GRADING AS A MARKET INNOVATION

J. W. FREEBAIRN*

This paper originates from research by the author into the economics of some grading schemes for New South Wales wheat. A prerequisite to this evaluation was the construction of an analytical framework in which to assess the likely effects of grading on the market and on the members of the market. This paper presents that framework. It is believed that this framework is sufficiently general to have relevance to other commodities besides wheat.

The inducements to grade a commodity are: (a) to increase producers' returns; (b) to increase buyers' satisfaction; and (c) to increase marketing efficiency.[1] No matter how or why motivated a decision to grade a commodity is a market innovation which may affect all members of the market: producers, buyers, and merchants. Moreover, (and this is usually by-passed in most text-books accounts[2]) grading will affect market conduct and performance since it entails a change in market structure.[3] By considering grading as a market innovation we are able to trace the dynamics of buyer, producer, and market adjustment to the grading innovation.

To facilitate understanding of the following discussion let us define some of the terms used. A grade is a class of a commodity classified on the basis of one or more of the characteristics, properties, or attributes (which we shall call quality characteristics) of that commodity.[4] The quality characteristics and their levels, according to which the commodity is sorted, are known as grade specifications. Grading is simply the process of carrying out such a classification.

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* Economics Research Officer, New South Wales Department of Agriculture.

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[1] A market may be seen as providing marketing services and as an equator of supply and demand decisions.

[2] See for example: R. L. Kohls, *Marketing of Agricultural Products*, Second edition, (New York: Macmillan, 1961), Chap. 19; A. L. Larson, *Agricultural Marketing* (New York: Prentice-Hall, 1951), Chap. 13; F. L. Thomson, *Agricultural Marketing* (New York: McGraw-Hill, 1951), Chap. 13.

[3] The concepts market structure, market conduct and market performance are adopted from J. S. Bain, *Industrial Organization*, (New York: Wiley, 1959), Chap. 1.

[4] In practice the bounds of a commodity are not clearly defined. Conceptually, those units with high positive cross-elasticities of demand belong to the same commodity category and those with low cross-elasticities belong to different commodity categories. Operationally, one would need to use this definition with an admixture of common sense. For a detailed discussion on the definition of a commodity see: Willard W. Cochrane, "The Market as a Unit of Enquiry in Agricultural Economics Research", *Journal of Farm Economics*, Volume 37, No.1, (February, 1957), pp. 22-28.

Several points should be developed from these definitions. First, the definition does not imply necessary homogeneity of the members of a grade, but only that units within one grade differ from those in another with respect to the quality characteristic(s) by which the commodity is classified. Second, a grade need not of necessity be of higher or lower quality than another grade; it need only be different. The value of units of a commodity in any grade depends on their use as a means to some end. Grades in this sense cover vertical, horizontal, and innovational types of quality variability.[5] Third, grading schemes may take different forms amongst various participants in a commodity market. In a standardized grading scheme the grade specifications are uniform among all buyers and sellers, and from place to place and time to time. For example, a standardized grading scheme is typified by uniform weights and measures. In other forms of grading schemes, different producers, buyers, or marketing authorities acting individually or in groups may adopt different grade specifications with respect to a particular commodity. These specifications may be based on the same quality characteristics, but different producers may use different levels of these quality characteristics as a basis for grading. For example, in the world wheat market, wheat is classified into classes of different baking strength, but the levels adopted by each of the producing countries differ between countries and also over time in each country. In the case of product differentiation via brand names, producers frequently use different quality characteristics in their grade specifications.

In this paper an analytical framework for assessing the economic effects of a grading innovation is constructed. The effects are discussed under the headings of:

(1) buyer satisfaction;
(2) return to producers and their competitive position;
(3) marketing efficiency; and
(4) market conduct.

Separating the effects in this way does involve some overlapping; however, it makes the exposition more manageable. Although principally designed to evaluate the effects of a given grading scheme, this framework also gives insight into the determination of an optimal grading scheme.

1. Buyer Satisfaction

Buyers do not have uniform tastes or purchasing power and use a commodity for different purposes. Similarly, the derived demand for inputs, e.g. wheat for bread making and wool for clothes, will reflect this diversity of final demand. The classification of items of a commodity into grades is essential to the matching of quality characteristics to such diverse preference systems, firm production functions and buyer purchasing powers. Grading enables buyers to obtain the particular quality characteristics in a commodity which they prefer and are willing to pay for. If only the ungraded commodity is offered to buyers they

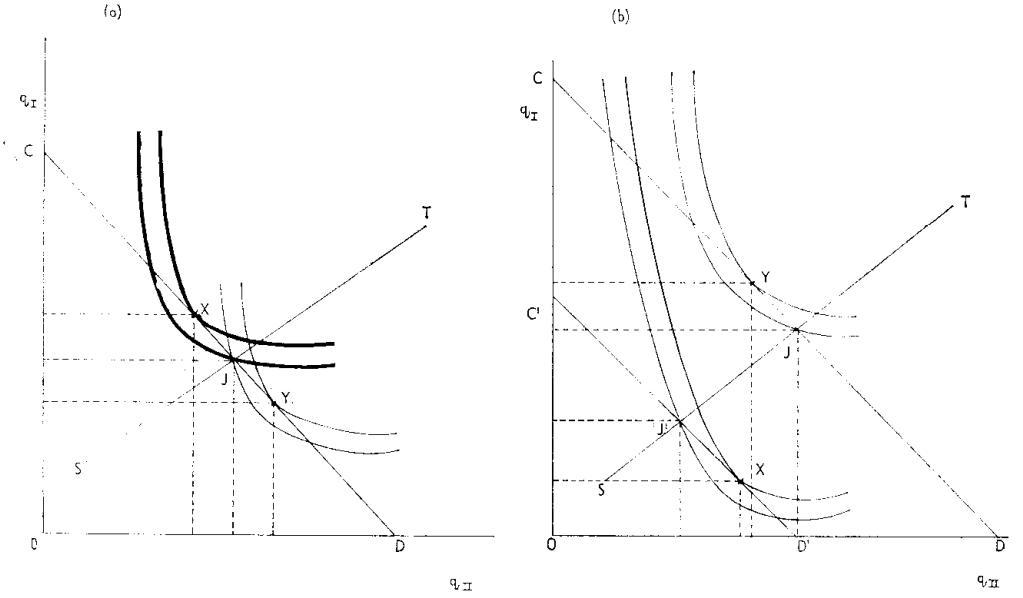
[5] As defined by Lawrence Abbott in "Vertical Equilibrium Under Pure Quality Competition", *American Economic Review*, Volume 43, No. 5 (December, 1953), p. 827.

are forced to purchase a commodity consisting of a predetermined combination of the grades.

The nature and extent of the effects of grading on buyer satisfaction can be shown using indifference analysis. We assume a perfect market, buyer rationality, and that buyers adjust instantly to the grading innovation. If the ratios of the marginal utilities from the consumption of different products are the same for all buyers, buyer satisfaction (utility) will be at a maximum; and if these ratios are not equal, reallocation of the products would increase buyer satisfaction.[6]

In Figure 1 suppose an ungraded commodity consists of two grades, I and II (which are regarded as closely related but different products), which are supplied by producers in the proportions shown by the line ST. Before grading, ST is the only attainable expansion path for buyers of the commodity.

FIGURE 1



In Figure 1(a) we consider the situation of different preference systems and identical purchasing powers. The heavy lines are part of one buyer's preference map (Buyer A) and the other lines are the indifference curves of a second buyer (Buyer *B*). If *CD* is the budget line for given purchasing power and relative prices of the two grades, before the grading innovation both buyers will purchase a combination of I and II indicated by the point *J* on the expansion path. In these circumstances the ratio of the two buyers' marginal utilities for the two products, grades I and II, are not equal.[7] If the commodity is graded, however, buyers are able to choose any combination of the grades of the commodity. Each will therefore move to the point where his budget

[6] W. J. Baumol, *Economic Theory and Operations Analysis*, Second edition (New Jersey: Prentice-Hall, 1965), p. 358.

[7] The marginal rate of substitution of two products is identical to the inverse of the ratio of the marginal utilities of the two products.

line is tangential to his indifference curve; Buyers A and B will now purchase the combinations of I and II shown at the points X and Y respectively. Since both buyers are now on higher indifference curves their satisfaction is increased. This finding holds for any combination of prices; indeed it may be demonstrated with box diagrams in which no price assumptions are required. Furthermore, buyer satisfaction is maximized because the ratio of the marginal utilities of grade I and grade II is the same for both buyers, viz:

$$MU_I^A/MU_{II}^A = P_I/P_{II} = MU_{II}^B/MU_{II}^B$$

where MU_I^A and MU_I^A are the marginal utilities of grades I and II respectively for Buyer A, MU_I^B and MU_{II}^B are the same quantities for Buyer B, and P_I and P_{II} are the respective prices of grades I and II.

Turning to Figure 1(b) we illustrate two buyers with the same preference system but different levels of purchasing power indicated by the budget lines $C'D'$ (Buyer A) and CD (Buyer B). Under these conditions Buyer A purchases the combination of grades indicated at point J', whilst Buyer B operates at J on the only attainable expansion path for the ungraded commodity. Following a line of reasoning similar to that used for Figure 1(a), grading, by allowing Buyer A to move to X and B to Y could again enable the buyers to increase (and maximize) their satisfaction from consumption of the commodity.

Note that some buyers' preferences may be such that their satisfaction is at a maximum by purchasing the ungraded commodity. This is clearly the case for any buyer whose budget line is tangential to one of his indifference curves at a point which also lies on ST in Figure 1.

Following from this type of analysis it can be argued that as the number of grades increases, the marginal increase in buyer satisfaction will decline.[8] Consider a commodity with only one variable quality characteristic. As the number of grades is increased the closer substitutes will any pair of the grades become. This will be reflected in a flattening of the respective indifference curves. The flatter the indifference curves the smaller will be the increase in buyer satisfaction for a given movement towards the optimum allocation, *ceteris paribus*.

The analysis of Figure 1 clearly demonstrates that if grading is to increase buyer satisfaction it is necessary to establish that proposed grade specifications reflect those quality characteristics of the commodity which are important to a significant number of buyers. Only those units of a commodity which buyers value differently and can distinguish as having different uses or levels of usefulness should be regarded as different possible grades. However, in the dynamics of buyer adjustment (i.e. when we relax our assumption of instantaneous buyer adjustment to a grading innovation) these distinctions may not become apparent until after the innovation. Much product differentiation by firms, for example, is pursued in anticipation of buyers' changing preference patterns.[9]

[8] For a more rigorous proof of this assertion see: Pinkas Zusman, "A Theoretical Basis For Determination of Grading and Sorting Schemes", *Journal of Farm Economics*, Volume 49, No. 1 (February, 1967), p. 91.

[9] These expectations are not always fulfilled and as a result buyers' satisfaction is not always affected by the grading innovation.

A prerequisite for assessing whether grading will increase buyer satisfaction is information on buyer preferences and purchasing power (now and in the future). For some commodities, particularly those which are used as inputs for subsequent processing (such as wheat for flour milling, oil seeds for oil production, cotton for yarn production etc.) the required information may be obtained directly by studying the pecuniary benefits that accrue to users of different units of the commodity with different quality characteristics. For final consumer commodities such as meat, fresh fruit and vegetables, other techniques such as consumer panels, consumer interviews and market experiments are required. Even so, the latter are beset with conceptual difficulties, not to mention practical and cost constraints[10].

For those commodities used as inputs, grading may increase buyer satisfaction indirectly by increasing the physical operating efficiency of the firm, especially where grades of raw materials may be systematically integrated with production requirements. For, as Southworth argues, "quality identification even more than ordinal grading, is the basis for much of the contribution (of grades) to physical operating efficiency in processing and handling".[11]

2. Return to Producers and Their Competitive Position

From the foregoing indifference analysis it can be shown that grading will lead to a shift to the right of the aggregate demand schedule for the commodity. Buyers are prepared to offer an aggregate price for a given aggregate quantity of the graded commodity which exceeds the price they are prepared to pay for the same quantity of the ungraded commodity.[12]

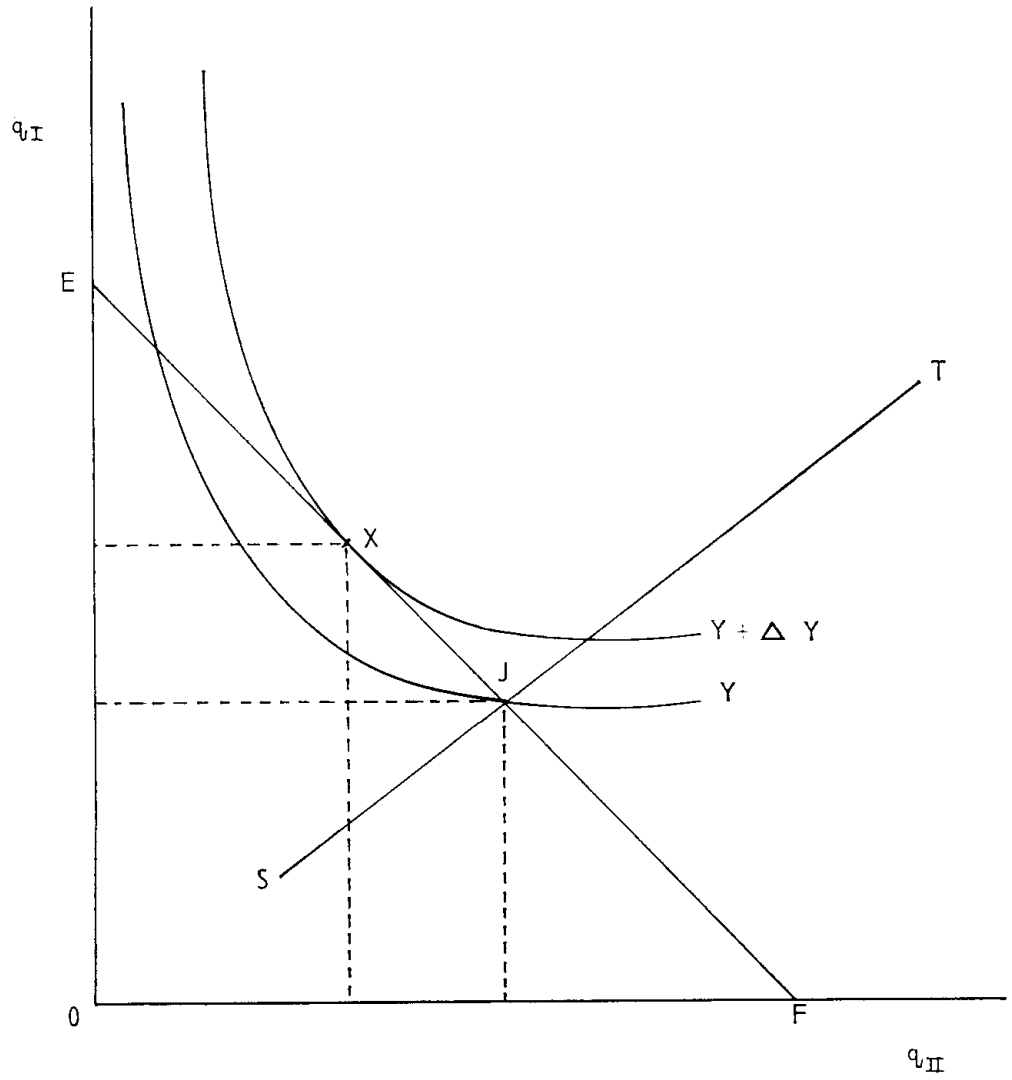
Let us return to our previous example of a commodity consisting of two grades, I and II. In Figure 2 ST represents, as before, buyers' only attainable expansion path for the purchase of the ungraded commodity. EF is an iso-quantity line along which $q_I + q_{II} = Q$, cutting ST at J, the point at which a given buyer is operating before grading. As only a small proportion of income is generally spent on any one agricultural commodity, and as we are assessing a small monetary adjustment only, the marginal utility of money may be assumed constant, and greater than zero. Hence the buyer's indifference curves may be expressed cardinally in money terms. Two such curves, labelled Y and $(Y + \Delta Y)$ are drawn onto Figure 2. We observe that the buyer would be prepared to offer $(Y + \Delta Y)$ for Q units of the graded commodity and only Y for Q units of the same commodity in its ungraded form.

[10] For a discussion of some of the difficulties which have been encountered in actual market experiments, see V. James Rhodes, *et al.*, "Consumer Acceptance of Lean Pork", *Journal of Farm Economics*, Volume 42, No. 1 (February, 1960), pp. 18-34, and G. H. Brayshaw, E. M. Carpenter, and R. J. Perkins, *Consumer Preference for Beef Steaks*, (University of Newcastle-upon-Tyne, Department of Agriculture Marketing Report No. 2), 1967.

[11] H. M. Southworth, "Discussion: The Function of Grades in an Affluent Standardized Quality Economy", *Journal of Farm Economics*, Volume 43, No. 5 (December, 1961), p. 1385.

[12] We assume that units of the different grades are summable.

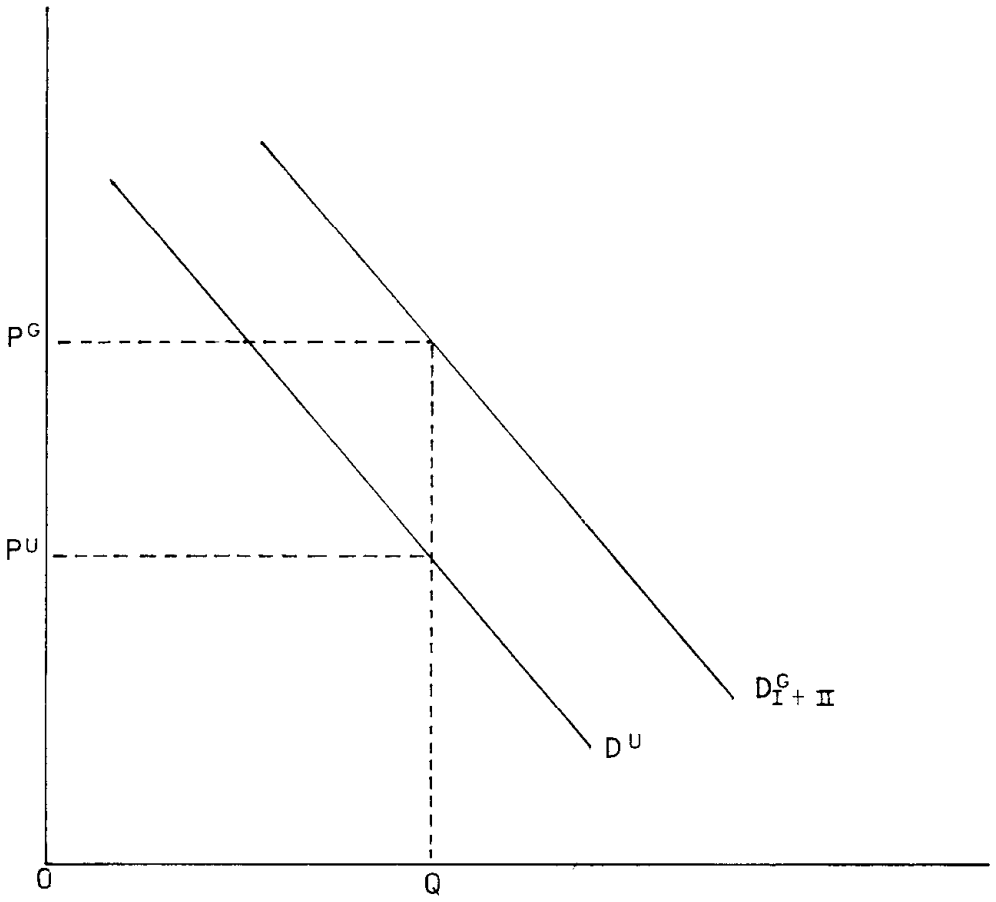
FIGURE 2



That is, as is shown in Figure 3, the buyer would be prepared to offer an aggregate price $P^G = (Y + \Delta Y)/Q$ per unit for Q units of the graded commodity and only $P^U = Y/Q$ for the same quantity of the ungraded commodity. Hence the aggregate demand schedule for the graded commodity, $D^G{}_{I+II}$, will lie to the right of that for the ungraded commodity, D^U.

This result may be generalized as follows: Suppose in Figure 4, *ST*, as before, represents the forced expansion path when the commodity is ungraded, and *UV* is the "true" expansion path derived for a given price ratio between I and II, which would be attainable after grading. From the foregoing analysis we know that the aggregate demand schedule for the graded commodity will lie to the right of that for the ungraded commodity. The distance between these two demand curves will be smaller the closer *UV* lies to *ST*, because the closer will P^G, the aggregate price buyers are prepared to offer for the graded commodity, be to P^U,

FIGURE 3

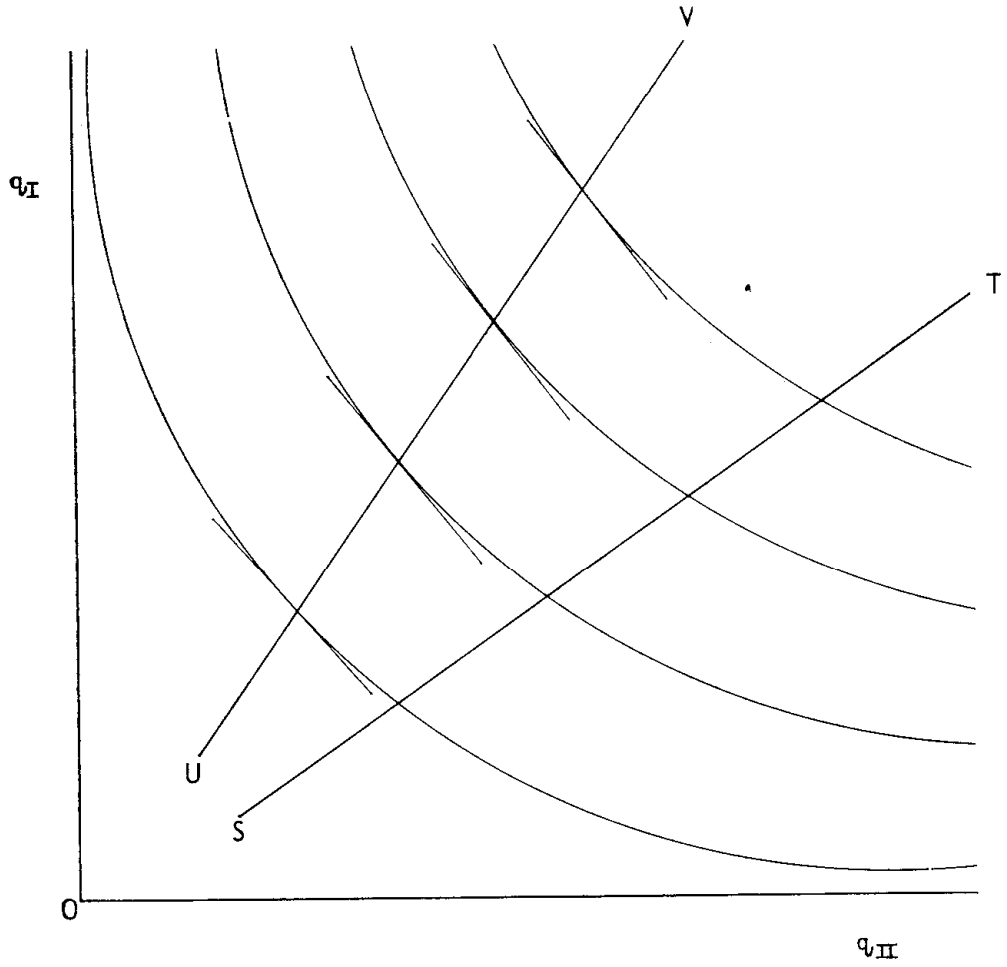


the price of the ungraded commodity. In the limiting case when buyers' satisfaction is at a maximum by purchasing the ungraded commodity, i.e. when ST and UV coincide, buyers will offer an aggregate price for the graded commodity that is no higher or lower than the price they are paying for the ungraded commodity, i.e. in Figure 3, P^U and P^G, and D^U and $D^G{}_{I+II}$, will coincide.

Another important factor which would tend to shift the aggregate demand curve to the right comes from attracting additional buyers because the graded commodity has greater value for potential buyers. A possible example would be attracting buyers of synthetic fibres to purchase natural fibres of wool and cotton which have greater value to them if they are graded than when they are ungraded.

Let us now consider the direct effects of grading on producer returns. In Figure 5, D^U and S^U are the respective observable demand and supply curves for the ungraded commodity. P^U is the long run equilibrium price for the ungraded commodity. Disregarding problems of aggregation, S^U may be regarded as the lateral summation of the supply curves of the grades of the commodity, which for simplicity we will, as before, assume to be two. (Note that the argument may be generalized to cases of more than two grades). To further simplify Figure 5, the

FIGURE 4



relevant curves for grade I only are shown. In each case considered the corresponding analysis for grade II may be easily determined.

Whilst the commodity is ungraded there will not exist a "true" observable demand curve for the individual grades. However, there will be apparent demand schedules determined partly by buyers' demand for the ungraded commodity, D^U, and partly by the proportion in which the grades are produced in the total supply of the ungraded commodity. In Figure 5, D^A_I is the apparent demand curve for grade I.

From the foregoing analysis we know that grading will shift the aggregate demand curve for the graded commodity, D^G_{I+II}, to the right of D^U in Figure 5. (D^G_{I+II}, may be considered as the lateral summation of the true demand curves for the grades). D_I in Figure 5 is the true de-

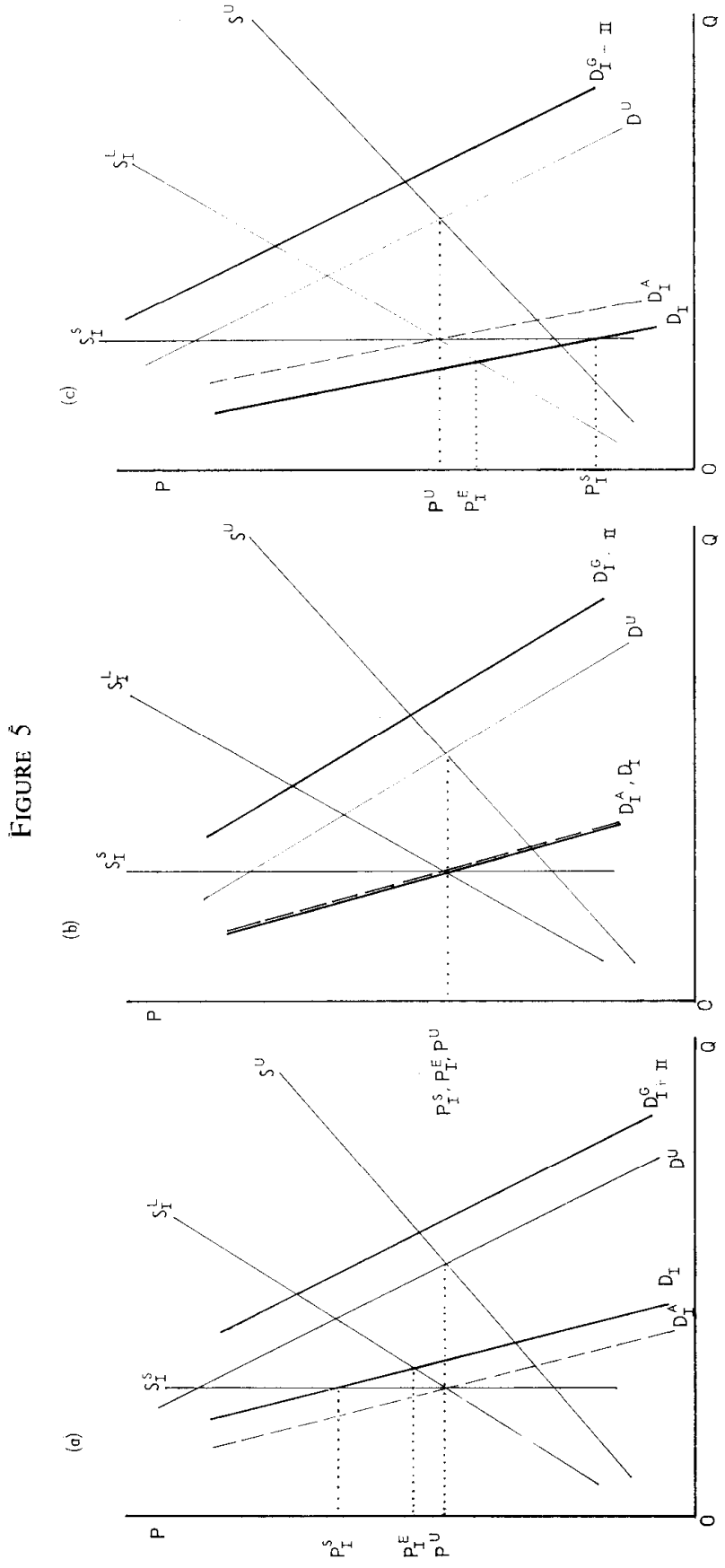


FIGURE 5

mand curve for grade I. For any particular price level the true demand curves for grades I and II may be either:

(a) both to the right of the apparent demand curves; or

(b) one in the same position as its corresponding apparent demand curve and the other to the right; or

(c) one to the left and the other to the right of its respective apparent demand curve.

Because the shapes of the two types of demand curves may differ this relationship may change at different price levels but such changes are not considered here. Relative to its apparent demand curve, the three possible positions which the true demand curve for a grade (in this case D_I) may take are shown in Figures 5(a), 5(b) and 5(c).

The effects of grading on producer returns as producers adjust to the market innovation may be considered for three time periods, viz.:

(1) the short run in which supply is inelastic as is shown by S^s_I in Figure 5, resulting in a price of P^s_I for grade I;

(2) the intermediate run in which adjustments can be made along the long run supply curve, S^L_I, resulting in an equilibrium price, P^E_I for grade I; and

(3) the long run in which the supply curve itself may be shifted.

In comparison to the intermediate run the long run assumes free mobility of all productive resources. Because of technical constraints on the production of some grades of some agricultural commodities such long run assumptions may not always be valid. For example, it is doubtful if prime lambs or baby beef could be produced in the dry pastoral zones of New South Wales.

Disregarding costs of the grading scheme itself, which may, however, be easily handled as a shift to the left (by the amount of grading costs) of the supply curves, the effects of grading on producer returns for the three possible demand curve situations may be assessed as follows:

(a) When both true demand curves lie to the right of the apparent demand curves it is clear that all producers gain (see Figure 5(a)). In the short-run super-normal profits are earned. In the intermediate period they are earning normal profits only, but on a higher level of sales and returns. In the long run the entry of more resources and/or new firms would erode away some of these gains; however, all producers would gain from the innovation.

(b) Producers whose true demand lies to the right of the apparent demand curve will gain from the innovation as in (a) above. Those producers of the grade whose true demand curve is in the same position as the apparent demand curve will be neither better nor worse off in the short and intermediate run (see Figure 5 (b)). In the long run they may be expected to reap some of the producer gains from the grading innovation. Certainly no one will be worse off.

(c) Producers of the grade whose true demand curve lies to the left of its apparent demand curve lose from the grading innovation in both the short run and in the intermediate run (see Figure 5(c)). In the short run they do not even cover their costs of production. In the intermediate run they cover costs of production, but their return is lower than before the innovation. In the long run they may be expected to

increase their returns above those of the intermediate run by shifting into production of grade II. In any of these time periods the gains of the producers of the other grade, II, may not exceed the losses of the producers of grade I. Thus the total return of all producers of the commodity may be reduced by the grading innovation.

To summarize, the conditions under which producers of particular grades gain from grading can be determined for the short and intermediate run using the analysis above. Their long run position clearly depends on the extent to which adjustments in resource use can be made following the grading innovation. However, the conditions under which producers in total gain are more difficult to specify in the general case. Obviously, important parameters are the elasticity of long run supply, the relative positions of the apparent demand curves, the extent to which the true demand curves lie to the left and right of the apparent demand curves and the opportunities for adjustment in resource use. In reality it would seem easier to assess this question in terms of each practical situation.

Although conceptually straightforward, operationally it has proved extremely difficult to quantify the effects of grading on producer returns. The true demand functions are not always known, and if they are, they are interdependent and rarely static. In the unlikely event that demand functions for the grades were known, independent and static, it is easy to make an assessment.[13] But, since the grades of a commodity are by definition substitutes their demand functions will be interdependent. Where demand functions for the grades are known, interdependent in a linear relationship and static we can use spatial equilibrium models of the Takayama-Judge type.[14]

Perhaps the greatest difficulty is that the individual grades are seldom static but are continually subject to structural variations due to changing technology, tastes, incomes, merchandising techniques and because realized or expected sales in given grades may lead to changes in preference patterns. This latter factor is very much a part of buyer adjustment to the grading innovation. It is perhaps more important in the case of product differentiation than it is for standardized grades.

In an oligopolistic market, grading, particularly in the form of product differentiation via brand names, is frequently used by particular firms to improve their competitive position and in so doing increase their returns and profits. Often grading is an important precondition for a successful promotion or product development program. Grading, for example, enables advantage to be taken of economies of size in consumer education since it aids the development of centralized product promotion schemes rather than localized promotion schemes. One of the purposes of firms developing brand names is to induce a more inelastic demand for their product by insulating their product against the effects of changes

[13] See, for example: F. V. Waugh, E. L. Burtis, and A. F. Wolf, "The Controlled Distribution of a Crop Among Independent Markets", *Quarterly Journal of Economics*, Volume 51, No. 1 (1936), pp. 23-47.

[14] In particular, see T. Takayama and G. C. Judge, "Spatial Equilibrium and Quadratic Programming", *Journal of Farm Economics*, Volume 46, No. 1 (February, 1964), pp. 67-93.

in competitors' merchandising policies so as to practice monopolistic pricing. There is adequate theory and trade experience in which to assess the direction of these effects, but often we cannot accurately quantify them because of gaps in market knowledge and because of the changeability of markets over time, some of which are induced by the grading innovation itself.

3. Marketing Efficiency

Grading may lower the costs of providing various marketing services, e.g. market reporting, storage, transport, and financing; (a) by making possible buying and selling by description; (b) by the provision of a common language for buyers, sellers, and market reporters; (c) by eliminating the time and expense of arguments over quality; and (d) by allowing the pooling and intermingling of products for transport and storage. The reductions in costs which grading would make possible could be assessed by cost accounting and budgeting techniques.

Grading will, however, increase some marketing costs. These include the direct costs of grading and additional handling, transport, and storage costs. In the case of brand names, some promotion and product development costs may be increased as well.

A set of standardized grades enables supply and demand decisions to interact more precisely and efficiently and thus permits a more efficient allocation of resources than when quality differences are not specified. This happens through the increased general level of market knowledge as some of the uncertainties inherent in exchange are removed. Standardized grades provide a universal and generally accepted language by which buyers and producers alike can better express their preferences, and further, they facilitate the dissemination of this market information. Because of their lack of uniformity of application, other types of grading schemes may not increase the general level of market information to the same extent as standardized grades. In fact, it might be argued that some brand names which are based on fictitious and spurious quality characteristics distort rather than increase the general level of market knowledge.

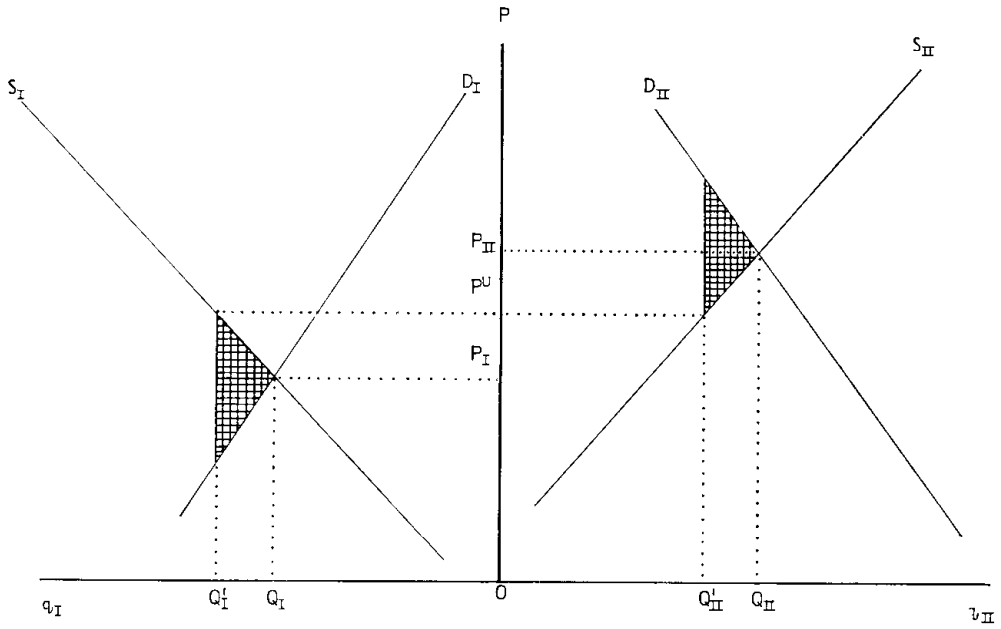
The gains to society from an improved allocation of resources which might be attributed to grading by increasing market knowledge can be shown using a utility concept of net social cost.[15] In Figure 6, suppose D_I, S_I, D_{II}, and S_{II} are the respective demand and supply curves for a commodity consisting of two grades, I and II.[16]. Suppose that before grading, because of insufficient market knowledge and because producers of both grades were offered the same price, P^U, producers supplied the non-equilibrium quantities of the grades, OQ'_I and OQ'_{II}. Compared with the equilibrium quantities of grades at which

[15] See, for example, Luther G. Tweeten and Fred H. Tyner, "The Utility Concept of Net Social Cost—A Criterion for Public Policy," *Agricultural Economics Research*, Volume 28, No. 2 (April, 1966), p. 33, who state that the "social cost concept has been viewed as the net value of goods and services foregone by producing either too much or too little of a particular commodity".

[16] This construction involves a simplification that the demand and supply curves of each of the grades are independent. Relaxation of this assumption does not invalidate the argument.

society utility is maximised, the cost to society of a misallocation of resources, which might be avoided if the commodity were graded, is equal to the sum of the hatched areas in Figure 6. The hatched area on the left hand of Figure 6 is the net social cost of overproducing at Q'_I rather than Q_I, and the hatched area on the right hand of Figure 6 is the net social cost of underproducing at Q'_{II} rather than at Q_{II}.

FIGURE 6



4. Market Conduct

Market conduct refers to the " . . . patterns of behaviour which enterprises follow in adapting or adjusting to the markets in which they sell (or buy)".[17] It includes the methods and criteria employed by the firm or groups of firms in determining their output, pricing policies, product policies, promotion policies and their relationships one to the other. There is a growing body of theory, much of which remains empirically untested, which argues that market conduct is in part determined by market structure.[18] As we have observed so far, grading may significantly alter the level of market knowledge which is a market structural parameter. We might therefore expect grading to have some effect on market conduct.

The effects of a system of standardized grades (as contrasted with product differentiation) on the nature of competitive devices used by

[17] Bain, *op. cit.*, p. 6.

[18] For a discussion of this relationship see: Robert L. Clodius and Willard F. Mueller, "Market Structure Analysis as an Orientation for Research in Agricultural Economics", *Journal of Farm Economics*, Volume 43, No. 1 (August, 1961), pp. 515-553.

firms is discussed by Farris.[19] Standardized grades, by removing the basis for product and promotion competition by individual firms, foster price competition and decrease the emphasis on the use of other competitive devices. They may, however, hasten product development as firms seek to find new quality characteristics with which to differentiate their product from those of competing firms.

Indirectly a system of standardized grades may help break down barriers of entry whereas brand names are developed with an eye to making it more difficult for potential competitors to enter the market. A study of beef grading in the U.S., for example, found that grading had contributed to the relative increase in the amount of beef sold through retail food chains, and in the number of independent wholesalers and independent large volume retailers. It also had led to the declining importance of national packer slaughtering plants and of packer branch houses.[20]

Because, as we have noted above, grading may alter the relative competitive position of firms in an industry, it will be necessary to consider whether the changed position will induce firms to change the aims and techniques of their merchandising policies, and if so, the nature and extent of these changes. Such changes may influence the ultimate effects of a grading innovation on producer returns, and also on buyer satisfaction. If, for example, a standardized grading scheme effectively lowers the barriers of entry, existing firms may choose to forego monopolostic pricing and monopoly profits (in the short term anyway) to hold potential competition at bay.

Summary and Conclusions

Grading it seems may either increase the satisfaction (utility) of individual buyers or leave their satisfaction unaffected. In general, grading will increase aggregate buyer satisfaction to the point where a grading scheme is obtained in which buyers regard all units of a commodity in any grade as homogeneous. Buyers would regard such a scheme as an optimal grading scheme. Also, as the number of grades increases, the marginal increase in buyer satisfaction declines. Our indifference analyses showed that buyers will express their increased satisfaction as the higher aggregate price they are prepared to offer for an aggregate quantity of the graded commodity compared to that price which they are prepared to offer for the same quantity of the ungraded commodity.

If grading is to increase buyer satisfaction, grade specifications must rest on important and recognizable quality characteristics of the commodity, i.e. on attributes or properties of the commodity which have different value to the buyer. Yet, in the dynamics of buyer adjustment to the grading innovation we found that these distinctions need not necessarily be apparent before the innovation, but may in fact be induced by the innovation. This raises the argument advanced by Farris that,

[19] Paul Farris, "Uniform Grades and Standards, Product Differentiation and Product Development", *Journal of Farm Economics*, Volume 42, No. 4 (November, 1960), pp. 854-863.

[20] Willard F. Williams, Earl K. Bowen and Frank G. Genovese, *Economic Effects of U.S. Grades for Beef*, (U.S.D.A. Marketing Research Report, No. 298), 1959.

"in looking upon a market as a moving and evolving process, the interrelationships (between standardized grades and brand names) may be complementary from the standpoint of product improvement and development".[21] His argument runs along these lines: significant quality characteristics of a commodity are first sought out and used in brand names, and in time, as the level of market knowledge increases, these quality characteristics become grade specifications in a system of standardized grades. However, in practice this line of reasoning is not always valid. Often the quality characteristics by which firms differentiate their products with brand names are spurious tending at first to confuse buyers and providing them with no real added satisfaction. In the long run such a brand name will pass from the market scene.

In terms of producer welfare, the effects of grading as suggested by theory are more variable and difficult to assess, particularly for the long run when changes in market conduct must be considered. Because the aggregate demand schedule for the graded commodity will in general lie to the right of the demand schedule for the ungraded commodity some, if not all, producers will receive a higher level of returns in all adjustment periods following the grading innovation. In the short and intermediate run the returns of some producers may be unaffected, whilst some producers may receive a reduced return after the grading innovation. For those situations in which some producers' returns are reduced, i.e. when the true demand curve for a grade lies to the left of its respective apparent demand curve, the aggregate return to all producers may or may not be greater than that received before the grading innovation. In practice, partly because of the theoretical complexities, and partly because of a lack of knowledge about buyer preferences, the effect of grading on the aggregate return of all producers is extremely difficult, if not impossible, to assess.

In general, standardized grades will result in increasing emphasis being placed on price competition as a merchandising technique to counter both existing and potential competition. This effect would generally favour buyers and reduce the opportunities for producers to earn monopoly profits. On the other hand, product differentiation via brand names is used by firms to improve their competitive position and in so doing to increase returns and profits. Clearly, an optimal grading scheme for one set of producers will differ from that which is optimal for another group, and also from that which is optimal for producers as an aggregate (if in fact the latter exists).

The effects of grading on the costs of providing marketing services, including the grading service, are considered as a movement of the supply curves to the right or left depending whether the net effect is to decrease or increase costs respectively. Both producers and buyers will gain or lose depending on the direction of the shift; the allocation of gains or losses between producers and buyers is determined by the respective supply and demand elasticities.[22]

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[21] Farris, *op. cit.*, p. 854.

[22] This problem is identical to the familiar subsidy (or excise) problem; see, for example, Baumol, *op. cit.*, p. 317.

To summarize, a grading innovation will be Pareto-optimal from the buyers' point of view since no buyers are made worse off and the satisfaction of others is increased. With respect to producers, a grading innovation, whilst always increasing the returns of some producers, may also reduce the returns of some other producers. Considered as an aggregate, society's utility should be increased by a grading innovation via a more efficient allocation of resources which grading facilitates by increasing the level of market knowledge.