ERRORS TO AVOID WITH PRICE REPORTING SYSTEMS[1]

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ABSTRACT

A great deal of money can be spent on collecting market information and on analysing the information collected. Many systems, though, collect information that is statistically meaningless. Many collect information that may be 'correct' but cannot be used by market participants to make the decisions they have to make. It is frequently the correct decision to scrap the Market Information System and start again from first principles.

INTRODUCTION

Before the development of modern marketing theory and information economics, price information systems were a panacea for agriculture, leading to "perfect markets", "market transparency", the "right price" and "stopping exploitation by middlemen". Much government effort in the 1920s and 1930s went into setting up these systems. Today there is a resurgence of interest in price information systems, because the advent of cheap computers and telecommunications has made it a fashionable, high-tech operation and has also made econometric analysis possible. However, it has also increased a hundredfold the amount that is likely to be spent, both in equipment and manpower.

Accordingly, it is more important than ever before to ask if it is worth spending money on price information systems. I am not aware of any in-depth appraisal of such schemes. Most economists and producers are highly critical of the systems they see, but are still ardent supporters of price information systems in theory, thinking that a perfect system would be useful, but having no idea whether such a system would be practical. Similarly farmers are eager for them in theory but ignore them in practice. All the farmers I spoke to in Baluchistan said that the Quetta radio price reports were extremely important and they listened to them every week, but none had noticed that they had been discontinued two years earlier.

This article will examine public price information systems for horticulture, excluding retail. The analysis is highly relevant to the private systems run by distributors, and for retail and wholesale price collection.

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[1] This is based on Bowbrick , **British Food Journal**. 90(2) 65-69 March/April. 1988.

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COSTS

Marketing information systems are expensive in money and resources, needing records, clerical staff for processing and publication, and graduate staff for interpretation and supervision, as well as funds for transport, telephones, telexes, publication and computers.

The opportunity costs are high. Few agricultural marketing departments in developing countries have as many as ten economists to cover the whole of agriculture, and few developed countries as many as half a dozen public sector economists working on horticultural marketing. If three or four are working on price information systems, there is a major decline in the organization's ability to do its other tasks, many with a very high payoff.

Noise

Information that is produced and published but is not used creates "noise". The mass of useless or unused information published makes it increasingly difficult for decision makers to find the information that they want to use and ought to use. Decision makers will be happiest if no information is published except the information that they need. Accordingly, publishing irrelevant information is not just a waste of money; it imposes a cost on users of other market information.

Credibility

If some of the price information published is perceived by the potential users to be wrong, then they will mistrust all information from all sources. They cannot be expected to examine the collection, processing and dissemination procedures of all information suppliers and decide which is best. For this reason a single bad market information system can destroy the credibility of good systems. This is a substantial cost.

END USES

Before establishing any price information system one should ask.

1. Who is going to use the information?

2. What is he or she going to use it for?

3. What benefits will he or she get from it?

4. What costs will others incur as a result? (e.g. other producers get a lower price when he or she gets a higher one, and consumers pay more when farmers get more. The welfare aspects of this would make another, very long, article).

5. What are the precise specifications and definitions necessary for the

information to have any meaning in this context?

6. What alternative sources of equivalent information exist?

7. What timing is needed? Economists doing long-term planning may be happy with a 10-year series ending a year ago, but farmers may find yesterday's price too old. Most systems publish figures one week to three months after recording.

8. What dissemination is needed? Many figures never reach the farmers, and some never leave the collector's office.

9. What is the cost?

I shall be discussing some of these points in general terms with regard to each end use.

WHICH MARKET SHALL I SEND TO?

In the market period the farmer wants to know which of the accessible markets to send to. He or she really wants to know what the price will be tomorrow, not what it is today, and certainly not what it was yesterday.

However, today's prices are a poor indicator of the relative prices in the different markets. Wholesalers everywhere complain that if one market has an exceptionally good price today, it is flooded with produce for the next week and the price collapses. In this way, the price information destabilizes the market.

Wholesalers and supermarket chains believe that a grower who chases the highest priced market ends up with a lower price on any one day. Retailers who know a sender's produce are also willing to pay a bit extra for it. A wholesaler gives better service and a higher price to his regular senders. (See Bowbrick 1976, 1994-5)

There is an alternative source of market information that gets round this problem. A grower can telephone his wholesaler and tell him how much he proposes to send the next day. The wholesaler can give an informed forecast, based on the very latest prices, on his observation of new deliveries into the market, on his knowledge of what other farmers are sending and on information from friendly wholesalers in other markets. He can ask a sender to divert produce to other markets, as the situation warrants.

In many countries, for instance, 80 per cent of the apples are marketed by contractor merchants who buy the apples on the tree and send them to cities hundreds of miles away. They are in constant touch with commission salesmen in all the main markets. Even the farmers who market their own acre or so of apples will telephone salesmen in several cities before deciding where to sell (and the telephone runs wherever there are power lines providing electricity for irrigation). If the local telephone is out of order, a small farmer may travel 50 miles to Quetta to telephone before making his decision.

Marketing organisations also consult competitors. The Irish tomato distributors, for example, tell Guernsey how much they are going to put on each British market, and Guernsey

adjusts shipments to avoid a glut in, say, Liverpool.

The implications are very serious. Choice of the best market to send to is the most commonly quoted justification for a public price information system, yet the information given may be counter-productive. What is more, there already exists a much more accurate and timelier system, one which makes a better shot at forecasting, and manipulating, the future.

SHOULD I HARVEST TODAY, TOMORROW, OR NEXT WEEK?

With some produce the farmer has the choice of harvesting (or releasing from store) today, tomorrow, or next week. With crops that must be harvested as soon as they are ripe, the question is "Will tomorrow's price cover my marginal cost, including casual labour, packing and transport?" or, less straightforward, "Can I leave my tomatoes three more days before picking, knowing that the riper fruit can only be sold on local markets?". Here again, today's price is of no interest: indeed it is doubtful whether any price data could significantly improve this decision, given that future prices will be determined by random shifts in supply and demand, both strongly influenced by weather, and by supply and demand for substitutes.

Conceivably, one could get improved information for short-run decisions by combining the historical data with data on the current season, but I do not know of anyone in the private or public sector doing this analysis.

SHOULD I STORE?

In the long run, farmers, co-operatives and merchants decide whether to build stores. In the medium term they decide whether to sell the crop immediately or to put it into store. The major decision is whether or not to put it into store, with a subsidiary decision on how long to store it, the practicality being that the overheads are much the same whether you store for one month or six, there being no alternative use for a CA store, and interest and electricity being the marginal costs for the short-run decision. The short-term decision of when to release stocks already in store has been discussed in the previous section.

The bulk of this kind of storage for any crop is done by a few large farmers, co-operatives, and large wholesalers, as they alone have the necessary stores and capital. They normally determine their storage plan after discussing requirements with their major clients. The supermarkets, wholesalers and co-operatives have excellent price information and quantity information from their own accounts, and it is interpreted by the people who negotiated the prices.

Each supermarket chain deals with perhaps a dozen distributors and each distributor with up to a dozen chains, so there is so much feedback in negotiations that the decision on how much to store has elements of a group decision using all the information available to the supermarkets and distributors.

Small farmers, do not, as a rule, store enough of the total to affect prices, and they can be expected to make random decisions, partly because of the quality of data available and their limited ability to interpret it and act on it.

HOW MUCH SHOULD I PLANT?

With long-term crops like cauliflowers, English farmers talk of two "average" years to one disaster and one bumper crop - and this in spite of a considerable degree of control of area planted, time of planting, quantity harvested and time harvested, by a small group of sharecropping merchants who dominate the industry. As these have excellent historical accounting data, it is not clear how public price information could improve the decision. With the very short-term crops like lettuce, supply and demand fluctuate wildly with the weather, and the amount planted fluctuates wildly as farmers gamble to beat the market.

WHAT SHALL I GROW?

A commission salesman will not hazard a guess at the price before planting, because he does not want to be blamed if his guess is wrong. This means that the grower must rely on past statistics to determine the relative price of different crops, and how prices vary over the year. This is of some value for the large-volume crops like carrots, but is of no use for others. No market information service I know is of any value for the prices of the different types of citrus for instance. The important detail, including quantities sold, is usually known only to the panellists, salesmen who represent large importers like Outspan, Jaffa and Maroc, and who certainly will not disclose it to a potential competitor.

In-depth market studies, rather than routine price reporting, can make a contribution here. The study can note the prices, varieties, quality, size and origin of a crop over a season to identify market windows. This study must be done in close collaboration with the traders who will be marketing the crop. The data collection is expensive and requires a committed and well-trained reporter in the relevant markets. The results are not reported daily, but after analysis.

SHOULD I CHANGE WHOLESALERS?

A perennial problem facing growers is to find out how effective their commission salesmen are. It is not practicable to compare actual receipts with the published ones. The salesman can always say with some justification that the quotation referred to a very small consignment of outstanding quality and a different variety, sold at the end of the day when a scarcity developed; or that his market was undersupplied the day the price quotation was given and oversupplied the rest of the week, or finally that he has the odd bad day, but he has a very high average over the season.

An alternative open to large growers, merchants or cooperatives selling through several salesmen in each of half a dozen markets is to analyse their returns and check one against the other. Le Gallais used computer monitoring to examine the returns obtained by a Guernsey flower co-operative selling in England (Le Gallais,1974). The most effective quarter of the salesmen returned a price 25 per cent higher than that returned by the least effective quarter over a three-month period. This was in spite of the fact that they were selling identical, closely graded flowers. The differences existed between salesmen in one market as well as between different markets.

Obviously, the variation between the best and the worst on any one day must have been

far higher.

Often, in fact, the market price is irrelevant to the decision. In Britain four-fifths of the carrots and most of the cauliflowers are grown on some type of share cropping, and in Pakistan four fifths of the fruit is sold on the tree. In the negotiation period farmers need to know the deals offered by other merchants at the time they are negotiated - at planting or flowering. The price eventually received by the merchant in the terminal market is irrelevant.

However, this does imply some uniformity in the contracts offered. In a study of the purchasing systems of the Lincolnshire vegetable merchants and the contracts they made with farmers, I found it impossible to work out what was the "farm gate" price. There were dozens of share cropping arrangements ranging from the farmer providing only a ploughed field, through arrangements where the farmer did everything but the harvesting, to straight commission selling. As there are perhaps eight different cropping systems for cauliflower alone, this meant that every contract was virtually unique, and comparisons were impossible.

A few farmers can consider the possibility of doing their own harvesting, marketing and storage. They are indeed interested in the price the merchant gets (through in practice farmers tend to give too much weight to one-off high prices, and to the prices for high grades, while ignoring the lower grades and the waste in packing and marketing). A great deal of market research on costs and margins is needed before any conclusions can be drawn, and it is essentially a job for an economist, one who thoroughly understands the industry. Public price information systems are not likely to be the only source of data for this.

ACCURACY

If the data collected are to have any value for economic analysis or decision making, they must be reasonably accurate. They must also be defined in such a way as to be usable in the economic analysis envisaged - data that are correct but inappropriate are no more useful than data that are completely incorrect.

WHAT MARKET PRICE?

Typically, only wholesale market prices are reported, but most produce does not go through these markets. It goes from the farmer to prepacker/distributors and then to supermarkets, or direct to supermarkets, so the price paid is equivalent to the secondary wholesale price. Alternatively, the supermarket chains may do their own warehousing and distribution, and pay a merchant's price. Even if a comparable level could be found, the supermarkets, which level their buying and selling price, pay more than the wholesale markets in gluts, and less in shortages. (Bowbrick, 1972)

There are major conceptual problems with "wholesale price" as there may be seven to ten levels ranging from the price paid to a farmer by a merchant, to the price paid by a small retailer to a van salesman (Bowbrick, 1973/4, 1976). Even within a single primary wholesale market, several levels exist, with, for instance, a box of oranges going from importer to panellist to commission salesman to breaker to retailer. It is an accident which price is reported, particularly when there is vertical integration in the corresponding firm, which may do everything from growing to secondary wholesaling.

If the problem is recognised, and the standard becomes, say, the price paid by the

commission salesman to farmers, there is still a wide range of such prices in any one market. Some salesman charge more because they operate in those parts of the market where access is easier - for reporters as well as retailers. Some specialise in certain fruits or certain grades and get above average prices for them (Bowbrick 1982). Some do bulk sales at low margins while others sell half boxes to corner grocers.

A single salesman may charge, and pay, a range of prices, for example charging one price for bulk sales and another, perhaps 30 per cent higher, for single boxes (Bowbrick 1976). Often the price of a single grade doubles or halves during a day. A slight shortfall, unnoticed at the beginning of the day, means that the line is in short supply at the end of the day's trading. The fluctuations over a week are higher. Which price does he quote?

For reasonable accuracy a very large sample indeed is required to give a statistically significant number of salesman covering each crop, and to cover the range of locations, times of the day and days of the week. Sampling errors are particularly likely with the less common crops. Cost constraints mean that recorders visit the market once a week or once month and speak to a handful of atypical wholesalers (random sampling is impractical given the range of wholesalers performing different functions). Accordingly the results are statistically meaningless.

QUALITY

In nearly all markets one can expect the apples most in demand to get a price three or four times as high as that for the apples least in demand. It is surprising therefore, how often one finds price reporting systems which quote only "the most usual price for apples" or "the most usual price for Golden Delicious"

The failure to take quality into account may exaggerate (or mask) price differences. For example, the price of apples going into store in November will be lower than the price of the same apples coming out in June, or it would not to pay to store. Statistics make the price difference seem higher, because only the best apples are stored, so only top quality apples are available in May, while in November the quality on the market is below average - the run of the crop less anything good enough to store.

Generally, the use of official grading systems such as the EEC standard is unhelpful, as there is a lot of evidence to show that they are not related to what the consumers want and are willing to pay for. There is no evidence to suggest that they would be of value in tying price quotations to a specific quality and a certain amount to suggest that they are not. Grades also perform a very different function at different levels of marketing chain - so much for transparency.2

It is a great deal more useful to have a quotation for a single closely defined quality recognised through the trade such as Kingdom Brand, Cox's Orange Pippin, Class I, 50-55 mm. In most countries this is impossible, because there is no nationally recognised brand and pack and because no one is packing to consistent standards throughout the year. Even if the information were available, it would be difficult to interpret. It is of little or no value in assessing the price of the early varieties before Cox comes on the market. The relationship between Cox and Golden Delicious is one thing at the beginning of the Golden Delicious season and another when only

[2]The problems of grading are discussed in detail in Bowbrick, 1977; *1978, 1982,1992*.

stored apples are available. Even to the farmer who packs to a consistent standard which is not the same standard as Kingdom, the quoted price is of limited value, as the difference between the prices all vary with the relative supply of the two qualities and the substitutes.

It is not practicable to get round this by recording all prices for all the main varieties and grades. One very soon gets to several hundred items to be recorded. When asked to do this, recorders abandon any random sampling procedure they are supposed to be using, and often resort to fabricating the data.

RESPONSE ERROR

Respondents frequently, indeed usually, give the wrong answer to questions on price, deliberately or accidentally. Some of the accidental response errors have been discussed above.

A large proportion of the world's population appears to distrust officialdom, and give misleading information when asked. Sometimes, they mislead randomly, giving the first figure that comes into their heads. Sometimes they may take a perverse pleasure in seeing just what the recorder will swallow - Dublin wholesalers, for example, were delighted when Government recorders solemnly wrote down "Apples, origin Hong Kong".

Usually respondents feel threatened, thinking that the study is being carried out for price control or tax purposes, to expose them as exploiting middlemen, or to detect fraud (which is pervasive in a business where most transactions are in cash, and where accounting is rudimentary). At the least, they are reluctant to give anything away, including information which may help competitors.

Wholesalers may gain from giving misleading information. I telephoned a Scottish wholesaler and asked, in my official capacity, for the price of tomatoes, and was quoted £1.20. Thirty seconds later a leading Irish exporter asked the same man the same question as I listened on an extension. £2.40 was the answer this time - a more correct answer, as the exporter expected to be paid this amount. This mis-statement appears to have been made so that the published figure was low; the wholesaler could tell all his clients how much better he was than the average wholesalers. It has been suggested that there was misreporting to the Fruit Trade Journal for similar or more reprehensible reasons. In Tanzania wholesalers pay a market levy according to the value of their produce, so the usually declare about half the going price. In the Regulated Markets of the Punjab, there is the same incentive to understate the price.

Where there is price control, official prices rather than real ones are quoted. It may be government policy not to quote above the official price, and it may be illegal to do so.

RECORDING ERRORS

There are all the usual possibilities of recording errors. Recorders may mishear, they may write the wrong figures, they may write the figures in the wrong column or they may invent figures or weights and measures. For examples, prices are quoted by the box, but a box of oranges from one source may be 32 pounds, and from another 40 pounds. Some packs may be metric, some Imperial. The weight of apples in a jumble-packed box may be greater than in a layer pack, especially in a country like Pakistan, where bulky straw is used between layers. "Price paid by commission salesmen to farmers" may be gross or net of commission, porterage or even transport.

One sometimes sees identical prices reported week after week even though the market is volatile. Often this means faking by recorders, but it may occur because recorders feel that should not leave any gaps in their form, even though little or nothing is sold in the off-season. The price quoted may be the price of the few boxes actually sold, what the wholesaler thinks the price would have been if he had anything to sell, or the price at which it was last traded two months ago. There are both conceptual and recording errors here. Serious biases occur when figures are available only as monthly averages, as undue weight is given to these observations. Similarly, there are obvious dangers of demand curves being calculated assuming the same accuracy and weight for all observations.

PROCESSING ERRORS

The data are subjected to all normal copying and calculation errors, and indeed to more, because there are none of the built-in checks of surveys.

However, there are far more serious errors than this introduced in processing. For example, the replies of wholesalers are usually given as a range of the most usual prices, e.g ,3.00 to ,4.50 but neither the respondent nor the reporters are quite sure whether these are the extreme values at that instant, the range of modal prices observed at different times over the last week, or anything in between , such as the upper and lower quartiles for the most common grade and size over the present day's trading. It is then usual for the official to calculate an "average" price from all their respondents. This may be an unweighted arithmetic mean of all the numbers quoted. or perhaps some sort of mode of the top figures, and of the bottom figures. All these manipulations produce the wrong figures. Since the quantities cannot be obtained, it is impossible even in principle to get correct figures (except with the Dutch auction).

Worse, the figures are not presented as observations for the day on which they were collected, but as "weekly average" or "monthly average" prices, again using unweighted arithmetic means. Further biases are introduced by using means of several markets to give the "London price" or "British price". These figures are meaningless, and any econometric analysis of them merely compounds the error.

ECONOMETRIC ANALYSIS

Econometric analysis requires that the economic models have been constructed, that data has been collected appropriate to those models, and that the data is accurate.

PRESENTATION ERROR

The data should be presented in a form which is easily understood by the farmers or other users. However many information systems present data in a form which a numerate economist finds very difficult to understand. Indeed, in the absence of detailed explanatory notes, no one could possibly understand some of them.

CONCLUSIONS

I conclude that any public price reporting system must be ineffective unless an in-depth analysis proves the contrary. I have had a close acquaintance with the systems of half dozen countries and I have worked with the output of several others, and have found that all of them incorporate most of the conceptual, recording and processing errors described here. They provide the wrong information to the wrong people at the wrong time. A few people might be able to use some of the information for some purposes (were it accurate), but it is useless to the vast majority of farmers and distributors. As if this were not enough, errors in collecting, processing and presenting the figures mean that the prices quoted are almost certainly wrong, and not just wrong but biased. They could possibly be used to identify periods of short supply, but not much else.

It is doubtful whether a useful system can ever be devised to cover a wide range of products in a wide range of markets. A purpose-built system to record the prices of three or four items in a couple of markets could be devised, but careful attention would have to be paid at all the point raised in this paper.

The future lies not with public price reporting systems but with private, accounting-type systems operated by large farmers, distributors and co-operatives. These systems can be purpose-built to cover the range of outlets and the range of crops of a particular organization. They can be programmed to provide the analysis required for specific decisions. These systems are likely to be of most value to people handling storable crops like oranges and apples, where large distributors can manipulate the market.

It must be emphasised, though, that badly designed private systems will have all the faults of the worst public system. Each problem is unique, and the appropriate solution must be uniquely designed.

It should not be thought that the advent of cheap and easy electronic communications will solve these problems. It may just mean that the wrong data are presented to the wrong people at a time nearer the right time but at a high cost. It will dump large quantities of raw data into the lap of someone who is not capable of processing it.

What do we do with our public price information services ? One can imagine many, specific studies they could do, essentially in depth market research, like finding out what are the quality attributes valued by the market for a specific commodity or determining the effects of imported apples on local apple prices for instance. There is a great danger here that research will be carried out because the price collection service exists, rather than because a problem exists. No, the work should begin at the other end with problem identification and analysis. Data collection comes very late, if indeed this kind of data is needed - the industry has managed without it up to now.

There is a strong case for abolishing the services altogether and putting the money into more productive areas of marketing.

References

Bowbrick , P., “Commission Sales or Firm-Price Sales - a Conflict of Interest” *Irish Journal of Agricultural Economics and Rural Sociology,* 5:229-238, 1994-5.

Bowbrick, P., “A Perverse Price-Quality Relationship”, *Irish Journal of Agricultural Economics and Rural Sociology,* Vol. 6 pp 93-4. 1976.

Bowbrick, P., "Price stabilization in a two-sector industry.", *Acta Horticulturae,* Vol. 40 pp 327-348. 1972

Bowbrick, P., "Some Limitations of Market-Margin Analysis", *Irish Journal of Agricultural Economics and Rural Sociology,* 4(2) 23-8, 1973/74;

Bowbrick, P., "Market Margin Investigations and Price Control of Fruit and Vegetables", *Irish Journal of Agricultural Economics and Rural Sociology,* Vol. 6 pp 9-20, 1976.

Bowbrick, P., "The Economics of Grades", *Oxford Agrarian Studies,* Vol. XI 65-92, 1982

Bowbrick, P., "The case against compulsory minimum standards", *Journal of Agricultural Economics,* 113-7, May 1977.

Bowbrick, P., *A Bibliography on the Economics of Grading,* An Foras Taluntais, Dublin, 1978.

Bowbrick, P., "The Economics of Grades" *Oxford Agrarian Studies* XI pp 654-92, 1982.

Bowbrick, P., *The Economics of Quality, Grades and Brands*, Routledge, London, 1992.

Le Gallais, J.,"The case history of a successful marketing group", *Scientific Horticulture,* Vol. 25 p 115, 1974.