CMPSC 600
Senior Thesis I
Fall 2018

Project Two
Assigned: Tuesday, September 18, 2018
Due: Tuesday, October 2, 2018 at 2:30 pm

Impact of Economic Policy on Income Distribution: An Agent Based Approach

Senior Thesis Abstract

Arguments surrounding the idea of a living wage and its legitimacy as an economic policy have been garnering increasing visibility within the general public. The gap between socioeconomic classes is widening, and real wages are declining, and solutions aimed at tackling poverty, unemployment, and production are constantly considered in a post financial crisis United States. Stylized facts and intuitive theory exist that can help inform policy decisions, but strong predictive models are lacking. Related fields of economics - specifically finance - have found success in computational agent based simulations to aide in the development and support of theories and models. This paper aims to extend the work of agent based simulation to observe the impact of minimum wage and other economic policies on the income distributions in an economy. The model used will replicate an economy using heterogeneous agents - representing households, firms, banks, etc. - whose actions with each other and their environment will be based on existing economic research. Changes in the environment the agents operate in will represent the different economic policy options. The results of the simulation will provide insights into how different policies effect the characteristics of the agents in the simulation. In addition to providing insight into the effects of different policies, it will also further the literature by adding additional features to existing agent based models.

Demonstrations of Feasibility

1. First feasibility indicator: Related research A paper from Haldane et al. titled "Drawing on different disciplines: macroeconomic agent-based models" details the history of modeling in Macroeconomics, and discusses how agent based models are poised to tackle problems in economics that traditional stochastic general equilibrium models are less suited to address. These problems are those that require agent heterogeneity and involve markets that are not always in equilibrium, among others. I believe that a paper researching the topic of income distribution meets enough of these requirements that using an agent based approach would be feasible and yield useful results. Additionally, a paper from Caiani et al titled "Agent based-stock flow consistent macroeconomics: Towards a benchmark model" provides a detailed review of the common issues relating to agent based models, as well as providing a template model for researchers to use and extend to their particular question. I intend to rely on this paper for the basis of the model implemented in the simulation, and extend it to simulate specific agent actions and attributes relevant to a study of income distribution.

2. Second feasibility indicator: Possible implementations In order to implement the computational side of the research, I plan to first rely on NetLogo as a means of prototyping basic interactions between various agents, as well as familiarizing myself with the fundamental concepts of agent based systems. I plan on implementing the final program using Java. This is due to two reasons; first, Java is the language I am most comfortable using, and secondly,

there is extensive support for this type of simulation through other Java packages and suites. For example Repast is a suite of Java packages for agent based modeling that has been under development for over a decade. JADE (Java Agent Development) is another similar framework.