Socialist Manifesto

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Super Computing Challenge

Final Report

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Team 38

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Executive Summary

Recently there has been much debate in The Capitol over the benefits of socialist systems. In this country there seems to be an avoidance of the term socialism; it is almost a taboo term. For a politician to use the term publicly would be akin to political suicide. However we have never been presented any evidence to why socialism, and even “socialist” programs are bad. We felt that a comparative study of socialism compared to capitalism would be a very timely project to attempt. We understood that there would obviously be benefits and disadvantages to each, and to say one is better than the other would be impossible to do with the evidence we can gather, however we did interpolate the quality of living, wealth equality, and economic growth of each economy, all of which are considered indicators of economic success.

Our goal was to investigate a socialist system and compare it to a capitalist system to determine the difference in wealth distribution. We are particularly interested in the socio-economic wealth breakdowns in each economy, and the difference between the two. For the purpose of our model we are defining a socialist economy as a limit surplus. The extraneous surplus is redistributed to the population that is under the minimum. It is important to state that our socialist model is a true socialism, and is not a regulated capitalism, nor is it an authoritarian communism, both of which are commonly mistaken as socialism. Our definition of a capitalist economy is an economy where the individual has surplus and uses this surplus to invest and expand their business; no limit surplus.

The Capitalist model resulted in the Investment becoming the richest, although there was a significant dip in there wealth for a few time steps, and every other class remained low and relatively stable. In the Socialist model, the Professionals were slightly richer than the Investment as well as a few Small Business Owners, but the wealth of all classes was relatively close. These results support our hypothesis.

Motivations

In a socialist system the wealth of the government is distributed to the needy, which means that a major advantage to that system is that there is a far smaller percentage under the poverty line. However in a socialist system, the potential for free enterprise, and people truly succeeding and amassing themselves large amounts of wealth, is far less common. The advantages of a capitalist system are the opposite. The wealth tends to go to the successful few at the top, because there is far less government regulation and redistribution. However the percentage of the population beneath the poverty line is often very large because the government is not helping them. We have tried to present unbiased background information on each of the economies that we are investigating.

Background Information

Capitalism is an economic system in which capital, the non-labor factors of production (also known as the means of production), is privately controlled. Labor, goods and capital are traded in markets, and profits distributed to owners or invested in technologies and industries.

There is no consensus on capitalism, nor how it should be used as an analytical category. There are a variety of historical cases over which it is applied, varying in time, geography, politics and culture. Economists, political economists and historians have taken different perspectives on the analysis of capitalism. Scholars in the social sciences, including historians, economic sociologists, economists, anthropologists and philosophers have debated over how to define capitalism, however there is little controversy that private ownership of the means of production, creation of goods or services for profit in a market, and prices and wages are elements of capitalism.

Economists usually put emphasis on the market mechanism, degree of government control over markets, and property rights, while most political economists emphasize private property, power relations, wage labor, and class. There is a general agreement that capitalism encourages economic growth. The extent to which different markets are "free", as well as the rules determining what may and may not be private property, is a matter of politics and policy and many states have what are termed "mixed economies."

Capitalism as a system developed incrementally from the 16th century in Europe, although capitalist-like organizations existed in the ancient world, and early aspects of merchant capitalism flourished during the Late Middle Ages. Capitalism became dominant in the Western world following the demise of feudalism. Capitalism gradually spread throughout Europe, and in the 19th and 20th centuries, it provided the main means of industrialization throughout much of the world.

Critics argue that capitalism is associated with the unfair distribution of wealth and power; a tendency toward market monopoly or oligopoly (and government by oligarchy); imperialism, counter-revolutionary wars and various forms of economic and cultural exploitation; repression of workers and trade unionists, and phenomena such as social alienation, economic inequality, unemployment, and economic instability. Critics have argued that there is an inherent tendency toward oligolopolistic structures when a laissez-faire regulatory structures are combined with capitalist private property. Capitalism is regarded by many socialists to be irrational in that production and the direction of the economy are unplanned, creating many inconsistencies and internal contradictions and thus should be controlled through public policy.

In the early 20th century, Vladimir Lenin argued that state use of military power to defend capitalist interests abroad was an inevitable corollary of monopoly capitalism. Economist Branko Horvat states, **"it is now well known that capitalist development leads to the concentration of capital, employment and power. It is somewhat less known that it leads to the almost complete destruction of economic freedom."** Some scholars argue that excessive income and wealth inequalities are a fundamental cause of financial crisis and economic depression, which will lead to the collapse of capitalism and the emergence of a new social order.

Proponents contest that capitalism has a unique ability to create economic growth. They claim that creating capital is proven to improve living standards, such as better availability of food, housing, clothing, and health care. Supporters also hold that capitalism offers more opportunity for individuals to increase their income through new professions or business ventures than other economic forms.

There have been many varying definitions of Socialism fabricated by economists and intellectuals, but they all share a core concept. This concept is of control over “the means of production and distribution, of capital, land,” as determined by “the community as a whole.” This economic system possesses the potential to terminate the class system, most importantly eliminate the proletariat class, creating absolute equality. This theoretical economic system is the system we plan to model. In comparison to the capitalist economy in which a small percentage of the population is forever gaining surplus and the remaining percentage is forced into deficit, the socialist model will redistribute the small percentage’s surplus to the individuals in deficit. We hypothesize that in the socialist economy, 90% of the population of the society will have equal amount of wealth and that amount will be the amount of subsistence. For the other 10%, half will have paltry surplus, the other half paltry deficit.

Socialism and Communism are two very complex economic systems that on have been confused and interchanged greatly because on the surface seem very similar, but when analyzed deeper are remarkably contrasting. Communism has the concept of all property as public property, which is not seen in the core of socialism where every individual has the wealth for private property of equal measure. Communism also has the feature of aptness in which every individual “works and gets paid according to their abilities and needs.” This restricting feature is not seen in Socialism because Socialism has a more liberal approach to payment and work that allows freedom of occupation.

Description of Model

Our model is meant to simulate a real economy using the StarLogoTNG modeling software. We could not create a model that could possibly accurately simulate an economy, and so what we have created is at best a rough estimation of a real economy. We state this because we do not mean to aggrandize our model and give the wrong idea that it is perhaps meant to be more accurate than it is. Our model is meant to show the difference between capitalism and socialism, not simulate a real economy, it is not meant to be pragmatic for anything except comparing the two systems. It has lots of room for enhancement, and perhaps several years down the line, we could have a fairly accurate model of a closed economy. The basis of our model is that different economic groups have different economics reactions, which we have based on their net worth. We have six different breeds, each of which represent a different job group in the economy that we have based upon demographics on population per class found from the 2000 census results. Our classes all have different reactions set for them, which we based upon our estimation of how a group would economically interact with other job groups.

Collision-based Wealth Distribution

We have written into our model two ways for groups to interact, we have labeled them Collisional Interactions and Non-Collisional Interactions. Collisional Interactions happen when groups randomly collide in the model, and follow the code of set reaction for them. Non-Collisional Interactions are when groups give to a pool of money, which is then, redistributed out to different groups every time step. Detailed explanation will be given for all of this below.

In our model, collisions are meant to simulate the cost of living and the day-to-day income exchanges for all the groups in our simulations. For instance most groups pay the professional class when they collide with them, to represent a payment given for services rendered, however at the same time, if the professional class were to collide with a small business owner, they would also pay them to simulate the professional spending money in a small business owner's store, restaurant or shop. In the collision based wealth distribution, the investor class is a special category, and deserves some explanation, the investor class generates large amount of income from colliding with most other agents, this is representative of the bank, credit card, mortgage and other interest based profits reaped from the working class by the investor class agents. We also have made wealth and size related in the model, so that as wealth increases, the chance of colliding, and interacting also increases as it does in real economic systems. The larger banks have more clients, the more affluent individuals shop more often, and so on.

Non-Collision Wealth Distribution

Capitalist (Reagenite)

For this we used the Reaganite system of wealth known as "trickle down" economics. This was applied to our model thusly: we have put in place a system of wealth redistribution pools, which simulate the overall payroll of each group to others. The small business owner's pay 0.4% of their net worth to the redistribution pool that pays the blue-collar group, the small business owners also give the same percentage to the minimum wage worker. The investors pay the redistribution pool that pays the small business 0.1% of their net worth every time step.

We use this to simulate the salary payments of each of the groups, this way they earn money from the groups above them as they would in a real economy. Investors would put money into local branches of their corporations, so to simulate that, we have them paying the small business owners a certain percentage of their wealth.

Socialist

For this the capitalist distribution is the same. The difference is that there is a bank where everyone puts in a percentage of their wealth, which varies depending on the wealth class they are in, and then the total money in the bank is redistributed to the individuals with the least income. This is how we intend to simulate the difference between socialist and capitalist economies.

Collisional Wealth Distribution

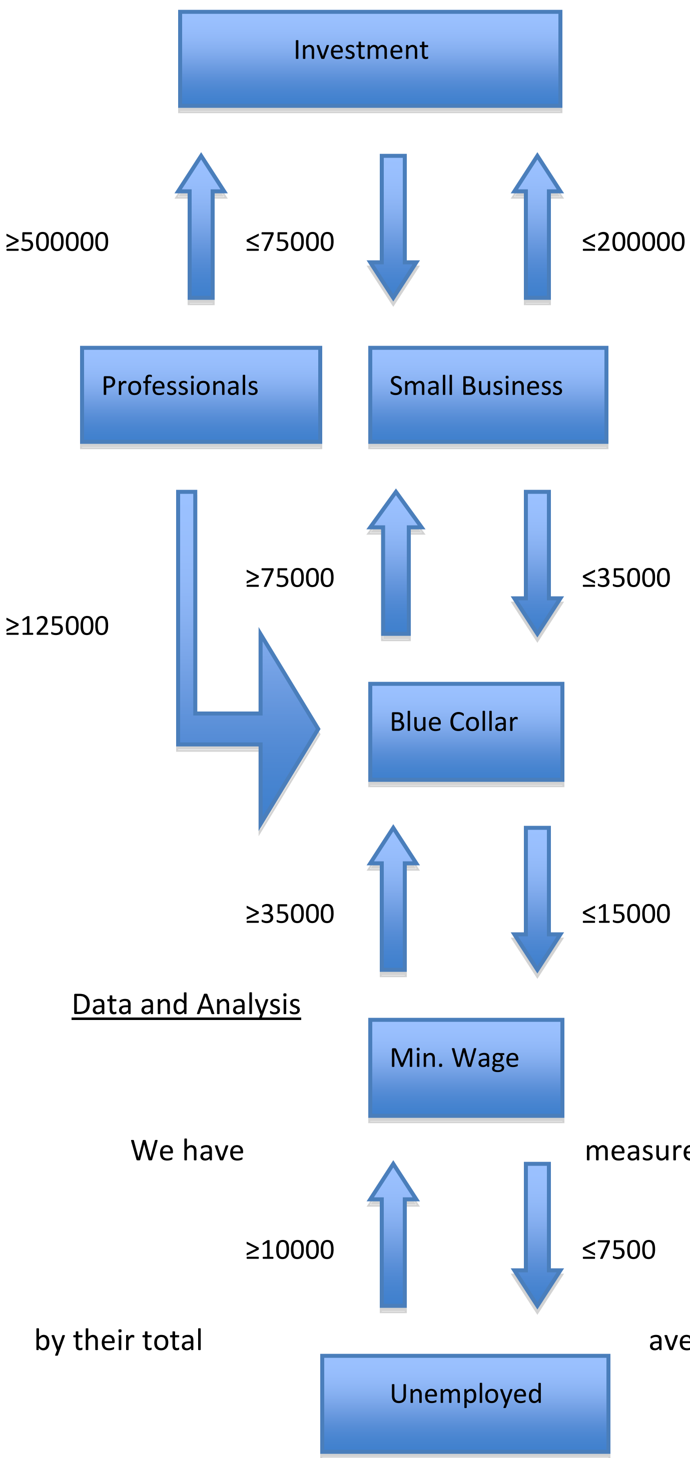
When groups collide with other groups we have set reactions that occur, these are simply transfers of a small percentage of one group's net worth to the other group. The attached table explains each individual reaction. The collisions are used in our model to simulate the day-to-day economic interactions that occur between groups. We want to use this to as accurately as possible simulate the interactions, so the investors don't give money directly to the low income groups, which is the ultimate problem with trickledown economics because wealth pockets form. The reactions with the professionals represent services that a professional might render and then get paid for. The only anomaly is that when two blue collars interact they give money to the small business bank, this represents them getting a bear, or eating together at a restaurant. The standard percentage of net worth transferred is 2%.

Reactions	Investor Class	Professionals	Small Buisiness C	Blue Collar	Minimum Wage V	Unemployed
Investor class	Bigger one gains small percentage	Investor Class gains small percentage	Investor class gains small percentage in collision.			
Professionals		Random small percentage exchange	Random small percentage exchange	Professional gains small percantage	Professional gains small precentage	
Small Business Owners			Random small percentage exchange	Small buisness gains small percentage	Small Business gains small percentage	Small Business gains large percentage
Blue Collar				Both Blue Collars give small percentage to Small Business Bank	No interaction	No interaction
Minimum Wage Workers					No interaction	No interaction
Unemployed						No interaction

Change of Class

In our model, we allowed room for individuals who are successful to change their groups and become different kinds demographics. This chart shows how groups can change. For the most part, groups change to the next demographic up or down, except for Professionals, who instead of becoming Small Business Owners become Blue Collar workers if they go down.

As each turtle's wealth changes, its breed changes. We set a certain net worth at which each breed switches to another. The breed each switches to and the exact number at which they do is illustrated in this diagram:

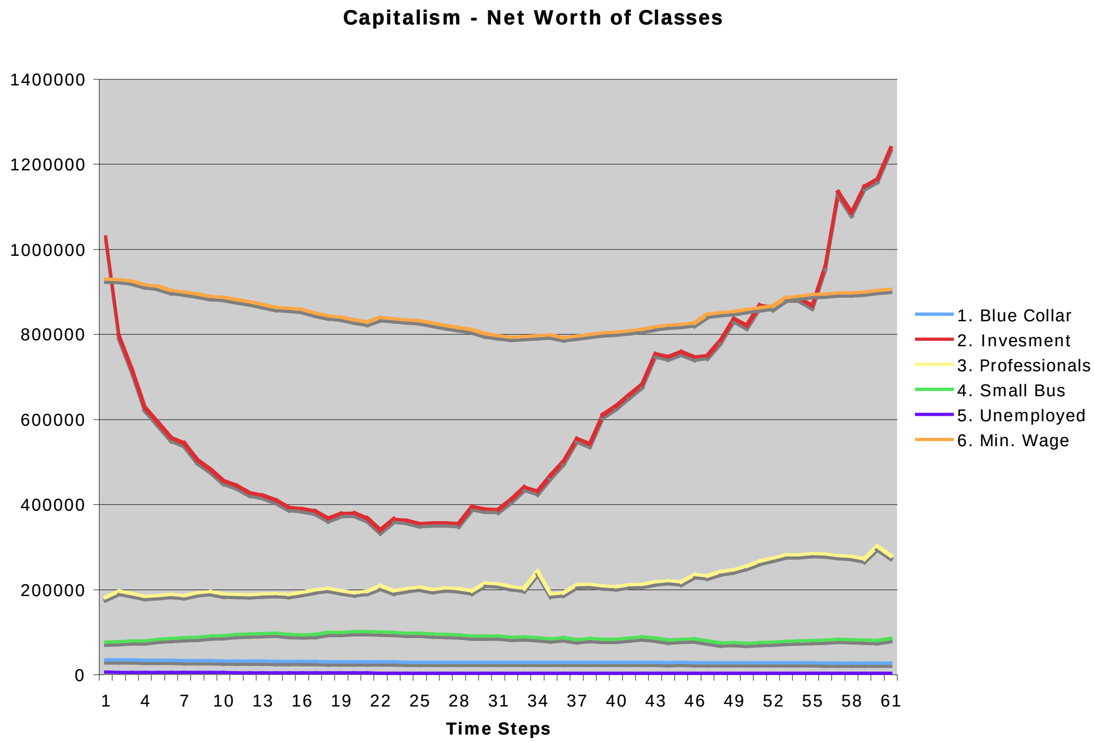


Data and Analysis

We have measured the socio-economic equity in each group by their total average wealth, and each group's control of the total wealth at the end of each simulation. We designed our program to test for wealth as a measure of equality rather than income, because as Alan Greenspan the chairman of the Federal Reserve Bank puts it, "Ultimately, we are interested in the question of relative standards of living and economic well-being. We need to examine trends in the distribution of wealth, which, more fundamentally than earnings or income, represents a measure of the ability of individuals to consume." In most economies, the trends seem to show that a greater disparity lies in wealth than income, because obviously once a certain income bracket is reached, the ability to amass wealth and hold on to it becomes easier. The lower the income bracket an individual is in, the closer they are to the basic cost of living in an economy, and therefore the harder it is for them to control wealth, even if by the numbers they are not making a large percent less income than the individuals in the bracket groups ahead of them. For these reasons, wealth is a better indication of overall economic status, because it is entirely representative of an individual's means of amassing and holding onto capital, which is the ultimate goal in any economy.

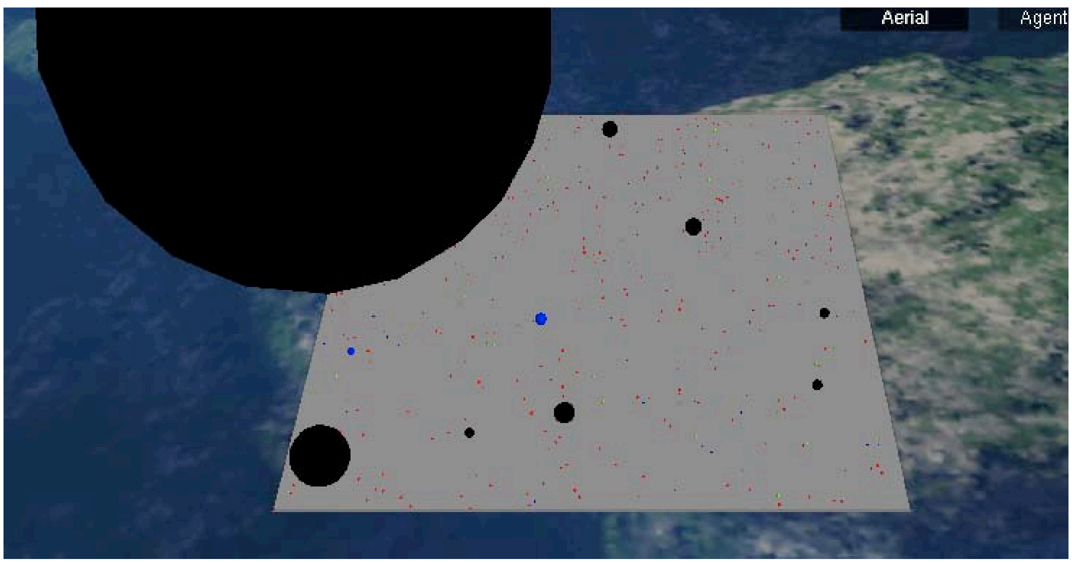
We measured two different variables in our data. The more essential and interesting variable we measured was the net worth of each class (breed). We collected this data as a graph. Secondly, we measured the population of each class (breed). This was merely to see if any interesting results could be observed or any correlation found between the net worth of a class and their population.

Capitalist:



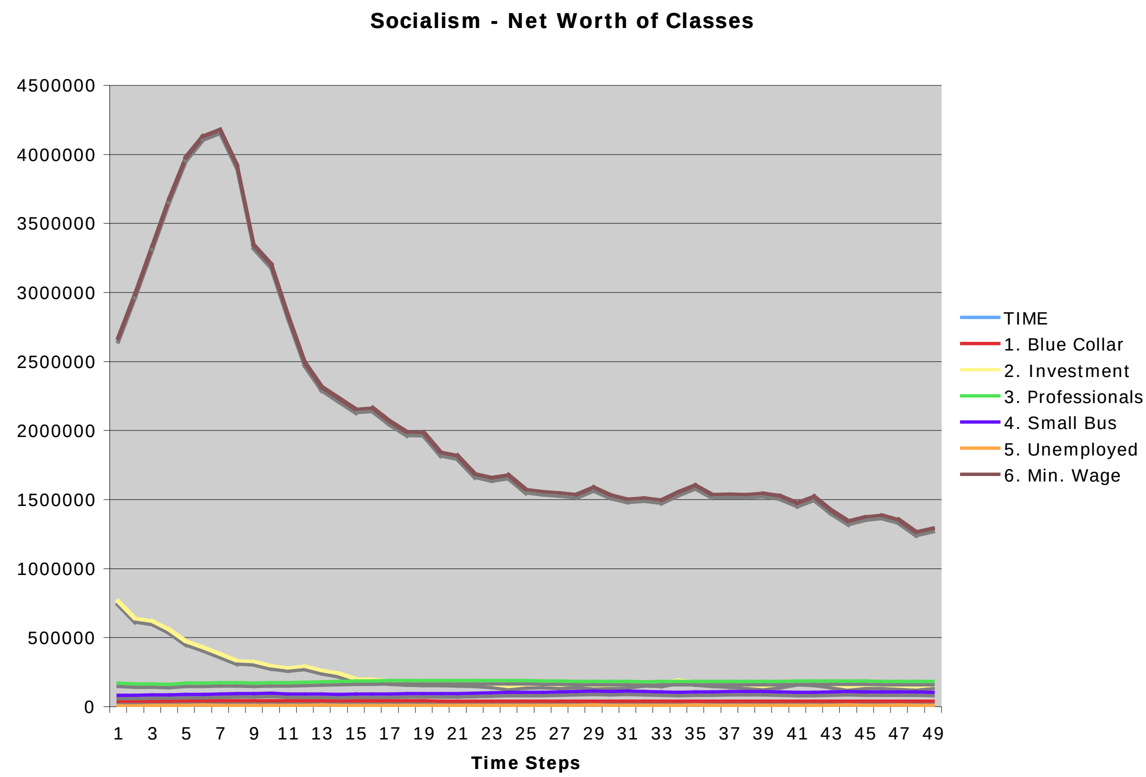
Capitalism Analysis:

The most obvious observation that can be made at first glance is that the minimum wage stays steady at an average of net worth of approximately 85,000. This is a queer result, probably a glitch, which shall be postulated on later. More importantly, the investment class dropped substantially and then rose again in a semi-circular curve, eventually climbing above its value pre-plummet. The investment did not rapidly rise and separate from the other classes, as we hypothesized, instead plummeted for roughly 16 out of 61 time steps. Although it eventually rose again to just above 1,200,000, it did not rise to the gargantuan amounts. The results varied in certain unremarkable ways each time we ran it, but two essential aspects recurred. One aspect was the monstrous growth and accumulation of wealth; wealth causing growth and vice-versa as explained previously, of one turtle (obviously of Investment class) until it almost blankets the entire “SpaceLand”. This is a good example of the “rich get richer” phenomenon. The second aspect was almost all turtles (other than the huge Investment turtle) became the class of Blue Collar and stayed stable at a certain size. This can be seen in this picture of the model:



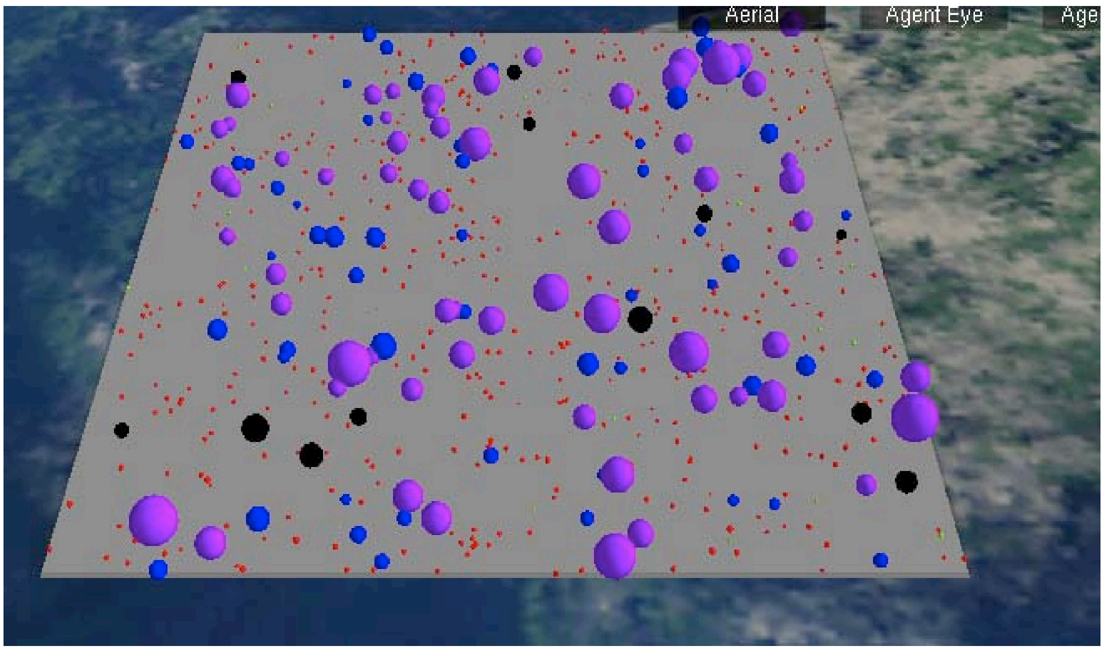
The black are Investment class and the red are Blue Collar (unfortunately they are not blue). Interestingly, our result almost exemplifies the theory of Karl Marx. This theory is that Capitalism always results in only two classes: the very few with incredible wealth (Investment class) and everyone else as the proletariat (Blue Collar or below), seen here in black and red respectively.

Socialist:



Socialist Analysis:

In the Socialist results, as in the Capitalist results, there is an obvious peculiarity with the Minimum Wage class, but as I previously stated, this will be postulated on later. More notably, the investment class drop to the same worth as the professionals and after time step 25, they drop to slightly under the professionals. This is a result of the tax rate we implemented in the Socialist model, which taxed the Investment greater than the professionals. This tax rate also kept the lower classes (Blue Collar, Minimum Wage, Unemployed) who were receiving the tax money, stable. Also, a few Small Business Owners became wealthier than the Investment, which can be seen in the image below. The results of this model were as our hypothesis postulated. The comparison of the class's wealth is difficult because of the discrepancy of the Minimum Wage class. We feel this image of the model gives a better indication of the differences in wealth thus making analysis through comparison easier:



This image shows the greater wealth of the Professionals (purple) and the few, smaller Investment (black). In this image, one can see that it consists of primarily of two halves of the population. One half is Professionals and Small Business Owners (blue) who hold most the wealth and the Blue Collar (red). This is the way we hypothesized the results, and the way a proper Socialism should be. This is where the Professionals or well trained/educated have the most, the Small Business Owners have medium amount of wealth, and the Blue Collar or proletariat have the least, but are still visible. There is no notable outstanding rich man (turtle), there are roughly twice as many Blue Collar as there are Professionals and Small Business Owners combined, which makes sense in that these Blue Collar work for the Professionals and Small Business Owners. This is what many, including Marx, would consider an almost ideal economy. The well trained and educated make the most, but not an outrageous amount, all relatively the same, the Small Business Owners make a medium amount, all relatively the same, with some exceeding the Investment, meaning there is opportunity for expansion of business, but not to an excessive amount—as stated in our background, opportune expansion, but with limit. The best aspect is the Blue Collar are the most populous and work for the first two.

Problems Analysis

In this process we encountered several issues that could account for the small variations to what we predicted occurring in our results. As a team, we set out from the beginning with the knowledge that we had a disability compared to many other teams, in that we were not what could be called "programmers," neither of the members of our team have any previous experience programming, so obviously there were some problems with our code that could probably have been fixed, if we simply were experienced programmers. One instance of this would be our graph, which would stop recording whenever a group's population got to zero. Mathematically we can explain this, because our code tells the graph to divide the groups sum net worth by the population to get the average net worth, therefore it is dividing by zero, which is undefined, however we could not come up with a method by which to fix this.

Another probable explanation for much of our problems was possible glitches the happen innately in StarLogo. One of the issues that we encountered was that on our graph the unemployed group appeared to have a very high net worth, which didn't seem to make sense as they were the group that was supposed to start with the lowest net worth. We checked and the individual agents in that category all were starting with the right amount of money, and our advisor said they could not find any reason for the anomaly in our text. We eventually passed it off as a StarLogo glitch, although perhaps this is another flaw that could have been fixed with a closer analysis.

There were also some flaws that were simply the result of poor implementation of the model. Any model is a simplification of reality, including ours, and we therefore made simplifying representations. Some of the collision reactions and salary simulators might not simulate the economy as accurately as we had wanted. Our model wasn't as sustainable long term as we had envisioned. In some ways it redistributed the wealth too well, and in the capitalist economy model we ended up with one huge investor and many poor blue collar workers, very rapidly. Though perhaps this reflect a pure capitalist economy, it was neither accurate nor applicable to many real life economies, certainly not the US economy, though it did in some ways model the distribution disparity we had envisioned.

Conclusions

Although there is definite room for improvement, we were able to model a preliminary comparison between socialist and capitalist economic models, with results that supported our initial hypothesis regarding tendencies of wealth distribution in the two systems. If we were to continue this project into next year, we believe we could continue to make progress on this project and perhaps even make it functional for real economic modeling, though we would probably use NetLogo instead of StarLogoTNG.

Acknowledgements

We would like to thank Thomas Christie for inspiring us and helping us along the way, he is our teacher in more ways than one. We also want to thank our families, who have supported us through this troublesome process. Finally we wish to thank Megan Belzner… 'nuff said.