SOME LIMITATIONS OF MARKET-MARGIN ANALYSIS

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ABSTRACT

It is shown that it is not normally possible to derive the elasticity of demand at wholesale from a knowledge of the demand at retail plus a knowledge of retailers' margins. Statistical, imaginary and objective demand curves may not coincide. Retailers may charge a range of prices below that indicated by the demand curve. The basic model used applies only to the simplest market structure. The time period considered as the "market period" or the "short run" is different at different levels of the marketing chain.

INTRODUCTION

In most textbooks where the relationship between wholesale and retail price is discussed three statements are made: Firstly, that where there is a high fixed element in the market margin the market demand at wholesale is less elastic than the elasticity of demand at retail. Secondly, that where there is a constant percentage margin the elasticity of demand at wholesale is the same as that at retail. Thirdly, that where the margin is particularly variable the elasticity of demand at wholesale is more elastic than that at retail (1, 2, 3, 4). It is argued, for instance, that as the costs of processing and marketing foods are largely fixed, wholesalers face inelastic demands.

In the crudest sense this is true: it can be shown mathematically that if the margin is a constant percentage of retail price the elasticity of demand at retail is the same as the elasticity of demand at wholesale; if the percentage margin is lower at high prices (if the margin is a fixed sum for instance) the elasticity of demand at wholesale is less elastic; if the percentage margin is higher at high prices the elasticity of demand at wholesale is more elastic.

This mathematical model, on which the textbook conclusion is based, makes certain implicit assumptions on the market structure, the time periods compared, the type of demand curve compared, etc. When these assumptions are relaxed, in order to apply the model to a real market situation, the model may no longer work. It has been shown, for instance, that if retailers are pursuing a constant income policy, these conclusions are only valid when certain restrictive assumptions are made about the

demand curves and that the conclusion is trivial in this case *(5).* If the relationship is to be of any value it should answer these questions:

(i) If a retailer's margin tends to be a constant sum of money, does it follow that his purchase curve will be less elastic than the demand curve he faces?

(ii) If all retailers tend to charge fixed-sum margins does it follow that the elasticity of the market demand at wholesale is less than the market demand at retail?

(iii) If the demand curve facing an individual retailer is more elastic than his purchase curve, does it follow that he tends to charge a fixed margin?

(iv) If the market demand at retail is more elastic than the market demand at wholesale, does it follow that all or most retailers are charging fixed-sum margins?

WHAT DEMAND CURVE?

Three types of demand curve should be considered. The first is the "true" demand curve of the textbooks, the second is the statistical demand curve and the third is the imaginary demand curve.

The true demand curve

The textbook treatment and the mathematical model are based on the true demand curves. The implicit assumption is that these demand curves remain constant while supply fluctuates. It is also assumed implicitly that the entrepreneur setting the margin knows the supply and demand curves and operates on them or alternatively that the relationship always exists ex post, though it may not exist ex ante. This assumption is not always justified. For instance, where an individual retailer faces an inelastic demand curve, perhaps because he has a certain locational monopoly, the demand curve shows the maximum retail price he can charge and still sell all he has to sell. The maximum retail price minus the margin gives the maximum price he can pay at wholesale. If he buys in a perfect market his purchase curve will be perfectly elastic and he will be able to buy all he wants at the market price. This will be his minimum wholesale price, and this plus his margin is his minimum retail price. He may charge any price between his minimum retail price and his maximum retail price, and sell all he has to offer while still taking his desired margin or a greater one.

There are many reasons why the retailer might not want to charge the maximum retail price. He may believe, for instance, that if he charges his maximum possible price when supply is low, consumer resistance will build up and change his demand curves.

Thus, the individual retailer's purchase curve is not necessarily less elastic than the demand curve he faces, his maximum retail price, when he charges a fixed-sum margin:
if he is operating on the minimum retail-price curve his purchase curve may well be more elastic than the demand curve. The model cannot answer question (i) or

question (iii).

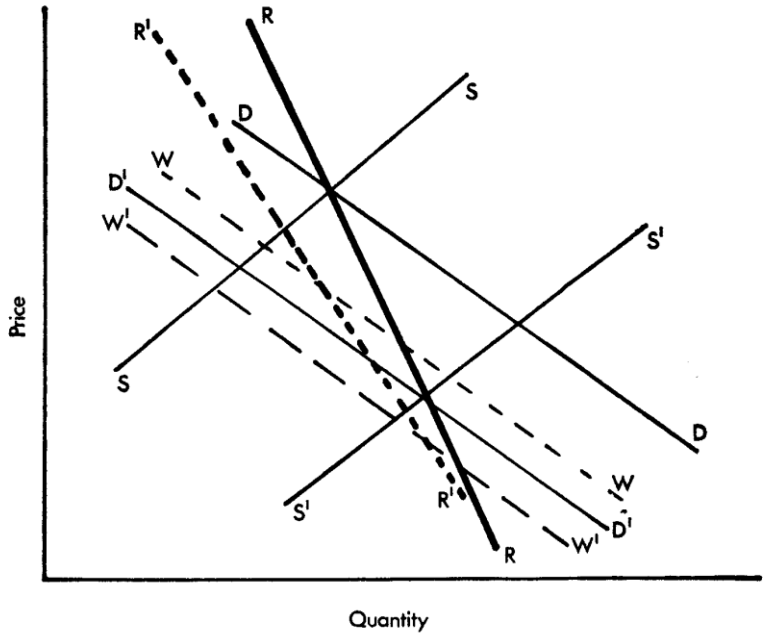

Figure 1: Statistical demand curve if size of fixed-sum margin varies with shifts in demand curve

The statistical demand curve

Retailers and researchers must base their ex-post analysis on some sort of statistical demand curve and E. J. Working's question "What do statistical 'demand curves' show?" must be answered (6). Most statistical demand curves are in fact regression curves through observed price-quantity relationships and the pitfalls in using these are described in most econometrics textbooks. One example of a wrong conclusion being drawn from a single-equation regression model will be sufficient to show the dangers of using such a model.

In the basic, market-margin model of the textbooks it is assumed that if a retailer is operating a fixed-sum margin, the fixed sum margin will remain unchanged in the face of shifts in a demand curve. This may not be so: for instance when there is inflation consumers will have increasing money incomes and will be willing to pay high prices, while, at the same time, the retailer needs a higher margin to maintain his real income. This case, where higher, though "fixed," margins occur when demand increased would cause the perverse result in Figure 1.

In Figure 1, D D and D^1 D^1 are two levels of the 'true' demand curves while W W and W^1 W^1 are the corresponding levels of the 'true' demand curve at wholesale. The margin is a fixed sum, so the curves W W and W^1 W^1 are *less* elastic than the curves D D and D^1 D^1. If the supply curve is S S when the demand curve is D D and S^1 S^1 when the demand curve is D^1 D^1 then the regression curve would be R R for the demand curve at retail and R^1 R^1, a *more* elastic curve, at wholesale. Thus the regression curve would give a result which did not agree with that in the model. This is of course an artificial example based on the assumptions that a high supply occurred at the same time as a high demand and that the level of the fixed-sum margin changed with shifts in the supply curve. The point is made, though, that this sort of error is possible and that researchers should use fairly sophisticated techniques to avoid it. Unfortunately the data available are usually so aggregated, so scarce and so patchy that these techniques are not applied.

Imaginary demand curve

If the analysis is to answer questions such as "If the retailer's margin is a constant sum of money, does it follow that his purchase curve will be less elastic than the demand curve he faces?" it cannot restrict itself to the "true demand curves" and the "statistical demand curves." As mentioned above, a range of prices may be compatible with any such policy. More important, though, is the fact that a retailer fixes his price according to the "imaginary demand curve." When an individual retailer is deciding on his price he must take into account the reactions of other retailers: if he cuts his price will they react, sparking off a price war?, if he raises his price will they follow suit? He can draw up a demand schedule based on the reactions of consumers and what he imagines will be the reactions of other retailers—it is emphasised that this demand curve is imaginary and may bear no relation to the actual demand responses. This curve is termed the imaginary demand curve (7) and it can be more or less elastic than the statistical demand curve. It is usually less elastic to an increase in prices and more elastic to a fall in prices.

If an individual retailer is charging a fixed-sum margin he will do so with reference to the imagined demand curve. It is possible then for the imagined demand curve to be less or more elastic than the derived demand curve facing the wholesaler in spite of the constant fixed sum margin. The model cannot answer question (i).

Market structure

The crude model of market margins compares the market demand facing a monopolist with the demand facing a producer selling to him and to him alone. In practice, the market will be more complex and it may not be possible to expand this textbook model to describe the more complex market. A farmer may sell wheat to his local merchant, who

has locational monopoly powers. The merchant sells locally, where he has a monopoly and in Chicago where he is on the world market. The wheat may be sold for stockfeed or industrial purposes in which case it has a high cross-elasticity with other grains, or it may be sold for milling into whole wheat flour, brown flour or white flour. The wheat is exported to a country where protected by tariff barriers, it is no longer on the world market. It is sold by a monopolist wholesaler. It is then baked and sold by a baker who has a locational monopoly. Clearly the model cannot handle a market of any complexity. The farmer selling on the Chicago market faces a perfectly elastic demand curve even if all the retailers face a perfectly inelastic demand curve and charge a fixed-sum margin. Again the market demand in Chicago may be elastic when the market demand in an importing country like England is inelastic. Thus, the model cannot normally answer questions (ii) or (iv).

Time period

A similar problem occurs with respect to the time period: the farmer with no storage may be compelled to sell immediately; wholesalers can store for months or even years; bakers must sell bread within 24 hours of baking. The market period of the wholesaler may be the short-run period of the farmer or the long-run period of the baker.

For the less perishable products, storage can have two effects. Firstly, it can mean that the effect of a change in sales at retail is not felt at producer level until some time after the change took place. It would be necessary to lag one of the variables to allow for this. Secondly, a drastic fall in sales in one week may have little effect on the producer or wholesaler in any one week, as either surplus supplies can be stored until there is a rise in sales, or output can be reduced slightly for several weeks until the surplus is absorbed. As a result the demand facing the wholesaler could be very different from that predicted in the basic model (this would be determined largely by the market structure). Only if remarkably complete data were available would it be possible to build this into a statistical model. This suggests that comparison of demand curves for an equal period and, particularly for the same period, may not be valid, as the cause and effect may not be confined to the same period.

A comparison of short-run and short-run demand curves may be invalid for the same reasons and also because the time periods in the "short-run" may be very different, so the daily or weekly demand curve of the baker is compared with the annual demand curve of the farmer.

The question then arises: should short-run curves be compared, even if they cover different time periods, or should observed demand curves covering the same time period be compared even if these are long-run curves at retail and market period at production level? Either comparison could be of value providing always that there is a genuine causal

relationship between the two curves and the market margin and that it is realised that the demand curves being compared are not the same. In practice though these conditions are seldom met: the time factor alone makes comparisons invalid in most cases. Comparisons between wholesale and retail demand curves of highly perishable items such as strawberries may be valid, as far as the time factor alone is concerned, but the demand curves facing the producer cannot satisfactorily be integrated into the model.

DISCUSSION

It is necessarily true that if the true demand curve facing a monopolist is compared with his own true purchase curve then, if he charges a fixed sum margin, the elasticity of the demand curve will be more elastic than the purchase curve, but only when certain restrictive assumptions on time periods, range of prices etc. are made. These restrictive assumptions would make the model difficult to apply in practice and it would, in any case, be difficult to think of any practical use of this result.

The result would be of more practical value if it applied to the statistical or, particularly, to the imaginary demand curves, but it is most unlikely that it could.

If the practical difficulties of calculating market-margins are taken into account (8, 9), it must be concluded that distributive margins have very little value in explaining or predicting differences of elasticity of demand at wholesale or at retail.

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Received September 18, 1973