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THE FUNCTION OF GRADES IN AN AFFLUENT, STANDARDIZED-QUALITY ECONOMY

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by

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The Words and the Questions

The Words

Only in an "affluent economy" are there many technical alternatives of production with substitutable inputs and many subdemands within broad classes of end-goods.[2] Its producers, handlers, exporters, and consumers can rationally pay different prices for different grades of related goods or services. In a "nonaffluent" economy, there are few and simple manifested want patterns, markets, materials, or opportunities for discrimination among grades in production or marketing of broadly defined products. In the "affluent" economy, many inputs and some end-goods are produced and sorted or sold to recognized specifications. In a sense, they are of "standardized quality." In some poor nations and in other managed economies, many consumer goods are of this type. Yet, again, in affluent and uncontrolled economies, both inputs and end-products in general have many different but related substitutes. While many inputs are specification items with little seller differentiation, variation by sellers of end-goods in materials, design, package, location, services, terms, and other attributes of end-goods is a major instrument of actual competition.

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2/ There is no simple definition of "affluence." Similarly, the number of "alternatives" constituting "many" is surely no absolute. Perhaps poor economies should use more and more complex grades. Generally, they do not perhaps because of poverty itself. There is little grading of perishables for local sale in some rich nations. "Subdemand" coefficients are regarded as uniform within but varying between subsets of a commodity class.

"Grades" are subdivisions of product classes defined by attributes, magnitudes, and ranges or tolerances. For the questions at issue here, grades and "quality" are taken to be synonymous. Few if any items--other than coupons or certificates for service--are identical. Costs of containing heterogeneity in the production of some items may often be prohibitive when weighed against associated enhancement of returns. There are stringent administrative limits to indefinite proliferation of grades. Thus, operationally, a grade is a simplification like the lumping of data into the classes of a frequency distribution or like the classification of life forms. There are almost unlimited possibilities with respect to choice of the attributes and magnitudes defining individual grades and therefore the battery of grades covering the entire commodity. The criteria governing optimal specification of grades are thus far not settled for many of the functions toward which grades seem to be directed.

Many definitions of grades and quality--some noneperational and others unrelated to optimal generation or exploitation of alternative production techniques or demands--are used. For example, it has been held that: "grade" is higher if price or cost is higher; if ratings by experts are higher; if sales at given prices are greater; or if "preferences" are higher.1/ Under some conditions, controlled production or the sorting of produced supplies can yield higher net return to

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1/ Two examples, among many, may be cited: H. Theil, "Qualities, Prices and Budget-Enquiries," Review of Economic Studies, vol. XIX(3), no. 50, 1952-53, pp. 129-148. Page 129--"Let us define a quality as a perfectly homogeneous good, at least as a good the heterogeneity of which may be neglected. Let us define a commodity as a set of qualities . . . ." Also, H. S. Houthakker and S. J. Prais, "Quality Variations in Family Budgets," Econometrica, vol. XX, no. 2, April, 1952, pp. 309-311. (Also published in full form in Economic Appliqué.) ". . . define quality by prices paid, which is reasonable if prices are constant between consumers." Here, grades are defined for the purposes of this paper as categories of a commodity class separated from each other by different definitional variables, magnitudes or tolerances. The commodity class can be defined in terms of production or demand substitutability relationships or both, for convenience or for any other reason.

sellers than would bulked sale of the same volume at a single price. Yet, even where subdemands (or productivities) for grades of a commodity are known, independent and static, the attributes defining grade categories must actually reflect different productivities or commercial subdemands. Where these functions are not known, independent or unrelated over time to the grade specifications, the net effect upon returns of alternative patterns of grade classifications and allocation of sale or use among them cannot so easily be estimated.

The Questions

The "functions" of grades in the "affluent" economy can be expressed through a series of hypotheses--some theorems consistent within broad theoretical systems, some tested or at least testable, and others neither.

1. Grades are obviously essential to collection of meaningful market news as guides for arbitrage among alternative outlets on an equal f.o.b. price basis.
2. Under specified conditions, price-differentiated marketing among grades can enhance short-run and perhaps long-run returns to sellers.
3. The channeling of items into grades is essential to the matching of quality, including terms of sale, to diverse individual preference systems, and price-differentiated marketing based upon grades may yield higher "aggregate consumer satisfaction" than would the unsegregated sale of all of the items in the commodity class at a single price.
4. Classification into grades can increase physical efficiency--at least under some conditions--and especially where grades for production of raw materials are systematically integrated with production requirements of processor-customers and their distributor-customers.
5. Similarly, grades can decrease procurement costs by elimination of purchase on an inspection basis.

6. Brand-grades may provide insulation against adjustments in price, grade, promotion, or other terms by competitors.1/

7. As a closely related function, brand-grades may provide latitude for price variation as an instrument of competition by decreasing the size of the market and increasing the ratio of the seller's sales to total sales.

8. Brand-grades may shift preference structures and lift demands.

   a. Product differentiation may be a necessary condition for promotion.

   b. Minimum grades--like those in some standardization laws--may protect individual class demands from adverse effects of sales in related classes.

   c. Grade requirements for inputs--like those in some laws limiting varieties, sprays, odors, or pests--may protect against adverse effects of inputs used by others.

   d. In oligopolistic markets, product differentiation may be an alternative to price competition.

   e. Variation over time in grade specifications and batteries of grades may facilitate manipulation of preference and demand structures.

9. Introduction of new products may be facilitated by variation over time in grades.

These hypotheses imply that grades may enhance the efficiency and lower the costs of production and procurement operations; increase net returns from a given supply through arbitrage or through price-differentiated marketing; and extend competitive devices beyond price competition alone by providing bases for product differentiation, supply manipulation, promotion, or new product development. If net subdemands are given, independent among themselves with respect to realized prices and static--optimal grade distributions and allocation among markets can be determined at least conceptually. Where they are known, interdependent, and invariant in level but not in form over time--optimal grade specifications

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1/ "Brand-grades" mean those classes of a commodity specified by a seller as one instrument of his merchandising policy.

conceivably can be determined but optimal allocation among outlets is far more difficult to specify.1/ Where the demand functions are sequentially related in form or level to realized or expected price in submarkets--but are independent of the grade specifications themselves--there appears to be no definitive theory limiting tenable hypotheses for allocation of given grades among markets or even for definition of the grades themselves. Where realized or expected sales in given grade categories may lead to changes in preference structures or to production responses, there again seems to be no useful theory. Consequently, many of the hypotheses set out above are not presently susceptible of even informal test against measurement, trade experience, or simple judgment.

The Hypotheses and the Evidence

Market News and Arbitrage

Price quotations not tied to grades and pack specifications may not be helpful as guides to allocation in marketing without price differentiation. This is a reason, among others, for limited geographic distribution in "nonaffluent" places. Yet, even in advanced countries, profitable segregation into grades may require several other basic conditions: high purchasing power associated with a complex set of wants; advanced technology in domestic or export outlets; no extreme limits to containment of heterogeneity in raw materials; high productivity of labor as a limit to individual inspection; and the existence of collateral marketing facilities essential to distant sale. As evidence, nearby sales of United States farm perishables are often ungraded and there is little standardization of grades and packs for domestic sale elsewhere. The reasons for the absence of grading for local sales of perishables in advanced countries are not clear.

1/ It is assumed here that if demands for classes are known it is still necessary to decide how grades shall be defined and how product shall be allocated among them.

Price-Differentiated Marketing

With known, static, and independent subdemands, criteria for optimum allocation are well known.1/ Yet, the functions are not always or perhaps even usually known. Conceivably, commodity demands could be striated by many different grade combinations. The criteria governing optimal specification of grades are not known even for the short run. Long experience with market controls indicates that short-run gains can be obtained through grade-based, price-differentiated marketing. However, nearly always, shifts in level, even if not in form, of demands and production responses over time have severely limited the long-run gains. There is neither theory nor experience whereby the long-run optimal grades or allocations can be specified.

Increased "Aggregate Consumer Satisfaction"

It is assumed, and probably correctly in most cases, that processors, dealers, and consumers can distinguish among grade classifications and relate them consistently with their own preferences, buying power, and alternatives. Presumably, specification of grades extends the range of choice and might therefore be expected per se to facilitate more accurate maximization in expenditure unless countered by

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1/ The pioneer study of Frederick V. Waugh, Edgar L. Burtis, and A. F. Wolf, "The Controlled Distribution of a Crop Among Independent Markets," Quarterly Journal of Economics, vol. 51, no. 1, 1936, pp. 1-41, is an excellent expression of the maximization conditions. See, also, Waugh, Quality as a Determinant of Vegetable Prices (New York: Columbia University Press, 1929), pp. 69, 87-88.

monopoloid distribution.1/ There are major gaps in the logic from which this hypothesis is derived and no compelling empirical demonstration of its general validity seems available. Very poor countries probably cannot afford complex grade systems, and economies under central management seem nearly always to limit the range of alternative grades.

Lower Operating Costs

Physical efficiency of production, processing, and handling can be enhanced through grade classifications, perhaps even where market demands cannot be segmented. If merchandising policies of distributors are based, among other variables, upon uniformity and stability of supplies in many outlets, the necessity for consistent grades among raw products and processed items is clear. Further, the engineering requirements of large-scale distributors make grades an essential phase of their operations.

Lower Procurement Costs

There is ample logic and empirical evidence to support this hypothesis. Again, grades would not and generally could not lead to lower procurement expense except in "affluent" economies in which grade differentiation is possible at the consumer

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1/ An interesting conclusion is set out by Lawrence Abbott in Quality and Competition, An Essay in Economic Theory (New York: Columbia University Press, 1955), p. 182.

> "One moral of this tale, which has been made familiar to us by Adam Smith, is obvious: Large markets are needed in order to reap the full advantage of the economies of specialization and mass production. Another moral is less obvious, but perhaps equally important for us of the twentieth century: The proliferation of wants and activities in our complex society, the cultivation of enhanced powers of discrimination, the desire to satisfy wants with a high degree of precision, and technological advances in the exploitation of possibilities for specialization and mass production have combined to bring our civilization to the point where it can no longer expect to reap the full advantages of mass production techniques except by the dubious expedient of curtailing people's wants and activities."

level. Further, separation of engineering and procurement economies attributable to grading is purely formal. The operations of specialized food processors and distributors would be impossible without grades as bases for both these sets of economies. Yet, for these purposes, grades would be generally useless in economies where such enterprises are not present.

Merchandising Policies

Competition here is taken to include any operations relevant to enterprise profit accounts. Accordingly, several phases of merchandising competition have been indicated as dependent upon development of grades. First, there is no doubt that one of the several purposes of developing and branding grades by a firm is to protect against changes by competitors in price, promotion, or the battery of attributes defined here as grades. Furthermore, at least in the short run, it may be possible to add price manipulation as a profit-affecting instrument if the size of the sales market for the item at issue can be decreased by differentiated brands actually representing different grades to purchasers. These are classical functions of grades and brands in merchandising. There is adequate theory under the restrictions noted above, and trade experience and some tests seem to support the hypotheses.

Yet, systematic variation over time in the battery of attributes called quality is obviously a major competitive device of distributors, most processors, and of some farm producers. Once all of the attributes of a product and the terms on which it is delivered can easily be duplicated by others, it becomes a "cordwood" item--undifferentiated, unprotected from competitor's adjustments, unsusceptible of promotion, and sold only on a going-price basis. Processors do not own the sales facilities of distributors as a general rule. The profit interests of distributors and those of processors are not invariably consistent.

Accordingly, both processors and distributors are, in fact, constrained continuously to develop new products--hopefully differentiated. The changes in the United States food industry over recent years seem to support this view. However, there has been a counterdevelopment--equally dependent on grades. In the meat industry, for example, small-scale specialized processors have obtained uniform livestock and processed it to one or a few grades for the specialized use of distributors. Yet, these same distributors, dependent on uniformly graded carcasses from producers and processors, have then differentiated United States graded products by adding grade specifications unique to themselves.

There are a few statements of theoretical criteria for optimum change in quality or grade specifications.[1] Yet, most such statements are fatally afflicted by failure to refer to several operating facts of actual markets: short-run subdemands are often not known, static or independent; they are sequentially interrelated in that alternative allocations among them in one or several periods may engender changes in form and level of both demands and outputs of the controlled commodity and others related to it in production, demand or both; conceivably, grade and brand specifications and combinations may themselves alter preferences, demands, and perhaps production techniques over time; and, perhaps most important, demands themselves may be functions over time of the introduction of new grades, brands, qualities--in short, of new product development.

It does not seem generally to be true that processors and distributors develop new products in response to already existing constellations of wants, buying power, and relative prices. The wants seem often to be created after the product is introduced. Product variation is essential to effective competition even with unchanging wants. However, preferences do seem to change over time. New product entry appears

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[1] As one example, see Purnell H. Benson, "A Model for the Analysis of Consumer Preference and an Exploratory Test," Journal of Applied Psychology, vol. 39, October, 1955, pp. 375-381.

to be tentative, exploratory, and subject to continuous revision. This is an area of merchandising in which there has been little analytical speculation and virtually no formal development of theory or measurement.[1] As yet, there do not seem to be persuasive demonstrations of the determinants of qualities or grades actually produced; the effects of grade variation over time upon price, cost, output or market structure; and, perhaps most important, upon preference constellations. In short, grades are essential elements in the affluent economy; yet, when considered carefully, relatively little seems to be known about their genesis or effects or the criteria governing optimum specifications, grade combinations, or variation over time.

Summary

If grades are taken to mean the attributes whereby inputs and end-goods may be segregated into subclasses with consequent enhancement of efficiency returns and satisfaction, it is only in an affluent economy that grading is feasible or profitable. Grades are a means for rational distribution among alternative outlets, with or without price differentiation. They are necessary means for decrease of costs or enhancement of returns by enterprises not restricted to the single and homogeneous commodity postulated in older price theory. They are a major instrument in the competitive policies actually used in the American food industries. There is a body of theory dating back some three decades from which useful hypotheses with respect to optimal short-run allocation of given supplies among known subdemands can be drawn. Yet, there are clear relationships of grades--or quality or product variation or new product development--to market structure; to coordination of farm production with food processing and distribution; to changing preferences over time; and to prevailing methods of actual competition among enterprises. These questions seem to be the crucially important ones from both enterprise and public viewpoints. They do not yet seem to be answered nor is there yet adequate theory upon which answers to many of them might be based.

1/ One of the best studies, free of the restrictive assumptions of the early writings on monopolistic competition, is Abbott, op. cit., 229p.