THE MARKET FOR QUALITY

by

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Product Quality

There is a lingering suspicion that the market is unable to provide for quality or seeks some lowest common denominator of quality. This has led to the need for, according to some, government intervention to ensure quality in terms of minimum standards.

Seldom observed or often only casually dealt with in the literature is the emergence, without coercion, of numerous market arrangements to provide consumers with information on product quality and/or help in processing that information. The market itself, in a number of ways, provides its own standards and enforcement of those standards. Explicit voluntary quality standards especially have received virtually no attention from academics. The most up-to-date industrial organization textbooks ignore the concept. Voluntary quality standards and the organizations which provide them, however, have not escaped the scrutiny of the Senate of the United States.

A bill recently under consideration (S.825) would direct the Federal Trade Commission to write and enforce procedural rules for trade standards setting groups (associations whose members are producing firms). It would ensure, according to its authors, that interested persons would have an opportunity to present views during the standards development process. The committee's view is that many standards setting agencies are monopolies and according to the committee ". . . the government is responsible for seeing that the private standards bureaucracies with their self-selected procedures leave neither the public nor the competitors within each industry with no recourse."¹ The subject of this paper is to examine the contention that firms and associations of firms drive quality to some lowest common denominator because they monopolize information on quality.

Quality Search

It is certainly true that consumers today face a huge array of alternative uses for their income. In department stores and grocery stores alone, the alternative uses of income number in the thousands. It is virtually impossible for any single consumer to have perfect information about product quality for all the items in a grocery or department store. The consumer faces a monumental information acquisition and processing problem with respect to product quality. It would be physically impossible for any consumer to become a truly expert buyer of each of the types of purchases made throughout the course of a given year. Consumer advocates like Ralph Nader often argue that

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consumers don't have access to adequate information on product quality to make rational choices. Industry representatives, on the other hand, often make the argument that consumers do not make use of the information they already have available to make rational choices. In a sense, both Ralph Nader and the industry representatives are correct. Information on product quality for various types of items is often not readily available to consumers and, likewise, when that information is readily available, consumers sometimes fail to make use of it. The consumer simply doesn't have enough time to search for some of the less readily available information and similarly the consumer doesn't have enough time to become a quality expert in some of those products for which information is readily available.

The product quality problem for consumers is getting worse, rather than better.² Consumers today have a wider selection of goods than were available in the past and this increase in the alternatives makes it more costly for consumers to acquire and digest information on product quality. Consumers today also have higher real incomes than in the past and so, more decisions requiring assumptions on product quality have to be made. Advancing technology has also increased the complexity of items and thus, increased the cost to consumers of perceiving quality differences. In short, the product quality problem for consumers is not going away. It is not becoming less costly, but is becoming more costly to judge and act upon quality differences. This would certainly be true in the absence of some institutions to provide economies to consumers in the acquisition and/or processing of information on product quality.

We should expect, however, in a relatively free market, with the costs of acquiring and processing information on product quality rising, that institutions or arrangements would arise which would seek ways to make the search process more efficient; that is, to allow the consumer to gain more information more cheaply, and/or perhaps to provide a service in the processing of available information. The suggestion here is that a number of such institutions have arisen and that by and large, these institutions compete with one another although they are often discussed separately in the academic literature, and sometimes overlooked completely as mechanisms for producing and processing information. The relevant consideration when examining product quality differences is not whether there is competition among different quality product standards setting groups, but rather, whether there is competition among the various institutions which provide "search alternatives" to the consumer.

A Quality Search Model

The search by the consumer for quality regardless of the institutions used by the consumer may be modeled in much the same fashion as George Stigler's theory of the search for price.³ This quality search model assumes that unless a market is completely centralized, no consumer will know all of the qualities which various sellers may offer to the market at any given point in time. A consumer who wishes to obtain information on quality must use available market institutions to gather and process quality information. The phenomenon of a consumer using

market institutions in this manner, is termed "search."⁴

Neoclassical demand theory deals with the situation of a consumer optimizing utility over some constraint. The individual theoretical consumer seeks to maximize utility subject to the constraint of a given and fixed budget. Demand theory assumes that knowledge is freely available and that goods produced by various manufacturers are homogeneous. This theoretical model yields an astonishingly vast array of meaningful predictions about economic behavior, but manufacturers in the real world do not, of course, offer identical products at market determined prices to consumers who have perfect information. George Stigler modified demand theory in 1961 with his article "The Economics of Information" which postulated consumers without perfect price information searching for low prices by canvassing suppliers and then making purchases in light of the information they had found. Stigler realized that the search by consumers to discover prices was only one of many of the possible roles of a search for information in economic life. A similar problem to the search for prices exists in the search for quality.

The returns to search for quality consists of the additional utils per dollar worth of goods (including the intangible "good" leisure) that a consumer may purchase by finding an item with better quality. The search for quality is explained here using a goods vs. leisure trade-off which treats search as an alternative to work or leisure.

Consumers maximize utility by increasing their consumption of each good until the return to spending an additional dollar on that good is equal to the return to spending an additional dollar on any other good. The price of leisure can be thought of as the return to the consumer (worker) for the next best alternative open to him: work. The return to work can be thought of as the average wage rate. In this fashion a consumer views leisure as just another one of the goods available for purchase and the consumer will purchase more leisure until it yields no greater return at the margin than work. In the analysis presented here, a third alternative is available to the consumer (worker). This third alternative is the search for quality.

The work vs. leisure trade-off framework assumes that a consumer may increase his income, and thus the quantity of goods he may purchase, by working more. In order to do this, however, the consumer must spend less time searching for quality, thus decreasing the value in terms of utils for each dollar spent on goods, or perhaps decreasing his leisure time, or decreasing both leisure time and the utils derived per dollar spent on goods. In any case, with three alternatives open to the consumer (work, leisure, and searching for quality), the consumer will seek to maximize utility by equating the returns from the last increment of each activity available. It is the differential returns available to these three activities which causes individual consumers to choose some of each in the real world.

While the quality search situation has at times been explained using the work/leisure trade-off technique, there has been no diagrammatic explanation of how the consumer maximizes utility in this framework. The quality search function is

presented in Figure 1 and represents quality measured in utils per dollar spent on the vertical axis and search measured in some unit of time on the horizontal axis. Any quality dispersion which is observed in the market is a measure of ignorance in the market (i.e., ignorance on the part of consumers). If the dispersion of quality among sellers for any type of good is at all large (relative to the cost of search), it will pay the consumer, on average, to engage in some search.

Figure 1

Quality Search Function

Whatever the actual distribution of quality over a given type of goods, increased search is expected to yield diminishing marginal returns as measured by the expected reduction in utils per dollar spent. The Q_0 intercept in Figure 1 is the quality as measured in utils per dollar spent which the consumer expects to receive if he buys without first searching for higher quality. Since Q_0 is the highest quality the consumer knows about in the first time period, he believes he can find higher quality if he invests time in search. The quality search function is positively sloped but concave downward to represent the statement above that increased search will yield positive but diminishing returns as measured by the expected increase in quality. The curve of the quality search function becomes horizontal at some positive quality since consumers expect that suppliers will have some maximum quality which can be offered while still covering short run costs. The distance along the horizontal axis from 0 to S_{maximum} represents the total amount of time that an individual can spend in searching for quality. The vertical line at

Figure 2

Goods vs. Leisure Tradeoff

Figure 3

Returns to Search

S_{maximum} is the consumer's time constraint in this original position. If this particular individual chose to spend the maximum time searching, the highest quality which could be reached by the consumer would be OQ_1 . The increase in quality which was the result of some positive amount of time spent on search would be $Q_0 Q_1$.

The goods vs. leisure trade-off is depicted in Figure 2. Leisure is measured from the left, along the horizontal axis, and work is measured from the right, also along the horizontal axis. Goods are measured on the vertical axis. X_{maximum} L_{maximum} is the linear budget constraint for a single, consumer between goods and leisure. If the individual chooses to operate at a point A on the goods vs. leisure trade-off, Ol_1 leisure and OX_1 goods will be consumed. If, on the other hand, B is the utility maximum point for an individual consumer, Ol_2 leisure and OX_2 goods will be consumed. Note that if Ol_1 leisure is consumed, l_1 l_{maximum} is the amount of time that is spent on work and if Ol_2 leisure is consumed, l_2 l_{maximum} the amount of time spent on work. In other words, this tradeoff simply represents the situation in which a consumer is confronted with a constant 24 hours in a day and is expected to maximize utility given that there are only two possibilities: work and leisure. Work produces an income, the income may be spent on goods, and the goods are represented on the vertical axis. The less time that is spent on leisure, the more time is spent in work and hence the more goods that can be purchased. This goods vs. leisure trade-off, however, assumes that there are only two opportunities for the consumer: work and leisure. Postulated now is the third opportunity: searching for quality. Figure 3 represents the returns to the consumer for this third activity, searching for quality.

Figure 3 shows the additional amounts of a good which a consumer perceives to be receiving because of an increase in quality received per dollar. The quantity of goods is measured on the vertical axis and search time is measured on the horizontal axis. The vertical intercepts for each of the curves in Figure 3 show the quantity of goods that a consumer may buy given that he engages in no search for quality. The assumption here is that as a consumer searches for quality and receives more quality measured in utils per dollar, this increase in quality may be thought of, or perceived by the consumer as "getting more for his money"; in other words, receiving more goods. Figure 1 depicted the situation of a consumer spending more time on search and increasing quality received with diminishing marginal productivity to search. Likewise, this real or perceived increase in quality may also be depicted as in Figure 3 as real or perceived increases in the quantity of goods received by the consumer. Figure 3 shows the additional quantity of goods which a consumer can purchase because of the discovery of better quality. Recall that the vertical intercept of each of the curves in Figure 3 indicates the quantity of goods that the consumer can buy given no additional quality information. If a consumer, however, chooses to spend some time searching for quality, Figure 1 indicated that the consumer would find higher

quality in diminishing amounts as more time was spent on search. The positive but decreasing slope of the curve $X = -F_1(Q)$ in Figure 3 results from the fact that as more time is invested in search for higher quality and this higher quality is found, the total perceived quantity of X that the consumer is able to purchase increases.

Assume that in Figure 2, Ol_1 leisure and OX_1 goods are chosen by the consumer as his most desired combination of goods and leisure when there is no search for quality alternative. This same choice could be depicted in Figure 3 as OX_1 goods and 0 search. With the new alternative now open to the consumer (searching for quality), assume that the consumer chooses to work the same amount but now chooses to search OS_1 hours and find quality high enough for him to be able to buy X_1 X_3 more goods. Obviously, in order to work the same number of hours and search more, this consumer must simultaneously reduce leisure time by the exact amount of time spent searching. If the consumer chose to search more, and thus accept even less leisure, he would be able to buy even more goods because of greater perceived quality.

Returning to Figure 2, if the original position of the consumer which maximized satisfaction when no alternative of searching for quality were available were Ol_2 hours of leisure and OX_2 goods, the corresponding vertical intercept in Figure 3 would be X_2 . If, in the original position a greater quantity than X_1 goods is being purchased, the return to search increases because of the larger number of goods being purchased. The new search function would be $X = F_2(Q)$. This new search function is drawn above the old search function in order to demonstrate the greater returns to search at every level of search.

It is possible to construct a returns to search curve for each possible original quantity of X which the consumer would purchase in the absence of the alternative of searching for quality. The resulting dense set of such curves drawn on the goods/search axis would show all of the various options open to the consumer for increasing real income (X) at every level of good and quality search.

To see the full effects of this third alternative (searching for quality) on the traditional goods vs. leisure trade-off, consider point A in Figure 4. Point A depicts a consumer choosing Ol_1 units of leisure and OX_1 units of goods in the absence of the alternative of search. The only way this consumer could consume more X would be to work more and take less leisure. In Figure 3, however, it was indicated that with quality search added as an alternative for the consumer, the individual can still with l_{maximum} l_1 work time, choose to enjoy less leisure and instead search for higher quality. With OX_1 goods earned by l_{maximum} l_1 work, Figure 3 shows that the appropriate returns to search function for this individual would be $X = F_1(Q)$. The quality search may be translated to Figure 4 so that zero time spent in quality search coincides with l_1 on the leisure axis. Quality search time is then measured from l_1 towards the vertical axis while leisure is still measured on the horizontal axis as before. The appropriate search function $X = F_1(Q)$ translated in this fashion is $X_{m1}A$. The thin line representing the search

Figure 4

Goods vs. Leisure Tradeoff With Search

function shows, with the given X_1 , the additional amount of goods that can be purchased because of higher quality found with search. It also shows the remaining amount of leisure which the individual can enjoy after each search alternative.

Each of the search curves in Figure 3, of which there are infinitely many, could be translated to Figure 4. For example, the returns to search curve in Figure 3 labeled $X=F_2(Q)$ translates to $X_{m2}B$ in Figure 4.

Translating each of the returns to search curves in Figure 3, in like manner to Figure 4, would produce a curve described by the envelope of the linear budget constraint and the field of search functions. This new curve would represent the new budget constraint for the consumer assuming that there are now three alternatives available to the consumer (work, leisure and searching for quality). This new budget constraint is the locus of points which represents the maximum quantity of goods attainable with an optimum division of search effort and leisure for each of a series of work alternatives. This curve is labeled $X_{m3}L_{maximum}$.

Note that any increase in search efficiency by rotating each of the search curves upward in Figure 3 would rotate the budget envelope in Figure 4 upward pivoting about the maximum leisure point $L_{maximum}$. Any decrease in search efficiency would rotate the budget envelope could be rotated downward to the point where the consumer would maximize utility by not searching at all.

Following the analysis presented above, consumers who are more efficient at searching for high quality, or for that matter, for lower prices, will be able to find better buys than those who

are less efficient. Some consumers are probably better shoppers, can better allocate their time, and are able to bring more human capital to bear in the market place. The subject of this paper, however, is not the personal determinant of search efficiency but the origins of the search for quality in the market place.

Institutions

Just as a "more efficient shopper" can cause the budget constraint in Figure 4 to be pivoted about the l_{maximum} point on the leisure axis, various institutions in a market economy may also pivot the budget constraint of individual consumers by providing more efficient (i.e., less costly) methods of quality search. To the extent in society that these institutions are limited, or eliminated, the budget constraint will tend to pivot back towards the position it might occupy in the absence of the opportunity for consumers to engage in quality search.

One of the institutions which would pivot the budget constraint to the right (i.e. upward) would be voluntary product standards setting organizations which make it less costly for consumers and producers to communicate quality in the market place. These institutions develop standards, test products against those standards and certify products as meeting the standards. There are numerous reasons for believing that the standards setting, testing and certification procedures of these agencies would have the effect of pivoting the budget constraint line upward. If a standard is set, a product tested and certified to meet the standard, the information that a product does or does not meet a particular standard is information to the consumer. Merely the piece of information that some consumers buy products that meet a certain standard is in itself a piece of useful information for uninitiated consumers. The standard setting procedure may provide a coordinating function because the consumer is now able to match the purchases of the standard item with purchases of other goods and services.⁵ Misunderstandings and time spent negotiating are also often reduced with standards because of agreed upon definitions and terminology.

If voluntary standards setting organizations then do have the power to pivot the budget constraint line by decreasing the costs of search to the consumer, the question of whether these voluntary standards setting organizations tend towards monopoly becomes rather important. If these organizations do tend towards monopoly, it could be argued in straightforward fashion that consumers would be even better off in terms of the pivoting of the budget constraint line if the government were to regulate these standards setting agencies to ensure their "efficient" operation (i.e. more like a competitive firm). According to Ralph Nader ". . . the nation's anti-trust laws provide little comfort to consumers and small firms who have been hurt by standards abuses, although there are some exceptions to observation."⁶ David Hemenway, whose book Industry Voluntary Product Standards, is quoted by Nader in his testimony before the Senate Sub-Committee on Antitrust and Monopoly, says "that standards creation in the United States is a highly 'concentrated' activity."⁷ According to Nader's interpretation of Hemenway, "the companies participating in standards writing usually are large

corporations well aware of standards market place clout. Economist David Hemenway concluded in a 1975 study of standards groups: 'In the United States major producing firms tend to dominate the standards writing process. This gives them great power in determining not only what standards are created, but exactly what those standards will say'."8

Garrett Vaughn, the minority economist for the Senate Sub-Committee on Antitrust and Monopoly correctly points out that in order to construct an explanation of why standards setting organizations could have monopoly power, the argument must not only include the cost curves which are consistent with an information producing firm, but must also consider the barriers to entry that demanders of information might erect.⁹ Vaughn points out that Stigler's theory of information at least admits the possibility that there may be a strong tendency towards monopoly in the provision of information and thus standards setting organizations could have monopoly power. Vaughn makes the important point, however, that what perhaps Hemenway, Nader, and Peter Maier observe as characteristics of the monopoly provision of voluntary product standards, is in fact an artifact of the barriers to entry which the demanders of the information have erected. Vaughn finds that it is more likely that standards setting organizations which serve clienteles composed primarily of government agencies will be those standards setting organizations which have monopoly power. He notes few instances of alleged monopoly power by standards setting organizations involving private users of information.

What about the case, however, of a standards setting organization which provides its standards to non-governmental consumers? In this situation, will a single standards setting organization be an equilibrium situation? Is it possible to describe a situation like this as a monopoly for the standards setting organizations? Recall that competition, the antithesis of monopoly is a process of exchange. In a competitive market, sellers try to out do other sellers by offering their product, in this case information, at cheaper prices. Most importantly we assume that a competitive market exists when the entry into the market is not restricted. At present, there are no restrictions on entry into the market for setting voluntary product standards, for providing quality information, or for providing aid in processing quality information. But we note, as Ralph Nader and David Hemenway have emphasized, that in most industries there is a single standards setting body largely controlled by manufacturer's representatives, which sets standards for the industry. A statement, however, that there is only one such formal standards setting organization for each industry (which is the case across many industries), is in itself not proof that the market for quality information itself tends to monopoly.

Standards setting organizations are not the only form of organization which provides information on quality to non-governmental purchasers of goods and services. Standards setting organizations may not even be the primary supplier of quality information to non-governmental users of goods and services. A number of alternatives to standards setting agencies as providers

of information on quality come readily to mind.

Guarantees provided by either manufacturers or retailers are probably the most common form of quality information received by consumers. A guarantee or a warranty will often ensure that a substantial portion of the burden of quality deficiency in an item or a service purchased will be borne by the manufacturer or the supplier. Most consumers probably correctly assume that the good or service supplied probably meets certain minimum quality standards such that the manufacturer or supplier will not be driven out of business by claims levied by consumers when the good or service fails to match the description in the guarantee or warranty.

Brand names, at least in the United States, also provide some information to consumers about the quality of an item or service purchased. Some manufacturers use their brand name as a marketing device, assuming that consumers having experienced "good luck" with one item in a brand line will correctly assume that there will be a high correlation with quality at a later point in time or with another item in the same brand line. In fact, the only value in a brand name to a manufacturer may be the amount of quality information which a brand name carries to the ultimate purchases.

Chain operations are also a convenient way of providing information on quality to consumers. Consider Marriott Hotels. Marriott Corporation owns most of its hotels and has a vested interest in seeing that each member of the chain meets certain minimum standards so that Marriott customers are assured that one Marriott will be as good as another.

Licensing and/or franchising is similar to the chain situation in that the various outlets for a product or service are expected to meet certain minimum quality standards which are identical from one outlet to another. Burger King and McDonalds are probably primary examples of mediocre but consistent quality standards from one outlet to another. The ends to which licensing or franchising firms go to in order to ensure that one outlet is identical to another is often the key to success in similar lines of business.

Retailers may also provide information. Sears, for instance, commonly offers more than one grade of many of the products which it sells. Lawnmowers are offered in a number of different grades. For years the Sears catalogue carried "good," "better," and "best" quality levels of lawnmowers. It was clearly indicated to a potential customer, that the Sears "best" lawnmower was significantly different than the Sears "good" lawnmower. Nader pointed out to the Senate Sub-Committee on Antitrust and Monopoly that Sears actually had its own internal testing laboratories and specification setting agency. Nader used this as an argument that the government could certainly afford its own testing laboratory. The fact that Sears and other retailers make such expenditures to provide standards and quality testing indicates that they feel that they can capture the cost of providing that quality information to consumers and that consumers value the information so provided.

Two other potentially competing institutions are the trade

press and advertising in general. The trade press might include those kinds of magazines and publications which provide information to individuals interested in a particular subject area. Road and Track magazine often carries comparison tests of automobiles, tires, and automobile accessories such as headlights. The tests are not sponsored by any standards setting agency or manufacturer, but are designed to interest the readers of the magazine so that they will continue their subscriptions. Consumer Reports is a broader based publication but behaves in much the same way. Consumer Reports is not affected by standards setting organizations in that it is not funded by them and it does not seek to set standards itself. Advertising itself can also be a form of conveying product information on quality and while a great deal of the advertising could certainly not be considered to be competing with the information provided by voluntary standards setting organizations, at least some of the information conveyed in advertising directly competes with quality information provided by the agencies.

Conclusion

Though the short list of above quasi-competitors for standards setting agencies is not exhaustive, it should indicate the possibility of pivoting the budget constraint line in an outward direction by providing consumers the alternative of searching for quality, is an alternative that is provided by more than one type of institution in the real world. Even if a single standards setting agency existed in a particular industry, it is unclear that a monopoly on providing quality information exists. It may be that the voluntary products standards setting organization exhibits monopoly qualities because it provides its standards largely to government agencies. But it is also probably the case that substituting a government testing and standards setting laboratory for each of the monopoly, private, non-profit standards setting institutions would accomplish little. The relevant question is not the number of voluntary standards setting groups, but the variety of search alternatives open to the consumer.

FOOTNOTES

¹Voluntary Standards and Accreditation Act of 1977, S.825, Hearings before the Senate Subcommittee on Antitrust and Monopoly (U.S. Govt. Printing Office, Washington, D.C.: 1977).

²For a full discussion of the difficulties facing the consumer see "Advancing the Backward Art of Spending Money," by Richard Holton in Regulating Business: The Search for an Optimum. San Francisco: Institute for Contemporary Studies, 1978.

³For Stigler's use and explanation of consumer price search see "The Economics of Information," Journal of Political Economy, Vol. 69, No. 3 (June 1961), pp. 213-225; "Information in the Labor Market," Journal of Political Economy, Vol. 70, Supplement

(October 1962), pp. 94-105.

⁴"Search" is used here in its broadest sense and is not confined merely to the action of individual consumers collecting information on quality. The particular analysis of advertising as used by consumers in this search for quality in a work/leisure tradeoff framework is examined by Phillip J. Nelson (although not diagrammatically) in "Advertising as Information," Journal of Political Economy, Vol. 82, No. 4 (July-August 1974), pp. 729-754; "Information and Consumer Behavior," Journal of Political Economy, Vol. 78, No. 2 (March-April 1970), pp. 311-329; "The Economic Consequences of Advertising," Journal of Business, Vol. 48, No. 2 (April 1975), pp. 213-241.

⁵The benefits of voluntary product standards are enumerated in David Hemenway's Industrywide Voluntary Product Standards (Ballinger, Cambridge: 1975), pp. 55-56.

⁶See Ralph Nader's testimony in Hearings Before the Subcommittee on Antitrust and Monopoly of the Committee on the Judiciary United States Senate Ninety-Fifth Congress First Session on S.825 (U.S. Government Printing Office, Washington: 1977), p. 11.

⁷See Hemenway, p. 81.

⁸See Ralph Nader and Peter Maier's "Trade Product Standards," MBA, Vol. 12, No. 1 (January 1978), p. 26.

⁹See Garrett Vaughn's "The Business of Supplying Information: Does It Tend to Monopoly? The Case of Voluntary Industrial Standards," presented at the Annual Meetings of the American Economic Association, August 1978.

REFERENCES

1. Hemenway, David, Industrywide Voluntary Product Standards (Cambridge: Ballinger, 1975).
2. Keating, Barry P., "Standards: Implicit, Explicit and Mandatory," Economic Inquiry, 19(3), pp. 449-458.
3. Nader, Ralph and Maier, Peter, "Trade Product Standards," MBA, 12(1), pp. 23-28.
4. Nelson, Philip, "Advertising as Information," Journal of Political Economy, 82(4), pp. 729-754.
- _____, "Information and Consumer Behavior," Journal of Political Economy, 78(2), pp. 311-329.
- _____, "The Economic Consequences of Advertising," Journal of Business, 48(2), pp. 213-241.

5. Regulating Business: The Search for an Optimum (San Francisco: Institute for Contemporary Studies, 1978).
6. Stigler, George, "The Economics of Information," Journal of Political Economy, 69(3), pp. 213-225.

_____, "Information in the Labor Market," Journal of Political Economy, 70, Supplement, pp. 94-105.
7. Vaughn, Garrett, "The Business of Supplying Information: Does It Tend to Monopoly? The Case of Voluntary Industrial Standards," presented at the annual Meeting of the American Economics Association, August 1978.
8. Voluntary Standards and Accreditation Act of 1977, S.825, Hearings Before the Senate Subcommittee on Antitrust and Monopoly (Washington: U.S. Government Printing Office, 1977).