Product Differentiation

Why might firms wish to differentiate their products? What difference does it make for market outcomes and efficiency if firms produce differentiated products rather than homogenous goods?

Profit-maximizing firms wish to differentiate their products because it helps them to earn greater profits. This statement may seem self evident, but it must be made with care. Some firms may product differentiate because they are unable to directly imitate their competitors' products (e.g. due to patents, trademarks, copyright etc). However, this still leaves open the question of why the competitors chose to product differentiate in the first place. Presumably this is because it would increase their profits. We must also distinguish between the short run and the long run. For example, new firms enter a perfectly competitive industry which is expanding because they are able to make greater profits in the short run, even though they know that in the long run profits will be driven back down to zero. A similar result holds for the introduction of new differentiated products in the standard model of **monopolistic competition**. In this model we assume free entry and exit of differentiated firms (thus paralleling the assumptions of the perfect competition model), leading to the result that profits will still be driven down to zero in the long run industry equilibrium. However, we do not get the efficiency result that perfect competition with homogenous goods gives us, because differentiated product firms always price above marginal cost, and so each firm produces less than the socially optimal amount of its particular product.

Although the outcome of a monopolistically competitive market is not Pareto-efficient, this does not imply that monopolistic competition is necessarily worse for society than perfect competition. This is because there are gains in consumer welfare from being able to consume a number of differentiated products relative to a single homogenous product. However, it is very difficult to quantify these gains because it is difficult to estimate how much consumers value being able to consume the first few units of a differentiated product. These gains must be balanced against the allocative inefficiency caused by the market power of differentiated product firms and the possible special productive inefficiencies caused by monopolistic competition, such as advertising. Unlike the case of perfect competition, there is no inbuilt market mechanism to ensure that the number of firms in a differentiated product industry is socially optimal, because there is no incentive for firms entering or leaving the industry to take into account the positive externalities they impose on consumers (by increasing product variety) and the negative externalities they impose on existing firms (by reducing profits). If on balance differentiated products are good for social welfare, there is still likely to be room for beneficial government regulation or intervention to further improve efficiency.

When firms sell differentiated products, each firm faces a downward sloping demand curve. This is because if it raises its price above the price that its competitors are charging, it does not lose all of its customers, because some of them are willing to pay more for the special features of that particular differentiated product. However, since the firms are selling close substitutes, the activities of firms will have large effects on the slope and position of the demand curves for all the other firms. For example, if a competitor lowers their price, then this would cause an inward shift of the firm's demand curve. If a competitor made their product more similar, this would make the firm's demand curve more elastic. As new firms enter the industry, this probably causes both an inward shift and an increase in elasticity because there will

then be more close substitutes and less consumer demand available for each individual firm (because there are more firms chasing the same amount of overall demand for goods in that sector).

The model of monopolistic competition differs importantly from that of oligopoly in that firms do not behave strategically. This means that each firm treats the actions of the other firms as fixed (i.e. each firm treats their own demand curve as fixed). Firms do not take into account the fact that by altering their prices they will have an effect on the prices set by other firms, which will in turn feed back into an effect on their own demand curve. This is clearly a simplification of the real life situation. It is arguably adequate because if there are a large number of firms in the industry then the strategic effect of each firm upon every other will be small.

The individual differentiated product firm, as usual, chooses its profit maximizing output where marginal revenue is equal to marginal cost. This means that there is an allocative inefficiency at the level of the individual firm's behaviour, just as with a monopolist. However, in the standard monopolistic competition model, we also assume free entry and exit so that profits are driven down to zero. New firms enter the industry until, in the long run equilibrium, the demand curve for each firm is shifted so that it is tangential to the average cost curve for every firm. In the diagram below, the light grey region is the deadweight loss caused by the fact that, even though it is making zero profits, the monopolistically competitive firm is charging price p' instead of the socially optimal price p^* and producing q' instead of the socially optimal quantity q^*. We can see that if the firm did price at marginal cost in would have to be making loss. This is a general result since the tangency condition at q' implies that D must be below AC at q^*. This means that in order to achieve efficient pricing in a monopolistically competitive industry, the government would have to subsidize it beyond the level at which it is privately profitable (by subsidizing each firm to produce beyond this point). Even if the government had the information required to make this policy feasible, the distortion caused by raising the taxes to fund the subsidy would probably still make it an undesirable policy. Also, as with natural monopolies, the fact that subsidies will probably lead to productive inefficiencies by encouraging firms to fail to invest in cost reduction is another consideration in favour of accepting the second-best outcome of allowing some allocative inefficiency as the price worth paying of achieving greater product variety in a non-subsidized industry.
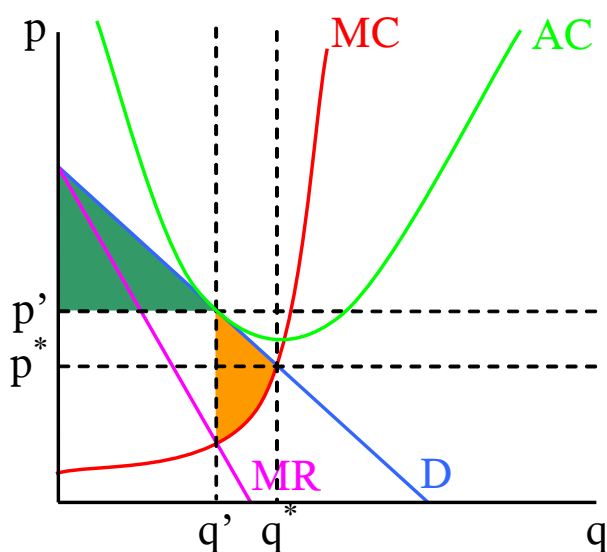

A more difficult question to answer is whether there are "too many" firms in the long run equilibrium of a monopolistically competitive industry. If there were less firms, then the demand curves for the remaining curves would shift outwards and it

might be possible to reduce the allocative inefficiency by having each firm produce closer to its minimum AC. However, the demand curves would probably become less elastic (i.e. steeper) for the remaining firms, and this would give them more market power, thus increasing the allocative inefficiency, and so this would counteract the outward shift (unless the government used price controls, which causes other problems). The U-shaped AC curve implies that there is a fixed cost of production for each firm. Having fewer firms allows society to save on the fixed cost (this is reflected in the fact that each individual firm will then produce closer to its minimum AC). However, we must also take into account the consumers' surplus that is gained by having each differentiated good available for consumption. Removing a product destroys a region of consumer surplus (like the triangle shaded dark grey in the diagram above). Although it will cause an outward shift in the demand curves for the other products, it is difficult to say from a priori reasoning whether the overall consumer's surplus in the industry will increase or decrease.

Whereas in the case of perfect competition, a firm considering entering the market can capture the increase in surplus welfare that it creates (by slightly undercutting the existing firms, it would capture all of the extra welfare generated as extra profits, as well as redistributing profits from existing firms to itself), in the case of monopolistic competition, a new firm entering the market will not be induced by the market mechanism to take into account the triangle of consumer welfare that it generates by introducing a new product (unless it is able to perfectly price discriminate, but this is assumed to be impossible in the standard model of monopolistic competition). The new entrant also does not necessarily take into account the negative externality that it imposes by reducing the profits of the other firms (because profits are not directly transferred between firms as occurs with undercutting in a homogenous product market). This now depends on complex factors like the degree of substitutability between the different products (as reflected in the interrelations between the different firms' demand curves). An economic analysis of whether more or less firms would be beneficial in a particular case would therefore be dependent on a fairly involved practical and specific investigation.

One of the most difficult problems from an empirical point of view is measuring the utility created from consuming the first few units of a differentiated good. We can estimate consumer's surplus by estimating the overall market demand curve. This is done essentially by plotting a line of best fit through observed market outcomes. However, although we may have enough observations to fairly accurately estimate the shape of the demand curve in certain regions, we generally do not have the observations at very high prices to estimate the demand curve near to the y axis. For example, in the following diagram, both lines are plausible extrapolations of the demand curve from the knowledge we possess. However, they will differ widely in their estimate of the overall consumer surplus gained by producing the good:
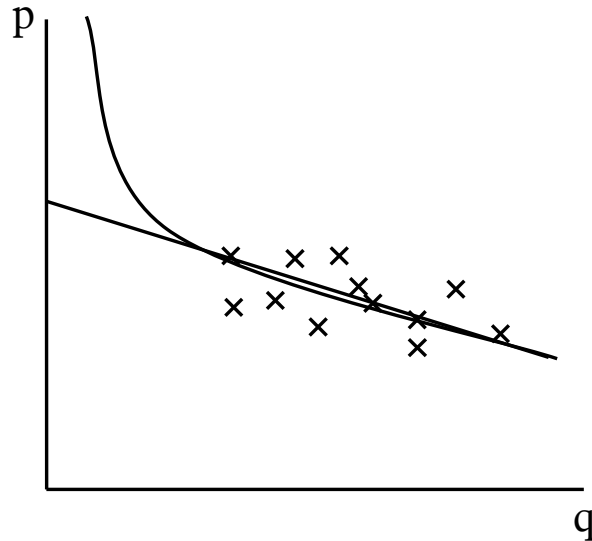
We have seen that although there may be some possibility that the government could intervene to improve allocative efficiency in a monopolistically competitive market, there are also a number of considerations which raise doubts about whether it is really feasible or desirable to do so. There are, however, other inefficiencies associated with monopolistically competitive markets which may hold out greater potential for beneficial government intervention. One of the most important is the role of advertising in monopolistic competition.

Since individual firms' profitability depends greatly on the degree to which their products are seen as different or superior to those of their competitors, it is likely that the process of monopolistic competition actually causes productive inefficiencies by inflating advertising costs. As with other possible inefficiencies, it is important to see that it is not necessarily the case that advertising is socially wasteful. If a firm genuinely has developed a useful new product feature, then advertising may fulfil the socially desirable function of informing consumers about this new development so that more can benefit from it more quickly. However, it is clear that if advertising is untruthful or uses manipulative psychological techniques, then the extra production costs created by the advertising expenditure does not expand consumer surplus (and may well cause it to contract by misinforming consumers) and so are essentially a production inefficiency (probably combined with a consumption inefficiency from the point of view of undesirable distortion of consumer choices). There is thus a strong case for government regulation of advertising standards to ensure that monopolistic competition benefits consumers by giving them genuine choice and variety.

To conclude, the introduction of product differentiation into the economic modelling process greatly increases the complexity of modelling market outcomes and the interrelationships between firms' behaviour. The neat efficiency result of the perfect competition model no longer holds, and there are more grey areas in the assessment of the efficiency of the market economy. However, on balance it seems likely that provided the government provides good regulation to ensure competitive behaviour and honest advertising, there are overall benefits to allowing consumers the opportunity to consume a variety of close substitutes rather than forcing them to consume a single brand. The historical experience of countries which adopted planned economies seems to back up this conclusion.