

## The Role of Technology in a Model Market with Asymmetric Information

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There is increased interest for microscopic models to investigate the mechanism that drives the market [1,2,6]. In particular, researchers have focused on analytical and simple models that are able to capture some real aspects of the economic activity. In this work, we study an economic agent based model under different technological levels and several asymmetric information degrees [1,2]. There are  $N_s$  sellers that offer goods with several quality diversit distributed in a range  $[1, \dots, S]$ . The  $N_b$  buyers have access to all goods in the market. At random, the buyer chooses one seller and evaluates the quality  $q$  according to the expression  $q = A(\beta k + (1 - \beta)k_a)$ , where  $\beta \in [0, \dots, 1]$  is the degree of asymmetric information,  $k$  is the quality of the good to be evaluated and  $k_a$  is the quality of the last item purchased by the agent. The agent recognizes the true quality of the item (the quality that the seller attaches to the item) only after purchase and this quality is used as the next  $k_a$ . Here, the parameter  $A$  is a rate that measures the buyer's willingness to pay. In this sense the value to be paid for the goods will be  $V_b = Aq$ . The seller computes the minimum price that she/he wants to sell the good with quality  $k$  as  $V^s = Bk^\alpha$ , where  $\alpha \in [0, \dots, 2]$  is the technological production level and  $B$  is the same constant for all the sellers and it defines a monetary scale. The trade will occur only if  $V_b \geq V^s$ , otherwise the buyer chooses randomly another seller in the next step. This model is quite simple and can be treated analytically since it evolves according to a stationary Markovian stochastic process. The technological production level plays an important role to explain how the asymmetry of information can affect the market evolution in this model [3]. We observe that for high technological levels, the market can control adverse selections [4]. The model allowed us to compute the maximum asymmetric information degree in order for the market to exist. Above this critical point, the market evolves during a very limited time and then dies out completely. When  $\beta$  is closer to 1 (symmetric information), the market becomes more profitable to high quality goods, although high and low quality markets coexist. All the results we get from the model are analytical and the maximum asymmetric level is a consequence of an ergodicity breakdown in the process of quality evaluation performed by the agents.

### Keywords

Market dynamics, tecnology, aysmmetry information, markov stochast process

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