FORMULA PRICING AND PRICE REPORTING PROBLEMS IN THE MARKETS FOR BEEF AND PORK

by

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In the last year, I have been involved in two closely related studies of pricing systems in the markets for beef and pork -- linking the slaughter firm and their primary customers-retailers, further processors, and the food service industry.

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My remarks today will be addressed to:

1) The prevalence of various pricing systems, including formula pricing, in the markets for carcass beef, boxed beef and pork products.
2) The economic impact of formula pricing, drawing upon a survey of major firms - both buyers and sellers - actively involved in the beef and pork markets.
3) A brief discussion of some policy issues and options associated with formula pricing.

Industry Survey Results

Beef

How prevalent is formula pricing?[1] Based upon a recent survey which focused primarily on the largest slaughter-processing firms and some of

[1] For more detail, see Vertical Coordination in the Beef Industry: Packer, Retailer, and HRI Linkages, NC-117 Working Paper WP-22, October, 1978, by Marvin Hayenga. Formula pricing is the practice of using a prenegotiated price premium or discount on each individual transaction, with the ultimate price determined by adding the premium or discount to the base product market price reported on a specific date in the future (e.g. day prior to shipment).

Pricing Systems Used for Beef and Pork
by Slaughter-Processing Firms, 1978*

Beef	Negotiated	Formula Priced	Price List
		(percent)	
Carcasses (50+% of sales)	30	70	
Boxed Beef (40+% of sales)	80-90	10-20	
Pork			
Fresh (60% of sales)	50	40	10
Processed (40% of sales)	1-4	5+	90+

*Based upon surveys of beef and pork slaughter-processing firms, and their customers in 1978 and early 1979. Because the sample was not comprehensive or randomly selected, and estimates by the individual firms were approximations, these results should be considered approximations.

their largest customers, formula pricing is used in approximately 70% of the beef carcass transactions; carcasses now comprise slightly over half of the sales from beef slaughter-processing firms. This 70% formula estimate coincides exactly with a subsequent USDA estimate reported in the December, 1978 Beef Pricing Report, which was based upon a 35 plant sample of one month's carcass beef transactions (in July, 1977).

The most rapidly growing beef product market is boxed beef, now comprising approximately 40% or more of the beef volume. Only 10%-20% of the boxed beef transactions are on a formula pricing basis, primarily boxed primal cuts in IBP's Cattle-Pak program and ground beef sales to some large food service operations.

Overall, one can roughly estimate that formula pricing systems are used on approximately 50 percent of the beef sales from large and medium sized beef slaughter-processors. The recent rapid growth in the market share of boxed beef is clearly going to continue, which seems very likely to cause the negotiated portion of beef transactions to increase. Formula pricing in beef is least used by very large retailers, West Coast retailers and slaughter-processing firms emphasizing boxed beef (with the exception of IBP's Cattle-Pak program). Firms most dependent upon formula pricing include small to medium-sized retail chains in the East and Midwest, slaughter firms primarily involved in beef carcass sales to other processors or small and medium sized retailers, and ground beef suppliers to the hotel and restaurant trade.

Pork

While the pork industry hasn't exhibited the rapid rate of change observed in the beef sector, there also has been a gradual shift toward more processing of pork by slaughter firms, with a corresponding shift in the mix of pricing systems employed. Based upon a survey of thirteen large pork slaughter-processing firms (with over 60% of pork slaughter), a few of their smaller competitors, ten of their retail customers, and a few large food service firms, one can conclude that slaughter-processors sell approximately 60% of their pork as fresh pork cuts (loins, boston butts, fresh hams, bellies, etc.). Slightly less than 40% of slaughter-processor pork sales were processed pork (smoked or canned hams and picnics, bacon, lunch meats, frankfurters, sausage, etc.).[1]

On fresh pork cuts, formula pricing arrangements are used in approximately 40% of the transactions, firm prices are established in 50% of the transactions through negotiated or offer-acceptance pricing systems, and a daily fresh product price list is the primary pricing vehicle for the remaining 10% of sales. The prevalence of formula pricing in fresh pork transactions apparently hasn't changed much in the last fifteen years, as formula pricing was used for approximately 40% of fresh and frozen pork sales in 1965, according to a study by the National Commission on Food Marketing.

In contrast, over 90% of the processed pork sales are based upon a weekly price list for packer-branded products. Less than 10% of processed pork sales were "private label." Over half of the private label transactions are on a formula pricing basis, and the remainder are priced using the branded price list minus advertising costs, or are individually negotiated transactions.

Overall, then, approximately 25% of all pork sales are formula-priced, 35% of the prices are established at the time of the transaction via negotiation or offer-acceptance, and 40% of sales are priced via a daily or weekly packer price list.

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[1] Marvin L. Hayenga, Pork Pricing Systems: The Importance and Economic Impact of Formula Pricing, forthcoming.

While these surveys were not a scientifically drawn random sample, and didn't cover the entire population of firms in these markets, they covered a sufficiently large proportion of the volume (40%-60%) to provide some reasonable approximations of the extent to which formula pricing was used. Based on these estimates, one can conclude:

(a) The House Small Business Subcommittee conclusion that 70%-90% of all meat is formula-priced is in error. In beef and pork, the primary red meats, the weighted average percentage would be in the neighborhood of 40 percent.

(b) More processing of both beef and pork is being done by slaughter firms. This cuts down the market volume of these beef carcasses and pork cuts that are in greatest demand by the firm's processing operations. As a result, a high proportion of the Choice, yield grade 2 and 3 heavy beef carcasses and the fresh hams and bellies never reach the market in that form today, though they would have 10-20 years ago.

(c) The use of formula pricing also shrinks the trading volume upon which firm prices are determined at the time of the transaction -- the end result is thinly traded markets for products where further processing by slaughter firms and formula pricing are both prevalent.

(d) Because some large buyers and sellers have chosen not to report some or all of their negotiated prices to the primary private price reporting services, and many negotiated transactions are on products which differ in grade, method of selection, or trim, from the basic commodity classes being reported (often due to buyer's requirements or sellers' efforts to differentiate their products), only a small proportion of the total product actually traded on a negotiated basis may be potentially reportable as "confirmed" sales. The timing of the transaction is an additional factor which may make a transaction inappropriate to consider as a "closing" price.

Formula Pricing Advantages/Disadvantages

As would be expected when most firms use formula pricing on at least a small proportion of their beef or pork purchases or sales, the disadvantages of formula pricing typically were considered to be outweighed by its advantages. This was the case for a majority of the buyers and sellers interviewed, though there were some strong contrary views.

The primary disadvantages cited were:

(a) The inability of the formula pricing firm to influence its own fate, relying on a price determined by somebody else.

(b) The lack of an authoritative market price report representative of prices on the West Coast; thus, formula pricing was impractical for West Coast firms.

(c) Firms were unable to capitalize fully on their forecasting or negotiating skills.

(d) Reported market prices were alleged to occasionally be out of line with actual market prices for a day or two, though they were generally considered representative of actual market prices in the long run.

(e) Some large buyers refused to use formula pricing arrangements.

The primary advantages of formula pricing were:

(a) The reduced risk of adverse price changes associated with advance purchase/sales agreements intended to assure adequate product volumes for both buyer and seller and satisfactory product quality for buyers with tight specifications and high volume requirements.

(b) The greater efficiency of each individual transaction for both buyer and seller - less purchasing or sales staff and negotiating skill required, less market information search, less communication time and expenses, etc.

(c) Greater bargaining equity, with less chance of being "taken" by a better-informed trader.

Packers and retailers were asked to estimate how their costs would change if they could not use formula pricing. Approximately ten firms provided estimates. Using estimates in the middle of the range offered by buyers and sellers, and multiplying by the industry volume estimated to be involved in formula pricing, we can roughly estimate that the additional transaction cost resulting from a ban on formula pricing would be five million dollars annually for pork, and much higher for beef -- perhaps 15 million dollars annually. This estimate does not include (a) the risk premium that slaughter firms would require for negotiated sales a week or ten days in advance of shipment -- the kind of lead time often required to assemble sufficient product volume for supermarket features of particular beef or pork products, or (b) the operating inefficiencies associated with more sporadic and uncertain product volumes for both buyers and sellers.

Policy Implications

Some concerns being voiced about formula pricing and price reporting may really be triggered by the rapid expansion of assembly line processing and fabrication technology in the beef industry, which has absorbed many beef carcasses from the market. While the market for beef carcasses may be thinner and potentially more problematic, the resulting increase in boxed beef is typically negotiated. The net result may be more beef involved in negotiated transactions. This evolution toward more boxed beef and more price negotiation seems quite likely to continue in the future.

Despite that, fewer beef carcasses may be involved in reportable transactions, partly due to the shrinking volume of beef carcass transactions, but also because several leading retailers who comprise the largest segment of the negotiated portion of the carcass market either buy carcasses differing from the standard product classes reported, or do not report purchase prices.

In a similar vein, the growth of further processing and attempts at fresh pork product differentiation will continue in the pork industry, and take more product out of the negotiated market or out of the standard product classes. Yet there has been little change in the proportion of fresh pork being formula priced since 1965 -- the performance of the pricing system or the price reporting system is not getting any worse due to a change in the amount of formula pricing.

Thus, some of the alleged and real problems that are surfacing may result partly from basic changes in these industries, and partly from formula pricing. As a consequence, a "remedy" directed solely toward formula pricing might help in the short run, but wouldn't necessarily be a long run solution.

A market in which formula pricing is present presents a setting where a continued increase in the use of quite efficient formula pricing arrangements could gradually erode the volume involved in the price determination process. In the logical (or illogical) extreme, formula pricing could expand to the point where the negotiated market would become extinct, and in so doing, make extinct the base market price necessary for the formula. Of course, one would begin to see signs of problems developing with regard to that market price as that evolved, which would probably cause private firms to act differently, and forestall the continued evolution.

The critical public policy question is whether the economic costs or problems associated with formula pricing are greater than the benefits, and enough so to warrant governmental intervention? Or, alternatively, could some of the problems be eliminated or minimized while retaining the economic efficiencies associated with formula pricing?

Policy Options

Private Firm Options

What might be some options available to private firms to remedy some of the alleged problems?

If buyers or sellers believe that the price report on any particular day is error prone because of the reporting firm not immediately and accurately sensing a real change in the market price level, or the failure of some firms to report accurately or fully, they could base their formulas on 3 or 5 day price averages, hoping that aberrations in either the market price or the market price report would average out over that time period. However, that might also slow the market responsiveness to product surpluses or shortages.

Alternatively, firms could elect to regularly negotiate prices on part or all of their volume. Reporting these negotiated prices could help insure representative prices being reported, especially if that product meets the specifications of the commodities reported by the Yellow Sheet.

If one reporting service seems error prone, it could be avoided, or an average price calculated from 2 or 3 price reporting services might be used. "Actual cost plus" contracts might be considered if no reports appear credible. At the extreme, forward or backward vertical integration might be attempted to avoid entirely the perceived pricing problem.

Price reporting services may have to intensify their efforts to more comprehensively report the trades in the most thinly traded (on a negotiated or offer-acceptance basis) product categories. But even that effort would have its limitations, since the point can be reached, and may already have been reached, where additional reporters' searching may be too costly for the results obtained. This could be partly attributable to the practice of some large firms to not report prices or confirm any negotiated trades, and the reluctance of reporting agencies to use unconfirmed trades when determining which price ought to be reported. These practices in conjunction with formula pricing take a high proportion of the product volume out of the population of transactions that could be reported. This undoubtedly makes it very difficult to find a large enough number of transactions to confidently base a price report on, while making it easier for a report to be in error because of the actions of buyers or sellers, or the actions of the price reporting service. Where thinly traded volumes lead to uncertainty regarding the appropriate price to report, reporting firms can elect to report no price. Alternatively, reporting the trading volumes actually used to determine the closing price (or price range) would help the user judge the likely credibility of the reported price.

Price reporting services may have to compensate for very small negotiated volumes in some basic commodity categories by expanding the breadth of the product categories that they report. For example, if more product is being further processed before entering the market, or different grades than those reported are moving in large volume in the negotiated market, the price reporting agency could provide reports on those product categories. This could provide many users with very useful supplemental information on those product categories that they deal in, or indicate when prices in the thinly traded but closely related product categories are out of line. If reported prices in closely related product categories appear out of line, firms could more carefully monitor prices in that suspect category, or avoid using the suspect price report in contracts or as a base for starting the next day's negotiations. Broadened price reports could help diagnose possible discrepancies and inequities, and could stimulate improved market arbitrage among some closely related product categories.

Public Policy Options

There are also several public policy options that might be considered, including some closely related to the private firm options. The extreme option would be banning formula pricing, with its corresponding effect on industry transaction costs and risk, and the readjustment trauma involved. There is a serious question whether a ban would be enforceable, given the strong motivations among many buyers and sellers for some form of low risk, efficient advance purchase/sales arrangement, and the oral nature of many such agreements.

All firms, or perhaps just the largest firms, could be required to negotiate all or a specified percentage of their sales or purchases, to maintain sufficient volume in the negotiated product markets. If all firms were forced to negotiate, the smaller, least informed firms now using formula pricing would incur the greatest transaction cost increase or be put at the greatest bargaining disadvantage, potentially leading to increased concentration of market power in the industry. Forcing the largest firms to negotiate prices on all or part of their volume would be less traumatic, since many rely on negotiation for a large part or even all of their purchases/sales now. However, this could shake up long standing buyer-seller relationships, and put smaller buyers or suppliers that the large firms now deal with on a formula basis at a comparative cost and bargaining disadvantage.

Large buyers or sellers not reporting their large volumes of negotiated transactions could be required to report prices paid or received to approved price reporting agencies. While some might question whether price reports by large retailers (or meat packers) might facilitate collusion in pricing (the risk of being accused of collusion may be one reason why some large firms currently elect not to report prices), the basic information on prices paid by leading retailers is already well known to the best informed traders in the industry without their report or confirmations of their purchase prices. Requiring reports from large retailers and slaughter-processors could eliminate that legal question, make that information more broadly available, and make the total spectrum of reported prices more credible. While there might be some costs involved in reporting, they probably wouldn't be large if the breadth of the report and underlying documentation required are reasonable.

Licensing approved private reporting agencies or having all reporting done by a government agency are two additional public policy options. If there are significant problems in current private price reports caused solely by the price reporting services' actions or inactions, an oversight or regulatory function might help to eliminate errors due to the price reporting agency, but at an added cost to the individual reporting services, ultimately their customers, and to the taxpayer if a government agency was established to administer such regulations. Sidestepping the "freedom of the press" legal question (which may be quite important), guidelines might be established to minimize some alleged problems. But, the nature and extent of the real problems are still insufficiently documented to clearly point out whether such a prescribed remedy would really be necessary (or whether the problems lie elsewhere). Of course, a mandatory requirement to report prices to approved reporting services might be a great incentive for one or more of the private reporting services to elect to seek a license as an approved reporting service--the increased credibility might dramatically increase customer confidence in its reports.

Requiring reports from buyers and sellers to a government price reporting agency is another option. But the current government price reporting agency is little used by most market participants, partly due to the lack of an overnight written report, partly due to the reporting format (price ranges, etc.), partly due to less credibility than the Yellow Sheet. Unless other changes were also made to make the government report more readily available and usable, it is not clear that the expansion of its price reporting population (at some cost) would by itself be sufficient to make its reports a superior product in the view of many market report users.

Are electronic markets a likely alternative? Electronic markets have been in use in several Canadian and U.S. commodity markets, and several more experimental applications of electronic markets are now being developed. While the concept is quite promising, I believe that we need to know more about the experience in these markets before we can judge whether the introduction of electronic markets (on a voluntary or mandatory basis) would be feasible in the very large and complex markets for beef and pork products. We also need to determine what institutional framework would be necessary and appropriate, and estimate its cost/benefit configuration relative to the current marketing system. If analysis of current experimental applications of electronic marketing suggests that an electronic exchange in beef carcasses, boxed beef, or pork products might be a practical improvement to the current system, and private development of electronic markets has not yet surfaced in the meat markets, it certainly would be appropriate to recommend a pilot effort that would be partially subsidized by the government in one of these complex product markets. If the problems are considered too severe to wait, an experimental electronic exchange in beef or pork could be tried earlier and evaluated in conjunction with the other ongoing experiments.

CONCLUSION

The results of my surveys have not brought out any significant market failures that would warrant major legislative remedy. While there have been many allegations, so far no one else has clearly shown that the market price reports in the Yellow Sheet (or its competitors) are significantly different from actual market prices. The USDA Beef Pricing Report looked at beef carcass prices for one month and found no conclusive differences. The House Small Business Committee investigative team sharply criticized how the work sheets of the Yellow Sheet reporters compared to their price reports. While that may be evidence of sloppy work or overstatements regarding the diligence of the reporters' note taking, they did not show that the market prices necessarily deviated from reported prices. While some packers may have felt reported prices in some product categories have been out of line with their prices for a day or two, it is certainly possible that the packers may not have been fully informed on all transactions, so it is difficult to clearly conclude that the reporting service was in error on the basis of such reports.

For the outside observer, allegations about partial reports, false reports, and market manipulation by market participants are almost impossible to clearly document; and even if they were true, the net effect on the reported market price may not be noticeable in some situations. If the negotiated market volume is not extremely small, other reported transactions can keep the report accurate, even in the face of one or more inaccurate reports. In some cases, a price that is out of line today will often cause a corresponding shift in inventory and price tomorrow or the next day, and the average price behavior over time may not be appreciably affected. Nevertheless, the extent of such allegations and the resulting impact on the credibility of the market, and possibility of temporarily affecting the market price for even a day through such actions certainly is disturbing. Where there is smoke, there may be fire.

The markets in many basic beef and pork product categories (e.g. beef carcasses most used by boxed beef operations, fresh hams and bellies, etc.) are more thinly traded on a negotiated basis than they were a decade earlier. However, this is primarily due to a shift in the composition of the product markets due to more processing by slaughter firms, more differentiation of product by suppliers, and more pre-processing required by the hotel, restaurant, and retail trade. While the extent of formula pricing is a contributing factor, it clearly is not the key change force.

To counter the movement of large product volumes out of the basic product categories reported, responsive price reporting services ought to expand their reported product categories to include those high volume product streams. Even though the product is processed to meet a different specification, is a borderline grade, or specially selected, this price information can be very useful to firms dealing in those products (and many do), in diagnosing market or price reporting discrepancies, and facilitating market arbitrage.

But another factor contributing to the problem of determining representative prices in some product markets is the failure of some large firms to report their prices or confirm trades. While I am personally not sure that the reporting problems require such a strong prescription, mandatory reporting by large buyers and sellers to approved price reporting agencies would quickly expand reported volumes. However, this measure would not be a cure-all in itself, since the large retailers who do not report prices often deal in product with special trims or borderline grades. But, in conjunction with broader product category reporting, such a step could improve the credibility and usefulness of price reports for many years.

As an outside observer, it is difficult to determine whether any of the negotiated beef and pork product markets are so thinly traded that they would be easy to manipulate, or provide misleading indications of product value to other market participants. A comprehensive census of the volumes traded and pricing systems employed for the wide variety of beef and pork products actually being traded would provide a partial answer, though a comprehensive answer would require a much more detailed analysis of firm behavior in those markets. To counter suspicions that reported prices in thinly traded markets aren't representative, the credibility and usefulness of the Yellow Sheet certainly could be enhanced by reporting the volume trading in each product category, the price range during the day, and the volume actually traded that was used as the basis for the reported closing price.

Some market participants are beginning to shift toward more negotiation, partly as a result of some of their misgivings about the price reports used in formula price transactions. In so doing, the volumes in the negotiated portion of the market and the credibility of reported prices are increased, countering some of the forces shrinking the negotiated product market volume.

The rapidly growing, heavily negotiated boxed beef market should provide an indication of beef product values that complements beef carcass price reports, and compensate for the shrinking base of negotiated carcass transactions. Since the carcass market and the boxed beef markets can have different values for carcasses reflected in their prices in the short run, using just a carcass price report to determine what a carcass is worth or what to bid for live animals could be misleading. Where it is not currently done, price reporting services should be encouraged to translate the large number of boxed beef prices into an approximate carcass value for comparison purposes. While that may be difficult, the information ought to be useful to many market participants as the transition from carcasses to boxed beef continues.

Would the introduction of electronic markets be a solution? Without significant further development effort and pre-testing in these complex markets, probably not. While an electronic market has the potential to be a low cost, high information content market innovation, its economic feasibility is strongly related to the degree of product standardization. This may be a constraint in the beef and pork product markets where a slip of the knife changes the product value. Further, an electronic exchange may not be an effective substitute for some of the long term standing order arrangements where quick response time or consistent, known product quality are critical, or where "tailor-made product" is involved. But, it could serve as an alternate market and information source, especially for the smaller, less-well informed buyers and sellers, and contribute to greater marketing efficiency and bargaining equity. Further development and a market test of a prototype electronic exchange for meat products should be a recommendation of this task force.

Formula pricing is controversial, and is a factor, though not the primary force causing some negotiated markets for beef and pork products to be thinly traded. Yet it is a highly efficient way of transacting business, and a risk-management tool that has some clear benefits to buyers and sellers. In fact, elimination of formula pricing could be quite costly and traumatic to many industry participants, and lead to some undesirable changes in the competitive balance and structure of the meat packing and retailing industries. In the absence of any significant and well documented market failures that are clearly the consequence of the use of formula pricing, I see no compelling reason to impose such traumatic changes on the industry.

If you have any questions, I will be glad to respond to them now.