



**CALIFORNIA STATE SCIENCE FAIR
2008 PROJECT SUMMARY**

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Project Title Extending Swarm Economic Systems using Agent-Level Adaptation	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals Increasing the capacity of the swarm translates to holding the prices of commodities steady for long periods of time using swarms of individual agents while in the presence of agents whose behavior is contrary to this group action. We find that economic swarms with greedy agents can be designed to withstand the effect of these ρrogue agents. We also demonstrate a method of both statically and dynamically increasing the capacity of the swarm.</p> <p>Methods/Materials This study is a computational study of a simulated economic system. We first use the swarm engineering methodology to theoretically examine an economic system. We then utilize a computer simulation to verify our theoretical results.</p> <p>Results We find that prices are stabilized in systems containing consumers which have a high aversion toward purchasing products that generate large vendors' profits or in systems containing consumers which have a long memory of the last lowest price. Rogue agents, those agents that do not have any aversions or memory of past prices. The maximum number of rogue agents that can be in the system is called the capacity of the system. Increasing the effect of the characteristics mentioned above and increase vendor number tends to increase the capacity of the system.</p> <p>Conclusions/Discussion This study extends the previous research by designing examining the effects of rogue agents and behaviors of consumers which tend to absorb the effects of such agents, also the effects of number of vendors and consumers. Increasing the effect of several characteristics of the system tends to increase the capacity of the system and lower stabilized prices. A decrease in the number of vendors tends to result in a more likely unbounded increase in price. We have demonstrated that these types of mergers increases the effect of rogue agents, and with fewer needed for unbounded inflation. While increasing the effects that bring stability to the system will aid in stabilizing the system, beyond the critical number of rogue agents, the system becomes unstable no matter what any of the ρnon-rogue agents do. It has demonstrated how consumers should behave in order to stabilize the price. If consumers are informed about the vendors' profit margins, they can act in a way to stabilize prices. This would seem to be a first step in helping money to regain its function as value determiner without government</p>	
Summary Statement This project extends swarm economic system by examining how swarms of agents can react to rogue agents that are interfering the economic system	
Help Received Dr. K assisted us in theoretical and conceptual issue.	