

Economic Modeling

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Abstract

After the fall of the Soviet Union, the idea of controlled and planned economies seemed to die with it. The apparent failure of the Soviet style system seemed to prove the triumph of free market style systems. But by modeling the systems in an ideal environment, the intended effects of each economic style can be observed against one another.

1 Introduction

1.1 Purpose

The aim of my project is to construct a model to try to replicate ideas behind economic theory. The variable here would be external control of the economy. In theory a more tightly controlled economy would have more equality in terms of wealth distribution but its overall production would be less than a economy of less restriction. The overall goal of the project is to create a limited simulation in which a single variable of wealth can be controlled to test the accuracy of the claims.

1.2 Scope of Study

This project will use agents with limited attributes to simulate human activity. Therefore the effects of an idealized model would likely be different from the real world.

2 Background and Review of Literature

Research into economic theory was most prevalent in the 20th century; two of the most prominent economists were John Maynard Keynes and Friedrich von Hayek. Keynes was a staunch supporter of government involvement in the economy, and is embodied in the Socialistic practices of many European governments. Von Hayek on the other hand was in support of free and unregulated markets and was initially shunned by most governments. In recent times, with Reganomics and Thatcherism drawing heavily from von Hayek's philosophy, his theory has eclipsed Keynes as the theory in favor.

3 Procedure, Development

3.1 Initialization

3.1.1 Netlogo

After observing a preloaded simulation contained in Netlogo, I decided the simplicity and versatility of the language would be good to conduct my simulation.

3.1.2 Learning the Language

Using the online tutorial, I familiarized myself with the Netlogo programming language, first using it to build a test program which I worked from.

3.2 Development

3.2.1 First Model

After learning the language, I created my first version of the model complete with agents moving around randomly in an environment. I then proceeded to give the agents different characteristics which differentiated them from other agents.

3.2.2 Characteristics of Agents

Learning more about agent attributes, I then proceeded to add characteristics such as dying and breeding to their code. After creating a randomized

environment, I created an algorithm in which agents eat and breed, with death the result of malnourished.

3.2.3 Customization

Using sliders and charts, the characteristics of the agents I had included were now available to be customized by the user of the program with little work. A chart was also added to tangibly measure the results of the slider changes, with the population of agents being the independent variable.

3.2.4 Testing

Optimizing the algorithm of the agent's environment and making sure each variable has sufficient efficacy was done by individually examining the effects each variable had on the system.

4 Results

4.1 Second Quarter

During this quarter the structure of my model came to be and the working skeleton was completed. Agents now move and interact with their environment and move independent of other agents. The next objective is to give each agent more individual traits and also make the environment customizable.

4.2 Third Quarter

This quarter I added the variable to the agents as well as the environment, but I had a setback when I found a glitch in my programming where many of the inputs to the program were not being factored into the algorithm correctly. This was eventually solved and a more effective simulation was the result.

5 Discussion

6 Conclusion

The scope of the economic simulation was probably too broad for a model in Netlogo, but by creating an environment of random wealth and having agents be programmed to interact with it in different ways, the aims of the project can be achieved, albeit in a different way. As more of the elements are added to the behavior of the agents, the model will likely become more and more accurate.