

*Chapter 6*  
**The Competition of Product Standards**

in

**THE NEW SYSTEMS COMPETITION**

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## *Chapter 6*

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### **Cassis de Dijon and Deregulation Competition**

A new era of European competition began in 1979 when the European Court of Justice handed down its Cassis de Dijon judgement. The import of this ruling is that the origin principle now applies to trade within the EU. A good which meets the legal requirements in one European country can be exported freely and without hindrance to every other country in the EU.

The judgement was occasioned by a French blackcurrant-based liqueur, Cassis de Dijon, which according to German product standards contained too little (!) alcohol and therefore could not be sold in Germany. In freeing the French liqueur from trade restraints, the judges also freed Belgian beer and German spaghetti – imports of the former had been prohibited by Germany and the latter by Italy. Neither German purity regulations nor Italian preferences for hard wheat can now permit national authorities to impose import bans. The origin principle is the court's appropriate response to protectionist trade practices. It has led to an improvement in the division of labour in Europe and gains from trade.

There is, however, a downside to the judgement, which relates once again to the Selection Principle. National product standards do not only protect domestic competitors from competition, they also have a responsibility to protect the consumers from buying lemon goods. If the state intervenes in order to protect consumers from a market failure in quality competition resulting from asymmetric information, then the origin principle becomes problematic because it exposes justified intervention measures to the forces of systems competition. Systems competition may

not work in this case since the market failure which caused the state to act in the first place may very well show up again at the level of the competition between regulatory systems. This chapter will show that deregulation competition may result in a lemons equilibrium.<sup>1</sup>

### **The Lemons Problem**

While consumer protection measures of the state usually were interpreted and questioned as paternalistic interventions of the state violating the principles of methodological individualism, Akerlof's (1970) path-breaking study of the 'market for lemons' clarified that such measures may have an allocative justification. They prevent the falling off of product qualities which are hard for consumers to observe. The basic assumption of Akerlof's model is that consumers and producers have asymmetrical information about the quality of the good traded. Producers know precisely what they produce; after all, they are the product specialists. Consumers, however, find it difficult to determine the quality of many products at the time they buy them.

This is not a problem with products that are purchased frequently, because over the long run people come to know what they are dealing with. Expensive products, too, are usually less affected because getting information about their quality before buying them is effort well spent. With cheap and infrequently purchased products, however, the information asymmetry can be important, because consumers are unable to find out about the product through experience and because it is not worth-while investing in an information search.

The consumers' information disadvantage is particularly large for problems which will occur only with a small probability but which nevertheless will be very harmful if they occur. It would require a very large number of acts of purchase over a long period before the quality could be assessed on a statistical basis. We need only think of a dangerous ingredient in a shampoo or food

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<sup>1</sup> For other problems associated with the competition between standards, see Knieps (1994).

which causes cancer in only one in 10,000 consumers. The probability of cancer is certainly an important quality feature of the product but purchasing experience will not disclose it.

In many cases, a precise description of the ingredients on the product package may help to alleviate the information asymmetry. Mostly, however, this is not a real solution, because a great deal of knowledge is needed to assess these ingredients. The consumer would have to consult a food chemist in order to understand the long list of chemical ingredients that would have to be printed on the package – a costly undertaking with the many hundreds, even thousands, of products that are purchased over a year.

The consumer's lack of information implies that the sellers cannot differentiate their prices in terms of the quality of the product. As a result the sellers have an incentive to offer qualities which are relatively poor and cheap. Sellers who would like to offer good quality products and charge a higher price for them find that there is not enough demand because they cannot make the consumers aware of the product's quality. The sellers who offer poor quality products will also try to persuade their customers that these are of high quality. So the market for good quality products will disappear, although informed consumers would be willing to pay a high enough price to make the production of high-quality products worth-while for the producers.

The example of the European BSE scandal speaks volumes in this context. For many years it was known that BSE was probably spread by feeding cows meat and bone meal. However, farmers had little incentive to take the necessary precautionary measures, since this would have meant switching to more expensive vegetarian fodder, and consumers were unable to find out whether the beef they bought came from cautious farmers. Thus an equilibrium emerged where the probability of buying contaminated food was high. The lemons equilibrium did not collapse until government agencies began to examine the slaughtered animals, found more and more cases

of BSE, reacted with dramatic policy decisions that ruined many farmers, and imposed bans on bovine cannibalism.

The lemons problem was originally modelled as a problem of adverse selection. Akerlof's main example refers to consumer durables, such as cars, which the owners can either continue to use themselves or sell to someone else. Because the owners know more about their cars than the potential buyers do, only poor cars – that is, the lemons – are offered for sale. The owners keep on driving the good cars because they cannot get a higher price for them than for the bad ones.<sup>2</sup> The average quality of used cars of a certain age and brand which are bought and sold is below the average quality of the respective cars with the same age and brand which exist in the streets, because used cars bought and sold are a negative selection.

This is not a problem of justice but one of allocative efficiency. The consumers will not be disadvantaged by the lemons effect because they will learn from their own and other people's previous experiences that used cars are poor cars and will therefore not be willing to pay high prices for them. The point is that they will be unable to buy good used cars at higher prices, because the adverse selection prevents a market for this type of car from being set up. There is a welfare loss from the non-existence of a market for good used cars.

The information asymmetry not only brings about adverse selection but will also give rise to a moral hazard problem. When the consumers cannot distinguish between qualities, the producers have an incentive to produce poorer quality goods so they can save costs. For new cars that is probably less of a problem, because a brand name already provides a definite idea about quality. But people do not only buy branded products whose quality they know about. There are information asymmetries even in the market for car parts and, without stabilizing interventions

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<sup>2</sup> See also Allen (1984), Klein and Leffler (1981) or Shapiro (1983).

such as the German DIN norms which are controlled by semi-public agencies, these would show up as quality problems. There is also a moral hazard effect with the dangerous ingredients in food and chemical products because reducing them imposes costs. The BSE scandal should again be mentioned here. Or think of preservatives which endanger health but help foods keep longer. These preservatives can be avoided by using refrigeration and expensive delivery methods, but in many cases the cheaper way of using problematic preservatives would certainly be chosen by firms in the absence of government quality regulations and controls.

In all of these cases government intervention in the form of imposing minimum quality constraints is justified from an allocative point of view, and indeed many countries have developed institutions that serve this purpose. The most prominent of these is the US Food and Drug Administration, whose mission includes the protection of public health by monitoring products for continued safety. Founded under the Food and Drug Act of 1906, its regulatory competence has expanded over the years to include not only food, drinks and drugs, but also cosmetics and therapeutic devices. Drugs and medical devices must be proven effective as well as safe before they can be sold. Institutions comparable to the Food and Drug Administration can also be found in many other countries. The Japanese Center for the Evaluation of Pharmaceuticals and Medical Devices, the German Federal Institute for Drugs and Medical Devices, the French Agency for the Sanitary Safety of Health Products and the UK Medicines Control Agency are important examples.

In the light of the importance of these interventions, the level of governmental hierarchy at which the supervisory institutions should be placed becomes a key question. If systems competition works, nation states or even provinces could define their standards independently, adjusting them iteratively to maintain their competitiveness and gradually approach an efficient equilibrium. If, on the other hand, systems competition does not work, centralized actions on the

EU level may have to be considered. Currently, the EU operates in 27 agreed product fields, including agriculture, public health and transport, and it is unclear whether this range of responsibilities should be further extended. The issue has not been resolved yet but will be on the agenda of a new EU summit in 2004 where the allocation of government functions to the different hierarchy levels will be discussed. The following considerations may add to that debate.<sup>3</sup>

### **Simple Model of Private Quality Competition**

Before the role of systems competition can be examined, the way private quality competition and the state's regulatory task work has to be modelled. Assume that there is a lemon good of quantity  $x$  and a normal good of quantity  $y$  that can be transformed into the lemon good by shifting factors of production between productive activities. The lemon good can be produced in different qualities, where higher qualities involve higher production costs. Let  $c(q)$  be the unit production cost of the lemon good in terms of the normal good where  $q$  is the quality of the lemon good. The function  $c(q)$  is continuous, differentiable, strictly convex ( $c'' > 0$ ), and has a minimum where  $q = q^*$ ,  $q^* > 0$ . The variables  $x$ ,  $y$  and  $q$  cannot take on negative values. The normal good is the numeraire and  $P$  is the price of the lemon good in units of the normal good. We consider a representative consumer whose quasi-linear utility function is  $U(x) \cdot V(q) + y$ , where both  $U$  and  $V$  are non-negative and strictly concave monotonically increasing functions.<sup>4</sup> Note that the formulation implies that quality and quantity are complements in the sense that the marginal utility of one item increases with the consumption of the other item.

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<sup>3</sup> See Sinn (1997).

<sup>4</sup> Note that this implies that  $U(x)/x$  is a falling function of  $x$ , a property that will be used in the following appendix.

To concentrate on the allocative distortions resulting from asymmetric information it is important to assume that the consumer can observe the average quality of the lemon good sold on the market but not the quality of the single good that he buys. This formal assumption is a simple attempt to capture the idea that the consumer is able to acquire information on the average quality by talking to other people and by recalling his experience from earlier purchases of similar goods, while he cannot check the quality of a particular good *before* he has bought it.

Taking  $q$  as given, the consumer chooses  $x$  and  $y$  such that his utility is maximized,

$$\max_{x,y} U(x) \cdot V(q) + y \quad (6.1)$$

where he, of course, must observe a budget constraint:

$$\bar{y} = y + Px. \quad (6.2)$$

The variable  $\bar{y}$  measures the consumer's income or endowment. He can spend his income on the normal good  $y$  or on the lemon good  $x$ . The condition for an optimum is Gossen's Second Law, that is, the equality of the marginal willingness to pay for, and the price of, the lemon good:

$$U'(x) \cdot V(q) = P. \quad (6.3)$$

The producer wants to maximize his profits by choosing the lemon good's quantity  $x$  and the quality  $q$  which only he can observe:

$$\max_{q,x} [P - c(q)] x. \quad (6.4)$$

The necessary conditions for the solution of this optimisation problem are

$$P = c(q) \quad (6.5)$$

and

$$c'(q) = 0 \text{ for } x > 0. \quad (6.6)$$

Condition (6.5) requires the usual equality between price and marginal cost, and condition (6.6) says that the producer chooses the quality  $q^*$  at which the unit cost of production is minimized. Because the price of the lemon good cannot be made dependent on  $q$ , it is not worth while making any effort to improve the quality beyond  $q^*$ .

The market equilibrium is described by condition (6.6) and by the condition

$$U'(x) \cdot V(q) = c(q) \quad (6.7)$$

which follows from equations (6.3) and (6.5) and requires that the consumer's marginal willingness to pay for a unit of the lemon good be equal to the marginal cost of production.

### **An Allocative Explanation of the State Regulation of Quality**

To make a judgement about the competitive equilibrium and the need for state regulation of quality, the welfare optimum must be known. In a welfare optimum the lemon good's quantity  $x$  and its quality  $q$  are set such that the utility of the representative household is maximized given

the economy's technological constraints. Since the economy is endowed with factors of production which allow it to produce a maximum of  $\bar{y}$  units of the normal good and since  $c(q)x$  units of this good have to be given up to produce  $x$  units of the lemon good, the amount of the normal good available for consumption is  $\bar{y} - c(q)x$ . Thus the welfare optimum follows from the following optimization problem:<sup>5</sup>

$$\max_{x,q} U(x) \cdot V(q) + \bar{y} - c(q)x .$$

The necessary conditions for a welfare optimum include the quantity condition (6.7) already derived for the market equilibrium and a new quality condition

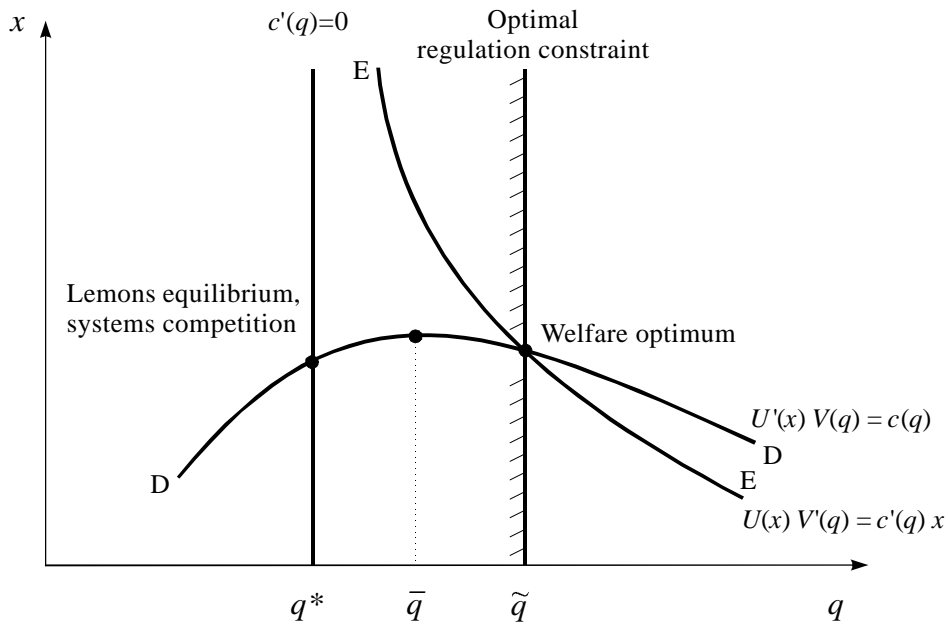
$$U(x) \cdot V'(q) = c'(q)x . \quad (6.8)$$

Equation (6.8) requires equality between the marginal benefit and the marginal cost of an increase in quality  $q$ , given the quantity  $x$ . As  $U \cdot V' > 0$ ,  $c'(q) > 0$  is required, which, because of  $c'(q^*) = 0$  and  $c'' > 0$ , implies that  $q > q^*$  in the social optimum: from a welfare perspective it is optimal to choose a higher quality than the one implied by the market equilibrium condition (6.6). The following proposition is the obvious implication.

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<sup>5</sup> The social maximand can also be seen as being equal to the sum of the consumer rent  $U(x) \cdot V(x) + \bar{y} - Px$  and the producer rent  $P(x) - x \cdot c(q)$ .

**Proposition 6.1:** *Under the assumptions made, the equilibrium product quality will be too low as judged by the citizens' preferences (lemons equilibrium).*



**Figure 6.1** The lemons problem and deregulation competition.

The difference between the private competitive equilibrium and the social norm is illustrated in Figure 6.1. The welfare optimum is given by the point of intersection between the curve DD and the curve EE. The curve DD is the locus of points in which equation (6.7) is met; it gives the optimal quantity given the quality. The curve EE is the locus of points in which equation (6.8) is met; it indicates the optimal quality given the quantity. The competitive equilibrium is characterized by the point on the DD curve corresponding to  $q^*$ , which is defined by equation (6.6): i.e. the absence of any efforts to increase quality above its natural level. As was shown, this point is to the left of the intersection of the DD and EE curves.

In principle, it is possible for the state to improve the market equilibrium by defining a minimum standard for the quality,  $\tilde{q}$ , at the point of intersection of the DD and EE curves. As quality improvements are expensive for the firms, they will only supply exactly this quality: that is, they will set  $q = \tilde{q}$ . Moreover, they will choose the optimal quantity associated with this quality as described by (6.7) and thus pick the corresponding point on the DD curve.

While it is clear from (6.8) and (6.6) that the intersection of the DD and EE curves is to the right of the competitive equilibrium, more information on the nature of the socially optimal quality regulation can be gained by inspecting the two curves more closely. The properties of the DD curve can be seen by implicitly differentiating (6.7),

$$\left. \frac{dx}{dq} \right|_{\text{DD}} = - \frac{A(x, q)}{U''(x) \cdot V(q)},$$

where

$$A(x, q) \equiv U'(x) \cdot V'(q) - c'(q). \quad (6.9)$$

As the term in the denominator is negative, the sign of the slope of the curve DD is equal to the sign of the function  $A(x, q)$ . The assumptions made about the utility and cost functions imply that  $A > 0$  for  $q < q^* + \varepsilon$  where  $\varepsilon$  is a strictly positive constant. The curve DD thus rises to the left of  $q^*$  and in a certain range to the right of  $q^*$ . Assuming that the marginal utilities  $U'$  and  $V'$  decline monotonically towards zero as  $x$  and  $q$  go to infinity while  $c' > 0$ , the curve DD has a maximum to the right of quality  $q^*$ . Let  $\bar{q}$  denote the quality where the DD curve has its maximum.

The curve EE is the locus of those points in which equation (6.8) is satisfied. In the appendix to this chapter it is shown that curve EE is declining, approaches the vertical at  $q^*$  asymptotically as  $x$  goes to infinity and, assuming the existence of a social optimum, cuts the curve DD to the right of its maximum, i.e. to the right of  $\bar{q}$ . This property is interesting not only because it confirms that in market equilibrium the product quality is too low, but also because it shows that the social optimum lies beyond the range where increasing the quality standard leads to an output increase.

**Proposition 6.2:** *In the case of asymmetric information the state can increase welfare by setting minimum product quality standards beyond the quality chosen by a competitive market. The standard is too low if raising it would induce an increase in the quantity produced. The socially optimal standard lies in a range where a marginal rise in the standard results in a decline of the quantity produced.*

Naturally, setting and controlling of the standard by the state is not a trivial economic exercise. The details of the public decision-making process make it difficult to give concrete policy recommendations for the quality criteria. On the other hand, it is a fact that states have created institutions like engineering control associations, public health offices as well as trade and industry offices whose responsibility is to assess quality properties of goods and to ensure that the minimum standards of product quality are observed. The American public Food and Drug Administration and the German semi-public system of DIN norms are important examples of successful product regulation. However, all countries are not alike in this respect, and in some public quality control operates only poorly. The proposition derived above may help detect the

inefficient states by checking how output would react to a raising of the standards. As long as output increases with a rise in standards there is every reason to raise the standards.

### **The Competition of Laxity**

The analysis now turns to systems competition. Assume that private quality competition takes place within each country according to the rules just described and that each country chooses its optimal system of quality regulation to overcome the deficiencies of this type of competition. What happens when the borders are opened and unrestricted trade based on the origin principle is allowed?

Opening the borders reduces the responsibility of the national regulatory authorities for the domestic population. On the one hand, the authorities are unable to regulate the imports and, on the other hand, the protective effect of the minimum standard also benefits the inhabitants of other countries. In the theoretical case of perfect competition between the regulatory authorities of many small countries which will be analysed here, the consumption possibilities of the domestic population are independent of the behaviour of the national regulatory authority, just as the consumption possibilities of the employees of a firm are independent of the range of products they themselves produce. In the case of perfect competition a regulatory authority can only influence the national welfare through the profits of the domestic producers, not through the utility of consumers.

When analysing the competition between systems one might be inclined to make the optimistic assumption that the responsible consumers in all the countries can know and judge the national standards. In this case, the standard would be a variable in the planning problem of the consumer and a price-quality relationship  $P(\tilde{q})$  would emerge in the market. Knowing this relationship, the

consumers would choose the quality at which their marginal willingness to pay for an improvement in quality is equal to the expenditure increase the market requires:<sup>6</sup>

$$U(x) \cdot V'(\tilde{q}) = P'(\tilde{q}) \cdot x . \quad (6.10)$$

The national regulatory authorities would also take as given the price-quality relationship  $P(\tilde{q})$  when making their decision. They would try to maximize national welfare via maximizing profit income and thus set the standard  $\tilde{q}$  such that the marginal revenue from an improvement in quality is equal to the marginal cost of this improvement:<sup>7</sup>

$$P'(\tilde{q}) \cdot x = c'(\tilde{q}) \cdot x . \quad (6.11)$$

Taken together, (6.10) and (6.11) result in the efficiency condition (6.9), implying that competition between the national regulatory systems would be efficient.

Unfortunately, however, the optimistic assumption that consumers can judge national standards goes against the Selection Principle. If the nation state regulates only those goods and product qualities that are affected by the lemon problem, then caution is needed, as assessing national standards will confront the consumers with the same problems they face when having to judge the 'standards' of the individual producers within their respective countries. There are 15 countries in the current European Union, and soon there will be 25 countries or more. How can one reasonably assume that, for each lemon good, the consumers will be able to distinguish

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<sup>6</sup> This marginal condition follows from maximizing (6.1) with respect to  $q$  subject to (6.2),  $P = P(\tilde{q})$ , and  $q = \tilde{q}$ .

<sup>7</sup> This marginal condition results from maximizing (6.4) with respect to  $q$  subject to  $P = P(\tilde{q})$  and  $q = \tilde{q}$ .

between 25 national quality standards? The hope that the consumer's confusion in the national context will not carry over to the international choice problem appears to be overly optimistic under realistic conditions. A normal consumer will hardly be able to judge the amount of dioxin contained in shampoos, lysozyme in cheese, sorbic acid in preserves or quillaia extract and polyvinyl-pyrrolidone in drinks. The consumer is already overtaxed by such ingredients in normal competition, and will be just as unable to work his way through the standards of a large number of national regulatory authorities.

The implications of the Selection Principle for the competition between systems are obvious. Since the product price cannot be made dependent on the state's minimum standards because of the confusion of the consumer, a profit maximizing national regulatory authority selects its standard  $\tilde{q}$  such that the production costs of the domestic firms are minimized. That is, it chooses

$$c'(\tilde{q}) = 0,$$

which implies that  $\tilde{q} = q^*$ . The regulatory authority thus decides in the same way as the private firms would, because it is only acting as a subordinate of these firms. Once again an inefficiently low quality level would be realized, as illustrated in figure 6.1.

**Proposition 6.3:** *When the Selection Principle applies, it cannot be assumed that the consumers will be able to distinguish between state-regulated national quality standards. An equilibrium in the competition between regulatory authorities is thus characterized by too lax standards. Systems competition results in a lemons equilibrium.*

### **Policy Implications**

The main result of the model presented above is that national consumer protection measures incur a positive international policy externality which distorts the national regulatory decisions. Consumer protection benefits the foreigners because the quality of the goods consumed by foreigners increases without their having to pay more to cover the additional costs. And for the same reason, it harms the domestic firms. Because the utility of the foreign consumers is not considered in the calculations of the national government, there is a policy implying overly lax consumer protection.

It is certainly possible to construct a model with foreign owners of domestic firms who are also affected by the consumer protection policy in that they bear part of the resulting cost increase. In such a model there would be a policy externality in the opposite direction which, in itself, would induce too strict a consumer protection policy. However, empirically, there is no question that the internationalization of the goods markets is considerably larger than that of the equity markets. For example, German exports make up 25% of the gross national product, while direct investment by foreigners in Germany is only about 7% of the total volume of investment.<sup>8</sup> Thus, on balance, national consumer protection measures will indeed generate a positive international policy externality and will therefore remain underdeveloped. The concern about the failure of systems competition seems justified even in a more general model than the one considered here.

Attempting to get rid of the policy externality by going back to a destination principle for regulating products would, however, not be advisable because this would encourage the

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<sup>8</sup> See Institut der Deutschen Wirtschaft, *Zahlen zur wirtschaftlichen Entwicklung der Bundesrepublik Deutschland 1998*, Cologne, and OECD, *International Direct Investment Yearbook 1998*, p. 145.

protectionist abuse of this principle which was all too obvious in the Cassis de Dijon example. Supra-national, European solutions may be advisable instead.

It is true, most goods do not need Europe-wide regulation because there is no information asymmetry associated with them. With other goods, it may be sufficient to provide the consumers with information about the properties of the product, or create well-defined quality categories which the consumers can select from. However, when there are potential health dangers, Europe-wide minimum quality standards which put upper limits on the amounts of the potentially dangerous substances are required. The argument that the poorer countries would perhaps prefer laxer standards than the richer ones is, in principle, defensible, but in practice it is far too weak an argument against such a solution. It should be possible to reach a compromise between rich and poor countries about the number of tolerable human deaths from eating beef that may contain the BSE pathogen.

To implement such a solution Europe needs a supervisory authority like the American Food and Drug Administration which supervises product quality in America with a firm hand. Europe does not have to copy everything from America, but much can be learnt from the American experience with respect to the federal institutions which limit and regulate the systems competition between the individual states.

## Appendix to Chapter 6

### The Properties of the EE Curve in Figure 6.1

Assuming the existence of a social optimum, this section studies the properties of the EE curve and shows that this curve cuts the DD curve to the right of the maximum of the DD curve. The EE curve is the locus of those points in the  $x$ - $q$  diagram (see figure 6.1), in which equation (6.8), which defines an optimal product quality for given quantity, is satisfied. It is useful to transform equation (6.8) to

$$\frac{U(x)}{x} = \frac{c'(q)}{V'(q)}.$$

Note that  $U(x)/x$  is a positive and declining function of  $x$ , that  $c'(q) < 0$  for  $q < q^*$ ,  $c'(q) > 0$  for  $q > q^*$  and  $c'(q^*) = 0$  while  $c''(q) > 0$  throughout, and that  $V'(q)$  is strictly positive. Obviously these properties imply that the EE curve lies to the right of  $q^*$  and approaches the vertical above  $q^*$  asymptotically when  $x$  goes to infinity. It is also obvious that  $x$  is a unique function of  $q$ , i.e. that the curve EE cannot bend inwards or be vertical with low values of  $x$ . Thus the curve EE has a negative slope when it cuts the DD curve. This property helps to locate the point of intersection. An implicit differentiation of (6.8) gives the following expression for the slope of the EE curve

$$\left. \frac{dx}{dq} \right|_{EE} = [c''(q)x - U(x) \cdot V''(q)] / A,$$

where  $A$  is again the expression defined in (6.9):

$$A(x, q) \equiv U'(x) \cdot V'(q) - c'(q).$$

As the term in squared brackets is positive, the sign of the slope of EE is equal to the sign of  $A$ . It follows that  $A$  is negative where the two curves cut one another. Recall that, as was shown above,  $A$  can only be negative on the DD curve to the right of the maximum of that curve, i.e. in the area where  $q > \bar{q}$ . Thus the point of intersection between the EE and DD curves is to the right of the maximum of the DD curve in a range where a marginal rise in the quality standard lowers the quantity produced.