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WHOLESALE MEAT TRADING IN THE U.S.:  
PRICING ISSUES AND EVALUATION GUIDELINES  
FOR ELECTRONIC MARKETING

by

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## ABSTRACT

The traditional exchange system for wholesale meat in the United States is under attack, partly because of changes in industry structure and partly because of alleged inefficiencies and inequities in pricing. New marketing alternatives are under consideration including a centralized computer trading system. This paper reviews the history behind the evolution of electronic trading potentials for meat, and suggests some economic considerations and evaluation guidelines for such a system.

Wholesale Meat Trading in the United States:  
Pricing Issues and Evaluation Guidelines for Electronic Marketing

Introduction

The United States meat industry is extremely large and complex. In 1979, slaughter plants produced 38.28 billion pounds of red meat. Beef accounted for 57 percent (21.3 billion pounds), pork, excluding lard, for about 41 percent (15.3 billion pounds), veal for 1.25 percent (0.4 billion pounds) and lamb and mutton accounted for .75 percent (284 million pounds) (14). Gross sales of the red meat industry were estimated at \$50.6 billion in 1979, up 12 percent from 1978 (1).

Individuals and organizations at each of the production-marketing chain links have a large stake in the quality of economic performance of the system. However, the most important link in the chain is the wholesaling function where meat packers and various handlers, including retailers, come together and the price discovery takes place.

Much public concern about the performance of the livestock-meat sector of the U.S. economy centers around 2 issues: (1) the changing structure of the industry and (2) adequacy of the existing price discovery and price reporting systems for livestock and meats. This paper is concerned with reviewing these issues, and suggests some economic considerations and evaluation guidelines for a specific alternative exchange mechanism for red meat, electronic trading.

Changing Structure and Technology

The structure of the meat industry became a matter of public concern over seventy years ago, culminating in the famous "Consent

Decree" of 1920. In 1918 the "Big Five" Armour, Swift, Wilson, Cudahy and Morris accounted for about 49 percent of commercial cattle slaughter, 44 percent of the hogs and 62 percent of the sheep and lambs. Concentration at the national level dropped to 23 percent, 33 percent, and 55 percent for cattle, hogs, and sheep by the 1960's. The decreasing concentration was due to many factors including the Consent Decree, improvements in transportation and communication, increased use of federal grading, and shifts in location of livestock production (18).

During the 1970's concerns again arose over increasing concentration of steer and heifer slaughter with the four largest firms accounting for 32.5 percent of national steer and heifer slaughter in 1978 compared to 26.1 percent in 1970, and larger proportions on a regional basis (18).

The 1970's saw the reemergence of multiplant large-scale firms with decentralized operations. These firms adopted new techniques which improved their operational efficiency by lowering in-plant unit costs and improving by-product utilization. The most significant technological innovation was the introduction of the concept of beef processing beyond the carcass level, i.e. "boxed beef." Cothern suggested that boxing beef has "reduced the geographic integrity of isolated markets, since products could be shipped longer distances more cheaply and also could be held longer periods of time in cold storage" (2).

As in the slaughtering stage of the meat market, the final

handlers (retail chains, fast food chains, hotel and restaurant chains) have also been getting bigger and more industrialized and often utilizing centralized meat buying/processing operations. Some carcass receiving capabilities are being eliminated and management flexibilities associated with boxed meat are being utilized.

#### Meat Pricing Issues

With these developments the industry emphasis shifted to large volume sales. Market basis trading, or "formula pricing," evolved and spread throughout the trade. This pricing method stipulates that terms of delivery, quality and quantity of meat traded are agreed on at one time with the price to be based on a published quote at a later date (usually the day prior to shipping). Prices are calculated on a formula, usually a number of cents per 100 pound over (or under) negotiated and reported price published by a market reporting service, usually the National Provisioner's "Yellow Sheet." Recent evidence based upon industry surveys suggests that a relatively large variation exists in the use of formula pricing by firm, product, and region (4, 5, 13).

Most of the studies suggest that formula pricing is the dominant method used for carcass beef transactions while most boxed beef is priced on negotiated basis. About one-half of fresh pork is sold on negotiated basis and the other half is priced on formula or price list basis (5). Surveys showed that there are geographical differences in the relative proportion of negotiated and formula transactions. In the West Coast, pricing is typically based upon negotiations for fresh

pork and beef while in the East, formula is the predominant method. In Central States either of the methods or a combination of the two is usually used.

The wholesale meat prices are primarily reported by three market new services. These are:

1. The Daily Market and News Service, published by the National Provisioner, Inc., also known as "The Yellow Sheet."
2. Meat Market Research and Reporting Service, published by the Meat Sheet, Inc., also known as "The Meat Sheet."
3. "Market News," published by the U.S. Department of Agriculture.

The "Yellow" and "Meat" Sheets are privately owned services and "Market News" is a government publication. Price and other market information are collected and disseminated through mailing, telephone, and other means of communication (9).

In recent years there has been increased criticism of pricing and price reporting in the wholesale meat market, especially for beef. A 1978 General Accounting Office study concluded:

"The current industry reliance on formula pricing has resulted in two major concerns: Inadequate price information and susceptibility of pricing information to manipulation" (3):

Similar concerns were expressed by the National Commission on Food Marketing as early as 1966 (8). A series of reports and congressional committees and government agencies reveal a range of concerns and alleged inefficiencies and inadequacies in the meat pricing system as well as strong denials of any real important problems. For example(17).

While disagreement exists on the effect on market performance,



evidence is strong that the reported base of negotiated transactions for some important meat products is small (13).

Controversy over the accuracy of market information and number of the reported negotiated transactions led the Secretary of Agriculture to appoint a Meat Pricing Task Force in 1978. A series of hearings, testimony, and studies resulted in a number of conclusions and recommendations that focused on efforts to improve the market performance through voluntary measures rather than new regulations. The Task Force's recommendations were for either the industry to provide more and adequate reporting through the present system or use an electronic trading system which could increase the volume negotiated and reported, i.e. development of an electronic meat trading system (15,17).

In 1980, the USDA Meat Pricing and Consultation Group, which was formed to review the meat industries efforts to accommodate the Task Force recommendations and to eliminate some of the pricing problems, submitted a report to the Secretary of Agriculture. It stated that little progress has been made since 1979 to expand the volume of negotiated - reported trades. Their review of the status of implementation of an electronic trading system by the industry led them to conclude that:

"Industry reactions to the plan to test the viability and feasibility of electronic trading in meat at wholesale have been disappointing. Nevertheless, the Group is convinced that such a system deserves a fair test to determine the extent of its promise. The Department should continue to take steps

to accomplish a test, including providing funds to assist with defraying the cost of such a test" (16).

In September 1980, the Secretary of Agriculture announced that the state of Illinois through the University of Illinois Agricultural Experiment Station will receive a grant to test and evaluate a national electronic meat trading system. Initially a pilot test will use a Computer-Assisted Trading System (CATS) developed by a private company. This paper will not address this specific system since it has not been implemented at this time, but will suggest evaluation criteria and discuss some of the economic considerations.

#### Electronic Trading

"Electronic trading systems" are to be distinguished from other non electronic marketing mechanisms and "electronic information systems." The term electronic trading in this paper refers to the use of various electronic devices to centralize the price discovery function as well as assembly and dissemination of market information. This is in contrast with an electronic information system's basic function of only reporting product availability and past transactions. Two features of electronic trading are that participants execute transactions through electronic communications links without copresence of buyer, seller, and product; and they use descriptive terminology (or possibly video display) to communicate product attributes.

Electronic trading is relatively novel in the agricultural sector having been successfully implemented in only a few commodities and comparatively small geographical markets. Existing examples of

electronic trading systems are the teletype system for marketing slaughter hogs in Ontario, Canada; the Telcot computerized cotton exchange in Texas; the Egg Clearinghouse in New Hampshire; and various telephone auctions for feeder pigs in several states.

Proponents of electronic marketing point to the conceptual appeal of centralizing the exchange function, which allows large numbers of buyers and sellers to execute transactions without transporting either the traders or product to a central point, with current market information readily available. Detractors, on the other hand, voice concerns that accurate description for product homogeneity is not achievable, and that the subtle kinds of market information gained through personal contact is lost. Other suggested advantages and disadvantages of electronic trading are found elsewhere, for example (11).

Meat, at wholesale, is already commonly traded privately, over long distances by description over the telephone, thus buying and selling at a distance on an electronic exchange would not, in itself, be a radical departure from the present. However, present descriptive terms and trading habits may be far from standardized among firms.

#### Economic Considerations and Evaluation Guidelines

"Market efficiency" is a concept commonly used by economists to evaluate the complex and sometimes conflicting perspectives in the marketplace. Some also often use the concept of a "purely competitive market" as a performance norm or base against which to judge or compare performance of existing or proposed market mechanisms. Others suggest the use of specific performance objectives assessed through indicators

and when possible quantified in empirical terms (7).

A successful exchange must exhibit several characteristics related to market efficiency and overall economic viability. From an analytical standpoint, electronic meat trading may be evaluated in terms of its performance in four aspects or objective (i.e. goal) categories:

1. Pricing efficiency;
2. Operational efficiency;
3. System's design and industry acceptability; and
4. Structural impacts.

It is highly unlikely that any system can provide the optimal conditions implied in these key areas simultaneously. For a new system to supplant an existing one it must provide for an improved and acceptable level of performance, on balance, in these areas compared with existing trading methods. Table 1 presents subjective performance indicators for each of these general evaluation categories. These and other economic issues are discussed below.

#### Pricing Efficiency

Pricing efficiency is a concept related to the market system's ability to reflect changes in demand and affect resource allocation. According to Philips:

"Pricing efficiency is concerned with the price-making role of the market system. It concerns how accurately, how effectively, how rapidly, and how freely the marketing system makes prices which measure product values to the ultimate

consumer and reflects these values through the various stages of the marketing system to producers." (10)

Pricing efficiency as a performance category is especially important since most of the recent criticism of the current system is focused on pricing and price reporting.

One of the main problems associated with the widespread use of formula pricing is the decline in the number of negotiated transactions, i.e. the "thin market" problem. A "thin market" is generally characterized by low transaction volume, inadequate, or lower quality information, and potential for price manipulation. Tomsek summarized the concern with "thin markets" as follows:

"A small volume of trading at a central marketplace can result in price behavior not warranted by economic conditions. Moreover, deliberate manipulation of prices is more feasible with a small volume. If the central market quotations are used as base prices in other transactions, the problems of unwarranted or manipulated prices acquire increased economic importance" (12).

A distinction should be made here between a "thin market" which implies a small transaction volume is involved in price discovery of a product and a "thinly reported market" which implies that a small proportion of a large volume of transactions is involved in the price discovery process. There is obviously a large number of transactions taking place in the meat trade each day. However, the number of negotiated transactions is only a portion of the total, and the

Table 1: Evaluation Guidelines for Electronic Meat Trading

<u>Evaluation Category</u>	<u>Performance Indicators</u>
1. <u>Pricing Efficiency</u>	<ul style="list-style-type: none"><li>a. The degree of market thinness as indicated by the relative volume traded.</li><li>b. Quantity, quality, availability and timeliness of current price and other market information to all potential users of the system.</li><li>c. Ability to minimize unwarranted price fluctuations by providing appropriate and desirable conditions for market clearance.</li><li>d. Pricing accuracy in terms of price differentials over time, space and form, including quality factors.</li></ul>
2. <u>Operational Efficiency</u>	<ul style="list-style-type: none"><li>a. Exchange costs including development and education costs.</li><li>b. Firm's per unit cost of trading on the exchange in the short and long term.</li><li>c. Effect on other marketing costs such as shrink, spoilage, quality, transportation and distribution.</li><li>d. Indirect cost reduction resulting from interfacing with firm's management and accounting functions.</li></ul>
3. <u>Design and Acceptability</u>	<ul style="list-style-type: none"><li>a. Adequacy of product description and the systems ability to account for the variation in product quality and firms within and among firms.</li></ul>

Table 1: (continued)

- 3. Design and Acceptability
    - b. Sensitivity to firms need for confidentially and performance guarantees.
    - c. Buyers and sellers' attitudes on number of complaints.
    - d. Adaptability and flexibility to accommodate different and changing needs of users.
  
  - 4. Structural Impacts
    - a. Degree of access or barriers to the exchange to all willing potential users.
    - b. The degree of interaction among firms by size and region, and indication of exposure and integration levels.
    - c. Differentiate costs among various firms sizes and volume traded.
    - d. Impact on formula or forward pricing.
-

number actually reported is smaller.

The major concern about "thinly reported" or "thin" markets is the quantity and quality of information. The potential impact of electronic trading of meat on the "thinly reported market" and "thin market" problems will depend largely on the volume traded in the open market. A large and frequently traded volume will increase the confidence in a reported price. On the other hand, a small volume traded, on a new system, may divide available negotiations between two exchanges (i.e., the current and electronic systems) thus, the problem of a "thinly reported market" may be magnified rather than reduced or eliminated.

Accessibility to a large number of traders is an important indicator of positive impact on pricing efficiency. In the case of meat, a relatively small number of large traders would be sufficient to generate large volume because of the existing structure of the meat industry. However, it is important that a minimum number of traders participate in the market in order to fully represent the market.

An electronic trading system may increase effective trading competition as a result of centralizing the price discovery function. An increasing number of negotiated trades and the availability of current market information to all traders would be expected to have a positive impact on the accuracy and representation of price and subsequently the efficiency of resource allocation. Electronic trading is capable of reporting market information to traders, regardless of their



geographical location or market power, hence increases competition.

Another indicator for pricing efficiency is the system's ability to minimize unwarranted price fluctuations by providing appropriate conditions for clearing the market. For example, there could be a potential positive impact on pricing efficiency if the number and frequency of the incidents of distressed trades are reduced as a result of increased accessibility to nontraditional traders in various locations.

Finally, the exchange should provide for pricing accuracy in terms of differentials over time, space and form, including the product's quality. Specifically: (1) price differences between any two locations for similar products during a certain period should not exceed transfer costs and equal to transfer costs if product is actually shipped, (2) prices for a given product over time should be flexible enough to accommodate changes in market fundamentals but not unnecessarily volatile or disperse and (3) price differentials for quality, sex, type, alternate forms, etc. of a product should reflect differences in processing and production costs.

#### Operational Efficiency

Operational efficiency is concerned with measuring input-output relationships. That is, it is concerned with the cost of performing various marketing functions in moving the products from producers/processors to consumers, including the cost of the exchange.

A new trading process must provide its service at a competitive rate. Both variable and fixed costs must be considered. Fixed costs

include equipment depreciation, insurance, and the relevant portion of the firms overhead costs. Variable costs are those associated with operating the equipment (e.g. computer terminal) which include preparation and actual operating costs such as computer usage, telephone and labor.

A trading mechanism is considered more operationally efficient than another if its sum of variable and fixed costs per unit of transaction is less than the other. The current operationally efficient direct long distance telephone marketing practice and the large volume of formula trading in the meat industry suggest that in the short term an electronic exchange would provide only a small savings potential. Henderson suggested that nominal efficiency gains might be achieved from more rapid communication (6). In addition, a large trader may save on total telephone costs by eliminating one or more telephone lines. Also there may be some potential of facilitating better contacts and larger market exposure, thus reduce transportation and other marketing costs.

Another potential gain in operational efficiency over the existing system is the possibility that it might have a lower cost of expansion, a long term consideration. As firms grow and expand their market share, the total transaction costs may be less for a computerized than traditional negotiation methods to that firm. An electronic system is technically expected to accommodate larger trading volume with less than proportional increase in cost compared with current methods. Also, in the long term an electronic trading system would provide an

opportunity of interfacing with firm's computerized management and accounting systems, thus improving the overall firm's operational efficiency.

Conceptually, it is possible that a large shift from formula trading to negotiation may reduce the market's operational efficiency. Since formula trading is quite efficient and requires minimum efforts in terms of skills and operation, a move to the probably more costly negotiated trading might increase costs.

#### System's Design and Industry Acceptability

An effective and successful system must be accepted and used by the meat industry. Acceptability is related to the design of the system, the traditions, the frame of reference, and the environment of the industry.

There are four characteristics necessary for a competitive electronic trading system: (1) established appropriate rules of trade; (2) equal access by all traders to the market and market information; (3) all traders are free to act on the information available; and (4) identification of the uniformly accepted and easy to understand product description and standardization. While all these characteristics are important in any market system, the identification and accurate description of the product is essential for an electronic exchange.

Theoretical conditions must be translated to a usable and practical system that meets the needs of its users or it will not be readily adopted. Confidentiality, assured performance on transactions, and ease and speed of use are design attributes desired by users.

Another performance indicator is the system's adaptability and flexibility to accommodate different and changing needs of users.

#### Structural Impacts

Structure refers to the physical and institutional characteristics of the industry, e.g. the number and relative size of firms, geographical location, the degree of vertical integration, etc. There are many ways in which a viable electronic meat exchange might affect structure. For example, it might deny access to the exchange to small firms because their cost per unit traded would be expensive. At the same time, it might provide them with better market information and thus improve their relative position in the long term.

Electronic trading might lead to "opening by" the market by bringing new trading partners together which might break up some traditional "habit" trades, or alternatively it might lead to more formal contractual or integrated relationships because of the fear of increased price uncertainty.

The impact on formula or forward pricing is an important structural issue since the present structure does not permit for easy public scrutiny. Electronic trading may provide for some structural safeguards and possibly increase the level of confidence in the process of base price discovery. It should be pointed out that an electronic exchange, in and of itself, will not necessarily change any already existing structural imbalances, and information which is equally available to all users may not have equal value to all users.

Conclusion

The problems of meat pricing are difficult and complex. It is not clear that an electronic market would be accepted by the meat industry. The economic viability of electronic trading of meat is difficult to validate without sufficient observations from actual trading over a long period of time. Furthermore, several of the performance indicators may be intangible and or/difficult to quantify. The pilot test phase in most electronic marketing ventures might give some indication of the impacts on some of these areas.

Electronic trading systems are necessarily complex and so are difficult for potential users to understand. Thus an educational program is usually important to assist potential traders in understanding the potential advantages or disadvantages and enlist their experience in improving current features. Industry commitment is essential for the implementation of electronic meat trading.

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