

Animal Identification



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Effects of Animal Identification on Cattle Market Structure

Overview

The National Animal Identification System (NAIS) will likely lead to structural changes in the cattle industry. Costs for implementing the identification plan are expected to be borne by firms according to their position in the marketing chain and their size. Further, public benefits from enhanced traceback may accrue to the industry, but may not be captured by individual firms at each level of the marketing chain. Individual animal identification systems will create opportunities for cattle producers to gather additional information about their production systems that could result in private benefits for those who use it to make profit-generating management decisions. Animal identification will improve linkages between the cow-calf, stocker, and feeding sectors of the cattle industry and provide incentives to share production and marketing information with upstream and downstream market participants. This will likely result in improved transfer of product liability and additional use of alliances between firms at each level of the supply chain.

Introduction

Structural change in an industry is assessed by the number of firms in the industry, the size of those firms, and the geographic location of the firms. The extent to which NAIS and additional record-keeping activities will affect structural changes in the cattle industry will not be certain until final plans are made to implement the program and the level of participation in the program is determined. Further, NAIS will likely be implemented differently in various states or regions, which will reflect the predominant production systems, marketing practices, and size of operations in those states. This paper explores some of the possibilities for structural changes in the cow-calf, stocker, and feeding sectors of the cattle industry.



Cow-calf Sector

The U.S. Department of Agriculture (USDA) estimated that there were 792,050 beef cow operations having a total of 32.8 million head of beef cows in 2003, or about 41 head per operation (Table 9-1). Seventy-eight percent of these operations, however, had fewer than 50 head, and 90% of the operations had fewer than 100 head. Clearly, the cow-calf sector is comprised of a large number of relatively small operations. Still, there were over 5,000 operations with herd sizes greater than 500 head. Geographically, over 40% of the beef cow operations and 60% of the beef cow inventory are located in the western states shown in Table 9-1.

Costs of NAIS are likely to differ widely across these beef cow operations depending upon their level of participation and technologies adopted for animal tracking. Some operations may choose not to participate in the (currently) voluntary program and will therefore not have increased costs unless they are unable to market their cattle through some market channels because those channels require animal identification. Other operations may obtain a premises identification number, but may not conduct group or individual animal identification.

Costs for obtaining a premises identification number alone are likely to be very small for most cow-calf producers, as they could

Table 9-1. Number of Beef Cows Operations, By Size, and Beef Cow Inventory, Selected States, 2003

State	Beef Cow Operations					Beef Cow Inventory
	Total	1-49 Head	50-99 Head	100-499 Head	500+ Head	
Arizona	2,000	1,350	200	380	70	175,000
California	12,000	9,300	810	1,600	290	720,000
Colorado	10,400	6,700	1,670	1,800	230	612,000
Idaho	7,500	5,100	930	1,300	170	488,000
Kansas	28,000	18,500	5,300	4,020	180	1,550,000
Montana	11,800	5,400	2,050	3,900	450	1,472,000
Nebraska	21,000	11,800	3,900	4,800	500	1,848,000
Nevada	1,300					244,000
New Mexico	6,400	4,400	820	1,000	180	455,000
North Dakota	11,000	4,600	2,920	3,400	80	937,000
Oklahoma	50,000	38,500	7,200	4,100	200	1,970,000
Oregon	12,300	9,900	950	1,200	250	603,000
South Dakota	15,500	6,300	3,490	5,300	410	1,711,000
Texas	132,000	104,000	15,600	11,500	900	5,483,000
Utah	5,200	3,400	750	950	100	351,000
Washington	9,200	8,100	520	530	50	270,000
Wyoming	4,900	2,000	900	1,700	300	756,000
Other States	451,550	381,200	47,815	22,865	970	13,215,300
United States	792,050	620,550	95,825	70,345	5,330	32,860,300

Source: USDA-NASS

obtain it through the mail or on the Internet by directly contacting their state department of agriculture, farm service agency, extension educator, or other third-party agent who is licensed to distribute premises identification numbers.

Participating in group or individual animal identification will increase producers' costs. Producers with small herd sizes that contract with a third party, such as their veterinarian or sale barn, to record and report animal location and movement will have variable costs for tagging and scanning animals that could range between \$2-5/head. If they invest in technologies such as electronic readers, computer hardware and software, and Internet access to record animal location themselves, these fixed costs could amount to between \$4-\$25/head depending upon herd size and the technology used (Blasi et al., 2003).

An alternative to producers collecting and managing individual animal identification information themselves is to contract with a third-party technology provider to not only collect the traceability information required by NAIS and to report it to the state department of agriculture, but also to collect and manage additional production information. This could include management records such as birth dates and weights, weaning dates and weights, progeny information, vaccination and health records, and other production information. In addition to obtaining premises identification and providing animal location to the government, the technology provider, through its software, would offer producers summary reports of the production information and would likely provide benchmark

information from comparable operations in their database. Costs for this type of arrangement are quite variable due to a number of factors, including 1) the amount of equipment the technology provider recommends the operation purchase for integration into its system, 2) individual tags and record-keeping charges by the provider, and 3) overall decreases in technology costs as adoption and volume drive these costs down.

As long as the NAIS plan remains voluntary and technology neutral, per head costs for animal identification will likely remain relatively low (probably less than \$5/head). Operators with small herd sizes will either contract with a third party to conduct animal identification or will simply forgo animal identification as long as the program is voluntary and market channels exist for them to sell their cattle without traceability information. Another possibility for producers with small herd sizes to implement animal identification is to cooperatively own the hardware, software, and other equipment with other producers who have similar herd sizes and production systems. This would allow the cooperating producers to distribute the fixed costs associated with the technology across more cattle, thus lowering the average fixed cost per head. Operations with larger herd sizes have more head to distribute the fixed costs over and may have more negotiating power to set lower rates with contracted third-party technology providers. Because operators of both small and large herds can implement animal identification in the method that is the least cost to them, the costs associated with animal identification are not likely to be borne disproport-

tionately by small and large cow-calf operations. Thus, the costs of animal identification should not lead to disproportionate reductions in the number of small and large operations. Perhaps producers with medium-sized operations will struggle most with managing costs of animal identification as they balance the decision of contracting the services of a technology provider and not having the economies of size to spread fixed costs over a large number of head.

Structural change in the number and size of cow-calf operations resulting from animal identification is more likely to be caused by how producers use the “extra” production records and information generated on a per-head basis. NAIS essentially only requires linking group/individual animal identification numbers with the times they were located at specific premises (traceability information). The extent to which additional production management information is collected and used to make management and marketing decisions may drive structural change in the cow-calf sector and differentiate producers. Information on individual animal productivity, including gain and genetics, may lead producers to discover new production or marketing practices that enhance their profitability. If such information is used to lower costs or to improve revenues by even a few dollars per head, these producers would have a comparative advantage over producers not collecting or not using individual animal productivity (management) information. If these extra profits are generated and reinvested in the operation, the operations using individual animal management information could be

expected to increase in size, and those not utilizing the information may have a difficult time competing.

Besides costs of animal identification compliance and potential benefits from additional productivity data collected to cause structural changes in the cow-calf sector, market access and price differentials may impact the number and size of operations. As long as animal identification is voluntary, not all producers will participate. However, if stocker or finishing operations or meat packers realize benefits from individual head information (either through productivity improvements, marketing improvements, or liability reductions), they are likely to translate their need for individual head identification and traceback either into requirements that cow-calf producers keep animal identification records or price discounts for producers who do not have an animal identification program. In other words, if benefits to identification and traceback accrue to feeder calf buyers, they are likely to discount cattle without traceback capability. Cattle with identification devices (e.g., radio frequency identification tags) would not be discounted and, in the early adoption phase of animal identification, may extract a small price premium. The larger the benefits to identification become for these firms, the larger the discounts will become. To the extent that identification becomes the industry standard in the future, market access (or severe discounts) could occur for non-identified cattle.

The traceback system created through animal identification could potentially expose cow-calf producers to increased liability for



quality or safety issues discovered later in the production and marketing chain. Through animal identification, cow-calf producers will lose some of the anonymity they currently have and may risk being financially or legally liable for breakdowns in product quality or safety. Such risks would likely be more difficult to bear by smaller sized cow-calf operations and, thus, cause some of them to exit the industry. Currently, legislation at the federal and state levels is being pursued to protect cattle producers from such liability. Some states already have such protection in place. Geographic differences in whether liability would cause some firms to exit the industry may be observed depending on when liability protection for cattle producers becomes widespread. These liability issues are further discussed in another fact sheet in this series by Roberts and O'Brien (2004).

Other structural changes relating to geographical differences are likely to be relatively small. Although each state will enact animal identification programs somewhat differently, the overarching NAIS provides guidelines that will not likely, in and of themselves, cause substantial differences in how animal identification impacts producers.

Seedstock Sector

Structural changes to the seedstock sector of the cattle industry as a result of animal identification will likely be minimal. Animal identification will comprise a small portion of seedstock operations' total costs. Further, technology to quickly read and record large numbers of identification numbers will not be necessary for individual operations. Because

seedstock cattle are already individually identified through the use of visual identification tags or some other device, the existing identification can be cross-referenced to the 15-digit animal identification number assigned through NAIS. Thus, the marginal costs to individual animal identification created by NAIS are expected to be small. Benefits in terms of productivity or marketing gains generated by individual animal identification will be hard to achieve in seedstock operations because this information is already being recorded and used by most operations. The biggest hurdle for seedstock operators could be recording and updating premises locations as seedstock cattle are moved from location to location for stock shows.

Seedstock producers, particularly those with superior genetics, may have the most to gain from individual animal identification. An animal identification system, coupled with production information, may be used to verify the breeding and genetics of particular animals. In cases where the breeding and genetics signify the presence of some trait that consumers will pay a premium to obtain (e.g., tenderness, marbling), the improved traceability and assurance provided by the animal identification system could help strengthen the value of that genetic line.

Stocker Sector

Stocker operations often deal with a relatively large number of cattle and utilize a combination of backgrounding lots and pastures to put 200-300 pounds of gain on the cattle. Because NAIS guidelines would have cattle identified before entering into



commerce, the cattle stocker operators' purchase would presumably be individually identified and have radio frequency identification tags or other acceptable animal ID device. Therefore, after the identification system functions for a period of time, stocker operators will not have the costs of tagging cattle. However, as purchasers of cattle, they have the responsibility to report the location (premises) to where the cattle are translocated after the cow-calf operator premises. They could accomplish this through some combination of their own technology investments and contract services from technology providers, as described above. These costs are likely to range substantially, as in the cow-calf sector, and vary inversely with herd size. However, some third-party technology providers' fee structure provides lifetime service for an animal identification number (an individual head), even to new owners. Thus, if a cow-calf producer and stocker operator use the same technology provider, the stocker operator may continue to be serviced by the provider through the tagging fees paid by the cow-calf producer. Still, whatever costs for animal identification incurred per head for stocker operators will likely be spread over a smaller amount of weight gain (production) than for cow-calf producers or cattle finishers. Thus, it is possible that on a per pound basis, animal identification costs may be higher for stocker operations.

Management of individual head identification data for stocker operators becomes more complex than for cow-calf producers in some respects. First, they will likely have to have electronic radio frequency readers that work

well across a range of different technologies and applications, or they will need to buy only from cow-calf operators who use one technology, or they will need to retag animals with a consistent technology at the time of purchase. Discovering the optimal reading systems is unique to an operation based on physical conditions; thus, stocker operators will likely have to invest some effort and dollars into determining the best system for their operation.

A second area of complexity is created by stocker operators moving cattle from pasture to pasture or from backgrounding lots to pastures. Different pastures and backgrounding lots may have different premises identification numbers and would therefore necessitate reporting a change of premises even when a change of ownership did not occur. In other situations, a group of pastures and lots used by stocker operators may have the same premises identification number and not require reporting movement of animals between pastures.

Feeding Sector

Like stocker operations, cattle feedyards purchase cattle from a variety of sources, including cow-calf producers, stocker operators, and sale barns. Thus, they also must deal with the complexities of reading and managing electronic identification devices from multiple systems. Like stocker operators, feedyards need to have tag readers that work well across multiple technologies and applications, buy feeder calves with one consistent technology, or retag animals that do not have the technology they use. Due to the volume of cattle in commercial feedyards, many are



likely to utilize a third-party technology provider to manage data and report movement of cattle in and out of the feedyard to the appropriate government agency. Further, to generate useful productivity data (along with location information needed by NAIS), feedyards need all the individual animal data for their feedyard aggregated into one software system. This need could be further complicated by cow-calf producers or stocker operators retaining ownership of cattle and wanting to maintain production systems other than the standard the feedyard uses.

Animal identification creates an incentive for feedyard operators to build stronger relationships with their feeder cattle suppliers. These relationships could be constructed through contracts, ownership, or other long-term agreements that ensure consistent animal identification technology across the marketing chain. The benefit to feedyards from such agreements will arise from the reduced costs associated with recording animal movement

into and out of feedyards that a consistent technology and animal identification method can provide.

Costs for animal identification will vary by feedyard and will differ according to feedyard size. Smaller feedyards, for example, may be able to use one panel reader to capture individual animal identification numbers for incoming and outgoing cattle and one handheld reader for other uses (e.g., hospital). Larger feedyards, however, may need multiple panel readers to accommodate the volume of incoming and outgoing cattle. Investments in electronic identification hardware, software, and other technology can be spread across the number of cattle marketed and the pounds gained as fixed costs. Thus, there will likely be economies of size in animal identification for feedyards, with larger feedyards having the lower per unit costs. Table 9-2 shows that of the 2,205 feedyards with more than 1,000 head capacity, nearly 80% had capacities between 1,000 and 8,000 head and that these

Table 9-2. U.S. Feedlot Number, Inventory, and Marketings, By Size, 2003

Feedlot Capacity	Lots	Inventory	Marketings
<i>head</i>	<i>number</i>	<i>1,000 head</i>	<i>1,000 head</i>
1,000-1,999	852	467	925
2,000-3,999	552	704	1,403
4,000-7,999	347	944	1,915
8,000-15,999	195	1,442	2,958
16,000-31,999	139	2,343	4,757
32,000+	120	5,353	11,509
Total	2,205	11,253	23,467

Source: USDA-NASS



feedyards marketed 18% of total fed cattle. The largest 5% of feedyards sold about half of the total cattle marketed. If benefits arising from individual animal data result in improved management decisions and generate even a small per head cost reduction or marketing return, the largest feedyards could stand to gain the most.

Like cow-calf producers, feedyards could have similar reactions to increased liability through animal identification. If cattle feeders do not receive liability protection, the risk of being in business increases for them and could be too great for some small feedyards to remain in business.

Implications

Animal identification by definition creates increased linkages between the cow-calf, stocker, and feeding sectors of the cattle industry. Further, it creates the incentive to share production and marketing information with upstream and downstream market participants. This has several implications for the industry as a whole. First, transfer of liability for product quality and safety would be easier to accomplish. Second, to minimize transaction costs for information transfer, producers have an incentive to do business with as few other firms as possible. The positive side of this, however, is that liability exposure can be reduced as a result. Additionally, producers working together across sectors and sharing information may result in improvements to product quality and safety, thus improving beef demand. Producers already participating in alliances or other integrated production

systems are likely in a better position, at least initially, to affect such changes and generate these benefits.

Individual animal information transfer and exchange has implications for cattle marketing practices as well. Transfer and exchange of information will likely be logistically easier and less costly through direct sales, at least in the early stages of animal identification. Because the majority of fed cattle sales occur as direct sales to packers, this market may be minimally affected by animal identification. The feeder cattle market, however, will have to adapt to the need for increased information transfer. Some feeder cattle markets that do not involve congregating animals in a single location at a single time (e.g., private treaty sales and electronic/video sales) can accommodate the information gathering and transfer easier than centralized markets (e.g., auction markets).

Centralized markets that physically handle large volumes of cattle in short time periods will need methods to rapidly collect, assemble, and disseminate individual animal data as incoming and outgoing group sizes change and cattle are commingled. This challenge will likely be addressed through improvements in technology, but ISO approval of new technologies may delay implementation in some cases. Centralized markets can, however, benefit from animal identification by providing additional marketing services to producers. For example, these markets may provide tagging services for feeder cattle entering commerce for the first time.

While animal identification will impose costs for cattle producers in various sectors of





the industry, benefits to individual animal identification also exist. Public benefits, such as improved domestic or foreign demand as a result of quality or safety enhancements and 48-hour traceback derived from information sharing are expected to benefit the industry as a whole. The extent to which cattle producers can generate information from individual animal identification and use that information to improve their net returns will likely guide the degree to which structural changes occur in the industry as a result of animal identification. The greater the benefits to be gained from traceback and from collecting individual animal data, the wider the disparity will become between cattle producers using individual animal data and those not using this detailed data.

References

- Blasi, D., K.C. Dhuyvetter, M.F. Spire, M.P. Epp, and B.B. Barnhardt. "A Guide for Electronic Identification of Cattle." Kansas State University Agricultural Experiment Station and Cooperative Extension Service, Kansas State University, Manhattan, KS, December 2003.
- Roberts, M. and D. O'Brien. "Animal Identification: Liability Exposure and Risk Management." Western Extension Marketing Committee Fact Sheet. WEMC FS#6-04. Fall 2004.
- U.S. Department of Agriculture/National Agricultural Statistics Service. Cattle Inventory Report. USDA/NASS, Washington, D.C., January 1, 2004.
- U.S. Department of Agriculture/National Agricultural Statistics Service. Cattle on Feed Report. USDA/NASS, Washington, D.C., February, 2004.

