

IFAMA 2015: Creating a new market mechanism for regaining trust in price formation

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Abstract:

We propose a new market mechanism for the agricultural food sector based on web based multi-agent technology. Such a mechanism would restore trust in the entire food chain network concerning the pricing evolving from supply and demand. As side effects of this system the transaction costs would diminish considerably and the market information would be accessible for all actors in the network.

Keywords:

Market pricing mechanism; multi-agent technology; level playing field; multi actor negotiations scenarios

Problem Statement:

Since the demise of the vegetable auctions in the Netherlands at the end of the last century, growers no longer trust the pricing of greenhouse grown vegetables. In the past the growers collectively owned the auctions. The auction clock determined the prices. The growers had a high level of trust in the impartiality and integrity of the process and thus in the prices. Today, however, the pricing process is no longer transparent; the prices larger participants in the network negotiate are the only points of reference. Aldi Nord, for example, negotiates the price of up to 20% of the total Dutch production of glasshouse grown vegetable - once a week. Whereas in the past the total Dutch production was known to all parties involved, today this knowledge is obscured. There is no longer a one-to-one relation between traders and produce. Traders negotiate a price for produce they themselves still need to acquire. This in itself is not a problem - current demand is higher than present production. This results in eroding margins and insolvable producers/growers that are kept in production by ever increasing bank loans. As a result there is extreme distrust between parties in the entire horticultural network and total stagnation in investments. It has become almost impossible to solve the many challenges in the horticultural network by cooperation between different parties involved. Our claim is that regaining trust in produce price formation within the sector is an unconditional requirement to sleigh the major barriers for vital business development in a sustainable way.

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Objectives:

We propose a new approach to market mechanism development for price formation based on known amounts of demand and supply. At present prices are formed in non-transparent negotiations between traders and retailers, where the major retailers are more or less responsible for the reference price in the entire network, as is depicted in fig. 1A. New market mechanisms will be designed to enable transparent price formation based on the actual supply and demand, between production and consumption, as depicted in fig. 1B. In such markets trade and retail becomes logistic and distribution. These markets will be designed and developed using multi-agent system technology in web based applications, such as has been shown to be possible in distributed energy markets (Brazier et al., 2009).

Methodology:

In an interactive space producers, logistic providers, retail (i.e. distribution providers) and consumers are represented by their own agents. These agents anonymously negotiate service level agreements with each other, given their owners' needs and preferences. We call this interactive space on the web "Agentscape[®]" (Lin et al., 2014). Due to the anonymity in the system the interactions themselves are not visible. However when a (profitable) deal has been formed in Agentscape the respective agents report back to their owners. If the owners consent to a transaction the deal is made and only known between the parties involved. Knowledge on the market as a whole, however is available to all parties involved - the total amount and specifications of the supply, demand and transactions, the "big data" are collected and distributed.

Results

The result of the market mechanism proposed is that the transactions costs dwindle to near zero as parties find each other, given that sufficient numbers of parties take part in this market (Thomas et al, 2010). At the same time, due to the availability of the big data, (real time marketing data), the market can fine tune itself - both with respect to supply and demand.

Conclusions

It is our opinion that the market mechanism proposed can restore trust by all parties involved in the food supply network, given that pricing is solely based on real supply and demand figures as it is presently the case in the stock markets globally. This should create a possibility for long term investments and innovations for a more sustainable food supply to our cities that are in sync with the desired quality and specifications of the consumer populations.

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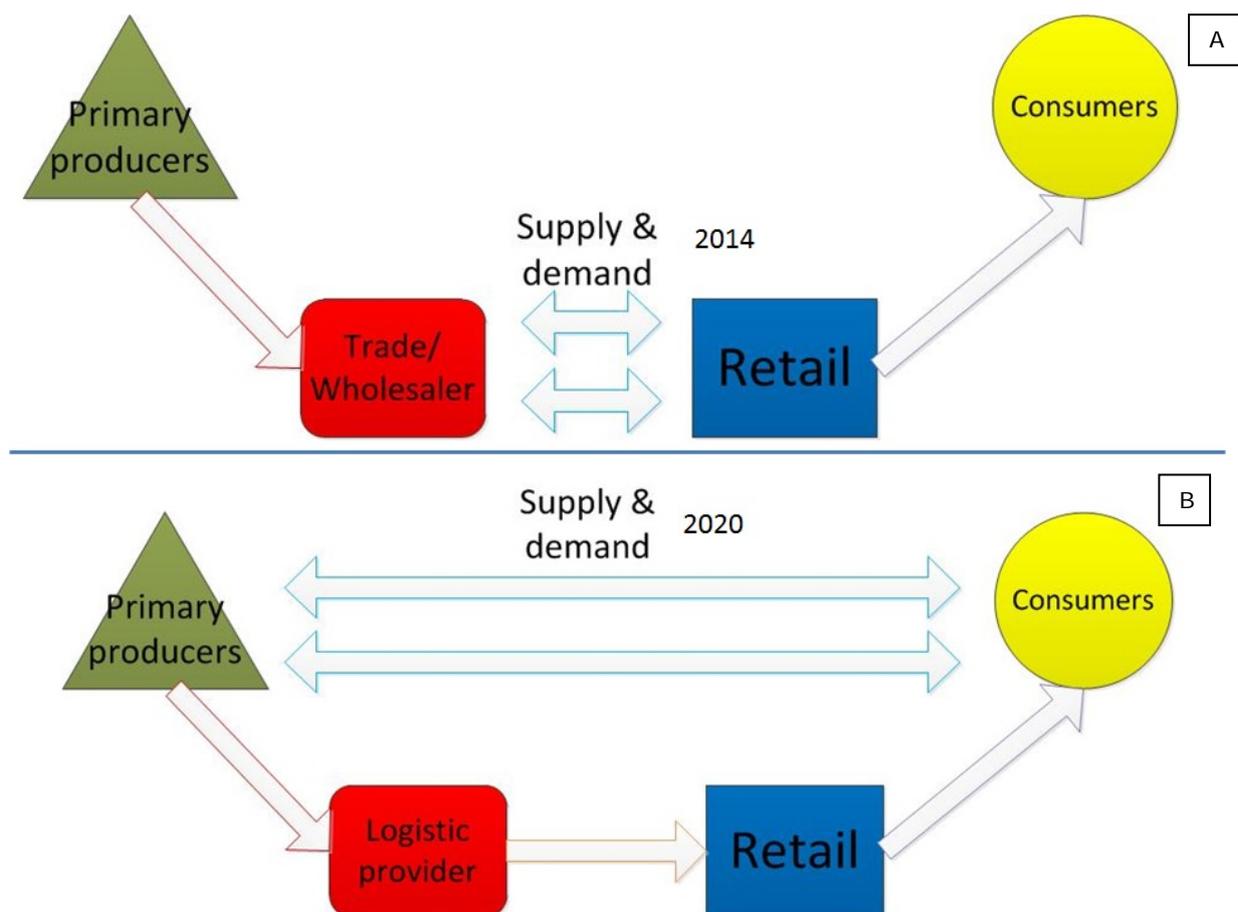


Figure 1: Schematic price formation in the market. A) as it is perceived today. B) As it is desirable in Agentscape[®].