

DYNAMIC OF INFORMATION IN THE MEAT SUPPLY CHAIN: THE ARGENTINEAN CASE

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This work analyzes the bovine meat chain in Argentina. The following parts form this supply chain: production, process and commercialization. In turn, the production is subdivided in breeding (production of calves) and hibernation (it puts on weight of the animals until weight of task). The process consists on the task of animals, a cooked treatment, frozen or cooled, and the commercialization in the export, or internal distribution, for its sale for consumption.

In the operation of this chain the price has a great weight. The same one coordinates the actor's decisions. They make their decisions using the current price and their expectation of future price. Events as the hormones employment, the appearance of *aftosa fever* (foot and mouth disease), or the *Bovine Spongiform Encephalopathy* (BSE, sometimes known as "mad cow" disease), alter the Argentinean exports; and consequently the expectation of prices.

Using system dynamics a model was elaborated. This model picks up the operation of the supply chain coordination of bovine meat. This model picks up delays, feedback and non-linear relationships to explain the coordination mechanisms among the different actors.

The chain works with a mechanism of market coordination. The delays in the transmission of the price are common. These delays are confuses with the shortage of information inside the production and distribution system.

That lack of information is typical in the incentive mechanisms based on the prices inside the agricultural systems. That lack punishes asynchronously to the producers and the down-stream industry participants because it breaks into fragments the coordination of functions and it limits the endogenous assignment of resources that generate value inside the system (Cloutier et. al., 1998; Cloutier et.al., 1999).

In the pattern we can observed the effect of different delays, in the transmission of the price, in the production-distribution chain. The Argentinean bovine meat is a "*commoditie*". That is to say a barely differentiated product. The exploitation of the bovine livestock for meat production is carried out in function of obtaining a rich food in proteins, extremely appropriate for the human diet; mainly in developed countries.

Diversity of production methods and product qualities exists. In the Argentina the pastoral system is used. The flavor, high quality, and low cholesterol, among other things,

characterize the obtained meat.

The market of this product is for the most part domestic: 2,200,000 tons of meat are dedicated annually to the consumption by this country; and only 440,000 tons are dedicated to export (that is to say 20%). This implies that of a total of \$6,200(USA) millions marketed only \$1,600 millions are exports.

This implies that the price achieved internally in the Argentina determines the price of chain coordination. The daily market is very important in this country. Every day this market offers in sale among 10,000 and 15,000 bovine for task. The price achieved in this market, in a transparent way, is the main indicator of the alive livestock price, and it is the indicator of the private operations.

The international trade of the meat is centered in types of specific meat products that agglutinate in certain commercialization routes. For that reason, a definable world market for the meat doesn't exist although. In general, the exported meat corresponds to the quality "*Hilton Beef*" dedicated to developed countries (Font y Costa, 1993). The refrigerating offerers in the local market can improve its offers but alone for capable lots for export.

The role of the price is extremely important in the operation of the chain. For that, it should be described it completely their operation to be able to reflect him appropriately in the pattern.

The material and information flow it is picked up next —figure 1—.

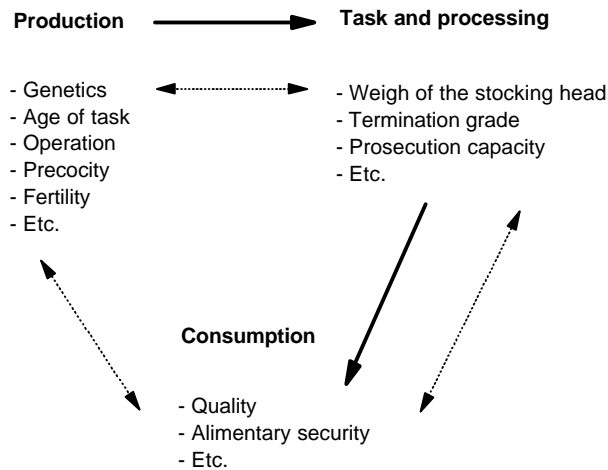


FIGURE 1. BOVINE MEAT SUPPLY CHAIN: PHYSICAL FLOW AND INFORMATION FLOW
Wiazowski y Barbosa da Silva (1999)

If the producer and the processor obtain quicker (and more purified) the consumption information, the supply chain will be able to work more coordinately.

To explain the operation of this agricultural chain, using system dynamics, it is used the “*commodities*” production cycles pattern developed by Goodman (1974). The same one, a model of third order, is presented in the figure 2.

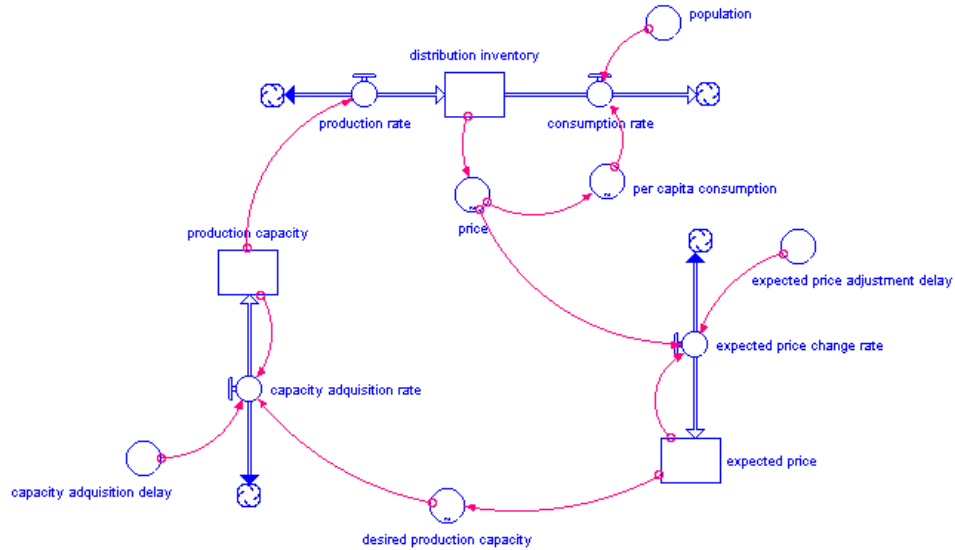


FIGURE 2. “COMMODITIES” GENERIC MODEL
Goodman (1974)

The flow denominated “*production rate*” and the stock “*distribution inventory*” were modified according to the pattern elaborated by Sterman (2001) —figure 3—.

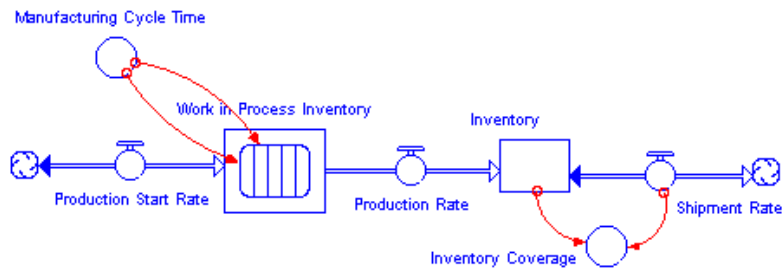


FIGURE 3. “COMMODITIES” GENERIC MODEL, SECTOR PRODUCTION
Sterman (2001)

In the same model the variable capacity acquisition rate and production capacity were replaced by the flows and stocks just as it is indicated in the figure 4.

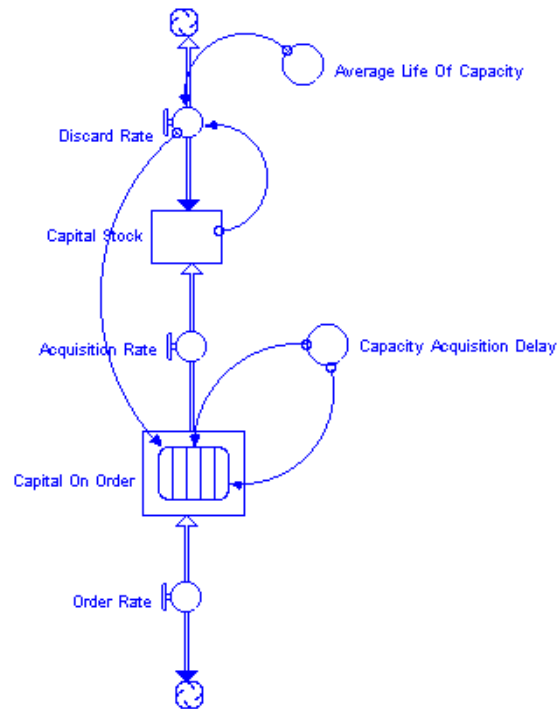


FIGURE 4. "COMMODITIES" GENERIC MODEL, CAPACITY PRODUCTION SECTOR

Sterman (2001)

The productive sector phases are the following ones:

- A) Breeding of calves (Méndez Acosta y Alonso Magdaleno, 1999); where the production capacity adjustment depends on the number of females to the lot of mothers.
- B) Weight of young bulls; where the adjustment of its capacity is carried out increasing the speed of growth and put on weight by means of improvements in the food quality (add maize grain and employment of winter forages and prairies).
- C) Processing; where the capacity adjustment is carried out by means of investment in plant capacity and processor (refrigerators).
- D) Distribution; where the capacity adjustment is made according to the equipment of new sale positions, generally hypermarket, increase of the gondolas number, improvements in the product presentation, etc.

Lastly the prices formation sector is formed by the interaction of the existent inventory in each one of the chain links (producer, feeder, processor and distributor), and it depends it on the future prices expectation of each one of them and the current demand. This demand could be influenced by the producer (breeder or feeder), the processor and the distributor, improving the product quality or the processes of each stage (increasing the consumer's trust who then their probability of acquisition could increase (Wiazowski y Barbosa da Silva, 1999).

If the mechanisms of information transmission worked, coordinately, this information it would arrive quickly to the producer who could improve the product quality by means of superior genetics, quickly selection for precocity, fertility, speed of growth, feeding, sanity, etc.

The delays in the arrival of the information affect the correct offer chain coordination.

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