

# DETERMINING DISTRIBUTIVE MARGINS: A Comment<sup>1</sup>

***P. Bowbrick***

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## **ABSTRACT**

Two papers on the determination of retail margins from market statistics using regression curves are refuted.

***The reply and the rejoinder to this comment are appended.***

**Reeves, A. and Young, S. “Market Margin Analysis: A reply to Mr. Bowbrick’s comments and some suggestions for further Research”, Oxford Agrarian Studies, Vol. V, 1976.**

**“Distributive margins - a rejoinder”, Oxford Agrarian Studies. 6 168-170. 1977.**

## **INTRODUCTION**

In a recent issue of Oxford Agrarian Studies there were two articles on the determination of retail margins from market statistics, one by Wanhill and El Fadni (7) and one by Young and Reeves (8). Both articles rely on the theory proposed by Allen (1), using the modified classification of margins proposed by Rashid and MacArthur (6). Both have as a primary aim, the fitting of regression curves to published data to test Allen’s hypothesis that retailers tend to charge margins that ensure that their income is stable. I have shown elsewhere in some detail that Allen’s theory is wrong and that it is impossible to identify a retailer’s pricing policy from his buying price and his selling price, much less from market wholesale and retail prices (2, 3). Each of the following reasons is, in itself, sufficient to refute the theory.

1. If the retailer has a constant-income policy, the regression curves drawn through observed data plotted on a graph, with wholesale price on one axis and retail price on another, could be either upward sloping or downward sloping, even if the demand curves are of constant elasticity. The theory assumes that the regression curves will be straight lines, but this is only true where  $e = -1$ ,  $e = 0$  or  $e = \infty$ . Otherwise different segments of the curve meet the criteria for percentage margin, absolute margin, composite margin and unsystematic margin.

2. If the demand curve is not of constant elasticity but is asymmetric or linear, the regression curves are even less like those predicted by the theory.

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3. For normal statistical analysis we are dealing with ex-post data only, but here we are comparing a decision made ex-ante with the ex-post result. The retailer's pricing policy is based on his imagined demand rather than on a statistical demand curve, so the ex-ante policy could not be derived even if one had access to the most detailed figures on purchase prices, selling prices and quantities sold.
4. The relationship between type of margin and elasticity of demand when retailers have a constant-income pricing policy is quite different to that postulated by Allen and by Rashid and MacArthur, having a different sign with perfectly elastic and inelastic demand curves, and being more complex with other elasticities of demand.
5. There may be a range of prices appropriate to any pricing policy. The retailer may get his desired margin by charging a high price and paying his wholesaler a price higher than the equilibrium market price (in time of over-supply for instance) or by charging a low price and paying suppliers a low price (when price levels are high for instance). For any given market wholesale price, therefore, a range of retail prices may be appropriate to a given pricing policy.
6. If retailers attempt to obtain a constant income (or if they adopt any other pricing policy) over a week, and the statistical analysis is based on any other period, a bias will be introduced, especially when there are large fluctuations in supply. The elasticity of demand used in the analysis must also apply to the same period.
7. A retailer attempting to maintain a steady income in the short run will probably do so by attempting to maintain his income from his total sales, rather than by maintaining a steady return from the sales of each commodity. Where there are large seasonal changes in supply he must do so.
8. An inelastic market demand curve can exist while each retailer faces an elastic demand curve. This is so in the classic perfectly competitive market.
9. It is impossible to aggregate the margin policy of individual retailers to get a margin for the industry in the way suggested.

Other factors such as the desire for growth rather than profit, cash flow problems, the need to preserve goodwill, declining marginal value of money and changing marginal return to retailers' input of services would further obscure the relationship between the reasons for the retailers' actions and statistical measures of their response, at firm level or at industry level.

Even if the theory were correct it is misapplied. Under the theory, if (a) all retailers pursue a constant-income pricing policy and (b) the elasticity of demand at retail is of a certain elasticity, then (c) the regression line between the recorded wholesale and retail prices will have a certain slope. However this regression line could have the same slope with a different pricing policy and a different elasticity of demand so c may be due to x and y or u and v rather than a and b. The theory suggests that from a and b one can derive c. It does not suggest that one can derive a from c and b or that one can derive b from c and a, which would be equivalent to the argument "All cats with tortoiseshell markings are female (a, b therefore c). My cat is

female so it has tortoiseshell markings (a, c therefore b)” or “All cats with tortoiseshell markings are female. My tortoise is female and has tortoiseshell markings so it is a cat (b, c therefore a)”. The studies using Allen’s theory (1, 6, 7, 8) assume a and b without any evidence (I consider the assumption on elasticity and the assumption that all retailers have the same pricing policy highly unlikely). In some cases (1, 6) the argument takes the extreme form “My elephant is female; I assume that it has tortoiseshell markings; therefore it is a cat”.

The most one can say, using the constant-income hypothesis, is that if all retailers think they face a demand of unit elasticity at retail and they price for a constant income with constant percentage margins for each product, then the ex-post aggregate demand curves at retail and wholesale will have the same elasticity. Since these conditions are unlikely to apply in practice the exercise is pointless. Using a less restrictive hypothesis one can say that if all retailers always charge either constant percentage or absolute or increasing margins for each product then a certain relationship may exist between the elasticity of demand at wholesale and at retail, e.g. one may be more or less elastic. If the relationship found is not as expected it shows only that the assumption on price policy, the assumption on elasticity of demand, the theory (see 3), the data, or the computations are wrong with respect to the one commodity being examined. Since it does not show what is wrong, we know no more than we did before. If the expected curve is obtained it adds only a minute degree of corroboration for:

1. The result is one which is expected to occur frequently for other reasons, for instance, many retailers adopt a constant percentage margin policy for convenience in calculation.
2. The result refers to only a small proportion of possible cases, for example, some commodities sold by some shops in Cagayan de Oro City between August 1968 and June 1969. If the theory or hypotheses were tested for other commodities, commodities sold by other shops, or for retailing in other towns or at other times, the result might be different.
3. The result could occur because of faults in the assumptions, the theory, the data or the computations.

Even if the theory was correct it would have very little explanatory power: after twenty years, a dozen books, papers and theses, and hundreds of regression calculations we know no more than we did at the start, that some retailers sometimes charge a margin compatible with a constant-income policy.

A second aim of the two studies was to derive other hypotheses. From a study of the data, Wanhill and El Fadni observed that the retail prices were more stable than the wholesale prices, and so derived the hypothesis that retailers attempt to stabilise prices and, furthermore, that they base their prices on a weighted average of past prices. They attempted to refine the hypothesis by statistical analysis. Young and Reeves appear to have derived their hypothesis in the same way - it is difficult to imagine how else they would have got the idea that the margin on tomatoes, apples or cauliflowers is influenced by a weighted average of the price three months, six

months and nine months previously. It would have been better to have tested a hypothesis that was derived independently, perhaps from a survey of retailers. I suspect though that this survey would have shown that, as I have found in Britain and Ireland (4).

1. different types of retailer, greengrocers and supermarkets for instance, stabilise prices over different lengths of time.
2. different types of retailer stabilise prices of different ranges of commodities.
3. the prices of different commodities do not remain stable for the same length of time.
4. the price may be held steady if it is expected that the change in the wholesale price will be temporary, but it will change immediately if the change in the wholesale price is expected to last any length of time. The previous week's price has little influence on the decision, and any earlier prices have no effect.
5. The stabilised price in any week lies somewhere between the free market price for that week and the seasonal average.

This would pose insuperable problems in collecting and analysing data and would rule out the use of lagged variables - even forward lagging could not account for the difference between actual and expected prices.

Unlike Wanhill and El Fadni, Young and Reeves discuss their data, and it is clear that these have many weaknesses, as one would expect of any such market price data. This means that the results would be doubtful, even if the theory was valid, though economists can make useful economic predictions from data which are subject to a wide margin of error.

One cannot, however, make useful judgement from the wrong data, regardless of the quality of the data or the theory, and the data used for this study are wrong for the job. For instance, wholesale prices for the whole of France are compared with retail prices for Paris only. Data are unweighted and so cannot be used for market margin analysis or price control for reasons I have explained fully elsewhere (5).

Young and Reeves did mention some of the weaknesses in the theory and the data used, but they did not realise their significance: the application of incorrect theory to data that are both inaccurate and inappropriate cannot give any useful results.

One may ask whether the statistical analyses carried out by the many authors, not just the seven quoted here, who have applied themselves to this problem have produced more high correlations than might be expected from regressions between randomly selected variables relating to the same period and to an industry with marked seasonal fluctuations in supply and demand. Certainly a lot of inconclusive or perverse results were obtained and, when correlations were high, "percentage" and "absolute" margins were both common. It is always tempting to assume that the

variables examined are not both dependent on the same other factors, and to conclude that a high correlation supports the hypothesis and that other results are due to poor data.

If one wants to find out how retailers fix their margins it is easy enough to ask them. Those retailers who have a clearly defined price policy will explain it clearly, while those who have an erratic policy or who have never thought about it will soon make this clear. The survey requires skilled interviewing, but is otherwise routine. One is far more likely to get the truth by working close to the problem than one is by collecting data, aggregating it, applying statistical techniques, applying economic theory and finally disaggregating the results. The more steps there are between the phenomenon observed and the conclusion, the more likely it is that mistakes will be made, as these two studies show.

## **References**

1. Allen, G.R., "Short Term Variations in Retailing Margins on Fruits in East Pakistan", Farm Economist, Vol. IX No.6, 1959; "Short Term Variations in Retailing Margins on Fruit and Vegetables in the Federal German Republic", Farm Economist, Vol. IX No. 12 1961; and "Agricultural Marketing: Policies", Blackwell, Oxford, 1959.
2. Bowbrick, P., "Retail Mark-ups and Distribution Margins - a critical analysis of Professor Allen's theory", Irish Journal of Agricultural Economics and Rural Sociology, Vol. 4 No.2, 1973-74.
3. Bowbrick, P., "Some Limitations of Market-Margin Analysis", Irish Journal of Agricultural Economics and Rural Sociology, Vol. 4 No.2, 1973-74.
4. Bowbrick, P., "Price Stabilization in a Two-Sector Industry", Acta Horticulturae, No. 40 Vol. II 1974.
5. Bowbrick, P., "Price Control and Market Margins for Fruit and Vegetables". Paper presented to Economics Symposium, International Society for Horticultural Science, Veitshochheim, September 1975.
6. Rashid, A. and MacArthur, J.D., "A Note on Short-term Variations in Retailing Margins on Fruit in East Pakistan", Farm Economist, Vol. XI No. 10 1969.
7. Wanhill, S.R.C. and El Fadni, A.M., "A Note on the Determination of Some Retail Margins for some Agricultural Products in the Philippines", Oxford Agrarian Studies, Vol. 4 No.1 1975.
8. Young, S. and Reeves, A, "Food Retailing Margins in France", Oxford Agrarian Studies, Vol. IV No.1, 1975.

# **MARKET - MARGIN ANALYSIS: A reply to Mr. Bowbrick's Comments and Some Suggestions for Further Research**

## ***A. Reeves and S. Young***

In his note on our recent article in this journal (7) Mr. Bowbrick discusses in some detail a hypothesis put forward by Allen (1) that retailers fix margins to ensure that their income is stable, and then goes on to make some specific criticisms of the data and methodology used in our work. We do not wish to enter into the former debate since it was not our aim to test Allen's theory. While we accept many of his criticisms of the constant income hypothesis, some, such as the kinked demand curve case, do not seem particularly relevant.

Our main concern, however, is to consider his criticism of our own approach. These, we feel, are worthy of consideration, not just in the specific context in which he raises them, but also as much more general issues which need to be discussed if further progress is to be made in market-margin analysis. In the first place it is necessary to consider the aims of, and approaches to, market-margin analysis. Such analysis can be undertaken at a number of different levels. For example, the problem may be viewed in a macro-economic context, the aim being to estimate the cost, value and efficiency of marketing food, or, if one likes the costs and efficiency of retailing food. This is the kind of approach taken, for example by Wollen and Turner (6). At a much more micro or disaggregative level, the aim of research might be to analyse how individual retailers or groups of retailers price, whether they pursue constant income policies and whether retailers' margins vary on different lines, in different stores, at various times of the year and so on.

The problem with which we were concerned can be specified in terms of:

1. At an aggregative level what factors seem to influence the level of retail margins, and do these vary as between different foods over time?
2. Although a broader question than the subject of our recent article, can this approach be used to help explain why the level of retail prices varies considerably across the EEC in spite of the CAP and its 'common' prices?

In this general area of distribution margins there are, of course, many areas which require more research, which to date have been sadly neglected. Be this as it may, the different aims and objectives of the research topics, in themselves, require different research methodologies. Thus input-output analysis may be the most suitable technique for answering the macro question. At the micro level, it is possible that surveys of retailers may provide useful information. The approach is, however, costly and time-consuming, answers depend on the questions asked, and responses

may be rationalisations. Identification of the correct person to ask may be difficult in the usual case of multiple and supermarket chains, the data obtained may be of a too disaggregative nature to be more than peripherally useful and such surveys may only be valuable in obtaining cross-sectional rather than time series data. Nevertheless for the kinds of issues with which Mr. Bowbrick is concerned, retailer surveys cannot be dismissed.

On the other hand, the associated difficulties of retailer surveys (and continuity in particular since we were using time series data) would effectively rule out this approach to the problem. Survey methods, moreover, have limited use when one is trying to evaluate particular determinants of margins, and even attempts to use some kind of ranking procedure could pose severe difficulties. Thus in our case the research aims effectively determined the research methodology.

Clearly, we were not concerned with the derivation of ex ante pricing policies since we accept Mr. Bowbrick's point that these cannot be inferred from ex post situations. The ex post situation gives some indication of how retailers as a group have acted in response to changing supply or demand conditions and to this extent permits short term forecasting at an aggregative level.

Mr. Bowbrick clearly has a very sceptical view of the value of econometric methods, and therefore by association, of our own work. His criticisms take two forms, firstly, that the model used was over-simplified, hence the comment on the use of lagged variables, and secondly, that the data used were inadequate. Models are by definition simplistic and thus unrealistic and hence must be judged in terms of the problem which they are designed to solve. (4) The fact that his work has shown that twenty greengrocers in Dublin (2) adopt a particular policy is completely irrelevant in the context of the aims and intentions of our paper. To try to elicit from a consumer or a farmer how their short-run and long-run responses to a price change differed, one might, at best, end up with a list of generalisations such as those Mr. Bowbrick mentions on p. 127. Aggregate statistical analysis, however, has shown beyond any reasonable doubts that short-run and long-run responses do differ. Is the position of the retailer any different? Without wishing to labour the point, there is no way in which the research methodology favoured by Mr. Bowbrick could be used, for example, for any type of aggregate short-term forecasting, a stated aim of our own work.

It is not our desire in this note to try to justify the use of statistical methods. Models may be incorrectly specified, estimated relationships may be in error and data may be inadequate for the purpose. The data used by the present authors were never viewed as ideal and the need for caution in interpreting these, as any other, statistical results, was emphasised. Indeed, a major and perhaps insurmountable difficulty that has been encountered in extending the work across the EEC has been data inadequacies. On the other hand, if similar data to that used by the present authors were available in many of the other studies undertaken across the entire field of economics and marketing, then researchers would sleep a great deal easier in their beds. In the end the definition of quantitative methods as 'the art of giving bad answers to problems to which otherwise worse answers are given' (5) must provide sufficient justification for proceeding.

This leads naturally into the second aspect with which this note is concerned, namely, how can progress be made in market margin analysis?

It is no surprise that the research undertaken into retailing margins using UK data has been very limited in scope. Data are either unavailable or inadequate. As long ago as 1962 (and no doubt earlier also) commentators were bemoaning the paucity of data in the UK (3), and this is still the most serious impediment to further progress. It also explains why so much of the work undertaken by individual researchers has made use of statistics for other countries.

Again, excluding the research undertaken at a macro level, the studies have generally been very restricted in their product coverage, being limited to products where the commodity at the retail level can be directly related to the same commodity at wholesale. There is no doubt that a great deal more work is required in margin analysis for meat products.<sup>2</sup>

Perhaps also too much time has been spent discussing G.R. Allen's work which was inevitably fairly restricted in its scope, and in discussing retailers' margins, without enough consideration being given to retailers' cost structures. On the latter aspect the Price Commission in the United Kingdom has made some useful ad hoc studies which could prove a starting point for any further research, and detailed product information is sometimes available where a statutory marketing authority exists. It is possible, furthermore, that studies of company accounts might throw up some useful insights.

Further work is also needed on extending research back from the retailing sector to cover all marketing and distribution activities from the farmgate to retail, and to providing regular analyses of the costs of these activities. It may also prove fruitful if more complex econometric techniques were applied to existing data in order to obtain better estimates of the parameters of the models e.g. it was apparent in our paper that auto-correlation of the residuals was present; this could have been overcome by suitable techniques to give unbiased estimates.

At reasonably regular intervals, as researchers pursue their own, relatively uncoordinated areas of interest, it becomes important for individuals to stand back from the specific work they are undertaking. The appearance, from time to time, of more general articles on research topics, which aim to integrate and coordinate the work that has been undertaken to date, can therefore prove very revealing. Perhaps, more than anything else, this is what is required with respect to distribution margins.<sup>4</sup>

## **References**

1. Allen, G.R., 'Short-Term Variations in Retailing Margins on Fruits in East Pakistan', Farm Economist, Vol. IX No.6, 1969 and other articles.

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<sup>2</sup> But see the work of Palmer, C.M. at the University of Exeter, for example.



2. Bowbrick, P., 'Retail Mark-ups and Distributive Margins', Irish Journal of Agricultural Economics and Rural Sociology, Vol. 4 No.2, 1973/74.
3. Houston, G., 'Meat Marketing Margins in Britain; Journal of Agricultural Economics, Vol. 15, 1962/63.
4. McClements, L.D., 'Some Aspects of Model Building', Journal of Agricultural Economics, Vol. 23 No.2, 1972.
5. Saaty, T.L., 'Mathematical Methods of Operations Research', New York, McGraw Hill, 1959, quoted in McClements, L.D., Op cit.
6. Wollen, G.H. and Turner, G., 'The Cost of Food Marketing', Journal of Agricultural Economics, Vol. 21 No.1, 1970.
7. Young, S. and Reeves, A., 'Food Retailing Margins in France', Oxford Agrarian Studies, Vol. IV No.1, 1975.

# DISTRIBUTIVE MARGINS - A REJOINDER

*P. Bowbrick*<sup>3</sup>

**“Distributive margins - a rejoinder”, Oxford Agrarian Studies. 6 168-170. 1977.**

In their original paper (4) Messrs. Reeves and Young stated that they had two aims. My comment (1) concentrated on their approach to the first, to determine “whether or not retailers operate markup pricing, the type of markup used and the extent to which variations in retail prices can be adequately explained by changes in prices at the wholesale level” (4). I also disagreed with their approach to their second aim “some attempt is made to identify factors, other than the level of wholesale prices, which influence the margins on individual products” in so far as they analysed aggregate data to identify individual retailers’ policy on margins. In their reply (5) they do not question my refutation of their methods. I did not disagree with the use of aggregate data to analyse aggregate phenomena - on the contrary I argued that these data could not be used for anything else - yet the reply is confined to a defence of the use of regression equations on aggregate wholesale-price, retail-price and wage-rate data series for France, to provide short-term forecasts of food margins at retail level. My comment ignored this, as there was only passing reference to it in the original paper.

However, if aggregate data are to be used to analyse aggregate phenomena, the phenomena should be of interest, and the study should aim at solving real problems. The study should be built around a specific problem, like “is price control for beef desirable and practical?” rather than the vague “to help explain why the level of retail price varies considerably across the EEC in spite of the CAP and its ‘common’ prices” (5).

This would mean that the equations, unlike the ones in the paper (4), could and would be used for planning or decision making by firms or the state. Most of the 600 papers I know of on market margins appear to have been written, not because there was a problem to be solved, but because the researchers came across a data series for wholesale and retail prices, which suggested market margin analysis to them. In practice few people can resist the temptation to use any wholesale and retail data series that are available, even if they are wholly or partially irrelevant.

In my comment I did not argue that retailer surveys were an alternative to econometric analysis - though in fact a study on the lines of Tilley and Hicks (3) for instance could have been used to make specific, testable, short-term forecasts of the effect of wage rates and other factors on margins, forecasts which would be of

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practical value to firms and the state.

I showed instead that it is necessary to obtain background information of this kind before such an econometric analysis is possible. Since one cannot use the same data to derive a hypothesis and to test it, and since relevant data for an analysis like the one attempted are almost unobtainable, one must derive as realistic and refined a hypothesis as possible from theory and previous empirical research before beginning an econometric analysis. From a crude hypothesis the most one can get is a tested crude hypothesis plus a more refined but untested hypothesis. When the first hypothesis is not supported by the facts it is not enough to present as a final result the hypothesis that another regression equation, which was obtained from the data for 1964-1971, and which has no support from any other studies, will continue to apply in future for some unstated reason. Had the hypothesis in the paper been based on appropriate studies, qualitative or quantitative, they might have been more realistic and have received some support from the econometric analysis.

Probably the commonest and most serious failing of present day economics is that economists refuse to abandon their conclusions when their hypotheses, theory or method are refuted. In this case for example, the authors continue to defend their study though they admit that (a) their hypothesis is apparently not supported by the facts; (b) their theory is wrong; and (c) their econometric method suffers from the weaknesses that their model was "over simplified" (5); that their data are irrelevant, distorted and possibly incorrect (4); that "auto-correlation of the residuals was present "that the lagged margin variable "may simply be a 'catchall', embracing a number of influences, and that this may be the reason for such high levels of correlation and high long-run effects being obtained when distributed lag models are used"; that there is insufficient identification; that there are limitations due to insufficient degrees of freedom; that several models were applied before the final choice was made; and that many variables believed relevant were left out because of data limitations.

I cannot accept the conclusion of Reeves and Young that we need analyses of retailers' cost structures, analyses of farmer-consumer price spreads, the collection of data and a review of the literature on market-margin analysis. Before anything else is done researchers must refute those papers which attack the logical and statistical basis for market margin analysis or develop an analysis which avoids their strictures. If this cannot be done, market margin analysis must be abandoned.

## References

1. Bowbrick, P. "Determining Distributive Margins: A Comment", Oxford Agrarian Studies, Vol. V, 1976.
2. Fuller, W. A. and Ladd, G. W. "A Dynamic Quarterly Model of the Beef and Pork Economy", J. of Farm Econ., Vol. 43, No.4, 1961.
3. Tilley, R. P. R. and Hicks, R. "Economies of Scale in Supermarkets", The J. of Industrial Econ., Vol. XXIX, 1970.

4. Young, S. and Reeves, A. "Food Retailing Margins in France", Oxford Agrarian Studies, Vol. IV, No.1, 1975.

5. Reeves, A. and Young, S. "Market Margin Analysis: A reply to Mr. Bowbrick's comments and some suggestions for further Research", Oxford Agrarian Studies, Vol. V, 1976.