

Price Discovery Issues and Trends in Cattle and Hog Markets¹

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Introduction

Price discovery has become an issue of considerable concern in the livestock sector. Once liquid local cash fed cattle and slaughter hog markets are rapidly being replaced with non-cash methods of trade including contracts, marketing agreements, alliances, and formula pricing arrangements. As this occurs, cash market volumes decline, cash price data become less readily available, and the representativeness of prices quoted from cash transactions becomes increasingly suspect. If recent trends continue, USDA cash market slaughter livestock price quotes could soon be of limited value or might disappear altogether.

As cash livestock markets decline in importance, university research and extension program directions will likely change. Some traditional programs will become less important as increased knowledge and information needs arise in other areas. Increased dialogue is warranted regarding university research and extension roles in evolving market institutions. What are the magnitudes of externalities associated with liquid cash market trade? How will symmetry of information between packers and producers be affected by changing marketing methods? What knowledge and information needs arise as cash markets become less important and contracts, marketing agreements, and alliances become more common? What is the most effective future role for livestock marketing research and extension program efforts regarding evolving price discovery and pricing issues?

This paper documents the essence of the price discovery concerns in livestock markets by reviewing recent changes in livestock marketing methods. Implications of these changes are identified and the role of university research and extension programs in this evolution is considered.

Price Discovery

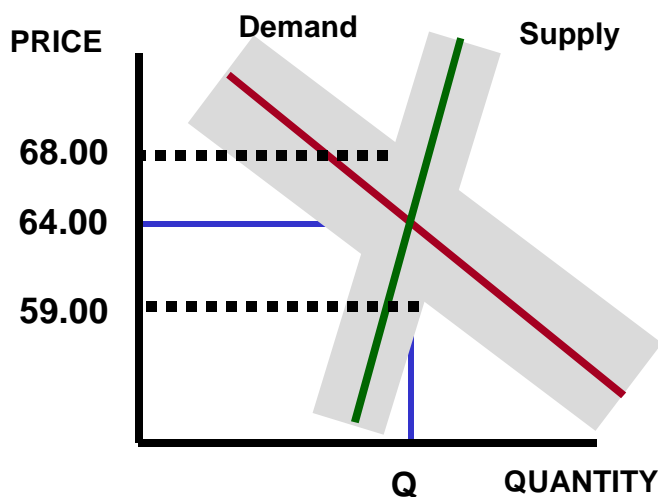
Price discovery refers to the price associated with individual transactions. Price discovery is the process by which buyers and sellers arrive at a price for a particular transaction. Price discovery is uncertain because the two parties to a transaction do not have precise information regarding demand and supply. Rather, both buyers and sellers make decisions based upon their interpretation of market fundamentals. In this regard,

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discovered prices for individual transactions contain price bands around market demand and supply (figure 1). The bands indicate any individual transaction price may differ from the market price because information regarding market supply and demand are uncertain. The less certain participants' knowledge of market supply and demand, the wider are the bands. Ward et al., using a fed cattle market simulator, found that cash market transaction prices were more variable when sizeable proportions of the fed cattle market were under marketing agreement contracts. Several previous studies have suggested market size and liquidity are important determinants of price dispersion (e.g., Stigler; Tomek). As the bands in figure 1 widen, transaction prices become more variable and it is more likely individual transactions will result in prices different from each other and the efficient equilibrium market price level.

Figure 1. Price Discovery



An important point should be made regarding the price bands in figure 1. Narrow (efficient) bands do not mean all cattle, for example, sold on any given day should bring the same price. In fact, the contrary is true if cattle sold on any day exhibit significant quality variation. Narrow bands mean cattle of equal quality, sold at a particular time, will bring similar prices that are all near their market value. Wide bands mean different pens of similar quality cattle sold at the same time may bring significantly different prices. So, an efficient price discovery process occurs when individual transaction prices most closely reflect market conditions at that time for the quality of cattle being sold.

Price discovery is not a costless activity. Individual buyers and sellers involved in price discovery have search costs that include collecting and analyzing recent market fundamentals and finding a party to trade with in order to arrive at a discovered price that is reflective of uncertain current market conditions (Stigler). This means to be effective in the price discovery process, and to have transactions with narrow price discovery

bands, producers and packer-buyers must each possess knowledge of recent and expected demand and supply. Schroeder and Graff also found that producer knowledge of cattle quality carries a significant value and is essential to the price discovery process. In addition, discovery is important because price itself contains important information for market participants (Garbade, Pomrenze, and Silber; Grossman and Stiglitz). If either party is uninformed, they are more likely to realize less favorable prices than if they were informed. In this regard, since packers are concentrated, buy large amounts of cattle or hogs regularly, and have a comparative advantage collecting market information, they are likely more informed of market conditions than most producers. Therefore, it is critical for producers to have access to reliable and timely price information if they are going to be successful at negotiating prices for individual pens of cattle or hogs marketed on a given day. Anderson et al. found that limiting market information in an experimental simulation setting significantly increased price variability and increased the difficulty of price discovery. Thus, access to recent price information is critical for helping to balance information levels between packers and producers.

Livestock Marketing Trends

Pricing methods used to market hogs and cattle have changed considerably over the past decade. This trend has coincided with the trend toward increased contracting (Hayenga et al.) and has been accomplished largely via formula prices. Formula pricing refers to establishing a transaction price for a particular quality and quantity of livestock at a specific time and place based upon an external reference price. Formula pricing has been common in grains for a long time where local cash prices are often tied to a terminal price (or nearby futures price) less a transportation and local grain elevator handling margin. Its prominence in livestock markets has recently increased significantly.

A survey of 12 leading pork packers in January 2000, conducted by Grimes and Meyer for the National Pork Producers Council (NPPC) determined that only 25.7% of hogs were purchased on a cash market basis (table 1). This compared to 35.8% just one year earlier. In 2000 74.3% of the hogs were procured using non-cash methods, up from 64.2% in 1999 and 56.6% in 1997. Importantly, nearly all formula-priced transactions for hogs are based on a single market report, the Iowa-Southern Minnesota spot market price or the closely related Western Cornbelt Lean market.

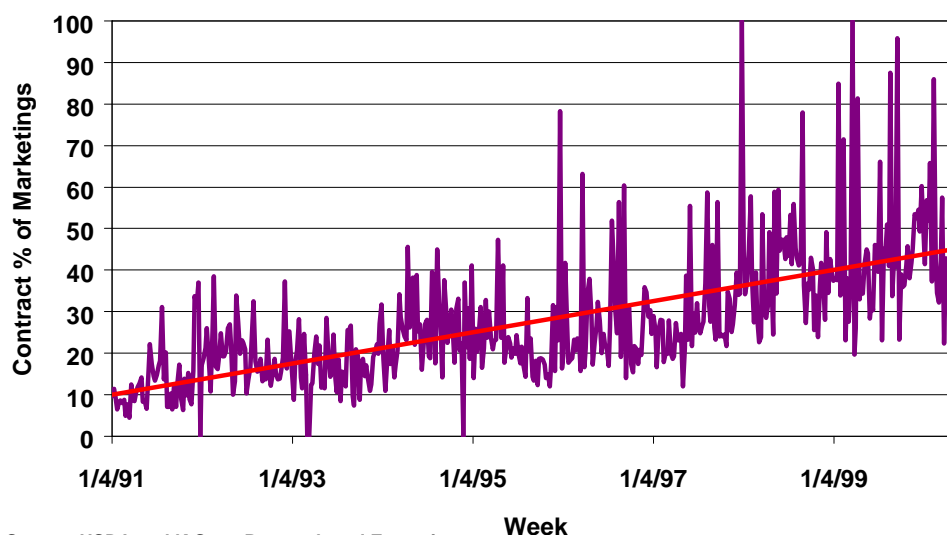
Table 1. Hog Pricing Methods, January 1997, 1999, and 2000.

Pricing Method	Percent of Hogs Purchased		
	Jan. 2000	Jan. 1999	1997
Formula (reported price + some amount)	47.2	44.2	39.1
Fixed tied to futures (i.e., cash contract)	8.5	3.4	2.9
Fixed tied to feed prices, no ledger	3.3	2.9	
Fixed tied to feed prices, with ledger	9.0	6.9	5.3 ^a
Window risk sharing, no ledger	3.8	3.6	
Window risk sharing, with ledger	0.8	1.0	3.1 ^a
Other (packer-owned, internal transfer)	1.7	2.3	6.1
Total Non-Cash Purchases	74.3	64.2	56.6
Total Cash Market Purchases	25.7	35.8	43.4

^a Categories were not split between contracts with a ledger and without a ledger in 1997.

Source: Grimes and Meyer.

Formula pricing is also becoming more common in fed cattle markets. During 1990 contract and formula priced cattle typically represented 10-15% of weekly fed cattle marketings in Kansas. By 2000, non-cash procurement methods generally represented more than 50% of fed cattle marketings in Kansas and occasionally exceeded 80% of weekly marketings (figure 2). Fed cattle marketings in Colorado, Texas, and Nebraska (not shown here) exhibit a similar trend over this same time period.

Figure 2. Weekly Contracted or Formulated Kansas Fed Cattle as Percent of Marketings, 1991 - May 2000

Source: USDA and K-State Research and Extension

The upward trend in contract and formula pricing is primarily a result of several factors including benefits accruing to both buyers and sellers from entering into marketing agreements. These benefits include reduced costs for both buyers and sellers compared to discovering prices for each transaction, and reduced search costs by both parties (Schroeder et al.). This trend is also associated with increased movement toward grid pricing which often starts with a base price established via formula (Ward, Feuz, and Schroeder).

However, formula pricing also presents several potential problems. Formula-priced hogs do not contribute to price discovery. Currently, formula-price arrangement terms are not publicly collected or disclosed by the USDA. As a result, formula pricing agreements are not visible to the market. Mandatory price reporting legislation may impact the amount of information made publicly available regarding formula hog trade. However, how much this legislation might reveal that is useful for price discovery is not clear, but it will likely be modest.

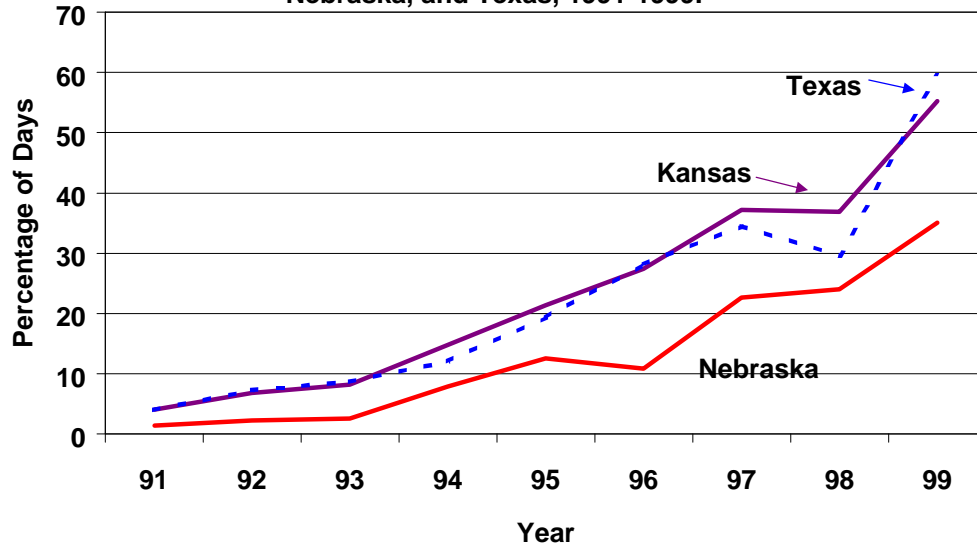
Formula pricing is also problematic if the external price used as a base in the formula is thinly traded or subject to manipulation. Agreements using recent local cash market prices (e.g., the previous week's price) for a base are a concern if the base is either thinly traded or, some days or weeks, not even traded at all. For example, some formula pricing arrangements for hogs are tied to a mid-session reported price for the Iowa-Southern Minnesota direct trade (cash market) on a specific day. Given that only a quarter of *all* hogs are sold in the cash market, the cash market in a single geographic market on a specific day and for a specific within-day trading period is very thin, nearly by definition. Some buyers allegedly only bid higher on cash market hogs after the mid-session report is released, so as not to increase the base price in their formula trades. Whether or not the thin market leads to price manipulation, it severely decreases the confidence in using that market as a formula pricing base.

Despite drawbacks to formula pricing, the economic incentives to formula pricing for individual producers and packers are strong. The market environment is increasingly encouraging more formula or long-term non-cash pricing methods. In the short run, regulatory or legislative action curtailing such pricing methods would reduce or eliminate their use. However, given significant incentives for using formula pricing methods, legislative curtailment of such trading methods would likely be counterproductive.

Daily cash cattle markets have become particularly thin. Fed cattle are frequently marketed in large bunches one or two days per week. As shown in figure 3, on many days, no cattle sales occur, thus no current public price information exists (Schroeder et al.). In the early 1990s more than 90% of trading days had an AMS cash price quote. By the late 1990s this has declined to less than 50% of days in Texas and Kansas having a cash fed cattle price quote in the daily mid-session report. Common verbiage contained in daily AMS fed cattle price reports is, "Trade quiet. No sales of slaughter steers or heifers confirmed. Inquiry and demand light." Lack of available cash market price data makes price discovery for cash market trade difficult. Market participants buying and

selling cattle on a particular day may not have much information regarding recent fed cattle prices. This increases uncertainty about expected supply and demand, thereby raising the likelihood the discovered transaction prices will not accurately reflect market conditions. Evidence of this was found in the Anderson et al. study estimating the value of public information.

Figure 3. Percentage of Daily Mid-Session Fed Cattle Cash Prices in which No Price was Reported by AMS, Kansas, Nebraska, and Texas, 1991-1999.



Many formula-priced cattle sales rely on an external reference price for establishing a base price (Ward, Feuz, and Schroeder). The reference price is used to establish the base market price for the cattle. Cash market prices, such as USDA's Western Kansas direct fed cattle trade price quote or the Iowa-Southern Minnesota direct slaughter hog trade price quote, are widely used as an external reference price. Often the previous week's average price is used as opposed to a single day's quote which means an external reference price is almost always available for use in a formula. However, when cash market trade is sporadic, thin, or represents a small portion of total marketings, the cash market price may not be representative of market conditions. As the trend towards carcass-weight pricing increases, the quality of cattle and hogs traded in the cash market is likely declining (Schroeder and Mintert 1999a, 1999b). Thus, the cash market becomes a residual market, i.e., a market for lower quality livestock, yet it provides the base price for formula trades of higher quality livestock. Therefore, illiquid cash markets often affect more than just cash market trade.

Implications for Research and Extension

University research and extension programs have a rich tradition of developing knowledge and providing information on cash livestock markets. Research support has included an extensive literature in the areas of market efficiency, market liquidity, spatial

markets, price-quality relationships, temporal pricing issues, vertical market price relationships, effects of market structure on prices, market information, and agricultural policy issues targeted toward cash markets and market information. Extension efforts dealing with cash livestock markets have included extending this research in addition to providing education and information on cash market outlook and cash-futures basis relationships.

The purpose of this organized symposium is to determine the changing role of, and implications for, university research and extension programs in light of marked changes occurring in traditional cash livestock markets. In particular several questions surface regarding the role of university research and extension programs as cash market liquidity, representativeness, and importance decline:

- What are the implications of this for buyer competition, access to public information, and market efficiency? Can viable commodity futures contracts exist without active and liquid cash markets? How important are cash markets for efficient price discovery? When are thin cash markets too thin for efficient price discovery? What are the alternatives?
- Should university research and extension programs refocus efforts away from studying cash market prices and pricing toward issues associated with long-term contractual developments? Will we have access to reliable data or will it be proprietary in nature? By shifting our emphasis, are we contributing to the demise of cash markets? Should our efforts shift from farm-level price discovery to wholesale and retail price discovery? With less data, do we have adequate tools to correctly estimate impacts? Should our efforts shift to e-markets? Can we design and guide the direction of e-trading towards efficient markets for livestock?
- What are the changing information needs of producers as cash markets disappear? What role do public university researchers and extension specialists have in an environment that is increasingly substituting private negotiations for public price discovery? What are the impacts of working explicitly or implicitly with vertically coordinated systems involving a few, large agribusiness firms instead of a broader taxpayer base? If the livestock-meat sector is transitioning from spot market price discovery to privately-determined price discovery, what can the public sector do to guide and assist participants in the transition. Can we identify the most desirable pricing system for the future?

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