

Seksjon for komplekse materialer

Panic Buying as a Self-organized Phenomenon

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Background

Panic buying at petrol stations is a recurring phenomenon that is fairly poorly understood. Apparently, there is often enough gasoline available to the consumer if everyone behaved “reasonably”. Why is it then that petrol stations can run dry? The crucial link might be a feedback mechanism between i) the tendency/willingness of vehicle drivers to refill early and ii) their observation of queues at petrol stations and petrol stations that have already run dry.

Project Summary - Methodology

In this project, we will study the process of gasoline demand and supply by use of stochastic differential equations and/or by use of Monte Carlo simulations of a network of drivers and petrol stations. The first step will be to conduct a literature review of what has already been done in this field so as to become familiar with the problem.

The main interest lies in whether panic buying can be understood as a phase transition between two modes of operation: purchasing gasoline only when necessary (the *procrastination* effect) and *hoarding*. In addition, different pricing policies will be modeled, namely rationing and letting the price escalate with shortage of supply. This modeling effort should ideally shed light on the root cause of panic buying which also occurs for other commodities such as food.

References

- [1] D. Helbing, *Quantitative Sociodynamics: Stochastic Methods and Models of Social Interaction Processes*, Springer, 2010.
- [2] D. Helbing, *Social Self-Organization: Agent-Based Simulations and Experiments to Study Emergent Social Behavior*, Springer 2012.