
PAPERS

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Quality, Choice, and the Economics of Concealment: The Marketing of Lemons

The quantity of hazardous or ineffective products on national and international markets is higher than can be explained by current theory. Research has shown that "lemons" can indeed occur and it has specified roles for (a) potential future purchases and (b) seller reputation. This paper explores incentives facing sellers of goods containing one or more negative characteristics. The economics of concealment provides the conditions under which some sellers use resources to interfere with quality signals. This allows, at the extreme, a class of product which is a "pure lemon" in that its very existence would not be justified if consumers were fully informed. The paper identifies important variables which have direct policy implications for regulation and for consumer welfare.

Significant progress has been made in researching quality and choice in well functioning markets. But immense resources have been devoted to matters like product differentiation or brand choices without a corresponding effort to issues that may be even more important to consumer welfare at home and abroad. For example, what is our explanation for the startling number of useless or hazardous products in international commerce? The United Nations *List* of banned or restricted products contains, by our count, over 11,000 trade names (United Nations Secretariat 1991). By no means are most of these sold by little known firms with no reputation to protect. How do we explain that one of the fastest growing segments of the market

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is the trade in fakes, counterfeits, and frauds? One estimate places the growth rate of the value of sales of such products at 1100 percent for the 1983-1992 period ("European Measures Against Counterfeits" 1992, 6), and most estimates place the current value at between six percent and nine percent of world trade ("Contrefaçon 1991; Counterfeit Intelligence Bureau 1987; International Federation of Senior Police Officers 1992; "La Piraterie Intellectuelle Ne Cesse d'Augmenter" 1992). The significant step in understanding these important issues comes from the explicit recognition of economic factors determining when it is profitable to hide information about quality.

Economic resources devoted to concealing hazards or defects are, by their clandestine nature, rarely evident. Given the secretive character of the activity, it is all the more remarkable that so many examples can be cited. Concealment as a general problem may date from the move from home production to the market economy. In the 1700s bakers could buy "sharp whites" (flour containing alum) to be mixed in with old flour to conceal its quality so that bread which would otherwise be grey would be white (Accum 1820). Industry was organized to supply the adulterants. Accum writes: "There are wholesale manufacturing chemists, whose sole business is to crystallize alum, in such a form as will adapt this salt to the purpose of being mixed in a crystalline state with the crystals of common salt, to disguise the character of the compound" (1820, 136). Likewise industry could supply bakers with three grades of defective pepper and a broad range of other adulterants. Thus throughout history a supplying industry responding to market incentives and providing inputs to help produce concealment has existed. In the 1990s, alum is still used to "whiten" bread made from old wheat in India. One can also buy white stones ground precisely to resemble rice or wood created as a careful imitation of wheat. "Food adulteration, in fact, is a highly organized industry in India" (Mandana 1982, 32). One estimate reported that as much of 25 percent of the food passing through markets in India had been adulterated (Jacob 1976).

In the 1960s, when over-the-counter (OTC) drugs were first evaluated by two separate scientific panels in the United Kingdom, fully 35 percent of OTC products were found to be "undesirable preparations"—defined as irrational combinations, obsolete preparations, or ineffective or dangerous drugs (Sainsbury 1967). A similar study was conducted in the United States, and "At the end of 1973, actions

had been taken to remove 5,516 drugs from the market" (U.S. Department of Health and Human Services 1974, 37). Even so, in 1981 the market value of useless OTC products was still \$524 million (Kaufman and Rabinowitz 1983). This is not sufficiently different from what Kallet and Schlink wrote about in *100,000,000 Guinea Pigs* (1933). Further, one of the largest testing laboratories in the United States, Industrial BioTest (IBT), was found by the Food and Drug Administration to be selling test results based on ". . . reports on the use of live test animals after they had been reported killed in earlier experiments" (*Science News* 1981, 11). In addition "IBT's records showed evidence of . . . data that had been doctored to obscure potential harmful effects of chemicals" (*Science News* 1981, 11). Well over 100 pesticides on the market were based on such tests. This was the biggest, but by no means the only, reputable testing firm to sell deficient results (Mokhiber 1988). Problems occur often enough to deserve explicit analysis.

Detecting Quality

The effort by economists to include quality in analyzing decision-making has often succeeded by means of adding quality as a separate variable in the utility function (e.g., Houthakker 1952; Theil 1952). A second line of research uses consumer satisfaction/dissatisfaction to discover elements of expected quality or lack thereof (e.g., Hunt 1988). Most evidence indicates that there is at least an interesting research problem with quality: for ordinary consumer goods, consumers perceived a problem with quality in 20.2 percent of the purchases in the Best-Andreasen survey of 28,574 purchases (1976, 23). A third tradition addresses price-quality decisions from the point of view of a price discriminating monopolist who uses uncertainty about quality as a screening device either to serve different preferences (as in Basu 1988) or as Salop has shown in an important paper to increase the price charged to less informed consumers (1977).

The classic discussion of quality is Akerlof's "The Market for Lemons: . . ." (in his illustration, a lemon is a bad car). This pioneering model demonstrates that bad products can drive out good ones when buyers are unable to detect quality (1970). In this paper, the term "lemon" refers to a product that could not survive in the marketplace at its current price (in some cases at any price), if the con-

sumer were informed about its true quality.¹ Akerlof also argued that the progress of economic development may create institutions which preserve or restore a market which would otherwise suffer breakdown. In his analysis the chief policies for market-based solutions require the provision of signals about quality (e.g., guarantees, brand names, chain retailers, licensing), a conclusion shared by others who view asymmetric information as a significant problem (Rothschild and Stiglitz 1976; Spence 1974). In a major advance, Klein and Leffler (1981) explored conditions where market forces alone will prevent "cheating" on quality. This is part of a set of "reputation models," where the reputation of the firm is sufficient to guarantee the promised quality is delivered. Abundant evidence exists to show that reputation is indeed a significant variable. An illustration is the huge expenditures by Johnson and Johnson to protect the reputation of its Tylenol brand analgesic against the contamination effort of a commercial terrorist.

But reputation models alone cannot explain numerous egregious cases. Examples include Ford's marketing of the Pinto model with knowledge of a dangerously placed gas tank (Mokhiber 1988), the continued marketing of silicone gel breast implants without providing doctors (or patients) with sufficient warning about risks ("Panel Recommends Restricting Silicone Breast Implants" 1992); Firestone's delayed recall of some eight million radial tires where the ". . . chief officers of Firestone had known for several years that their tire was defective" (Bollier and Claybrook 1986, 88);² or the continued use by Nestlé and other reputable sellers of infant formula of free samples and inducements to health workers even after the firms had agreed to abide by international codes forbidding precisely these practices (World Alliance for Breastfeeding Action 1994).³ The

¹In his classic work Akerlof clearly recognized that ". . . there is incentive for sellers to market poor quality merchandise. . ." (1970). The incentives are the target of this analysis. In Akerlof's original presentation the lemon, a bad car, included both new and used cars. Within the population of new cars the lemons constitute a statistical portion. Although the Ford Taurus is a good car in general, I got a lemon. In contrast, all the vehicles offered on the used car market in the Akerlof model are known to be lemons. Most who use the model do so in the sense of the used car market. This definition of a lemon focuses on this second interpretation where there are known to be bad characteristics of each product relative to its price.

²The United States National Highway Traffic Safety Administration ". . . documented cases in which at least 50 people died, several hundred were injured . . . because of a design defect in which the steel belt did not bond to the tire carcass" (Bollier and Claybrook 1986, 88).

³A survey of compliance with the WHO/UNICEF International Code of Marketing of Breast-milk Substitutes completed in 1991 found 41 firms (among them Nestlé and Wyeth) in

force of reputation was not strong enough to prevent scandals in the financial sector casting a shadow on the most prestigious accounting firms in Europe and the United States or on the most reputable brokerage houses in Japan. Theoretical economic modelling has argued that reputation is the dominant force if a firm has such a large investment in specific capital (in assets or in advertising) that the investment is worth protecting. In these circumstances, the authors argue that the firm can find cheating to be unprofitable. But the firms in the cited examples are among the most reputable in the world.

In the approach taken by Schmalensee (1978) and also by Smallwood and Conlisk (1979), a key role is played by the probability of a repeat purchase. Klein and Leffler (1981) demonstrated that reputation is most reliable for goods (a) which are frequently bought and (b) whose non-performance can be detected at low cost. Shapiro explored the role of a seller's reputation as an incentive to produce quality and identified the crucial role played by the rate of consumer learning (1982). Faster learning implies larger incentives for quality. None of the cited research gives explicit attention to economic conditions governing the ability of sellers of inferior products to impede the rate at which consumers learn about quality. Therefore, much can be gained by searching for the conditions under which resources will be allocated to concealing negative information about quality.

How Much Deception?

In an important contribution, Darby and Karni (1973) showed the optimal quantity of fraud (with positive policing expenses and costly information) is usually greater than zero. They built upon the concepts of **search** goods, with characteristics which can be identified prior to purchase, and **experience** goods, with characteristics which can be appraised only after purchase (Nelson 1970). They added **credence** goods which require additional costly information or where the buyer must trust the judgement of the seller about the need for both

violation of the Code's provision in more than 25 of the countries studied (International Organization of Consumer Unions 1991). In 1994 the World Health Assembly voted against proposed amendments which would have allowed firms to encourage bottle feeding through free milk supplies to hospitals, with the World Health Organization concluding that "... one and a half million infant deaths could be averted if more babies were breastfed" (as reported in World Alliance for Breastfeeding Action 1994, 1).

diagnosis (demand) and service (supply).⁴ Even so, their analysis does not deal with a class of cases requiring expenses to conceal information which might be significant to consumers. Also important is the conclusion that, where concealment occurs, there is a significant misallocation of economic resources.

The organization of the paper is as follows. In the next section (the economics of concealment), a simple, static,⁵ heuristic model is developed and interpreted. Then the revenue, technological, and cost impacts upon the decision to conceal are explained. A brief conclusion follows.

ECONOMICS OF CONCEALMENT

It is necessary to recognize that some sellers may be well rewarded for purchases of products which have defects unknown to the consumer and pertaining to search, experience, or credence characteristics of the product. The hazards or defects may be unimportant or they may be absolutely vital. A method of incorporating this phenomenon is to assume that many products have both positive and negative characteristics. This holds for hot dogs (which have nutrients but also nitrosamines), beer, candies, pharmaceuticals, etc. It is a crucial feature of cigarettes. In general, here the word **malefit** is defined to cover the sum of the negative characteristics. Therefore, the interest is in both goods and their malefits ("bads").

The production of any good (X) can be represented as a function (f) of capital (K) and labor (L), or

$$X = f(K, L) \quad (1)$$

(where the usual assumption is made that the function is smooth, increasing, and strictly quasi-concave to get the normal production/cost relationships). Given the cost of inputs P_K and P_L , cost minimization gives the standard cost function (C)

$$C = C(X, P_K, P_L). \quad (2)$$

⁴For example, a dentist who finds business a little slow may recommend more remedial work than is really necessary. A mechanic may find more problems than really exist.

⁵Dynamic representation is possible, but does not enrich the main argument.

If input markets are perfectly competitive, the function can be simply expressed as $C = C(X)$.

To this point we have followed the traditional path. It is necessary to extend the framework to recognize malefits. If a malefit is associated with product X it is hypothesized that Y , the quantity of "bad" produced is such that

$$Y = Y(X) \quad (3)$$

where $Y \geq 0$ and $Y' > 0$ and $Y'' \geq 0$. This states that bad is an increasing function of good. With a defective car this might be a linear relationship (doubling the good doubles the bad). With pollution or with a hazardous drug, $Y'' > 0$ may be possible (the harmful effects increase at an increasing rate). For all products or services with nonzero Y (where positive amounts of malefit are generated) the seller may employ any of three strategies: ignore undesirable properties (A), devote resources to eliminate undesirable characteristics (B), or devote resources to concealment (C). Even though a firm may pursue a combination of these tactics, for heuristic purposes each is considered in isolation to expose its implications.

Ignore Malefits

The strategy—some negative characteristics exist ($Y > 0$) and they are to be ignored—requires that the seller recognize potential additional costs: costs associated with being detected. The extra cost (following detection) for a firm employing this strategy depends on redress expense, on lost sales, and on consumer complaint skills. Often, it is uneconomical for the seller to present negative information. In the pharmaceutical trade this can be the ". . . conscious withholding of unfavorable results. . ." (Mintz 1976, 32), a problem which is worsened by recent efforts to shift some public testing onto sellers (Hillman, Eisenberg, and Pauly 1991). Research indicates there may be some advantage to an advertiser from revealing negative information the customer already knows (increased credibility), but there is no payoff from revealing information the consumer does not know (Crowley and Hoyer 1994). The mass media, financed by advertising, cannot always be relied upon as a check (Hayes 1987; Maynes 1976). One assessment of measures taken by broadcasters concludes that stations ". . . are more concerned about the decep-

tions that audiences will find out on their own than the deceptions they might never discover" (Rotfeld *et al.* 1990, 407). A leader from the advertising industry is blunt enough: "We are opposed to the whole concept of warnings in advertising. . ." (Gilnitz 1971, 526).

If this strategy is employed and negative characteristics are ignored, then P_A is the probability of being detected and C_D is the direct cost if detected. Both variables depend directly on the quantity of malefit Y , which in turn depends on the quantity of output X . The expected cost of detection can therefore be expressed as $[P_A(X)] [C_D(X)]$. In considering the direct cost C_D , the producer may recognize that normal practice excuses many defects under the *caveat emptor* principle. Detected means being found out, not necessarily going to court. Discovery of any malefit implies at least a potential loss in goodwill. Further, the discovery of the malefit could lead to voicing (complaint administering) expenses for firms and for consumers and to exit by dissatisfied buyers. This results in a corresponding reduction in revenue for the firm.

Let $R(X)$ be revenues if the bad is successfully concealed and $\bar{R}(X)$ be revenues if the bad is discovered, where $R(X) \geq \bar{R}(X)$. As $P_A(X)$ is the probability of being detected and $1 - P_A(X)$ is the probability of non-detection, the expected profit, π_1 , is

$$\pi_1 = [1 - P_A][R(X) - C(X)] + P_A[\bar{R}(X) - C(X) - C_D] \quad (3)$$

$$= R(X) - C(X) - P_A[R(X) - \bar{R}(X)] - P_A C_D. \quad (4)$$

$D(X)$ is defined as the revenue impact where $D(X) = R(X) - \bar{R}(X) \geq 0$. With $D'(X) \geq 0$, expected profit can be written as

$$\pi_1 = R(X) - C(X) - P_A[D(X) + C_D]. \quad (5)$$

Simple maximization yields the profit maximizing output level, X^* , and the maximum expected profit, $\pi_1(\max)$.

Abatement or Elimination of Malefit

Let π_2 be the expected profit when the abatement strategy is employed. If Z equals the quantity of abatement and a equals the level of abatement, then

$$Z = -aY \text{ where } 0 \leq a \leq 1. \quad (6)$$

Here, $a = 0$ implies strategy A (do nothing) and $a = 1$ implies complete elimination. Now assume

$$Z = -aY = F(Y, a) = F(Y(X), a) \quad (7)$$

and thus the cost of abatement C_{AB} is,

$$C_{AB} = C_{AB}(X, a), \quad (8)$$

whereas the "new" level of malefit is $(1 - a)Y = (1 - a)g(X)$ and thus the probability of being detected due to residual malefits will be reduced to $P_A[(1 - a)Y]$ from $P_A(Y)$.

In terms of the notation used, the expected profit of this strategy, π_2 , is

$$\pi_2 = R(X) - C(X) - C_{AB}(X, a) - P_A[(1 - a)Y][D(X) + C_D]. \quad (9)$$

In the extreme case where $a = 1$, all the malefit is eliminated. The outcome has little to do with ethics and more to do with the expected level of expenses for product improvement, repairs, contingent contracts, or warranties—when these are appraised against the expected expenses of concealment. Equation (9) demonstrates that when $a = 1$ (so $1 - a = 0$) the last term in the equation is equal to zero. This means that profit depends on the normal revenue minus production cost minus abatement cost. For all intermediate cases where a is between zero and one, the whole of equation (9) is needed to express the expected profit. If this profit is higher than the profit in the extreme case, only a partial abatement will be carried out. All potential levels are considered and the optimal strategy, the one that maximizes expected profit, will be determined. This yields the output level, X^* , the level of abatement, a^* , and the maximum expected profit, $\pi_2(\max)$, corresponding to this strategy.

Conceal the "Bads"

The cost of hiding information may be assumed to depend upon the quantity of bad produced and the desired level of concealment. In the long run this is affected by the consumer's stock of skills (Kerton 1980; Sen 1981). Let the quantity of concealment be h where $h = -bY = h(Y, b)$, $0 \leq b \leq 1$. Here $b = 1$ means complete concealment and $b = 0$ implies there are no resources devoted to con-

cealment so the cost of concealment C_H is $C_H = C_H(h, Y) = C_H(b, Y)$. If $0 < b < 1$ the perceived amount of malefit is as if $(1 - b)Y$ of malefit was actually produced, although Y is in fact produced.

If the expected profit, π_3 , is allowed to be the profit accruing when strategy C is employed then

$$\pi_3 = R(X) - C(X) - C_H(b, Y) - P_A[(1 - b)Y][D(X) + C_D], \quad (10)$$

and

$$Y = g(X). \quad (11)$$

Again the maximum expected profit, $\pi_3(\max)$, the profit maximizing output level, X^* , and the quantity of concealment, h^* , may be determined.

When Is Concealment Chosen?

Now, compare the three strategies. If $\pi_3(\max) > \pi_2(\max)$, $\pi_1(\max)$ concealment will be chosen. Here, the expected profit from concealment is greater than the expected profit from following either the strategy of ignoring malefits or the strategy of abatement. When resources are expended on concealment it is more difficult for consumers to determine quality. The general proposition is that, if economic enterprises are to be run as profit maximizing firms, then in certain predictable economic circumstances, resources will be devoted to concealing unfavorable information. (Any tempering effect of ethics is to be treated in a later section on ethics and disapprobation.)

Among all possible cases, two are of special interest. Case 1: $\pi_3(\max) > \pi_2(\max)$ and $\pi_1(\max)$, where $\pi_1(\max); \pi_2(\max) < 0$; $\pi_3(\max) > 0$. In case 1 the product would **not** be produced unless there is concealment of the malefit. Such a product can be defined to be a **pure lemon**. A potential example is provided by Thalidomide where marketing expenditures succeeded in introducing a product ($\pi_3 > 0$) which, judging by its subsequent withdrawal, had π_1 and $\pi_2 < 0$. This type of example is of sufficient importance to justify further subdivision of pure lemons. If the pure lemon also has hazards or is life-threatening, it can be designated as a "hyperlemon."⁶ A long list

⁶The Oxford dictionary includes "cheat" as one meaning of "hype," with "hyper" meaning excessive. A more recent example of a hyperlemon might be Clioquinol which caused more than 20,000 cases of blindness or paralysis when it was sold for inappropriate purposes. Subsequent bans in most countries removed the opportunity to market this hyperlemon.

of hyperlemons is provided by the many banned consumer products on the United Nations *Consolidated List* (U.N. Secretariat 1991, 375-434). The consumer products category excludes most pharmaceuticals and farm-based pesticides, yet it is still of considerable length. Restricted items include toys, cosmetics, paints, fireworks, and household cleaners—110 products in all, sold under more than 600 names. Pure lemons which do **not** fit the hyperlemon category might include an ineffective “cure” for baldness or a liquid marketed as apple juice with no apple content at all.

In the case of a pure lemon, private incentives lead to the production of a product which should not, from society’s perspective, exist. Even in most benign of this class of cases, from society’s point of view, resources diverted to concealing harmful effects are wasted. With hyperlemons, additional harm is generated. When all consumers are fully informed, a case 1 product would not be justified by the market.

Case 2: $\pi_3(\max) > \pi_2(\max)$, or $\pi_1(\max) > 0$. In case 2, there is also wasteful use of inputs to enhance profits. The product would exist without camouflage, but the expected profit from following the concealment strategy is higher. The condition leads to resources being diverted to concealment and this reduces the consumer’s ability to detect quality. If nicotine is a benefit and carcinogens a malefit, an operational example might be provided by the history of cigarette marketing (Harris 1978; Silber 1983), especially with the ongoing accusations of a “. . . pattern of deceit” and negative health findings, where “. . . the company allegedly kept them secret. . .” (“Tobacco: Does It Have a Future?” 1994, 26). Case 2 is undoubtedly important, but it is not separately treated here because the analysis and policy implications are similar to case 1.

In the third significant case, the market outcome is optimal. Case 3: $\pi_2(\max) > \pi_3(\max)$ and $\pi_1(\max)$. This is a happy outcome of the incentive structure: no resources are devoted to concealment and some are devoted to product improvement to remove all or part of the negative characteristic.

FACTORS AFFECTING CONCEALMENT

In sum, concealment occurs for economic reasons. It is important, therefore, to give explicit attention to the underlying factors leading

to this choice. In the case where the firm chooses to conceal malefits, the expected maximum profit is π_3 , where $\pi_3 = R(X) - C(X) - C_H(b, Y) - P_A[(1 - b)Y][D(X) + C_D]$ (equation 10). In essence, equation (10) provides three key sets of variables: those with revenue impacts— $D(X)$; with cost impacts— C_H (cost of hiding) and C_D (cost of being detected); and those influencing the probability of detection— P_A . In every instance when concealment is chosen there is an interplay among these variables. For analytic purposes each of the three sets of variables is now addressed in turn.

Revenue Impacts When Concealment Is Chosen

Revenue depends on the selling price and price elasticity of demand as governed by competitive conditions in the output market. In general the situation calls for either an absence of competition or goods with experience/credence qualities. In the long run, $D(X)$ is affected significantly by whether the seller expects a "once only" sale or if repeat transactions are a possibility. In the latter case the expected discounted value of future sales becomes significant. A number of studies have found that needed information about quality will be provided if the present value of expected future sales is high enough (Klein and Leffler 1981; Schmalensee 1978; Shapiro 1982; Smallwood and Conlisk 1979). This explains why a consumer is at greater risk facing a travelling salesperson than facing the community shopkeeper. When concealment is inexpensive, expenditures to mask defects can produce revenues which overwhelm the effects predicted by reputation models—even for goods purchased repeatedly. Consider the case of the firm selling "nutritious apple juice" for infants. This "apple" juice was, in fact, a lemon in economic terms. It became fully known to the company that its product contained no apple juice whatsoever. As Burke observed, "From that day on Beech-Nut officials had essentially two choices: admit the problem and prove to the public that they had corrected it, or try to hide it and keep on selling the counterfeit juice" (1990, 305). This is a choice between strategies of abatement or concealment—concealment was chosen.

A life-and-death demonstration of the need for understanding the economics of concealment is embodied in the controversy over breast milk substitutes, where sales greatly exceed a billion dollars per year (World Alliance for Breastfeeding Action 1994). Marketing tech-

niques can be deployed with such success that mothers are convinced of the superiority of infant formula, thereby choosing the product over breast milk. Concealment costs have often included expenses for hospital style clothing (which hides the hazard by allowing sellers to be mistaken for nurses). The product being marketed can be superior in some circumstances. In general it has shortcomings, one of which is an inability to convey the immunological benefits of mother's milk. What fully informed parent would choose to spend a significant portion of family income on a product which increases the mortality probability of an infant? The product's(s') boycott which resulted, like hundreds of ongoing boycotts,⁷ was an attempt to impose a revenue impact, $D(X)$. The infant formula example is akin to case 2, where $\pi_3 > \pi_1$ or π_2 . The specific example is lemon-like in the Akerlof sense and contains a distinction of great significance: virtually all sellers in this market are striving for market share against a nonmarket substitute. The point has analytic importance as there is no seller with a financial interest in improving the quality of signals.

Cost Impacts When Concealment Is Chosen

Concealment costs cover a wide variety of activities from measures to prevent consumers from shopping around ("today only" specials) to the purchase of adulterants to conceal quality deficiencies, and even extending to "noise" in advertising. The approach taken here extends the economics of crime (Becker 1968) to include elements which may not be clearly against any existing law. Concealment is a risky activity because unsuccessful attempts to hide negative information or to provide false claims about favorable characteristics may be punished either by courts or through the revenue term by means of exit or voice (complaints to sellers, to potential consumers, or to others) as in Hirschman (1970). Aside from the previously discussed revenue effects, the additional expected cost (beyond normal produc-

⁷The *National Boycott News* for the United States, contains 195 pages of listings of current boycotts (Putnam 1990). Maynes used a comparable explanation to show that boycotts are strategies for consumers to increase "leverage" (Maynes 1976, 207-245). The boycott of firms selling breast-milk substitute was ended when sellers agreed to a code prohibiting certain concealment techniques. However, there is evidence that prohibited marketing practices did not stop (International Organization of Consumers Unions 1991). The economic point can be simply stated: Whenever a firm believes *ex ante* that a boycott will be significant, it will assess concealment to be a costly strategy.

tion costs) to the seller who follows a concealment strategy is given by the expression: $C_H + P_A(C_D + E)$, where as previously defined C_H is the direct cost of hiding information, P_A is probability of being detected (discussed later), C_D is the cost of being detected, more specifically, the financial cost, and E is added to account for any personal psychological cost from embarrassment. Let us examine the components in more detail.

Cost impacts: Direct expenditure on hiding: C_H

In his famous essay on dissimulation, Sir Francis Bacon argued that there is "great advantage" to a policy of less than perfect information, one reason being ". . . to lay asleep opposition. . . ." Evidently he felt that $C'_H > 0$ and $C''_H < 0$, for he argued for "dissimulation in seasonable use" indicating an optimum quantity of concealment to use.

The direct expenditure is easiest to understand when a market input (e.g., wood chips fabricated to replicate wheat grain) is used. In a routine case, C_H may merely be the cost of an advertising campaign to produce enough noise to confuse consumers (when the marginal revenue from doing this exceeds the marginal cost, as in Salop (1977)). This is especially important for an inferior brand or product. Another tactic occurs after a testing organization publishes informative results: a manufacturer of a lower quality brand need only change the product identification number or announce that the product is "new." The complex mix of brand names for similar pharmaceuticals and pesticides in international trade lends itself to concealment. Moreover, deception may be greatest when resources of the state are used to produce the misinformation, a point made eloquently in George Orwell's *1984* with its "Ministry of Truth" (1954). Few dictatorships espouse consumer rights, and in democracies government-owned sellers have been a special problem for consumers.⁸ It would be comforting if market-oriented economies were immune to

⁸In 1994, consumer organizations from around the world held their fourteenth World Congress in Montpellier, France as members of the International Organization of Consumers Unions (IOCU). Presentations on regulation and on utilities revealed a wide range of distressing examples of problems from seller insouciance to downright contempt for the customer. In the experience of IOCU members there was little difference between public monopolies and unregulated private monopolies. For concealment, the important point rests in the seller's control of information under unregulated monopolies.

easy concealment of negative information, but as Akerlof indicated, transparency is by no means guaranteed (1976).

The balance of detection skills versus hiding skills depends in part on the effectiveness of the technical methods of concealing defects, hazards, etc. from consumers. This proficiency can change over time. It is known the complexity of the product has a direct effect on this (O.E.C.D. 1972). The balance of forces is affected by the presence or absence of detection expertise, a factor of major importance. When the ratio of product complexity to consumer skill is high, consumer choice is much more difficult (Kerton 1992). This ratio explains the existence of double standards and the special vulnerability of countries without adequate detection institutions (Hartog and Schulte-Sasse 1990; IOCU 1994; Kerton 1990; Stebbins 1987; Thorelli and Sentell 1982). Consumers in richer countries are also at risk. One assessment of the 50,000 pesticide products registered for agricultural uses in the United States concluded that for data reasons “. . . the comparative risks and benefits of the 200 most commonly used active ingredients in pesticides remain unattainable at the present time” (Gianessi 1987, 4). One essential first step toward a workable public policy is to address the fact that in certain economic circumstances, state-of-the-art concealment technology can be used to decrease overall welfare. The policy response will need to ensure that there are meaningful costs for sellers who attempt to conceal negative product characteristics.

Financial cost of being detected: C_D

The higher the cost when detected, C_D , the lower is the expected profit, π_3 , to be derived from following the concealment strategy. The cost may be financial or nonfinancial. “Mankind has invented a variety of ingenious punishments to inflict on convicted offenders: death, torture, branding, fines, imprisonment, restrictions on movement and occupation, and loss of citizenship. . .” (Becker 1968, 179). These require social action to generate the legislative rules to actually impose the penalty. Anyone who has observed the inability of the courts to conduct economic analysis will agree at least with Stigler’s claim that “. . . the penalty structure is not well designed for either deterrence or guidance of enforcement” (1970, 534). This appraisal was for the United States, the most litigious country in the world, but the assessment is appropriate for countries with different types of

sanctions, including greater use of soft law. Given cross-cultural variations in the trust of government (Darley and Johnson 1993; Durvasula, Lysonski, and Andrews 1993), it seems prudent to think of sanctions in a broader sense rather than solely as activity of courts. In wealthier countries there is an argument that the shift of corporate crime from the criminal courts to civil courts has greatly lowered the cost of malfeasance (Braithwaite 1984; Mokhiber 1988). For the set of consumer problems addressed by the use of courts, C_D can almost always be increased by changing the problem into a simple two-party case by allowing class action suits. Restitution orders are thought to be helpful on grounds of fairness. But restitution is also a critical economic variable: the existence of this potential sanction increases the cost of marketing lemons. More use can be made of lump sum repayments where the members of a class injured by a deceptive practice could not readily be ascertained or where pecuniary loss suffered by each member was too small to justify individual payments. Even so, the best regulatory intentions may pave a road which does not go to heaven, an economic lesson illustrated by the Profile Bread gambit. The makers of Profile Bread advised weight watchers that its product had fewer calories per slice—without providing the information that this was achieved by cutting the slices thinner. The company was required by the FTC to devote 25 percent of the next year's advertising budget to correcting the misinformation. This noble intent to increase C_D did not succeed because, under the ruling, the optimal advertising budget quickly went to zero (Gilnitz 1971; Mokhiber 1988).

Some researchers have explained that sellers with superior offerings can often be relied upon to inform consumers, through comparative advertising, about the quality of lemons (Spence 1976) and indeed this is frequently the case. Yet a significant difference exists between "technical" invisibility where information has not yet been discovered by science and "economic" invisibility where sellers have an economic incentive not to discover negative effects of products and services (Fischer and Kerton 1975; Shapiro 1982). The analytic approach taken in the economics of concealment allows a clear perspective on an important polar case where all sellers in a market choose the concealment strategy to produce a product (the pure lemon) which would not otherwise be rewarded by the market. In the dynamic context, the seller of products that might cause harm need only be careful to avoid research efforts to learn what this harm

might be.⁹ Thus, there is a strong policy rationale for “public search” efforts. Investment in public search often occurs only after an unconscionable incident has motivated people to take action. At the time of such a scandal “voicing” is observed which often leads to the formation of action groups such as consumer organizations (Fazal 1980; Forbes 1987; Herrmann, Walsh, and Warland 1988; Kallet and Schlink 1933; Mayer 1989). These groups become one force urging the investment. The process results in sharply higher concealment costs for sellers of lemons without substantially increasing expenses for firms selling superior goods.

Ethics and “disapprobation”: E

Are there ethical or nonfinancial constraints at work, and if so, is there a means of addressing them through policy? In *The Theory of Moral Sentiments*, Adam Smith considered the need for imposing a “disapprobation” penalty on individuals who act against the broader interest (1759). Certainly the concept of cost must be enlarged to include social shame. Does E have any measurable impact?

There are circumstances where E appears to have a value of zero, implying in the short run that E is not a sensitive variable. E may even be negative: for example, in markets in the Philippines sellers often take pride in deceiving consumers (Montiel 1977). “In Thailand, as in many LDCs, chicanery is not unethical—it is a game” (Thorelli and Sentell 1982, 156). If P. T. Barnum really uttered “there’s a sucker born every minute” he was not exhibiting a high E value. Yet there is evidence of impact. The U.S. Environmental Protection Agency has found that publishing the names of the firms creating the most pollution has led to corrective behavior (“An Embarrassment of Clean Air” 1993). There is some reason for mod-

⁹The pharmaceutical industry provides an obvious example where it is not always profitable to spend money to discover side effects or harmful drug interactions. When Dr. James L. Goddard became commissioner of the U.S. Food and Drug Administration in 1966, he was “shocked” at the quality of some of the test data being submitted by drug companies. He protested “. . . the deliberate choice of clinical investigators known to be more concerned about industry friendships than in developing good data. . .” and he protested the “. . . conscious withholding of unfavourable” results (Mintz 1976). More recently, a trade journal reported that: “In 1988, for the first time, U.S. \$1 million would be made available . . . to support studies of the reported adverse effects of marketed drugs. There are no funds available at present for such studies” (*Script* 1987, 17). It has proven to be exceptionally difficult to specify the pre-clearance tests that firms must conduct (Murray and Chen 1993).

erate optimism about the marketing of pharmaceutical lemons. A survey of marketing tactics used in countries with limited protection (the third such appraisal) found a decline in the frequency of unsupported claims (Silverman, Lee, and Lydecker 1986). Softer evidence is moderately encouraging. Out of 17 companies with publicity crises, Fisse and Braithwaite (1984) found that 15 said they were concerned about their corporate reputation. Any effort to measure this is fraught with risks, but it is still perplexing that corporations making dog foods rated higher on a checklist of reputation factors than companies making remedies for people (Lydenberg *et al.* 1986).

What the ethicists have not considered is the role played by the mix of good and bad characteristics in each product or service. This is easiest to see in the contrast between a product that has a minor flaw which is economical to correct (where $\pi_2 > \pi_3$) and a product that is a pure lemon ($\pi_3 > 0 > \pi_2$). With the first, abatement or elimination of the malefit is economical; with the second, concealment is almost certain. At the level of the individual firm, a monopolist with high ideals can choose to use some (or all) of the monopoly power for ethical purposes. The resulting "loss" will be limited by the cost-revenue spread, so the ability to deploy ethics disappears for products in competitive markets. The model enforces Akerlof's conclusion that in final equilibrium some markets will be populated only by sellers of lemons; anyone following some ethical high road will continue to lose market share to more aggressive sellers.

Is it appropriate to apply personal ethics to corporate behavior? Probably not. There does seem to be a significant difference between the E value felt in a publicly owned corporation as opposed to a privately owned business with a prestigious family name. Mokhiber points out that a person has friends and neighbors, a corporation has none, and "... corporations cannot be punished in a stigmatic manner" (1988, 29). Even with that limitation, corporate "embarrassability," as Lydenberg *et al.* (1986) and Wilde (1992) have shown, is a sanction that plays a role. Has "social shame" been managed as an element of public policy? Not so far: survey data indicate an alarming drop in the level of business ethics as appraised by the U.S. public and by business people themselves (Cadbury 1987; DesJardins and McCall 1990; Reidenbach and Robin 1989; Smith 1990).

In many business schools, courses in ethics have been added to the curriculum explicitly to bring about change. Recent books dealing with business ethics include many that believe ethical norms can be

deployed to improve behavior, indicating that the E variable is endogenous. Many address both individual and corporate codes of conduct, both of which could affect the marketing of products with known defects. But how much should one expect from a corporate code of conduct? Caution is evident. Reidenbach and Robin note that "In many cases when individuals are forced to choose between a behavior that is ethical and one that results in a desired reward, the behavior that is rewarded will be chosen" (1989, 104). Smith (1990) is skeptical enough to place policy emphasis on boycotts instead, that is, on the revenue term $D(X)$. If, in the short run, voluntary corporate codes are not very powerful, the evidence still suggests that more promise exists for collectively drafted international codes (Cadbury 1987; Frederick 1991). This is because even a draft version of a code provides an inexpensive, off-the-shelf model for national legislation (Adam 1987; Harland 1988). For example, the Philippines used the international pesticide code as a model for national legislation (Hansen and Regnam 1987).

On the whole, the evidence challenges the notion the E term can easily outweigh other forces in the incentive structure. It plays a marginal role, and not one that is easy to deploy in the short run. In general when both psychological and financial costs are included, the condition governing cost factors is as follows: When the cost to be borne by a seller who is detected concealing a malefit is low, deception is relatively more profitable (π_3 increases).

Probability of being detected: P_A

Equation (10) shows the profitability of the concealment strategy is directly affected by the probability of being detected. What affects the probability? As Alam (1990) has shown in a different context, decisionmakers may rearrange incentives or take other action to reduce the odds of being detected. It is difficult to design policies which oblige producers of complex goods to discover and report information on negative characteristics; indeed evidence exists that "research" is frequently abused (Crossen 1994; Mintz 1976). The policy task is even more challenging when the monitoring system has the potential seller sponsor the research as is sometimes the case with pharmaceuticals (Hillman, Eisenberg, and Pauly 1991). And there may be a natural condition which makes concealment easy or costly: even without economic concealment, some malefits are intrinsically

harder to see.¹⁰ Additional important factors are the legal environment, individual consumer search skills, and collective search skills as exemplified by a public agency. The legal environment may be especially useful when we know precisely the piece of information which may be concealed. "Truth-in-____" Acts, when enforced, can lessen the problem (Garman 1991; Lee and Zelenak 1987; Morse and Fasse 1973; Trooboff and Boyd 1976). However, the legal system can unwittingly lower the probability of being detected by lowering the rate of diffusion of information. This can occur when the legal framework fails to reward individual consumers for prosecuting and for providing the signal. The private costs (including time and anxiety costs) make it uneconomic. A consumer who understands this may correctly decide not to complain—reducing P_A .

The probability of detection may be strongly affected by the existence of health and safety agencies. Where these institutions which make up consumer search capital exist, they are usually organized on a national basis. When detection is probable the preferred strategy may be to export to another country lacking an effective public health agency. This was so for 26,000 cases of "apple juice" (noted earlier) which were sent roaming the high seas after U.S. inspectors discovered the abysmal level of quality. The firm's decision was to ship it out of the country, mostly to Puerto Rico, the Virgin Islands, and the Middle East (Burke 1990). More dangerous examples are evident, and substandard or counterfeit pharmaceutical preparations are frequent threats. Serious concern has recently been expressed about the shipment of toxic wastes to countries lacking the expertise to evaluate potential hazards. **Individual** consumer skills depend on education and experience, and these can be increased in the long run. **Collective** consumer search in the form of a public detecting agency may play a positive or negative role. The agency's contribution is positive—and important—when it acts as a form of "capital" in providing expertise (Kerton 1980; Sen 1981). An example may be a food

¹⁰Disposable bottles may be more visible than tariff malefits. Or hydrogen fluoride may be less easy to "find" than sulphur dioxide, but more harmful. During its regulatory phase the U.S. Congress apparently believed in this type of difficulty, for partly in response to 17 million accidents from products used around the home, a 1972 law passed because, "The Congress finds that— . . . (2) complexities of consumer products and the diverse nature and abilities of consumers using them frequently result in an inability of users to anticipate risks and to safeguard themselves adequately. . ." (U.S. Congress 1973). Two decades later, the U.S. Food and Drug Administration announced plans to increase sharply the effort to educate consumers (Health Action International 1992, 6).

and drug agency. However, the existence of an agency is not sufficient to increase the probability of detection; in fact, it can have the opposite effect. Regulatory capture (where, for example those to be regulated gain the role of regulator) is a singularly effective way to lower the probability of being caught concealing information. In its worst form this would be the lemon producers having the job of catching themselves and getting paid at public expense for their lack of zeal. Additionally, regulatory boards, for their own bureaucratic reasons (perhaps to "protect" themselves), conceal information as a matter of course. This implication is in Darby and Karni (1973). The upshot is that some alleged policing effort really operates to lower the probability of being caught.

From an international perspective the positive contribution of properly functioning public expertise has undoubtedly been overlooked, especially by researchers in countries with adequate public agencies. Data do exist and they illustrate the abysmally low level of the stock of capital in most countries. The World Health Organization conducted an assessment of agencies protecting pharmaceutical quality in 111 developing countries and found that 102 countries have **inadequate** systems for health protection. In 73 countries there was some attempt to protect health, but 44 of these had a lab which "does not function adequately" while the other 29 had no scientific laboratory at all (WHO 1988). And in at least 29 other countries there was no drug quality assurance system whatever. Even if information about an ineffective or dangerous pharmaceutical is shared with one of these countries, can we be sure the information is understood let alone passed on to others who need to know? Research has shown that this type of expertise has a statistically significant effect in explaining mortality differences (Murray and Chen 1993). Policies for enhancing the public capability for detecting quality, at WHO or in comparable programs at the United Nations Commission on Trade and Development (1990), are essential for the functioning of the market. Where there is no agency capable of interpreting information on hazards, the probability of being apprehended is low. If, at the same time, consumer search costs are high for individuals, this combination of economic incentives can explain the persistence of life-and-death problems in many countries long after a solution has been found in one or another jurisdiction. The Secretary General of the United Nations observes, in a report on corruption, that problems are all too common and difficult to discover in international

transactions, as are payments to "avoid discovery" (1991, 3-4). An important conclusion follows from the international character of this consumer problem: policy can be influenced most directly by international cooperation rather than by domestic action. The needed information has the characteristic of an international public good (Kerton and Ahonen 1991; Kindleberger 1986). Thus there is strong economic support for measures like the U.N. *List* (of products banned. . .), the *Waste Trades List* (the Basel Convention of U.N. Environmental Programme 1989 (ratified in 1994)), the *International Register of Potentially Toxic Chemicals* (U.N. Environmental Programme 1989), as well as "positive" lists like the World Health Organization's *Essential Drugs List* (1990a, 1990b).

CONCLUSION

Aristophanes argued, "Evil events from evil causes spring." Ethics certainly play a role, but quality choice is less explained by evil persons than by routine economics. The "evil cause" is a set of incentives facing sellers, incentives leading to a decision to devote resources to hiding negative information (when $\pi_3 > \pi_2$ and π_1). Whenever economic concealment is successful, what the consumer sees is different from what the consumer gets. This affects the way a market functions because the active use of resources to conceal information leads to a shift in market shares making the "lemons" outcome more frequent. Some policy conclusions are evident.

(1) Each nation, and each market, has a need for its own "transparency institutions" to ensure that rewards go to sellers with superior offerings. These institutions enforce weights and measures laws, contract laws, truth-in-advertising rules, and certain health protections. There is a minimum level of regulation required to ensure that markets are transparent, fair, and efficient. The deregulation movement could go too far by removing these essential components. Many countries which are attempting to make greater use of the market, including those in Eastern Europe, may fail to see the crucial role played by the basic institutions which shape the incentive structure. The efficacy of concealment depends on the ratio of the complexity of the decision to the resources available for detection. Vulnerable consumers are those without public or private search facilities. When normal incentives produce too much concealment, a

change to the incentive structure is required, this being more cost efficient than other regulatory antidotes.

(2) Where detection occurs, consumers can choose to exit affecting the seller's revenue. In response, the seller may either reduce the negative characteristics or leave the market. Both are to be expected. In cases thought to be especially egregious, voicing may be organized. In addition, a boycott can be deployed by those aggrieved enough to bear the effort. If successful, a boycott has two impacts: first, directly on revenues, and second, on the probability that concealment is detected.

(3) Especially useful are policies to reveal information on negative characteristics and on harmful products as these act directly on concealment incentives. Often enough, the information needed has the character of a public good. In addition, scale economies in search are evident. This is one strong justification for a consumers' association with some measure of independence and for product testing/certifying organizations.

(4) An extraordinarily strong case exists for international sharing arrangements to provide information which already exists. This substantially increases the probability of detecting the negative information. It changes the probability at a very low cost, particularly when this cost is compared to the cost of searching for negative information from scratch in one country after another. Some sharing is exemplified in certain precisely targeted United Nations programs like the list of banned products, the Waste Trades List, and in programs of the International Organization of Consumers Unions. Any country attempting to make greater use of the market for its allocative advantages has a pressing need for shared information.

(5) Nonfinancial sanctions have always played a role. This means that we must avoid being naive about cultural forces in different markets throughout the world. Clearly, efforts to temper sanctions in socially useful directions are important. Voluntary industry codes are welcome too; they sometimes serve as a model. In a silent room, a quiet word may be decisive. But in the noisy storm of the international marketplace, the calm voice of moral suasion can easily be drowned out by the siren of economic rewards.

In sum, there is no advantage in the frequent presumption that all of the incentives in the marketplace are benign. Whenever a negative characteristic is successfully concealed, there is a loss in consumer welfare. This holds with even more force if the good or service being

marketed is a pure lemon. Firms with superior offerings are also losers when concealment occurs. At the country level this can “. . . undermine the process of development by inducing countries to make inappropriate expenditures and to waste needed resources” (U.N. 1991, 4). Concealment is a problem to be faced in all countries, rich and poor alike.¹¹ By understanding the economic structure of the general problem we can shortcut the attempt to regulate a long list of “evil events” piece by piece. It is more productive to address the major variables affecting the incentive structure itself.

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¹¹ “. . . importing countries are rendered particularly vulnerable. . . . Indeed, it has been possible for unscrupulous individuals to set up companies engaged solely in exportation and to arrange their business in such a way as to escape all statutory controls in the countries from which they operate” (United Nations 1991).

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