to the case of abolishing antitrust laws, given that a common market has been created.

Suppose, the given set of  $n$  firms is divided into  $z$  identical markets or countries operating in autarchy, each containing  $n/z$  of the total of  $n$  firms. Suppose further that the market-specific demand curves are identical and given by the functional form

$$P(y_j) = b \cdot (K - z y_j) + c; \quad b, K, c = \text{const.} > 0, \quad j = 1, \dots, z,$$

where  $y_j$  is quantity produced in market  $j$ . Aggregating these demand curves 'horizontally' generates the overall demand curve described with (8.1), where

$$X = \sum_{j=1}^z y_j.$$

As there are  $n/z$  firms per market and each market's competitive quantity is  $K/z$  it follows by straightforward application of the above reasoning that in each of the separate markets the supply is given by

$$y_j = \frac{1}{\frac{z}{n} + 1} K/z, \quad j = 1, \dots, z, \quad (\text{autarchy, Cournot-Nash})$$

such that the aggregate quantity sold is

$$X = \frac{1}{\frac{z}{n} + 1} K. \quad (\text{autarchy, Cournot-Nash})$$

This equation coincides with (8.4) when  $z = 1$ , but in general it indicates a smaller quantity. The larger the number of separate markets, the smaller is the aggregate quantity supplied. Inversely, the following proposition is obvious.

**Proposition 8.1:** *Suppose there is initially a group of identical markets between which no trade is allowed. Creating a common market, given the number of firms, increases aggregate output and welfare because the market share of each single firm falls and competition becomes more intense.*

### **The Ordo Liberal Equilibrium in Systems Competition**

The welfare gain from creating a common market, as stated in proposition 8.1, was derived under the assumption that the total number of firms,  $n$ , is constant, which basically means that the national antitrust laws remain intact, prohibiting the formation of larger conglomerates. The interesting question, however, is whether this assumption is justified. What if antitrust policies will themselves react to the creation of a common market?

This is the problem of where a competition of competition rules will lead. Will this type of competition between the legislators bring about an ordo liberal equilibrium where each parliament prohibits cartels and mergers, or will another kind of equilibrium result where the single countries seek advantages by dismantling their antitrust laws, perhaps even before the others do so? As explained above, this chapter cannot give an ultimate answer to this question. What it can do, however, is outline which kinds of argument would support an affirmative answer and which ones would support a denial. Let us begin with the affirmative view first.

Assume again that initially there are  $n$  firms and that these firms are equally distributed over  $z$  countries between which free trade in goods is allowed. Let  $n$  be sufficiently large so that there

are at least two firms per country. The first  $m$  firms are located in various countries where the *ordo liberal* economic policies are in place. The remaining  $n - m$  firms belong to a certain country, say 'Germany', which lifts the prohibition on mergers such that there are  $m+1$ ,  $m+1 < n$ , firms in total after the German conglomerate has been formed. Quantities remain flexible and there are no commitment possibilities.

The purpose of this exercise is to find out whether Germany will be able to gain from dismantling its merger prohibition. If it does, an *ordo liberal* equilibrium in systems competition does not exist. However, if Germany cannot gain by allowing mergers, it will not, in fact, do that, and systems competition is compatible with an *ordo liberal* equilibrium.

If they are allowed to form a conglomerate, firms will actually make use of this possibility, because, given the behaviour of other firms, they can internalize part of the pecuniary externality and increase their profits by reducing their supply. However, the conglomerate will be indistinguishable from the other firms and produce the same output as each of the other firms does. A new equilibrium will emerge, where the joint output will be

$$X = \frac{1}{\frac{1}{m+1} + 1} K . \quad (\text{one country allows mergers})$$

Obviously, as  $m+1 < n$ , the joint output will be smaller than in the case where all antitrust laws remain in place, as indicated by (8.4), and Germany's market share will decline from  $(n-m)/n$  to  $1/(m+1)$ .

As the merger reduces both the market share of the previous  $n-m$  German firms and aggregate supply, it is clear that German welfare falls. This country continues to receive  $1/z$  of the aggregate consumer surplus, and it would receive  $1/z$  of the aggregate profit if the market

share of its firms had not declined. Thus, national welfare would decline in proportion to the decline in the sum of all rents even if the market share had stayed constant. Given, however, that the share in profits that accrues to Germany shrinks, national welfare falls for yet another reason. Thus, the condition for an ordo liberal equilibrium in systems competition is satisfied. It does not pay to deviate from a situation where ordo liberal policies are pursued in all countries.

**Proposition 8.2:** *If, in a symmetrical confederation of countries, private firms follow Cournot-Nash strategies, it is not in the interest of a single country to abandon its antitrust law and allow its national firms to merge. Systems competition brings about an ordo liberal equilibrium where all countries maintain their antitrust laws despite the creation of a common market.*

### **Ordo Liberal Policy vs. First Mover Advantages**

This was the affirmative view, as is held by the ordo liberal economists. Politicians and company leaders doubt this view, however. They insist that the common European market will bring about national conglomerates and that it is important to form such conglomerates earlier than others. Obviously, they have first-mover advantages in mind when they argue that national conglomerates should be formed and antitrust laws should be generously interpreted or even abandoned to pave the way for the creation of strong international competitors. 'A country will not be able to succeed in a globalized world unless it is able to create at least some global players,' is a statement of a recent German economics minister which makes the position utterly clear.

First-mover advantages result from strategic decisions which can credibly and irrevocably be made, forcing players who come later to take these decisions as given and allowing them merely to react. The necessary credibility may result from sinking fixed costs, subscribing to binding

legal contracts or receiving public support, which makes it useless for the competitors to challenge these decisions.

Sinking fixed costs may result from putty-clay technologies or the prevalence of binding, long-term employment contracts. They are compatible with the above assumption of constant variable cost if it is assumed that the production decision is made initially and cannot easily be changed thereafter, while the production cost occurs periodically.

An important example of binding legal contracts are the so-called strategic alliances which have gained much importance in recent years. Strategic alliances involve mutual promises of quantity constraints intended primarily to be binding for the alliance partners but which may be even more important as signals to rivals of irrevocable quantity decisions.

Government policy decisions aimed at the formation or preservation of strong international players are also frequent phenomena. Think of national aircraft or spacecraft industries which are of military importance or of new technology clusters which governments want to set up so as to foster technological progress. The topic has a substantial practical importance in the context of privatized state firms. Often such firms are not dissolved into a set of competitive companies as they should be under the *ordo liberal* creed but kept intact and supported by explicit government actions. Examples are the German state banks (*Landesbanken*), which enjoy the privilege of unlimited state warranties; *Electricité de France*, which occupies a publicly sanctioned and subsidized state monopoly position in France; *Deutsche Post*, which is building up an international logistic network and which the government wants to grow fat before competitors are allowed in; or Spanish *Telefonica*, which received a hidden subsidy of many billions of euros by not being forced to pay for UMTS licences and which therefore was able to buy such licences on a large scale in other countries.

In the analysis that follows it is assumed that parliaments design their competition policies so as to maximize national social welfare, choosing between an *ordo liberal* policy and a first-mover policy. An *ordo liberal* policy involves the prohibition of cartels or the dismantling and subjection of privatized companies. A first-mover policy involves creating national conglomerates, abolishing anti-trust laws, providing state subsidies and privileges, preserving state protection after privatization and the like, including measures to credibly signal irrevocable capacity and supply decisions. For simplicity the discussion will typically be phrased in terms of maintaining and abolishing antitrust laws, but the reader should keep these other strategies in mind.

It has been assumed that when countries' borders are closed all parliaments will follow *ordo liberal* strategies, as suggested by the introductory model. The question is whether such strategies will maximize national welfare when the borders are opened such that there is a common international market for all the firms of an industry branch.<sup>3</sup> A positive answer to this question is necessary for the existence of an *ordo liberal* equilibrium in the competition between competition rules and, as was shown (proposition 8.2), such an answer emerges if no credible commitment strategies are available for a country such that all countries play the Cournot game. Things are different, however, if commitment strategies of the kind discussed in this section are available.

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<sup>3</sup> In what follows, national welfare will be defined as the sum of national profits and consumer surpluses. Little would change when it is assumed that the national parliament maximizes the profits of the domestic firms rather than national welfare, which Olson's (1965) theory of the political dominance of the producers' interests would imply.

*Stackelberg position through lifting the prohibition on cartels*

Suppose Germany lifts its ban on cartels and helps its firms to credibly commit to their supply decisions. In this case German firms can occupy the position of a Stackelberg leader, while *ordo liberal* attitudes in the other countries force the firms of these countries to take on follower strategies. The Stackelberg leader knows how its rivals would react to its own behaviour and uses this knowledge to arrive at the best possible, profit maximizing, decision. Unlike the Cournot model, where all the players are in symmetrical positions because they cannot commit to irrevocable supply decisions, the leader does not assume that it must adapt to the quantity set by the others. Instead it knows that it can confront the others with its own irrevocable production capacity and, to this extent, present them with a *fait accompli*.

The behaviour of the firms in the other countries which can only react must be examined next in order to determine the optimal policy of the Stackelberg leader. This behaviour will be determined by the rules set out in the previous section, i.e. by condition (8.2). Now, though, the aggregate sales volume, which according to equation (8.1) determines the product price, is given by

$$X = X_R + X_G \quad (8.5)$$

where

$$X_R \equiv \sum_{i=1}^m x_i \quad \text{and} \quad X_G \equiv \sum_{i=m+1}^n x_i \quad (8.6)$$

are the total quantities supplied and the subscripts G and R stand for Germany and the rest of the countries. As before, there are  $n-m$  firms in Germany and  $m$  firms in the rest of all countries. Sticking to the basic assumptions of the initial model and using (8.1), it follows from (8.2) that

the supply of an individual firm which is located in the other countries is determined by the equation

$$x_i = K - X \quad \forall i = 1, \dots, m. \quad (8.7)$$

Thus, the individual firm which behaves as a Cournot-Nash follower produces a quantity which is just equal to the difference between the competitive quantity and the quantity produced by all firms, including itself. Given the quantity supplied by all other firms, the individual firm can still vary the total supply within a certain range up to the competitive quantity. As it is faced with a decision problem like that of a monopolist it will cover half of this range with its supply - that is, it will leave a gap between the total quantity and the competitive quantity equal to the quantity it supplies itself.

Summing all  $m$  equations of type (8.7), and taking (8.5) and (8.6) into account, gives the total supply of the firms in the rest of the countries which do not allow a cartelization as

$$X_R = \frac{1}{\frac{1}{m} + 1} (K - X_G). \quad (8.8)$$

This equation is formally similar to (8.4), except that the free production range up to the competitive quantity is reduced by the quantity covered by the Stackelberg leader, the German cartel. The Cournot players produce a quantity which covers a fixed share,  $1/[(1/m)+1]$ , of this free range which depends on their number as in (8.4).

Knowing this reaction pattern, the German cartel can choose its quantity  $X_G$  so as to maximize its profits. The decision problem of the German cartel is

$$\max_{X_G} P(X) X_G - c X_G \quad (8.9)$$

subject to (8.5) and (8.8).

Applying the demand function (8.1), (8.9) can be written as

$$\max_{X_G} X_G b(K - X_G) \frac{1}{1+m} .$$

From the first-order condition of this optimization problem it follows that

$$X_G = \frac{K}{2} \quad (8.10)$$

which means that the German cartel provides half the competitive quantity just as a monopolist does. The firms of the rest of the countries, which are not in a cartel, comply with rule (8.8), and thus, because of (8.10), supply a quantity given by

$$X_R = \frac{1}{\frac{1}{m} + 1} \cdot \frac{K}{2} .$$

The total quantity supplied therefore is

$$X = X_G + X_R = \frac{1+2m}{1+m} \cdot \frac{K}{2}. \quad (\text{Stackelberg}) \quad (8.11)$$

### *National welfare gain*

Taking a Stackelberg position can increase the ‘German’ profits and the ‘German’ welfare but it does not have to. Because of the revealed preference theorem, the profits increase when the German quantity sold changes compared to the Cournot-Nash game, whatever the direction of the change is. However, the consumer surplus only rises when the price falls and this requires there to be higher total sales. Note that, because of the Cournot-Nash behaviour of the other firms, the aggregate quantity will always move in the same direction as the German quantity does. When taking a Stackelberg position results in the same aggregate quantity sold as in the case where the antitrust laws are retained, then neither German profit nor German welfare changes.<sup>4</sup> When the aggregate quantity sold falls, the German profit increases but the consumer surplus falls. Only if the quantity sold increases when a cartel is established can an increase in both the profit of the German firms and the German consumer surplus be expected, providing strong incentives for the German legislator to abolish the antitrust law.

The change in the aggregate quantity sold as a result of establishing a cartel is the net effect of two counteracting forces. On the one hand, the cartelization of the German firms leads to a reduction in the number of competitors in the international market and this tends to reduce the aggregate quantity sold. This effect is similar to the one that makes it wise not to permit cartelization in a closed economy. On the other hand, in an open economy, the Stackelberg leader may be able to expand sales at the expense of his rivals, increasing the aggregate quantity sold.

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<sup>4</sup> The profits and the welfare of the other countries also remain constant.

This effect resembles the one emphasized by the strategic trade literature.<sup>5</sup> If there are sufficiently many German firms initially relative to the number of firms in the rest of the world, the first effect will dominate, and the aggregate quantity sold will fall. If, on the contrary, there is only *one* German firm initially, and if this firm is now able to position itself ahead of the other firms - that is, to change from a Cournot-Nash player to a Stackelberg player - there will certainly be an increase in the aggregate quantity. In which direction the quantity supplied will change when the number of German firms is between the two extremes is not obvious.

Letting  $X_A$  stand for the quantity sold which results when all antitrust laws are in force and  $X_S$  stand for the quantity which, in the case of the Stackelberg game, results from abolishing the German antitrust law, then, after a little transformation,

$$X_S \begin{cases} > \\ = \\ < \end{cases} X_A \Leftrightarrow m+1 \begin{cases} > \\ = \\ < \end{cases} n-m \quad (8.12)$$

follows from (8.4) and (8.11). The result says that establishing a cartel of German firms leads to an increase in total sales, and thus to a fall in price, when the number of firms in the other countries,  $m$ , is larger than, or equal to, the number of German firms before the cartel was set up,  $n-m$ . Only when in the initial situation there were at least two more firms in Germany than there were in the rest of the world will the quantity sold fall and the price level rise. However, if we stick to the basic assumption of identical countries, this case is not possible here and, of course, it is not realistic where a country like Germany is being considered. Thus the national consumer surplus unambiguously increases as a result of setting up the cartel. The following consequences emerge.

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<sup>5</sup> See Brander and Spencer (1981).

**Proposition 8.3:** *In autarchy each country maximizes its own welfare when it imposes an effective antitrust regulation. However, once the borders are opened, it is in the national interest of any single country to help its national firms to form a cartel and to credibly commit to a common supply decision. The cartel will take on a Stackelberg leadership position if the other countries continue to stick to ordo liberal policies. The leadership position results in an increase of national welfare by lowering prices and shifting profits from foreign to domestic pockets. Therefore, an ordo liberal equilibrium does not exist in systems competition when countries can create national conglomerates and help them to credibly commit to their supply decisions.*

The result just derived is a negative one. It says that a country will take on a Stackelberg position if the others do not, proving that no ordo liberal equilibrium in systems competition exists. It does not describe the equilibrium which will emerge instead. It should probably be assumed that the other countries will also get rid of their antitrust laws, form national conglomerates and help these conglomerates credibly commit to their supply decisions. In this case the different national cartels interact in a more complicated fashion, as will be analysed next.

### **The Deregulation Race**

Suppose now that all countries consider the possibility of helping their national companies to attain credible leadership positions. The advantage of taking on leadership positions is higher the earlier the commitment is made, because countries that decide later have to take the previous decisions as given. Clever governments will first abolish their antitrust laws and help establish strong national conglomerates, others will follow after a delay, and some countries will not be able to overcome internal political obstacles and to act before many other countries have done so. In such a situation, it pays to be quick in order to achieve the position of a Stackelberg leader. A

country which, thanks to rapid deregulation, is able to establish universally respected conglomerates of firms more quickly than other countries can has created facts which the firms of all successive countries must take into account in planning their own capacities. Speed is important. First come, first served — but those who come second or third may still be better off than those who come even later because they, too, can create unalterable facts for the latecomers. There is more than just one Stackelberg leadership position. The later you come, the more ground is already occupied and the smaller the position that you must be content with. A deregulation race starts because the starting position will decide long-term success.

*A sub-game perfect equilibrium*

The order in which the countries' governments make the decision about repealing the national antitrust law depends on national features which are not considered here and, indeed, are not important. What *is* important is to know how the parliaments decide when it is their turn and how the private firms behave as a result. The parliament has three choices.

- (1) It may repeal its antitrust law immediately.
- (2) It may repeal its antitrust law later, after other parliaments have done so.
- (3) It may decide never to repeal its antitrust law.

Firms also have similar decision opportunities, because setting up a cartel is a right, but not a duty. If the national antitrust law is not repealed and *ordo liberal* attitudes continue to prevail, the firms in the country are not in a position to make binding quantity agreements and thus they behave like Cournot-Nash competitors, adapting themselves to the quantities fixed by the national cartels of the other countries. But once the national antitrust law is repealed, the firms of a country

- may immediately build a national cartel,

- may decide to build such a cartel later or
- decide not to cartelize at all.

As explained above, it will be assumed that building a cartel is equivalent to adopting a commitment strategy since there are binding contracts between the cartel members ('strategic alliances') which serve as credible signals to others, or since the government will credibly support the cartel or conglomerate with protective policy decisions. Again, countries are assumed to have the same size and the same number of firms with the same constant average and marginal cost  $c$ . Let  $m$ ,  $m \geq 2$ , now be the number of firms per country. The buyers are distributed equally over all countries.

A deductive solution to the game structure just described is extremely difficult because of the large number of possible decisions. Another method will therefore be used here. We start with a conjecture about the behaviour of the parliaments and firms (a), continue with a recursive calculation of the details of the game among the firms which results from the parliaments' conjectured decisions, (b), and conclude with the proof that no parliament can make its country, and no firm can make its owners, better off when they make policy decisions different from those conjectured, (c).

*(a) Conjecture*

The conjecture is that each national parliament uses its scope for decision making to repeal the antitrust law as soon as the chance arises and as long as there is at least one other parliament that has not yet decided to repeal the law. The repeal makes it possible for the national firms to establish cartels and to credibly set the quantities they sell in advance of other firms in order to shift profits to their own pockets. It is conjectured that only the parliament that is the last to decide does not repeal, because by doing so it will not bring about a profit transfer but only a

reduction in the consumer surplus. It is also conjectured that the firms immediately use the right to establish a national cartel as soon as their parliament allows them to.

*(b) Calculation*

In order to analyse the behaviour of the firms in detail, given the conjectured behaviour of the parliaments, the decision situation of the players must be looked at recursively. Technically speaking, the task is finding a sub-game perfect solution for the quantity planning of the firms. The players are the firms and the parliaments of the  $z$  countries. The countries will be numbered in reverse order of their decision to repeal the national antitrust law, where the last country, which is conjectured to retain the law, will be number 1. The last country will produce the quantity  $x_1$ , the second last  $x_2$ , the third last  $x_3$ , and so on. The total quantity that the  $i$  last countries produce is  $X_R^i$  and the total quantity that the  $z-i$  previous countries produce is  $X_A^{z-i}$ .

For the moment, it will still be assumed, in accordance with the conjecture described, that the firms use the right to form a cartel as soon as they are allowed to. It is not a question of whether they will use it, but how they use it when they do.

The firms of the last country, 1, are confronted with the fixed quantity  $X_A^{z-1}, X_A^{z-1} < K$  given by the earlier players, where  $K$  is once again the competitive quantity - that is, the quantity at which the international demand curve cuts the horizontal marginal cost curve. The firms in country 1 play a Cournot-Nash game because of the cartel ban and thus choose, analogously to (8.8), the aggregate quantity

$$X_R^1 \equiv x_1 = \frac{1}{\frac{1}{m} + 1} (K - X_A^{z-1}) \quad (8.13)$$

where  $m$  is now the number of firms in country 1. The second last country, 2, has, as conjectured, a cartel which is confronted with the given aggregate quantity chosen by the previous cartels  $X_A^{z-2}$ ,  $X_A^{z-2} \leq X_A^{z-1}$ . The cartel of country 2 knows from (8.13) and

$$X_A^{z-1} \equiv x_2 + X_A^{z-2} \quad (8.14)$$

that it can influence the quantity chosen by the firms of country 1. It solves the maximization problem

$$\max_{x_2} P(X) \cdot x_2 - c x_2, \quad X = X_R^1 + x_2 + X_A^{z-2}$$

subject to (8.13) and given  $X_A^{z-2}$ .

Because of (8.1) and (8.14)

$$x_2 = \frac{1}{2} (K - X_A^{z-2}) \quad (8.15)$$

follows from this, which then determines

$$X_R^2 \equiv x_2 + X_R^1. \quad (8.16)$$

The cartel of the third last country is faced with the fixed quantity  $X_A^{z-3}$ ,  $X_A^{z-3} \leq X_A^{z-2}$ , given by the  $z - 3$  earlier cartels and knows from (8.13), (8.15) and

$$X_A^{z-2} \equiv x_3 + X_A^{z-3}$$

how it can influence the behaviour of the succeeding countries with its quantity decision. It solves the maximization problem

$$\max_{x_3} P(X) \cdot x_3 - c x_3, \quad X = X_R^2 + x_3 + X_A^{z-3}$$

subject to (8.13) and (8.15), given  $X_A^{z-3}$ ,

which, because of (8.1), (8.15) and (8.16), determines

$$x_3 = \frac{1}{2}(K - X_A^{z-3}) \quad (8.17)$$

and therefore also

$$X_R^3 \equiv x_3 + X_R^2.$$

The chain of decisions continues in a similar fashion. The cartel of the  $i$ th last country solves the problem

$$\max_{x_i} P(X) \cdot x_i - c x_i, \quad X = X_R^{i-1} + x_i + X_A^{z-i},$$

once again subject to the solutions for all succeeding countries and given the decisions of all preceding ones as summarized by  $X_A^{z-i}$ . It chooses the quantity

$$x_i = \frac{1}{2}(K - X_A^{z-i}) \quad (8.18)$$

which determines

$$X_R^i \equiv x_i + X_R^{i-1}.$$

Equation (8.18) also holds for the cartel of the first country that makes a decision,  $i = z$ , where, of course,

$$X_A^0 = 0.$$

The simple decision rule in such a sub-game perfect equilibrium is that country  $i$ ,  $i = 2, 3, \dots, z$ , covers with its production half the range  $K - X_A^{z-i}$  between the competitive level and the quantity given by the previous cartels.

This decision rule can once again be understood by comparing it with the profit maximizing decision rule of a monopolist. The monopolist, too, supplies exactly half of the range available to him when the demand curve is linear. The difference from the monopoly case is only that the range no longer starts at zero but at the quantity given by the previous cartels, and that the perceived demand curve is flatter because it also takes account of the fact that the cartel can partly drive out the quantities of the following countries if it decides to expand its own quantity. As the slope of the perceived demand curve, given the competitive quantity  $K$  where the demand curve intersects the marginal cost curve, has no influence on the quantity planning, the number of

countries that follow plays no role for a particular cartel's decision. In every case, it will itself cover half of the range still open to it.

Country 1 is the only exception to the rule that the quantity supplied is exactly half the still available range up to the competitive quantity because no cartel will be set up in that country. The oligopoly of the  $m$  firms in this country also covers a fixed share of the range  $K - X_A^{z-1}$ , but this share is  $m/(1+m)$  which, because  $m \geq 2$ , is more than  $1/2$  (at least  $2/3$ ). Interestingly, the number of firms in this country has no influence on the prior cartel decisions although the total sales quantity is an increasing, and the product price is a falling, function of this number. An increase in the number of firms in country 1 would only make the perceived demand curves of the prior cartels flatter, but it would not influence those cartels' profit maximizing quantities. Even if country 1 permitted a monopolistic policy with  $m = 1$ , this would have no influence on the quantity planning of the previous cartels. This can be seen easily as  $x_2$ ,  $x_3$  and  $x_i$  in (8.15), (8.17) and (8.18) are independent of  $m$ .

*(c) Proof*

It is now time to prove that the conjectured behaviour of the national parliaments and firms does actually maximize their national welfare. Consider the parliaments first. There are, in principle, three options open to the parliament of a particular country at the exogenously fixed time of decision. It can repeal the antitrust law. It can decide to enter the time hierarchy after a country that comes later and then repeal the law. And it can refrain from repealing the law at all. For the moment, it is still assumed that the firms use the right to set up a cartel as soon as they are allowed to.

Let us begin once more with the parliament which decides last, and which has the number 1. This parliament does not have the three options, because there is no other parliament whose

decision it can wait for. It can only choose between repealing and retaining its antitrust law. It was conjectured that it retains the antitrust law.

This conjecture is not trivial. On the one hand, the situation of this country has a certain similarity with that of a country in autarchy whose firms face a competitive range of size  $K - X_A^{z-1}$  and which should stick to *ordo liberal* policies so as to avoid the welfare loss from setting up a monopoly. On the other hand, allowing for a national cartel has the advantage of being able to gain from a price increase imposed on the consumers of all countries.

To find the answer, a formal analysis is necessary. Suppose that country 1 repeals its antitrust law and that its firms set up a cartel. The firms decide like a monopolist would in relation to the remaining range; that is, they fix a quantity  $(K - X_A^{z-1})/2$  rather than  $(K - X_A^{z-1}) \cdot m/(1+m)$ .

This means a price increase,  $\Delta P$ , which lowers the country's consumer surplus and increases its profits. The key question for the parliament is which effect predominates. Only if the former does, such that there is a net welfare loss, will our conjecture that the country does not repeal its antitrust law be correct.

For the size of the loss of consumer surplus,  $\Delta V$ ,

$$\Delta V > \Delta P \cdot \frac{1}{z} \left[ X_A^{z-1} + \frac{1}{2} (K - X_A^{z-1}) \right] \quad (8.19)$$

holds as can easily be concluded, since the share  $1/z$  of the consumers lives in country 1 and since the right-hand side of (8.19) contains the part of the loss of consumer surplus that results from the price increase with the given (new) quantity, but not the part that results from a fall in quantity

with a given (old) price. Considering that the optimal decision rule of the cartels according to (8.18) implies

$$K - X_A^{z-1} = \frac{1}{2^{z-1}} K \quad (8.20)$$

it follows from (8.19), after a little transformation, that

$$\Delta V > \Delta P \cdot \frac{1}{z} K \left( 1 - \frac{1}{2^z} \right). \quad (8.21)$$

On the other hand, taking (8.20) into account,

$$\Delta G < \Delta P \cdot \frac{1}{2} (K - X_A^{z-1}) = \Delta P \cdot \frac{1}{2^z} K \quad (8.22)$$

holds for the increase in the firms' profits,  $\Delta G$ , because the right-hand side of (8.22) only covers the profit increasing effect of a price increase with the given (new) quantity, and not the profit reducing effect that results from a reduction in quantity with a given (old) price. It obviously follows from (8.21) and (8.22) that  $\Delta V > \Delta G$  when

$$\Delta P \cdot \frac{1}{z} K \left( 1 - \frac{1}{2^z} \right) > \Delta P \cdot \frac{1}{2^z} K$$

or, what amounts to the same thing, when

$$2^z > 1 + z.$$

Since this condition is satisfied for all  $z \geq 2$  it is clear that country 1 will, as assumed, really not repeal its antitrust law. The repeal would increase the profits but would lower the sum of the national consumer and producer rents.

Next, whether country 2 could improve its position by choosing a different policy must be examined. Let us first consider the case where it retains its antitrust law while country 1 does so, too. In this case, country 2 is clearly worse off than when it repeals its antitrust law. It is sufficient here to outline the proof because the result can be derived analogously to proposition 8.3. In the case of a cartel ban, the firms of country 1 and country 2 are in the same situation as the  $n$  firms in the whole economy which was considered when deriving this proposition. The only difference is that the range available to the firms is narrowed by the quantity  $X_A^{z-2}$  already given. Taking into account that  $2 \cdot m$  rather than  $n$  firms take part in the Cournot game, it is found analogously to (8.4) that

$$X_R^2 = \frac{1}{\frac{1}{2m} + 1} (K - X_A^{z-2}) \quad (\text{Cournot-Nash})$$

and, analogously to (8.11), it can be worked out for the case where country 2 is the Stackelberg leader that

$$X_R^2 = \frac{1+2m}{1+m} \cdot \frac{1}{2} (K - X_A^{z-2}). \quad (\text{Stackelberg})$$

Analogously to (8.12), it is immediately obvious from the comparison of the two magnitudes that the last two countries taken together produce a bigger quantity with the Stackelberg solution and, because of the revealed preference theorem, this indicates both a higher profit and a higher consumer surplus for country 2. Country 2 will therefore not renounce its Stackelberg position when it believes that country 1 will continue to play a Cournot game.

A fortiori, country 2 will not renounce its Stackelberg position when doing so would lead to country 1 preceding it and taking the Stackelberg position itself. Since the Stackelberg leader chooses a higher quantity and makes a larger profit than its followers and since the change of places will affect neither the aggregate quantity supplied nor the price the consumers have to pay, it certainly never pays to leave the leadership position to another country. Country 2 will thus also behave as conjectured, that is, it will repeal its antitrust law when it can do so.

Let us now look at country 3, which is the country that can decide before country 2. Its situation is clear. If it does not use its opportunity to decide and repeals its antitrust law so late that country 2 precedes it, its firms experience a reduction in profits. Changing places does not alter the aggregate quantity supplied, the sales price or the consumer surplus. However, it cuts the sales quantity and the profit of the domestic firms in half. If the country does not repeal its antitrust law at all, it slips behind even country 1. Country 2 will now behave as country 3 would otherwise have, and country 1 as country 2 would have, thus taking a Stackelberg position in relation to country 3. Because, as was shown, country 2 would lose if it changed places with country 1 by not repealing its antitrust law, country 3 would lose a fortiori. Country 3, too, will therefore repeal its antitrust law as quickly as possible and use the decision opportunity it has been offered.

The conclusion we can infer for country 4 and the countries which are able to decide even earlier is obvious. Each individual country will behave exactly as conjectured in (a) because any other economic policy would lead to lower national welfare.

Finally the conjecture that firms cartelize as soon as they can has to be proved. This is trivial since the firms' decision possibilities, given the decisions of their parliaments, are similar to the three decision possibilities of the parliaments. The firms can set up the cartel, they can postpone the decision to set up the cartel until after the establishment of another cartel, or they can choose not to set up a cartel at all. As postponing and doing without a cartel, would, as just shown, reduce profits, the firms in each country will set up a cartel as soon as the national antitrust law is repealed.

**Proposition 8.4:** *The competition between competition rules is a race to repeal the national antitrust law as quickly as possible. The aim is to give the country's own economy a lead in achieving an early Stackelberg position, which it then exploits, as soon as it is allowed to. The quantity sold and the profit of the firms are smaller the later in the succession of countries this country decides to repeal its antitrust law. All countries except the last one repeal their antitrust laws. The last country retains its law and forces its firms to behave like Cournot-Nash players. The deregulation race between the national parliaments just described is a sub-game perfect equilibrium in systems competition.*

### **An Uncomfortable Proposition**

The result derived confirms the judgement that, once the borders between countries are opened and competition between competition rules starts, the day of ordo liberalism is over. The question now is how is this result to be judged in allocative terms? Intuitively one would tend to reach a

negative judgement, because ‘cartelizing’ the national markets” does not sound exactly confidence inspiring. But semantics may not lead very far.

It follows from (8.13) that the range  $K - X_A^{z-1}$  which the  $z-1$  first countries leave for the last country will be covered by that country’s own production with the share  $m/(1+m)$ . The share of this range not covered is therefore  $1/(1+m)$ . Moreover it follows from (8.20) that the range, which the first  $z-1$  countries leave for the last country, itself has a share of the competitive quantity  $K$  equal to  $1/2^{z-1}$ . Taking these pieces of information together shows that in the deregulation race the gap between the competitive quantity and the actual production is

$$K - X = \frac{K}{2^{z-1}} \cdot \frac{1}{1+m}. \quad (\text{deregulation race}) \quad (8.23)$$

The cartelization of the market made possible by the deregulation race can be prevented either by harmonizing the antitrust regulation policies of all the individual countries or by creating a single antitrust authority which covers all the countries. Such measures would force the firms in all countries to behave in a Cournot-Nash manner, and, in accordance with (8.4), there would then be a gap between the competitive quantity and total production equal to

$$K - X = \frac{K}{z \cdot m + 1} \quad (\text{cartel ban covering all countries}) \quad (8.24)$$

where the number of firms  $n$  is replaced by the product of the number of countries and the number of firms per country.

It obviously follows from (8.23) and (8.24) that total sales with the deregulation race are larger than with the overall cartel ban, if

$$2^{z-1}(1+m) > 1+zm$$

or, which comes to the same thing, if

$$2^{z-1}-1 > m(z-2^{z-1}).$$

This inequality will obviously hold when there are at least two countries and at least two firms per country as was assumed. The following result is therefore obvious.

**Proposition 8.5:** *The deregulation race, which leads to a sequential repeal of the anti-trust laws of the individual countries and which induces these countries to establish national conglomerates with credible supply decisions results in higher total sales, lower prices, a higher consumer surplus and a lower aggregate profit than would be expected in the case of a cartel ban covering all countries.*

Surprisingly, an all-clear is appropriate for the allocation problem. Paradoxical and uncomfortable as it may sound, a deregulation race that results in the cartelization of the national markets and the formation of national conglomerates does not threaten to be at the expense of the consumers or to lower the welfare of all countries combined. On the contrary, at least in the symmetrical case of equally sized countries, the deregulation race has a very positive effect from an allocative point of view.

This does not mean that the race for the starting position does not create problems. One of the most serious of these is the very different distribution of profits which occurs in equilibrium. The disadvantaged industries will find it difficult to accept the unequal distribution and will attempt to achieve an equal distribution by means of centralized policy measures. The falling aggregate sum of profits will also lend support to such a policy measure.

One of the measures to achieve an equal profit distribution would be the establishment of an international antitrust board, preventing the single countries from taking on Stackelberg leadership positions. Another one would be an international agreement to build one big cartel covering all countries coupled with a sharing rule for the profits. However, all of this could not be legitimated from an international welfare perspective. If it happens, it will rather reflect the fact that the disadvantaged countries or companies have sufficient political power to enforce another allocation even though aggregate welfare declines.

### **Reconsideration of Regulation Policy**

When the European markets were fairly segmented, the goals of national competition policy were clear. The *ordo liberal* view that a workable competition with strict antitrust regulation would be the best precondition for national growth and prosperity was rightly shared among politicians and economists. Things have changed with the increasing international integration brought about by the forces of globalization in general and European integration in particular, which have strengthened the voices calling for a repeal of national antitrust laws and the creation of strong national conglomerates, strategic alliances and global players. While it is natural that these voices could always be heard from companies that attempted to increase their market powers, the new phenomenon is that politicians are joining the choir and that more and more economists are

advocating a generous interpretation or even a repeal of antitrust legislation when particular merger decisions are pending.

From a theoretical perspective, the case has not been decided. The defenders of *ordo liberal* positions argue that there is nothing to gain from the formation of global players and a lot to lose because the foundations of the competitive system are threatened. In the above model, this view could be defended with the case where no credible commitments to particular supply decisions could be made such that firms are forced to play Cournot-Nash games. Indeed, it was shown that a country that repeals its antitrust legislation is harming itself. It reduces the national share in aggregate company profits, hurts national consumers and, on balance, lowers national welfare. If this case prevails in reality, *ordo liberal* competition policies are likely to survive in systems competition, and Europe will develop as its founders had envisaged when they formulated the Treaty of Rome.

However, countries do try to exploit first-mover advantages by neglecting antitrust regulation and supporting the formation of national conglomerates or, which amounts to the same thing, keeping privatized state monopolies intact. It was shown that this policy is actually in the national interest if credible commitment strategies become available, because the national conglomerates are given the opportunity of taking on Stackelberg leadership positions. In such a situation, speed is important because there will be a race for such positions, and it is always better to mark out the claims earlier than later. An equilibrium where it is in the national interest of each country to stick to *ordo liberal* competition policies does not exist in this case. Instead, a hierarchy of national conglomerates emerges where the market share of domestic firms and national welfare are smaller the later the conglomerates are formed and where only the last country has no interest in deviating from *ordo liberal* policies.

Surprisingly, this kind of equilibrium turned out to be not as bad as expected. While welfare is distributed unevenly over the countries, aggregate output and welfare will even be higher than it would in an oligopoly situation where the national antitrust laws are maintained throughout. This is admittedly a somewhat disturbing result for a liberal economist, but if economics is a science, it is better that theoretical results shape policy rather than the other way around.

## **Epilogue**

This book deals with systems competition, i.e. competition of tax systems, of welfare and social standards, of infrastructure, of environmental, product and banking regulation and, finally, of competition laws. It shows that uncoordinated policy choices do not necessarily impair the economic development of nations. There are conditions under which the “Invisible Hand” of systems competition works well. However, the book also identifies a number of problems, largely stemming from the Selection Principle – the fact that governments take charge of activities in which private markets have failed. I conclude that much more attention should be given to the definition of rules of conduct for competitive government behaviour. Well-functioning private markets emerged only after detailed rules for the exchange of goods and factors had been established. With regard to systems competition, such rules are still lacking. This book may contribute to a discussion on how and where such rules should be introduced and where, instead, a harmonization of government actions seems advisable. It may also offer some useful suggestions on constructing the new Europe.