

# Junk Economics

A Critique of Neoclassical Economic Theory

By Gabe Powers

## Introduction

Neoclassical economics (NCE) is an economic system with many names. More commonly known as free market, laissez-faire, or neoliberal economics, this school has its roots in the 18<sup>th</sup> century classical economics of Adam Smith and David Ricardo. Whatever Adam Smith's intentions may have been, classical economics has, over time, become an economic system justifying both the dynamism and dark misgivings of the free market. NCE ignited economic fire in the industrial revolution, but it also became a system neglecting to help the disadvantaged and often profited greatly from society's poor workers—the disgruntled proletariat for whom Karl Marx became a champion. While the capitalist activity to exploit the poor may be less cut-throat today, it is still an inherent aspect of the current economy. This tendency has indeed become part and parcel of the mathematical formulas of capitalism, a theory justifying the superiority of individuals to improve their condition through the accumulation of capital, while the market's "invisible hand" supposedly ensures economic equilibrium with the least amount of government intervention. In reality, however, the economy often does not perform according to the scientific rules it is based upon.

The result of the growing influence of this theory has been to create a body of orthodox academic knowledge that is disseminated into the education system from the elementary to the graduate level. Today, laissez-faire thinking has become so ubiquitous in society that it informs media outlets, guides policy makers, forms the perspective of politicians, constrains political discourse within a narrow band of possibilities, and influences the climate of opinion among the general population. Laissez-faire thinking has become such a dominant worldview that the economics profession's claim to scientific objectivity debars the untrained professional from questioning the validity of free-market policy and capitalism in general, and at the same time indoctrinates those who seek to become trained professionals. As we have seen, however, capitalism—both classical and neo-classical—has some fundamental shortcomings, and now we will take a closer look at what these are.

## The Classical Foundation of Economics

In 1651, political philosopher Thomas Hobbes argued that in a world without government people would exist in a brutish state of conflict of "all against all". To evolve to a more peaceful existence, he claimed, people voluntarily enter into a social contract that limits their freedom and establishes government. Hobbes argument was intended to justify the need for a strong governmental system, i.e. the monarchical and feudal systems<sup>1</sup>, and to provide a rational sounding reason why certain groups of society have power and live in opulence while others struggle from day to day to serve the needs of those in power. Hobbes argument came at a time when scientific rationalism was replacing religious dogma, and hence there was a need for some social or scientific justification to replace the religious justification for monarchical sovereignty. Hobbes idea was accepted (out of necessity) but brought with it a rather underwhelming view of humanity. Over the next century, there emerged a nascent class of industrialists, traders, and businessmen who wanted freedom from monarchical impositions. They needed a convincing argument, one which did not violate the logic of Hobbes, that society could function without a strong monarchy to maintain order amongst people who had a tendency towards barbarism. Political economist David Ricardo and his contemporaries argued that markets would make a better, more stable society because peoples' own selfishness would quell them to fall in line due to the invisible hand. If only a "market system" were to be put in place, then that system itself would keep everyone in line and lead to a peaceful and disciplined society. Economist Steve Keen explains:

Economic theory – then rightly called political economy – provided the merchants with a crucial ideological rejoinder. A system of government was not needed to ensure order: instead, social order would arise naturally in a market system in which each individual followed his own self-interest. Adam Smith's phrase 'the invisible hand' came along rather late in the process, but the notion played a key role in the political and social transformations of the late eighteenth and early nineteenth centuries.<sup>2</sup>

The intellectual environment of the time demanded an abstract precision from ideas if they were to be considered legitimate. The theoretical foundation of every field of study, from physics to psychiatry, had to be based upon blind mechanistic forces with expletory power. Of course, such a criterion was justified for hard sciences such as physics,

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<sup>1</sup> Note that anthropological evidence suggests that Hobbes was wrong.

<sup>2</sup> Keen, Steve, *Debunking Economics*. Second edition, (Zed Books, 2011). [www .debunkingeconomics.com](http://www.debunkingeconomics.com)

but the attempt to hold the biological, social and psychological sciences to such a standard is unreasonable, because they are studying the living world (in the case of biology) and the human world (in the case of the social or psychological sciences). The subtler is the object of study, i.e. the more advanced it is in terms of its evolutionary distance from lifeless physical matter, the less can it be explained by mechanistic or probabilistic laws. Biology, psychology, and the other social sciences have gradually overcome their 17<sup>th</sup> century ties to Newtonian thinking and found a language of appropriate subtlety, but economics has remained attached to its 17<sup>th</sup> century roots. Early economists wanted the market mechanisms to function as an inhuman machine, the only problem was that this machine was human society itself. They found in Smith's concept of an invisible hand a way to explain away human agency from their study of human economy. The invisible hand was thus transformed from a poetic phrase into a blindly deterministic market force that would supposedly guide society provided that other social forces such as governmental regulations were removed from the picture. The laws of economics were believed to be the laws of nature, and so labour (along with everything else) had to find its price on the market according to indisputable market forces just as every other marketable commodity—there was no scope for human feelings.

In order to establish a market economy, adherence to Hobbes' philosophy demanded that economists could show that a self-regulating market indeed exists and would be able to maximize welfare while restraining people's barbaric nature in the absence of a monarch. The primary aim of both classical and neoclassical economics was to demonstrate that a self-regulating market existed and would maximize welfare, i.e. that market capitalism was the only reasonable social system. To this end, they set themselves to *prove* two basic ideas: first, that human behavior is guided by focused self-interest, and second, if human activity is able to freely express itself (i.e. if everyone is unrestrained in the pursuit of their own self-interest), then it would lead to a perpetually stable society and social welfare (which to an economist means that all demands are satiated and all supplies consumed). The effort to validate two concepts signified the birth of economic equilibrium theory, which has since remained a central idea in modern economics.

These economic ideas are much more ideological than they may seem at first glance. Of course, there is nothing wrong with envisioning a better world or economy, but that is not the domain of science. Economists presented themselves as scientists developing objective theories about society. They were modeling society as the selfish activity of purely economically-minded individuals within an economic world that operates according to cold market laws, and concluding *without any supporting evidence* that if the capital interests are given free reign then a harmonious world would result. The classical economists wanted to create a science of economics that followed precise and natural laws. Hunger and the scarcity of food, it was believed, kept nature in good order. Likewise, the laws of the market would keep society in proper order provided that human sentiments and the government did not get in the way. The classical economists declared that society was controlled by the laws of beasts, of predator and prey, of hunger and greed; they felt that to pity the poor was to interfere with the functioning of society, and since the natural law of hunger and scarcity was sufficient to impel them to work, government regulations and political sanctions were superfluous. Such reasoning established the basis for *laissez-faire* economics.

The imposition of this idea on early 19<sup>th</sup> century society caused the brutal exploitation and suffering of the newly formed working class. The promised equilibrium has never been observed. Rather, over the next 200 years, *laissez-fair* required the continuous use of state violence and government decrees to keep the working class from rebelling. The economists of the times failed to see that the stability of society depended on human sentiments, such as morality, solidarity, and institutions and social structures that serve people's needs.

For the invisible hand to make theoretical sense, human interactions had to first be idealized as based on reciprocity, and then reciprocity had to be further reduced to exchange based on an urge for selfish advantage. In the words of economist David Graeber: "The reason that economics textbooks now begin with imaginary villages is because it has been impossible to talk about real ones."<sup>3</sup> Smith had indeed invented the examples used in his book; the land of barter-and-trade simply did not exist. It may seem to be a plausible story, to those of us in the modern capitalist society, that the fundamental human interaction is that of reciprocity and exchange. But this idea does not accord with history or with common human experience. The fundamental relations of human life, those of brotherliness and parenting, are not reciprocal. Traditional societies were based on giving, sharing, goodwill and collective welfare. Among the tribes of the past, a gift might be repaid eventually, but not in any precise or accountable way.

Ironically, the "free market" or market system required the imposition of government regulations and laws. Although *laissez-fair* policy and the automatic working of the invisible hand were the supposed underpinnings which would enable a market system to guide society to the "best of all worlds", when they tried to implement the market system

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<sup>3</sup> Graeber, David. *Debt: The First 5000 Years*. (Meville House, 2012) P56

it turned out to be incompatible with laissez-fair. The invisible hand was replaced by the all-to-visible fist of the government.

A market system required that all goods find their price on the market, including labor, land and the movement of capital. As distasteful as a market in land, nature, resources, and the environment may seem, having a market in labor ran contrary to the very flow of human society and sparked the centuries long battle between the owners of capital and the workforce they sought to hegemonize. The classical economists vision of how a market system should work required that people conceptualize their life as a thing to be traded for a wage.

In order to make people behave as the early economists insisted they should, if the new system was to function, the organic society and human culture, which had developed over 1000's of years, had to be dismantled. People needed to be forced into a situation where they felt themselves to be isolated individuals with no responsibility for anything except to survive. To this end, the peasants were kicked off the land, so that working in a factory was the only alternative to starvation, otherwise they never would have willingly subjected themselves to toil in the fatally dangerous conditions of early industrial society. Hunger and scarcity were imposed on the lower classes, who may not have had money before but never experienced scarcity because they lived in agrarian communities.

Still, even the threat of starvation was not enough to remove the human tendency towards solidarity and fraternity. The government had to be strictly callous, often brutal, in its enforcement of an absurd number of new regulations and laws aimed at the working class with the intent to impose the ideal of a labor market on those who suddenly found themselves to be its object. The dawn of industrial society was characterized by the brutal exploitation of the working class, to an extent unimaginable during feudal times.

The effort to impose the market system, which was supposed to be natural, was planned and received ceaseless support from governments; but the reaction against it was spontaneous. Socialism was not planned, it was an expression of the human desire to survive. The working class, being sacrificed for the supposed movement of history to a better world, found their voice in a new group of humanists and leaders. Robert Owen was the most prominent leader, visionary and protectorate of the workers; while Karl Marx focused his mind on dismantling the economic theories which underpinned the plight of the workers. He effectively put an end to classical economics but was not able (nor did he attempt) to thwart the growth of capitalism.

As NCE started developing in the early 20<sup>th</sup> century, to fill the vacuum left after Marx's critique of classical economics and to combat the spread of socialist ideas. It soon assumed a pinnacled place amongst the social sciences. After the Second World War, economics-based ideas became popular and were drilled into people's heads everywhere, from universities to factory floors, from secondary school classrooms to parliamentary halls. Soon the social sciences either had to use the same assumptions about psychology as economists did or be branded as unscientific. Later, the social sciences moved beyond the umbrella of economics, but to this day, economists have not adapted any bold new assumptions about human psychology—the general assumption remains that human interactions are based on exchange and selfishness.

## Four Axioms of Neoclassical Economics

There are three basic axioms that underlie the assumptions within the broad range of neoclassical schools and practices. To these three, we have added ergodicity<sup>4</sup>—an idea so fundamental that it is often overlooked as an axiom.<sup>5</sup> These axioms became the guiding principles that structured the understanding of human behavior.

Neither hard nor soft sciences are axiomatic. In other words, science does not start with assumptions about the world and then tries to build up theories based on those assumptions. To the contrary, all sciences start by observing the world in an effort to try to understand it, if any assumptions are made, they are based on observations of reality.

The four axioms of NCE are not based on a scientific observation of the world we live in. They developed over time, not according to what was observed, but according to what was needed for the theory to sound scientific. Modern economics has thus followed the rule of justifying axioms to make their theories work, rather than having a reason to

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<sup>4</sup> The technical definition of a probability distribution involves integrals, but in simple language, a probability distribution is either a table or an equation which gives the probability of the outcome of a statistical experiment. As a simple example, the probability distribution for the number of heads in two consecutive coin tosses would look like this:

Number of heads	0	1	2
Probability	0.25	0.5	0.25

Ergodicity means that the probability distribution of random events does not change over time.

<sup>5</sup> There are also a few commonalities that are present in the general practices of neoclassical economics, and in the standard neoclassical textbooks, but which are sometimes absent from many new theories.

believe that they might be accurate. In this way, writes economist Paul Robinson, “mainstream economists are assuming what they pretend to be proving.”<sup>6</sup>

### **1. Methodological individualism and Reductionism**

The first axiom of NCE is “methodical individualism.” Methodological individualism simply means that theory shall progress from individual agency to structure, not vice-versa. This means that the complexities of social reality are to be understood by analyzing individual behavior and then extrapolating that behavior on a population of individuals. This practice is also known as strong reductionism, which, in some mainstream economic theories, leads economists to assume that the world is entirely populated by absolutely identical individuals, or even to the assumption that there is only one individual who owns all businesses and consumes all products.

The first problem with this approach is that understanding (or inventing) the laws that govern how parts behave will almost never make us understand how the whole, which is composed of those parts, will behave. That is, the ability to reduce, dissect, and analyze does not automatically imply an ability to construct, build, and synthesize. If one creates a hierarchical list of sciences, starting from atomic physics and culminating with social sciences, then one will find that each science on this list uses the elements and concepts that are the objects of study of the preceding science on the list. However, the latter is not merely an applied version of the former. Each level requires completely new concepts, generalizations, fundamental laws, and methods of study. Hence, for example, anatomy cannot be deduced by understanding cell-biology and psychology cannot be deduced from anatomy.

The second problem is that the complexity of many interacting parts presents difficulties when trying to understand the dynamics of systems by studying their constituent parts. In its attempt to create a micro-foundation, NCE is essentially applying the principals of statistical mechanics to human society. In the words of economist Steve Keen, “Macroeconomic phenomena – and even phenomena within one market – are emergent properties of the dynamic, disequilibrium interactions of individuals and social groups in a rich institutional environment, constrained by the physical, temporal and environmental realities of production. These phenomena will not be predictable from the behavior of isolated individuals.”<sup>7</sup> Because constructing society from a group of individuals was a hopeless task, neoclassical economists took the reverse course and constructed the individual according to the needs of the macroeconomic system. Put another way, when the observable facts did not fit the theory, instead of changing the theory, they changed the facts.

The third problem arose from a mechanical view of the universe as being made of little pieces. Yet a tree is not simply made up of wood, we are not simply a collection of cells, nor are cells just made up of molecules, and molecules are not just made up of atoms. In this living world, there are properties that arise due to the existence of a higher level organizing principle, which not only organizes the parts according its needs but calls the parts into existence. This organizing principle does not exist at the lower level. It is not the complexity of interaction leading to emergent phenomenon that gives rise to the fundamental distinction between a collection of cells and a dog. A dog has a higher organizing principle that organizes, develops and conducts the activities of the cells and other elements that is inconceivable for the point of view of cell biology. A dog is not just “made” of cells, and at the same time one cannot say that a dog is just using its cells to give expression to its inherent “dogness.” In fact, nearly all cells of the dog, and the molecules that they contain, will be changed within a matter of months and yet the dog remains. The dog is a self-organizing phenomenon, and the root cause of its existence does not originate from the physical molecules, the living cells, or even the biological systems. Dogs are organized by something higher and subtler—a mind with its own desires and needs and dreams—which is at a “higher” level than atoms, cells and organs. The dog’s mind is, in a way, the organizing principle of its cells, atoms and molecules. In other words, a dog is so much more than the sum of its cells, atoms, and molecules.

Likewise, society is not just made up of individuals, it exists in its own right. Society’s laws molds people’s character and various historical and socio-economic forces shapes people’s outlook and behavior. In short, society teaches people how to live and behave. It is through society and our role in it that we understand our life and make choices. We are also shaped by economic, cultural, and political power structures, as well as by the simple joy of collective living and from the fraternal love and innate goodness of people. All these sentiments, behaviors, interactions, and states of being develop when people come together. Our human traits thus emerge due to the complexity of the social systems we live in. The real causal mechanisms that leads to a society’s significant social patterns cannot be understood by simply studying the actions of the individual.

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<sup>6</sup> Davidson, Paul. *John Maynard Keynes*. Page 28

<sup>7</sup> Keen, *Debunking Economics*. Page 371

## 2. Methodological instrumentalism

The second axiom is that of “methodical instrumentalism.” This is the belief that preference maximization is the driving force behind all human behavior. When taken together, the two axioms of methodological individualism and instrumentalism express Smith’s invisible hand in philosophical terms. From the 1870’s until today, neoclassical economics claims that people can (and undoubtedly should) be modeled as if they possessed consistent, clear, premeditated preferences and a tireless aptitude to view reality through the calculated lens of optimization. In most of neoclassical theory, and especially in the mainstream models, this is strengthened by the rational utility maximizer with perfect foresight and knowledge. This is a different type of reductionism<sup>8</sup>; it does not involve reducing a complex entity to the sum of its parts, but rather by reducing a free-willed, self-determined human being into a set of behavior mechanisms arising from selfishness.

The word “rational” typically means the use of discriminative introspection motivated by feelings of love, welfare and justice; a quality that distinguishes us from animals. When an economist uses the word “rational”, however, humanity is reduced to a disjoint collection of ingeniously and selfishly calculating automatons. The full spectrum of human qualities has been reduced to only one quality. This reduction was necessary because the belief in free will, or any will for that matter, does not allow for economic projection. The only way out is to reduce humans to entities who do not have an independent will. Such people were dubbed “rational” in the economic sense because their behavior could be stipulated and predicted.

Since NCE is dependent on aggregating individuals, the individual had to be conceived of as a calculating economic-animal. But the reverse was also true; if the market system was to function, then people would have to behave like economic machines. And therefore the economic machine required the suppression of distinctly human qualities in order to function as the early economists insisted that it should. On the one hand, the market was designed to systematically remove from human interaction any information that would actually allow people to behave humanly. On the other hand, there was a tremendous push right from the early days of the classical economists to design a society that would narrow the gaze of the individual. In the early days of capitalism, organic society was dismantled so that people had no means to live except by selling their labor to the highest bidder. In more modern times, people were indoctrinated with economic principles and educated to fit into a bureaucratic system, a system designed to keep people obediently marching to the tune of the industrial machine. Real people, however, do not act and behave in the superficial and limited ways predicted by this axiom.

## 3. Methodological equilibration

This is the axiomatic imposition of the equilibrium theory. As stated earlier, the original purpose behind classical economics was to demonstrate that markets generate a robust stability.<sup>9</sup> If NCE had been a rational theory, based on the assumptions of the first two axioms, the natural question to ask would be: “How will these rational markets behave?” Instead, in 1838, when the first models of competition were not able to predict the eventual emergence of equilibrium, a never observed equilibrium was simply assumed.

The problem with methodological equilibration is that economies do not move towards an equilibrium<sup>10</sup>. Equilibrium is a state in which the opposing forces, tendencies and influences of a system are balanced *over time*, and so if a system is described by a set of equations that do not have time as a variable, then that system is been assumed to be in equilibrium. This is exactly what economists have done. They could not demonstrate equilibrium, and so they simply assumed that the economy would eventually arrive at equilibrium and tried to write down equations that described what that equilibrium state might be. These equations had no time variable, hence they could not show how economies change, and in particular, could not show how an economy would move from a state of disequilibrium to a state of equilibrium. They ignored the whole process of economies equilibrating (or not equilibrating), and tried to describe their fantastic picture of a perfect economy by simple equations without any notion as to how this fanciful state of affairs might come about, and claimed that the market system and the invisible hand have been substantiated, hence we should all have faith to entrust economic machine to guide our lives and our society.

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<sup>8</sup> Reductionism is usually defined as the practice of analyzing and describing complex phenomena in terms of its simple and fundamental constituents.

<sup>10</sup> There are theoretical reasons for this statement that involve non-linear dynamics and complexity of real markets. But, this simple statement can be concluded simply by observing economic history. We have never seen economic equilibrium. In fact, it is very hard to even imagine a world where the economic system was in equilibrium. The economy is embedded within human society, which is a very large group of people immersed in the currents of history, and could only be in equilibrium if human society (ergo history) was also able to equilibrate in some sense. Such a condition would imply that all decision making of consequence had been decided upon and there were only left routine, day-to-day choices that were not important in the economic sense because the impact of such decisions is averaged out over a large population.

But it is wrong to assume that the dynamic process, which economists erroneously hope will lead to equilibrium, can be ignored. Maybe there is no equilibrium; maybe there are many, even an infinite number; maybe the economy will never get there; maybe if it ever gets to an equilibrium, it will not remain in equilibrium for very long. Methodological equilibration removes the dynamic nature of economic systems from the purview of analysis. As Keynes famously said, “this long run is a misleading guide to current affairs. In the long run we are all dead. Economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is long past the ocean is flat again.”<sup>11</sup>

The very concept of equilibrium was always an ideological gem for economics. During the ideological battle between capitalism and socialism (largely due to the struggle of workers in USA and England) NCE had its birth and once again embraced equilibrium as the core of its market creed. In the words of Steve Keen:

In contrast to the hand-waving of Smith, the neoclassical economists of the late nineteenth century provided a substantive mathematical analysis of how equilibrium could be achieved by an idealized market economy, and how this equilibrium could be fair to all. However, unlike the earlier classical championing of capitalism, this technical edifice provided very little in the way of libertarian slogans for the battle against the ideology of socialism. Instead of arming capitalism’s defenders with rhetoric to deploy against socialists, it gave birth to the academic discipline of economics. The need to defend capitalism had a profound impact upon the nature of economic theory. The defensive imperative, and the role of equilibrium in that defense, cemented equilibrium’s role as a core belief of economic theory.<sup>12</sup>

Methodological equilibration was a tenet of economics from the classical period, when the poor were being mercilessly exploited in factories. The shift to neoclassical economics took place at the height of the labor struggle. At that time, economists retained the belief that the economic equilibrium will provide the highest possible welfare for the most people and so any interference of the markets by either the government or by the “lazy, trouble-making” working class people would simply make our lives worse.

Pareto’s<sup>13</sup> concept of optimization is more than just a bland statement, it disguises the role of power; no one was more aware of this than Pareto. He had detected some Darwinian justice in the existence of a wealth ladder, on the bottom of which people starve and children die, and atop of which the wealthy sit in comfortable opulence. Optimization was not only about maximizing wealth or the use of resources, but was about optimizing the human race. In Pareto’s words, “compare the social body to the human body, which will promptly perish if prevented from eliminating toxins.”<sup>14</sup> It would be hard to find a modern economist who makes such bold statements today, but the belief in the infallibility of markets still lingers on as an excuse to remove welfare programs and minimum wages. The ideal of market discipline always served as a rejoinder that the powerful used against the poor, but the powerful never subjected themselves to market discipline—they have always used any advantage their position can afford them (tax breaks, kickbacks, predatory pricing strategies, military begotten access to cheap resources, etc.) to get to a position where they are not endangered by the turbulent movements of the market system *because* every business person knows that markets are not stable.

#### **4. Ergodicity**

The final axiom of neoclassical economics is ergodicity. As we explained previously, this idea implies that the future is predictable in a probabilistic sense. For an ergodic process, a past data sample will be statistically equivalent to a future data sample, and hence a probability distribution generated from data samples of the past is an accurate representation of the probabilities of future events. But for a non-ergodic process, estimates of its statistical properties based on past observations will not give reliable information about the future and so one cannot make predictions by looking at past data. Without the ergodic axiom the proof of efficient markets falls apart; that is to say the backbone of NCE depends on ergodicity. However, ergodicity is not something one can assume, no matter how much the neoclassical economist would like to, because it is a property of the data that must be observed.

None of the hard sciences involve the interaction of human beings and the ergodicity they display is due to the obvious fact that their objects of study do not display any signs of free will (i.e. atoms are not making decisions). The statistical makeup of an economic process, on the other hand, is created by human actions and will change as peoples’ behavior responds to any change in the ecological, political, technological, cultural, social, business, or economic environment. Since economics studies essentially social processes, which have repeatedly demonstrated a remarkable tendency to

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<sup>11</sup> Keynes. *A Tract on Monetary Reform*. (Macmillan and Co., London, 1924) Page 80.

<sup>12</sup> Keen. *Debunking Economics*, *Op Cit*. Page 193

<sup>13</sup> Pareto equilibrium simply means that after transactions are complete then no one can be made any better without making someone else worse off.

<sup>14</sup> As quoted in Mandelbrot, *The Misbehavior of Markets*. Kindle edition, location 2244

produce both surprising systematic shifts and unpredictably large game-changing events, and since NCE in particular focuses on relatively long-run states of the economy, ergodicity is rather uncommon in the economic world.

“In essence,” writes macroeconomist Paul Davidson, “the ergodic axiom imposes the condition that the future is already predetermined by existing parameters.... Efficient market theory, Arrow-Debreu models, Ricardian equivalence, etc. require the households, business enterprises, and politicians to possess a significant correct and accurate message of things that are going to happen in the future if they are to make efficient (optimal) decisions today.” And although the conclusions reached based on these theories may be applicable to highly constrained circumstances, they are, he writes, “inapplicable to the world of experience because in the real world, households do not have any significantly reliable information about the future, and neither do budgetary policy makers, nor entrepreneurs.”<sup>15</sup>

The core of Keynes argument was to denounce the ergodic assumption by emphasizing the fundamental difference between risks, which are choices involving statistically known probabilities, and uncertainty, which are choices involving probabilities that cannot be estimated. During the last third of the 20<sup>th</sup> century, when economics shifted its focus to the analysis of data, there was an increasing reliance on the assumption of ergodicity.

Despite the lucidity of Keynes’s arguments, Nobel prize winners Samuelson, Lucas and Sargent have all claimed that the ergodic axiom is the only scientific method of doing economics and virtually all economists, including Cochrane, Stiglitz, Mankiw, Friedman, Scholes, etc., as well as economic textbooks have assumed that economic data is generated by ergodic random processes.<sup>16</sup>

### **Commonalities**

Commonalities are not axioms that are held universally by all the various branches of neoclassical economics, but are still part of the mainstream theories that are used in policy creation and which are taught in universities. Many neoclassical theories include these assumptions in their full form, however others will modify one or more of them. Even the casual observer can discern that accepting these common ideas has political or ideological implications. In the words of economist John K. Galbraith:

Economics now tells the young and susceptible (and also the old and vulnerable) that economic life has no content of power and politics because the firm is safely subordinate to the market and the state and for this reason it is safely at the command of the consumer and citizen. Such an economics is not neutral. It is the influential and invaluable ally of those whose exercise of power depends on an acquiescent public. If the state is the executive committee of the great corporation and the planning system, it is partly because neoclassical economics is its instrument for neutralizing the suspicion that this is so.<sup>17</sup>

The following three commonalities are assumed by economic textbooks because they are a part of General Equilibrium Theory, and if they are removed then the theory falls apart.

#### **1. Gross Substitution**

The assumption of gross substitution alleges that any product is a valid substitute for any other. This idea was fundamental to General Equilibrium<sup>18</sup> theory, and rather than this axiom being relaxed over time, it became stronger with the introduction of the representative agent into the list of assumptions. It implies, for example, that if the price of water rises, then people will buy more Coca-Cola instead. This principle is used to suggest that if prices are flexible, then whenever some items are not sold on the market at current prices, then sellers can sell what remains by lowering the price relative to all other prices. The use of this axiom is strongly political when applied to the labor market; gross-substitution implies that if there is unemployment at a given wage rate, then it can be removed by decreasing the wage. This argument is commonly used by the wealthy to depress wages.

The assumption of gross substitution has the devious effect of homogenizing away the crux of what makes economies actually function. Markets exist because products are different; differentiation is the key principle that allows companies to compete. This competition in turn leads to innovation and progress. But an equivalence of products removes human choice and therefore makes the application of microeconomics as a foundation for macroeconomics utterly pointless.

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<sup>15</sup> Davidson, Paul. *Is economics a science? Should economics be rigorous?* Real-World Economics Review, no. 59

<sup>16</sup> *ibid.*

<sup>17</sup> Galbraith, John. “Power and the Useful Economist” in *The Essential Galbraith*, edited by Andrea D. Williams. (Houghton Mifflin, 1972 )

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<sup>18</sup> See section on General Equilibrium further on.

In the 1950's, gross substitution was used to try to mathematically establish the existence of economic equilibrium. In 1971, it was shown (by Arrow and Hahn) that that stability and uniqueness could not possibly be shown without the assumption of gross substitution being applied to *all markets*. In their words, without the assumption of gross substitution, "all mathematical proofs of the existence of a general equilibrium solution, where all markets – including the labor market – clears<sup>19</sup> are jeopardized."<sup>20</sup> Markets "clearing" means that all the products are sold; labor markets clearing means that there is no unemployment. Hence, if workers are not viewed as interchangeable, freely transplantable, utterly unattached and unskilled, then economic theory does not predict full employment.

Neoclassical theory was able to show that in a make-believe world where their axioms and assumptions are actually true, there is the possibility that an equilibrium state could exist (but even in the make-believe world no one knows how this equilibrium would actually arise). They then made the bold claim that unemployment is *not* a byproduct of the economic system (because in their make-believe world there is no unemployment), but rather is due to a lazy working class that would rather sit at home than go get a job. Such arguments have been useful by the political right in justifying trickle-down policy, denouncing welfare, job placement, minimum wages, workers' rights, etc.

## **2. Neutrality of money**

The neutrality of money means that rational people place no value on money; this implies that changes in the quantity of money have no real effect on the economy. If money is neutral then employment and output are completely determined purely by non-monetary factors. According to Paul Davidson, "By the early 20th century, this neutrality of money presumption became one of the basic axioms of the prevailing orthodoxy in economics textbooks. Even today, neutral money remains one of the fundamental axioms of modern mainstream economic theory."<sup>21</sup> It is also an integral part of economic policy, and in the wake of the 2008 financial crisis it is becoming increasingly clear that treating money as neutral is a flagrantly irresponsible misuse of the authority entrusted to economists. This practice has led to the unrealistic economic models, deregulation, and reckless behavior that have caused the recent great recession, as well as many smaller economic crises over the last 30 years. The neutral money axiom is central to the justification of capitalism because it hides the essential roles played by financial power brokers.

To be fair, there is a major branch of NCE<sup>22</sup> that introduces a short-run lag-effect in the movement of money and the adjustment of prices. Adherents to this branch even recognize that the "short-run" can last for a long time for people, and so monetary policy can have real effects. However, they do not admit that money has inherent value and therefore plays an important role in the economy. Keynes, on the other hand, was adamant about the need to remove this assumption. "Money," he wrote, "plays a part of its own and affects motives and decisions and is, in short, one of the operative factors in the situation so that *the course of events cannot be predicted either in the long period or in the short, without a knowledge of the behavior of money between the first state and the last.*" In particular, if one is to have an economic theory that can model and understand depressions, then one must accept the non-neutrality of money because, as Keynes believed, "booms and depressions are peculiar to an economy in which ... money is not neutral."<sup>23</sup>

## **3. Value-Free Science**

Economics claims to be a "value free science", but actually the pretence of being value free is the central reason economics is unscientific. Modern economics provides the value-system that justifies market capitalism, thereby creating the ideal for what a human being is. Economics is then used to create, or at least rationalize, the policy that will be used to guide the economy. Economics both studies and directs the economy, thereby creating a situation where the very theory that is supposed to explain the market in reality both influences and changes that market.

In contrast to science, the economist's subject matter changes at a rapid pace. An economic system is continuously transforming, and exists in a dynamic interchange with the evolving ecological, political and social systems into which the economic system is embedded. According to physicist and author Fritjof Capra, "The evolution of a society, including the evolution of its economic system, is closely linked to changes in the value system that underlies all its manifestations. The values a society lives by will determine its world-view and religious institutions, its scientific enterprise and technology, and its political and economic arrangements. Once the collective set of values and goals has been expressed and codified, it will constitute the framework of the society's perceptions, insights, and choices for innovation and social adaptation."<sup>24</sup>

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<sup>19</sup> In economic terms, a market 'clear' when all goods on offer have found a buyer.

<sup>20</sup> Davidson, Paul. *John Maynard Keynes*. (Palgrave Macmillan, 2007) Page 31

<sup>21</sup> *ibid.* Page 27

<sup>22</sup> Called the neo-Keynesians, although they are not particularly Keynesian in their concepts or outlook.

<sup>23</sup> Keynes, John Maynard. "A Monetary Theory of Production" (1933) quoted in Davidson, Paul. , *Op. Cit.*

<sup>24</sup> Capra, Fritjof. *The Turning Point*. (Flamingo, 1989). First published in 1982. Page 196



From the time of the classical economists, economics has been propagating a world-view, a set of values for people to believe in and embody, including the claim that economics is value-free, simply because its ideology demands that it be viewed as a value-free science. World renowned economist Joseph E. Stiglitz points out that the indoctrination of students in economics graduate programs “bears testimony to a triumph of ideology over science.”<sup>25</sup>

Economics, perhaps more than any other subject, has a dramatic effect on its own object of study. That is, changes in economic theory and academic practices changes the economy; hence objectivity is impossible. Furthermore, for economics to be honest, its fundamental curriculum would have to include the socioeconomic effects of its own value system, assumptions, and the policy choices it motivates. To use Bertrand Russell’s language, there would need to exist a branch of economics called “Meta-economics”, to be studied alongside macro and microeconomics.

Economics today is not just based on assumptions that are out of touch with reality, economic theory is also out of touch with its own core beliefs. This denial of its own value-system detaches economics from the real-life effects it has on society. While economics may not be very good in explaining how the economy works, it has become a very powerful tool to shape the economy it pretends to study. So while economics may have failed as a science, the great irony lies in its success in convincing politicians *to set up rules to force markets to behave approximately as the economic theories claim they would do if there were no rules in the first place*. Thus NCE is highly effective at promoting its unstated value-system, and its own ideology, even though the average economist seems to be keenly unaware of this fact.

## Microeconomics

The plausibility of the invisible hand as a concept implied that individuals think and act with uniformity and predictability. The first step, therefore, in demonstrating the functionality and stability of the market system was to codify the individual. As a starting point, Bentham transformed the idea of human passion into an index of pleasure and pain. In the 1870’s a group of economists attempted to add mathematical rigor to Bentham’s utility, hopefully transforming economics into a science by making it possible to derive economic laws from the fundamental law of utility maximization. This marked the start of the neoclassical period.

The concept of utility was of central importance to neoclassical economics because it was through utility that economists claimed to include human beings in their analysis. Although utility functions have been replaced by indifference curves (these are explained below), utility functions are still taught in undergraduate courses and the utility concept remains the core of the economic conceptualization of people (this is the methodological instrumentalism which we looked at earlier). The lack of a unit to measure utility was problematic, nonetheless, the neoclassicals proceeded to define a utility function as if utility was measurable. They gave a host of circular arguments to excuse this oversight; systematic empirical evidence or analysis was almost completely absent.

Economic theory has depended upon assumptions that were included because of the effect they would have on the outcome of the theory, rather than because there was a cause to believe the assumptions reflected reality. For example, Walras wrote, “Let us suppose, for a moment, that utility is directly measurable,” and proceeded to show how this was useful for his theory, and then concluded that “I shall, therefore, assume the existence of a standard of measure.”<sup>26</sup> Mathematicians complained that utility was not measurable, which would render even simple mathematical operations meaningless. Walras justified the mathematical existence of a utility function by stating that it was necessary for his theory to work. He justified the assumption that people use a utility function by the following circular argument: (1) assume that markets tend to be in equilibrium, (2) assume that individuals maximize their utility, (3) conclude that if people were not able to measure their utility then markets could not equilibrate, therefore people must be able to measure their utility and use this to make choices.

Psychologists criticized economics as hedonistic for assuming that behavior is always aimed at maximizing utility. The Institutionalists used the psychological criticism of NCE as a launching point to create a study of economics based on institutions and sociology. The neoclassicals ignored sociological criticisms by shunning the softer social sciences for their lack of rigor and sidestepped psychological criticism by claiming to only be interested in behavior, not the “black-box” of the mind that led to such behavior, and therefore psychology was not important.

In 1906, Pareto introduced ordinal utility<sup>27</sup> in the hopes of creating a theory that only depended on empirically observed behavior in the market. In 1934, a theory of equilibrium was constructed that was not dependent on utility

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<sup>25</sup> Stiglitz, Joseph. “There is no invisible hand”, *The Guardian*. December 20, 2002

<sup>26</sup> Taken from a paper in August 1873 which was a prelude to his *Principles*. . Quoted in Moscati, Ivan: *Were Jevons, Menger and Walras really cardinalists? On the notion of measurement in utility theory, psychology, mathematics and other disciplines, ca. 1870–1910*. (2010) page 30

<sup>27</sup> Ordinal utility was a listing of preferences, rather than measurable quantity. Ordinal Utility only tells which option is better, but gives no comparative information regarding *how much* better.

functions, and therefor sidestepped the mathematical and psychological criticisms brought about by using a utility function. The utility function was replaced by forming sets of “bundles of goods” such that the consumer was indifferent to each “bundle of goods” in the set<sup>28</sup>. They believed that these sets of goods could be discovered by empirically observing consumption habits in consumers. However, this theory soon ran into trouble because when observing consumption habits, it is only purchases that are observable, the choices that led to those purchases cannot be observed. It is not possible to know what a person *didn't* buy when s/he is observed to buy a certain collection of products, or to know what they *would* have bought if something else had been available. Hence if a consumer is observed to buy a certain bundle of goods, it is not possible to know what other bundles of goods belong to the same “set”.

Utility had therefore no empirical possibility until Paul Samuelson put economics more solidly on the behaviorist stance by introducing revealed preferences. He was wedding economics to psychological behaviorism and this was to prove a definitive movement that would distance economics from the other social sciences. The behaviorists saw man as an animal with different types of behavior and equated psychology with the study of behavior patterns. They took psychological symptoms as primary, they saw people as machines void of an inner self and decisions as response mechanisms. Such ideas were ideally suited to neoclassical economists who wanted to justify the use of utility concepts. They implied that preferences were simply a manifestation of the consumers' conditioned response mechanisms, which would be revealed through their spontaneous behavior in the market; hence consumers did not even need to know their preferences.

Revealed preference theory, however, failed. Economists could not derive indifference curves from controlled experiments, let alone from data on the market. In 1953, Milton Friedman published his famous *Methodology of Positive Economics*, where he put an end to the need to justify assumptions by claiming economists have the right to make “wildly implausible” assumptions about individuals provided that aggregate data behave as if the assumptions were true. The failure of economic behaviorism did not result in a more intuitive approach, but instead was used as an excuse to move mainstream economics into the use of statistics in the emerging field of econometrics. Ideologically, the early development of NCE overshadowed an ongoing conflict between those who felt economics should be rigorous and those who felt it should be based on introspection and sociological understanding. The latter claimed that examining behavioral data would not reveal causal relationships and so one could never know if future behavior could be estimated from past behavior. As we have observed over and over in our study, NCE has consistently changed its assumptions to be less and less realistic and more and more detached from the real world.

### Consumer theory

Preferences are still used as the foundation of general equilibrium, game theory, DSGE models, etc., where the core idea remains a simple picture of downward sloping demand intersecting upward sloping supply and defining market equilibrium. However, it is not possible to discover preferences by observing consumer choices<sup>29</sup>. So preference theory becomes a theoretical game used to justify demand curves. And even as a theory, it requires a host of senseless assumptions about what entails rational behavior; without these assumptions it becomes impossible to construct an individual's demand curve from his or her preferences.

Experiments<sup>30</sup> suggest that optimization was the wrong metaphor to use when describing decision-making. Within a given individual there are almost always contradictions between satisfaction, psychological well-being, happiness, productivity and actual enjoyment of life's moments, which lead to a marked difference between premeditated thinking about life, choices made when living life, the experiences that result, and the memories of those choices and experiences. This implies that people do not rank preferences or even consider utility, and it certainly means that the economists' assumptions about rational behavior are not justified. Most economic choices are made impulsively and thereafter people tend to fabricate rationalizations that gave the illusion that the choice was made after proper

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<sup>28</sup> For example, if there are two goods in a market, apples and bananas, and a consumer is indifferent between bag A (containing 5 apples and 3 bananas) and bag B (containing 3 apples and 4 bananas), then bags A and B would be in the same “set”. In a two-good model, these sets formed *indifference curves*. Indifference curves contain identical information to an ordinal utility function provided that utility had certain properties; the change was only semantic, but it gave the illusion that they were not “peeking into the mind of the consumer”.

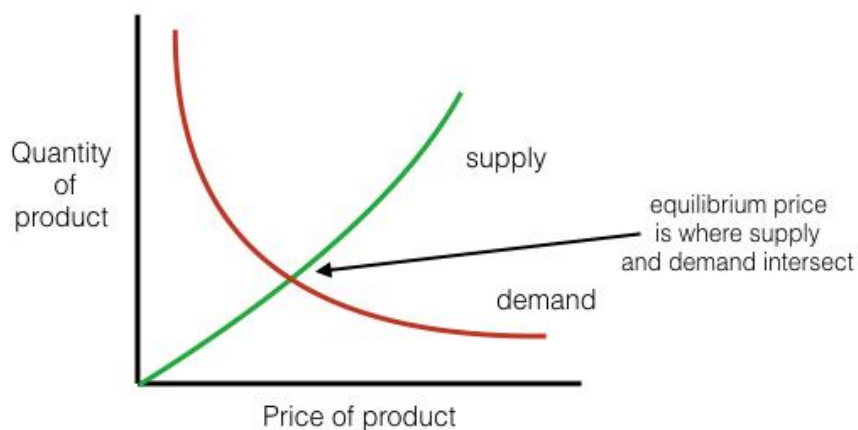
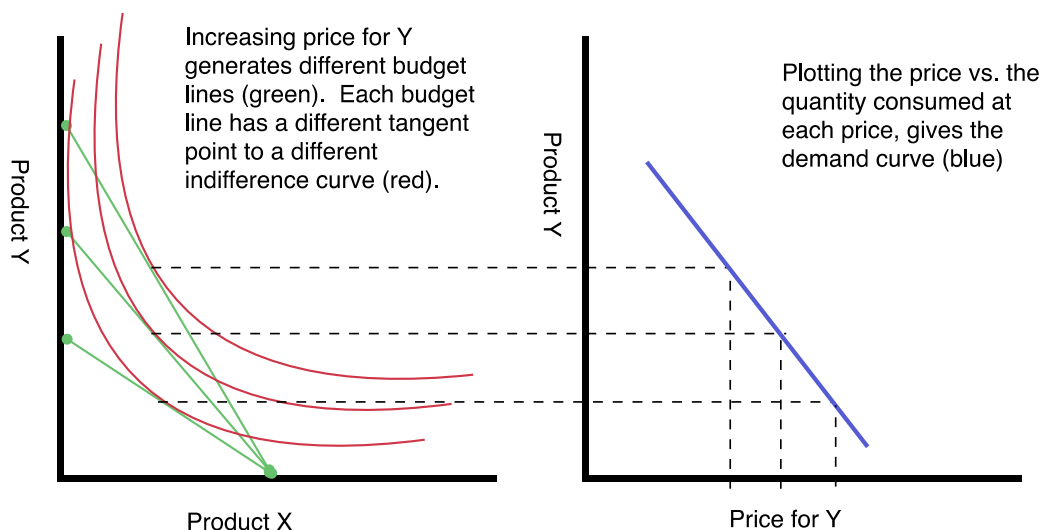
<sup>29</sup> Peoples' preferences for bundles as well as the bundles offered in the market would change long before enough observations could be made to even estimate the simplest preferences. Furthermore, one cannot tell the difference between a consumer choosing his preferred bundle or randomly choosing from a set of bundles between which he was indifferent. Lastly, we never observe them *choosing* between bundles; we observe them shopping and sequentially choosing each item separately and it is impossible to observe what they are *not* choosing vs. what they simply did not consider.

<sup>30</sup> Kahneman and Tversky conducted many and varied experiments over a 14 year period, documenting peoples biases and decision processes. Kahneman wrote a book called *Thinking Fast and Slow* about their research; it was dedicated to Tversky, who had died after 14 years of collaborating with Kahneman.

deliberation, and even in cases when people have trouble to impulsively choose something, they will use absolutely unrelated information to make decisions easier<sup>31</sup> rather than resort to a rational thinking process.

## Macroeconomics

All macroeconomic theories are only modified versions of the same theories derived at end of the 19<sup>th</sup> Century by Walras, et. al. We include here a brief summary of the standard supply and demand theory, because (perhaps surprisingly) these simple pictorial models are used by neoclassical economists to analyze markets for products, financial markets, money, labor, etc. and are the basis for modern theories.



This is the pictorial way to derive individual demand curves from the indifference curves (utility) of a consumer. The pictures that are drawn to explain this theory are generally only for two commodities; with  $n$  commodities you will not get indifference curves but  $n-1$  dimensional indifference spaces that are “tangent” to  $n-1$  dimensional indifference spaces. The indifference curves are generally drawn to look like those above (in red), and so students find this theory

inherently palatable, but as the above analysis of microeconomics and its assumptions demonstrates, the indifference curves are not possible to know and even if they were, they would not look like the simple curves drawn above. Similar pictorial methods are used to draw curves for the supply of products by a firm. Another important thing to note is that this is a purely hypothetical device that is used to demonstrate market equilibrium. It is impossible to empirically observe indifference curves and derive the demand curve for even a single consumer of a single product.

Once the curve for the demand of a single person for a certain product has been supposedly calculated (which is not possible), and then this process repeated for all people in the market, neoclassical economic theory proposes to add them all up to form the total market demand curve. Likewise, when the supply curve for a single supplier of a product has been generated (also not possible in reality), then this repeated for all suppliers and these curves are added up to

<sup>31</sup> In one experiment, Kahneman asked German judges to roll a pair of loaded dice that always came up 3 or a 9 before suggesting a prison sentence for a shoplifter. On average, those who had rolled a 9 gave the shoplifter a 50% longer sentence (8 months vs. 5 months). When faced with a choice that was (1) important for someone’s life and (2) somewhat arbitrary, their minds were seeking some basis for judgment and they unconsciously employed a number shown on a dice. If Judges, who (as their name suggests) are discriminating people and are in a situation in which they have training and ample time to utilize their rational thinking, will allow their choice to be altered by something as irrelevant as the number on a pair of dice, then can the economists have any justification in claiming that an untrained consumer making an unimportant choice on the spur of the moment will use a rational process in their choice?

get the market supply curve. Only then can these supply and demand curves be plotted against each other. The intersection should be the equilibrium price. This is a theoretical process; in reality the sellers do not know this price. In fact, we will see there are many problems with this process.

It seems plausible that if there is only one person and one product, then rising price will drive down demand and cause an increase in supply, leading to a unique point where they intersect; but reality is not so simple. The real economy contains many elements that interact in a dynamic and nonlinear way. In order to make the theory tenable, neoclassical economics had to eventually assume, in fact, that there is only one person, one product, and one seller.

### **Supply and Demand**

Despite the manifold problems generating the individual demand curve, standard NCE proposes to add together all the demand curves for all the individuals to create the consumer demand curve which represents the total demand for products at a given prices.

Then the market supply curve<sup>32</sup> is constructed in an identical way as the consumer demand curve (instead of individual people you have individual businesses), and then the equilibrium price is taken as the intersection of the market supply and demand curves. Neoclassical economics assumes that the supply curve for an individual firm slopes upward<sup>33</sup>; but if you ask anyone in business, they will tell you that their supply curve is either horizontal or slopes downward. The supply curve is assumed to slope upward so as to intersect the demand curve, which is assumed to slope down.

In the theory about the firm, the market price is equal to the marginal<sup>34</sup> cost of production. This theory assumes that (1) every firm accepts the market price and cannot influence it and (2) they can neither influence the local market nor respond to competitors (horizontal demand curve). In reality, it is exactly this process of responding to each other and influencing the market that is supposed to result in the market equilibrating; NCE has thus assumed away the invisible hand mechanism that was supposed to make capitalism function. Firms in the real world are keenly aware that their demand curve is not flat, they do indeed influence demand, and this is an integral part of the logic of running any business.

For all its complicated mathematics, general equilibrium theory does not provide any insight that is not implicit in the assumptions that goes into the theory. The statement of the theory is as follows. Assumptions: (1) all people are identical and have perfect foresight, (2) there is a complete set of markets (i.e. all products available for production and consumption) (3) all markets open at the same moment, (4) all transactions are done instantaneously and simultaneously *at the equilibrium prices*. Conclusion: there will not be any further transaction that could make anyone happier without upsetting someone else (because in which case, duh, that transaction would have taken place simultaneously with all the others).

In a real economy, supply and demand for each product depends on the supply, demand, price, availability, etc., of all other products in a highly complex way. But in the assumptions of this theory, there is an imaginary scenario through which the prices are discovered prior to the exchange at time zero, and only then do all transactions happen instantly at the equilibrium price. However, in real markets it is during the very exchange processes through which sellers gradually discover how much they will charge. The imaginary process that is required to make the theory work assumes that people are organized and cooperative, but this, of course, violates the very theory that neoclassical economics is trying to prove: that markets will lead to equilibrium because the equilibrium was not the result of any market in the first place!

The problems get worse; since all exchanges instantaneously take place after prices have been agreed upon, money is an irrelevant entity. And since there is no time in the model, debt is also non-existent. Modern economic theory is still based on slightly refined and complex versions of these ideas, and so it is not surprising that they said that a crisis or depression is not possible.

### ***The problems with aggregation***

In the standard General Equilibrium theory, it is assumed that the market demand curve for a product has certain nice properties. However, the demand curve is the “sum” of the demand curves of all every separate person (i.e. the

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<sup>32</sup> The reader who wants a summary of supply and demand theory may please see [https://en.wikipedia.org/wiki/Supply\\_and\\_demand](https://en.wikipedia.org/wiki/Supply_and_demand)

<sup>33</sup> Everyone knows that productivity generally increases as production increases, but NCE assumes that the productivity of workers will fall once there are too many in one factory, but no business is so stupid as to cram too many workers in a small space. Like all NCE assumptions, this is nothing but an excuse to make the theory work.

<sup>34</sup> “Marginal” is a common term in economics jargon. It simply means “the last bit” or “an additional bit”. So the “marginal cost of production” is the cost rate of producing “an additional bit” of product. This is different from the average cost of production, which is the total cost divided by the total production. The “marginal rate of profit of capital” is the rate of profit from “the last bit” of capital utilized. This is different from the “average rate of profit” which would be the total profit divided by the total capital utilized.

market demand for a product is my demand for it, plus your demand for it, plus everyone else's demand for it), and it had never been demonstrated that if you add up the individual demand curves for many people that the result would be a market demand curve with the nice properties which the General Equilibrium theory required. In the 1970's, three NCE economists (Sonnenschein, Mantel and Debreu) set out to prove that the aggregation of individual demand curves would produce a nice market demand curve. Their intention was to give more credence to the GE theory, but they arrived at the opposite result, the sum of individual demand curves could lead to a market demand curve that was the opposite of what was needed for the assumptions of the GE theory. As future mathematicians and economists investigated this problem further they revealed that the problem was even worse than demonstrated by Sonnenschein, Mantel and Debreu.

This was the SMD (Sonnenschein, Mantel and Debreu) theorem and it proved that economic equilibrium is neither unique nor stable. If an equilibrium is not unique then there are many possible intersections of the market supply and demand curve, each with a different price. If this is true, then even in the fantasy land of NCE, how would sellers and buyers know which equilibrium price to use in their transactions? Hence, the fabricated scenario where all transactions happen simultaneously at the equilibrium price is not even a theoretical possibility.

Systems move away from unstable equilibrium points and towards stable equilibrium points. A stable equilibrium is like a golf ball sitting inside a bowl, it is easy for the ball to arrive at that position and it has no tendency to move; if it is perturbed then it will return to the equilibrium point. An unstable equilibrium is like balancing a golf ball on top of a basketball, it may be possible to place the golf ball on the basketball, but a bouncing golf ball could never possibly land there by itself and even if the golf ball was on top of the basketball, the slightest perturbation would cause the golf ball to roll off of the basketball. Hence, it is *never* possible for any system to move to an unstable equilibrium, and if any system somehow happens to be in an unstable equilibrium then it would very quickly move away from that point.

The problem which SDM theory highlighted stems from the very axioms upon which NCE is founded. Equilibrium is incompatible with methodological individualism if the motivation is methodological instrumentality. In lay man's terms, this statement becomes humorously obvious: there is no guarantee that a disorganized collection of selfishly motivated individuals will spontaneously create a stable economy. The crux of SMD is that that the pretty picture, which is taught in schools, of a uniformly, smoothly, downward-sloping demand curve is a big lie. Even if individual demand curves are nice and downward sloping (in reality they aren't), the aggregate demand curve can have almost any shape.

Since a neoclassical analysis of all markets (capital, labor, supply, demand, etc.) is based on aggregation, SDM put a roadblock in the analysis. This should have halted all efforts to try to build up a macroeconomic theory from microeconomics, and put a stop to the obsession of demonstrating that economies tend toward equilibrium. But instead the economists cleverly circumnavigate SDM theory by assuming (we're not joking) that there is only one consumer and one supplier in one market for one commodity (hence they do not need to aggregate). It is not phrased this way in the textbooks, of course; rather it is explained that the agent represents the average of all consumers, all sellers, and all markets. But to pretend to use such averages, one must impose the axiom of gross-substitution (otherwise you cannot take the average of products). Essentially, all human interactions have been removed from the model.

Reality is not, in fact, as bad as the SDM results shows; but by trying to construct an unnaturally stable theory, NCE ended up with a model that was unstable. The insistence on individualistic microfoundations, a cornerstone of NCE, is what it made the equilibrium analysis completely untenable. The problem is that mainstream economics refused to admit sociological underpinnings in their economic analysis, but these sociological realities are exactly what provide the non-economical structures in society that prevents the economic world from creating chaos. It is these soft, human, caring, benevolent aspects of social life that allowed markets to exist. In essence, their unrealistic assumptions removed the possibility of a dynamic and organic stability (which is an essential characteristic of living systems); but rather than removing their unrealistic assumptions, they tried to save their theory by putting it into a straightjacket with even more unrealistic assumptions.

### **Labor**

The standard model of labor is often used to argue that progressive taxes, minimum wages, worker benefits, unions and safety laws will disrupt the natural equilibrium of the labor market, which would, the theory goes, have resulted in everyone who wants to work to have a job. This idea underlies the basic argument for the right-wing attack on socially beneficial policy measures. NCE also rationalizes class disparity by saying that bankers and insurance salespersons get paid more because they are more productive than scientists, engineers, teachers, carpenters, and firemen.

Economists ignore the role that money has in making money and that the affluent have a vital interest and play an important role in maintaining a system that serves the interest of a capitalist class.

The neoclassical theory of labor presumes the wage rate is determined by the same analysis they use to determine the equilibrium prices in all other markets. Every criticism that we applied to demand and supply above also applies to the neoclassical economy's analysis of labor. Most importantly, this NCE analysis of labor ignores (as with all of NCE) that businessmen want to make money, and so the worker is *never* paid the marginal profit but always paid less. This obvious fact implies that the equilibrium of supply and demand does not determine the going wage. These criticisms invalidate the arguments for regressive taxation and lowering the minimum wage.

Of social importance, we should note that people do not work less if paid less and more if paid more. The classical economists and early industrialists understood this very well: underpaid and hungry workers will work more because you have to satisfy your needs. Normal people desire to live, not consume, and work to pay their bills; if they get more then they will generally work less. Would anyone who needs to feed his family work less if his salary decreases? Aren't we all familiar with the story of someone getting laid off from a decent job and then having to work many more hours, or even two jobs, to be able to maintain an adequate standard of living for their family?

What this implies, is that the labor supply curve tends to slope *downward* and therefor raising the minimum wage would decrease unemployment. Furthermore, the labor demand is actually *upward* sloping because the limiting factor for labor demand is the quantity of output the employer can sell. Higher wages imply an increased purchasing capacity, so there will be greater consumption because the common people have more money to spend, hence the employer will sell more and so will need to produce more and hence there will be a need for greater employment.

Neoclassical economists assume that *households* supply the factors of production, in doing so they treat all households as equivalent and pretend that all people have the same interests. This removes the actual institutional and power structures, which actually govern the economy, from their analysis. This also removes the very real and important effects of class disparity in the economy and in society.

Likewise, they lump together all forms of capital and all the various kinds of production methods, and by doing so, their analysis does not take into account the environmental and social differences between various types of business. This also means that in their analysis, all the various options for the uses of capital are of equal value. Building a school is the same value as building a bomb. These assumptions thus guarantee that the resulting models will be good for corporations and the wealthy because they can pretend that all output is beneficial, and that all profit is equal, no matter how it is distributed.

### **Monopolies**

According to NCE, a monopolist does not need to accept the market price and can therefore under-produce and over-charge, resulting in a cost to society. However, if we use a realistic demand curve for firms, i.e. remove the inconsistencies discussed above, then in the neoclassical model there will no longer be anything bad about a monopoly, it will produce and sell at the same (supposed) equilibrium point as a group of competitive firms. In fact, due to economies of scale the monopoly is quite likely to produce at a socially more optimal point than a collection of competitive firms. This implies that perfectly competitive firms cannot exist in a long-term equilibrium, since returns to scale will drive them to collude. Now if monopolies are more socially beneficial than competitive markets then socialism (i.e. an economy that is not primarily based on competitive production) would be more efficient than capitalism (which insists that the only way for an economy to be efficient is if production is done in a competitive environment).

This conclusion is immensely distasteful to any mainstream economist, and hence the argument against monopoly is much more ideological than theoretical (actually NCE gets trapped in a web of inconsistencies trying to avoid the above conclusion). In actuality, monopolies abound in capitalism and are incredibly powerful, and in areas of the highest market concentration (automobiles, rubber, chemicals, alcohol, junk-food, pharmaceuticals, finance, weapons, etc.) we do not find underproduction (as NCE predicts) but rather a gross overproduction beyond what society needs.

### **The Historical Development of Mainstream Economics**

Classical economics developed at a time when the success of Newtonian ideas dominated the intellectual landscape and anything attempting to be scientific had to seek some mechanism which governed it; everyone was looking for blind mechanical forces that governed reality. After Marx, a new class of economists arose who wanted to create a more mathematical economics that would be useful in fighting socialism—but the most salient point was the same: free markets would lead to a happy state of general equilibrium and therefor capitalism is the greatest and the only rational system worth considering. Their task was to rigorously demonstrate, in any way possible, making any assumptions necessary, that general equilibrium was a reality. They took their cue from physics. "In appropriating the formalisms of mid-nineteenth-century energy physics and adapting them to the language of utility and prices, the

progenitors and their epigones adopted a certain worldview..."<sup>35</sup> that would determine what was to be befitting of economics orthodoxy; a world view that limited economic discourse to a narrow domain of precision and rigor and considered *words* soft and vague. But did not this softness allow them to point to the depths wherein lie the actual causal relationships? Economists were stuck mathematically modeling the *effects*, while the causal factors remained beyond the purview of their mathematical models.

After the Great Depression, people started to lose faith in economics and in capitalism. Keynes understood that true capitalism was self-destructive and sought to save it by introducing just enough socialist elements to blunt capitalism from destroying itself again. He made an effort to halt the process of excessive mathematical abstraction and to create a legitimate macroeconomic language not based on individualism or equilibrium. This may have led to a *social* science of economics but he could not let go of the ideology that markets should remain the major organizing principle of society. His basic concepts were not difficult, for the most part they were much more intuitively obvious than those of the neoclassicists, but they were hard to apply whereas neoclassical ideas were nonsense, but readily lent themselves to authorities who wanted to create policy.

The major flaw, however, was that Keynes was unwilling to point to the major culprit, i.e. to role that the tremendous wealth disparity had on limiting demand and creating unemployment. That would have been sacrilege for an economist. He remained close enough to the economic paradigm so that neoclassical economists were able to alter his theories and keep them as additions to NCE. His general theory *removed* three axioms from NCE (ergodicity, gross-substitution, and neutrality of money). Only one year after Keynes's published his theory, Hicks had dumbed down Keynes ideas to three absurdly misstated points and a simple model which everyone thereafter assumed to embody Keynes's ideas. More than 30 years later, Hicks saw that his interpretation had led economics down the wrong path and published an apology followed an explanation of how his theory did not do justice to Keynes's ideas. By the 1980's Hicks was adamantly opposed to his model and to the mainstream models that had evolved from it.

Samuelson from MIT was a dominant figure during the post-war period who shaped the outlook of economists. His focus was on mathematical optimization. He was a self-proclaimed Keynesian, however he never let go of his neoclassical upbringing and formed the Neoclassical Keynesian Synthesis School. He kept all three of the NCE axioms that Keynes had denounced. His theory was neoclassical equilibrium theory that allowed for imperfect completion cum temporary disequilibrium to allow for short-run unemployment to be a theoretical possibility according to NCE. However, Keynes had emphasized that underemployment was not due to imperfect competition and went to great lengths to show that unemployment was possible *even in the idealist case of perfect competition*. "Samuelson, who became the premier American Keynesian of his time, had either not read, or not comprehended ... chapter 19 of *The General Theory*."<sup>36</sup> The conspicuous absence of *uncertainty*<sup>37</sup> in Samuelson's models meant that he had completely sidestepped the most essential aspect of Keynes's theory, and this led to conclusions that were exact negations of statements made by Keynes.

There were also ideological reasons that limited Keynes ideas. Mainstream economics suggested that it was the workers that were to blame for their own problems, that unemployment was voluntary, that all socialist ideas would only interfere with the market and make problems worse, that all markets (including labor) should be liberalized, that labor unions should be broken up to prevent them from damaging the natural functioning of society, etc., and the powers-that-be would not have it any other way. Those few who attempted to publish Keynes's real theory or to oppose the trend towards abstraction met with censorship and ostracism.

Soon NCE stopped even *attempting* to explain the real world; models may have used economic terms but were shamelessly unrepresentative of any real economic system. In the preface to Debreu's *Theory of Value*, "The theory of value is treated here with the standards of rigor of the contemporary formalist school of mathematics.... Alliance to rigor dictates the axiomatic form of the analysis where the theory, in the strict sense, *is logically entirely disconnected from its interpretations*." [my italic]<sup>38</sup> To make it clear, he said that rigor and axioms were more important than being relevant to the real world. His book was the main book used by graduate schools for over a decade and trained the next generation of economists in how to conduct their craft and to develop new theories.

Hick's model was extended to the ADAS model, followed by the Harrod–Domar model (1946), the Klein–Goldberger model (1955), Mundell–Fleming model (1962), the Solow<sup>39</sup>–Swan model (1956), which became a common starting

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<sup>35</sup> Ibid..

<sup>36</sup> *ibid.* page 182

<sup>37</sup> Keynes went to great lengths to emphasize the difference between risk (which is probabilistically known) and uncertainty (which is probabilistically unknown)—risk can be treated in terms of "expected gain", but uncertainty cannot. In fact he said that uncertainty was the hallmark of his theory. The real world has much more uncertainty than calculable risk. To remove uncertainty is to ignore Keynes altogether.

<sup>38</sup> Debreu, Gerard. *Theory of Value: An Axiomatic Analysis of Economic Equilibrium*. Yale University Press. 1959

<sup>39</sup> This model, like much work in economics, is surprisingly simple (aside from the task of pulling assumptions out of thin air); It is a linear ODE whose solution is a constant plus an exponential. It gives the unrealistic result that the economy will converge to a steady fixed growth rate *exponentially fast!!* And left open the question, why do economies take so long to settle down in reality?

point for a stream of more extensive large-scale models; all were either linear or assumed that the nonlinearities would not affect the equilibrium and did not consider how the economy moved between equilibria<sup>40</sup>. The theories contained highly restrictive and unrealistic assumptions to limit the potential nonlinear effects.

Friedman enters the picture in the beginning of the 1950's as the leader of the Chicago School, intent on removing all traces of Keynesianism from economics, and re-establishing original NCE. He reasserted that money was neutral, that inflation was only due to monetary policy and, most famously, declared that *the plausibility of assumptions does not matter* so long as the theory is useful. Useful for whom is not discussed, but it was understood that he meant useful for making policy. For Friedman's stance to be honest, the academic study and practice of economics would have to be based on an empirically driven methodology that would firmly abandon theories (and the teaching of those theories) once they have been shown to be inaccurate. If we insist that the assumptions and internal details of the model are not relevant, then an inaccurate theory must be trashed. Friedman did not. Even when his theories were shown not to give results, he stuck to them. As a result, he ended up with a theory based on unrealistic, even silly, assumptions that had no predictive value whatsoever.

In science, the assumptions are the real understanding, the models built on top of them are but the details that serve to verify the assumptions; it is *exactly because they insist that assumptions do matter* that the falsification of a theory implies that the assumptions need to be adjusted, and this leads to a deeper understanding. Friedman's statement had a negative effect on the epistemological approach to the study of economics by violating the purpose of science. Science is not an effort to create magic formulas that seem to make predictions, but a search for understanding to explain how phenomena arise, relate, and fit into a system.

In reality Friedman's logic was little more than a rejoinder of the fact that GE could not be rationalized. Lucas went even further, declaring that the strength of NCE's "artificial, abstract, patently unreal" assumptions lies in the fact that they do not need to conform to reality because that permits "the development of logical conclusions that are independent of real world political and economic institutions."<sup>41</sup> In the end, the reason that the canon of NCE always includes, and repeatedly reinstates, the same class of assumptions is because they put the cart before the horse: they want certain conclusions and will create a theory that gives those conclusions.

## Ideological influences

In the first half-century, economics departments were under the watchful eye of businessmen and their political supporters, who imposed a neoclassical curriculum and disposed of any heresy. Overt censorship gave way to academic indoctrination, which then defined economic truths, such as, "no one needs to censor economists, they can censor themselves." NCE developed the uncanny ability to avoid alternative ideas and hold steady to market-promoting equilibrium concepts. As Galbraith points out, "Nothing is so important to the defense of the modern corporation as the argument that its power does not exist – that all power is surrendered to the impersonal play of the market."<sup>42</sup> The myth of the optimizing market keeps the door of democracy forever closed by pretending that society is homogeneous. Democracy arises due to the heterogeneous nature of society; in the world of NCE all differences in products, people, interests, values and utilizations are swept away. NCE cannot recognize the interplay of antagonistic groups and interests, it does not allow in its analysis for the interaction of economic and socio-political forces. In such a world there is no scope for either political or economic democracy. As soon as you allow diversity into the analysis then the allocation of resources stops being a matter of calculating equilibrium and becomes a choice to be discussed considering the relevant social issues and various interests.

Ludwig von Mises was a wealthy and influential economist with a disparaging view of equality. He was highly critical of the labor struggle, progressive taxation, minimum wage, unions, etc. He argued that capitalism justly allocates resources through the infallibility of the market system, and that labor unions would fail because they attempted to remove the natural advantage afforded to the wealthy. He claimed the market should dictate the welfare of children, to keep the "lesser stock" in their proper place. For Mises, "making the share of the social product which falls to each member of society depend on the product economically imputed to him ... the elimination of surplus human beings by the struggle for existence...is replaced by a reduction in the birth-rate."<sup>43</sup> After Mussolini had already seized power and brutally crushed the workers movements, von Mises showered praise on him "It cannot be denied that Fascism and similar movements aiming at the establishment of dictatorships are full of the best intentions and that their

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<sup>40</sup> See Keen, Steven. *Debunking Economics Op. Cit.*, Page 251. Also see Mirowski, Philip "From Mandelbrot to Chaos in Economic Theory", *Southern Economic Journal* Vol. 57, Oct., 1990. Or Faggini and Parziale, "The Failure of Economic Theory. Lessons from Chaos Theory" *Modern Economy*, January 2012, page 1-10

<sup>41</sup> Davidson, Paul. *John Maynard Keynes*. Page 34

<sup>42</sup> Galbraith, John. *Anatomy of Powers*. 1983. Page 120

<sup>43</sup> Mises. *Socialism: An Economic and Sociological Analysis*. Original published in 1922. Yale University Press edition 1951 page 317



intervention has, for the moment, saved European civilization. The merit that Fascism has thereby won for itself will live on eternally in history.”<sup>44</sup>

After the depression the public began losing faith in capitalism. The USA’s largest corporations took over the National Association of Manufacturers (NAM) in 1932, increased its public relations budget by 20 times and started a full-scale propaganda assault on anti-capitalists ideas. They influenced media, advertising, education and professional academics—especially history and economics. Behind the scenes they operated through universities via “a massive ‘economic education’ program, aimed at the public, school students and employees, which taught the fundamentals of free enterprise economics.”<sup>45</sup> In 1947 the nation’s largest corporations spent \$100 million (that’s in 1947 dollars!) on a 12 month campaign “to sell the American economic system” to the public through “a major project of educating the American people about the economic facts of life.”

In 1944, Friedrich Hayek published the influential free-market propaganda piece called *Road to Serfdom*. He blamed socialism for the troubles of capitalism, even claiming that the tendency towards monopolies that is observed in capitalistic societies is due to the influence of socialist ideas in the labor struggle and accusing unions of sharing in monopoly profits. He also blamed the socialist workers movements for the rise of Fascism (in fact, the international business community supported the Fascists until the outbreak of WWII in order to destroy the workers movements). Hayek understood that the teaching of standard neoclassical economics was the ideal tool for promoting free-market policy.

In 1946, economists, business executives, media magnates, and advertising researchers created the *Foundation for Economic Education* (FEE), dedicated to advancing economic freedom, private property and free trade through “economic education”. The 20 largest corporations in the USA supported the FEE. With von Mises as its economic advisor, it was connected to the congressional Educational Advisory committee, and had relations with hundreds of newspapers and magazines who regularly printed FEE articles. In 1947, historians, journalists, politicians, philosophers and economists formed the Mont Pelerin Society in order to have a long-term influence on the climate of opinion and on academics. They helped free-market economists get positions at American universities. The Institute of Economic Affairs and American Enterprise Institute are think-tanks promoting free market economics through the media and various publications. The Brookings Institute became active in promoting neoclassical ideals and is currently the most influential think tank in the world. The Liberty Fund was created to influence the education system, followed by many more. Then in 1981, economists and business elites formed the Atlas Economic Research Foundation to create and network 150 market-oriented think tanks in over 20 countries. These think-tanks edit or hold sway over the content of the major economic journals, many media outlets, educational departments, etc. They provide expert opinion to journalists and politicians to create a climate of opinion in favor of laissez-faire economics amongst the general population.

To economists the beauty of a free market based on competition was that it was efficient ... But for business people the theory had its merit on a political level. It disguised the power that they wielded, it re-labelled their drive for profit as public service, and it provided an argument against government regulation of business activities. Economics was presented as a science but was more often simply an argument for the promotion of free enterprise, with minimal government interference.<sup>46</sup>

## General Equilibrium Theory

We will now take another look at macroeconomics, but this time focus specifically on the general equilibrium theory (GE). Although a number of recent Nobel laureates have demonstrated various problems with this theory, it still dominates the teaching and practice of economics. Mainstream neoclassical economists, from both camps, cling to GE theory with religious convictions; they insist that the economy is stable and have gone to great lengths to patch up the holes in their theory. Reality, however, repeatedly demonstrates that the world does not accord to their theory, and whenever we have an economic crisis, such as a recession, depression, or a stock market crash, these deviations from theory are ignored or rationalized as being caused by “external” factors.

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<sup>44</sup> Written by Ludwig von Mises. *Liberalism*. 1927. Available online <https://mises.org/library/foundations-liberal-policy#10>.

<sup>45</sup> Bender, Sharon. “The Role of “Economic Education” in Achieving Capitalist Hegemony” *State of Nature*, 2, Sept/Oct 2006.

<sup>46</sup> Bender, Sharon. *Free Market Missionaries: The Corporate Manipulation of Community Values*. Earthscan Publishers. London. Page 47

## Equilibrium vs. Dynamics<sup>47</sup>

We will start with the simplest example of a nonlinear recurrence relation to illustrate the difference between equilibrium and dynamics<sup>48</sup>. A recurrence relation is simply a way to generate new number in a sequence based on the previous numbers in the sequence (e.g. the Fibonacci sequence). For our example we will use the logistics equation<sup>49</sup>,  $a_{n+1} = ra_n(1 - a_n)$ . Note that we are only interested in values of  $a_n$  between 0 and 1. The parameter  $r$  can be varied from 0 to 4. The equilibrium value is simply where  $a_{n+1} = a_n$ . For  $r \leq 1$ , the only equilibrium point is  $a = 0$ . For  $r > 1$  there are two equilibrium points,  $a = 0$  and  $a_{eq} = \frac{r-1}{r}$ . Equilibrium analysis only seeks to know these two points. This is useful if the values of  $a_n$  approach the equilibria. Dynamic analysis wants to know actually what happens to the values of  $a_n$  over successive iterations. So, the question we want to examine is, for various values of the parameter  $r$ , what happens will successive iterations  $a_0, a_1, a_2, a_3, a_4, \dots, a_n, a_{n+1}, \dots$ . Here we summarize the results.

Value of $r$	What happens to $a_n$	Nature of equilibrium
$0 \leq r \leq 1$	The values of $a_n$ will tend to 0. The smaller $r$ is, the faster they will approach 0. i.e. the population will die off.	Here 0 is a stable equilibrium, and there is no other equilibrium point
$1 < r \leq 2$	The values of $a_n$ will quickly approach $a_{eq} = \frac{r-1}{r}$ . Only if the initial value is 0 will it remain at 0. The values of $a_n$ will directly approach $a_{eq}$ without any fluctuation.	Here $a_{eq}$ is a stable equilibrium and <i>attracts</i> all initial values to it. 0 is an unstable equilibrium, no matter how close the initial value of $a_1$ is to 0, even if $a_1 = .000001$ then values of $a_n$ will quickly grow and approach $a_{eq}$ .
$2 < r \leq 3$	The values of $a_n$ will still approach $a_{eq}$ , but now they will fluctuate and oscillate around $a_{eq}$ . As $r$ gets closer to 3, the values of $a_n$ take more and more time to get close to $a_{eq}$	Note that in equilibrium analysis, there is not information about the oscillatory behavior and the number of iterations it takes to get close to the equilibrium state.
$3 < r < 1 + \sqrt{6}$	Unless the initial value is exactly 0 or $a_{eq}$ , the values of $a_n$ will not approach $a_{eq}$ . The values of $a_n$ will approach a 2-cycle. That is to say they will settle into a permanent oscillation between two values. These two values will change for different values of $r$ . This two-cycle is an "attracting" or "equilibrium" cycle.	Here both 0 and $a_{eq}$ are unstable equilibria. If we only use equilibrium analysis we will only discover the equilibrium point, but we will not know that the values of $a_n$ will never approach that equilibrium. We would not be able to discover that the true behavior of the system is to oscillate between two values.
$1 + \sqrt{6} < r < \sim 3.544$	Instead of $a_n$ approaching a two-cycle, it will approach a four-cycle. i.e. the values of $a_n$ will settle into a permanent oscillation between 4 values.	Again, both 0 and $a_{eq}$ are unstable equilibria. Same comments as above, but now the behavior is more dynamic
$\sim 3.544 < r < \sim 3.570$	For increasing values of $r$ , the sequence of $a_n$ will settle into an 8-cycle, then 16-cycle, then a 32-cycle, then a 64-cycle, then a 128-cycle. There are values of $r$ for which $a_n$ settles into a 32768-cycle, because $32768=2^{15}$	This range of values of $r$ represent "period doubling". For every power of 2 there is some small range of values of $r$ for which $a_n$ will settle into a cycle of that length. Again, equilibrium analysis would simply tell us that there is an equilibrium point at $a_{eq}$ , but since that is an unstable equilibrium point it does not tell us anything about what happens to the values of $a_n$
$\sim 3.570 \leq r < 4$	$r = 3.56995$ is the onset of chaos. For most values of $r$ in this range the movement of $a_n$ is chaotic. Never repeating or settling into any cycle.	Although the behavior is chaotic, as $r$ grows from 3.56995 to 4 something interesting happens. Suddenly the chaos will stop and there will be small ranges of values of $r$ where 5-cycles, 3-cycles, 9-cycles, 36-cycles, in fact it is possible to find a cycle of any length emerging out of the chaos for some value of $r$ .

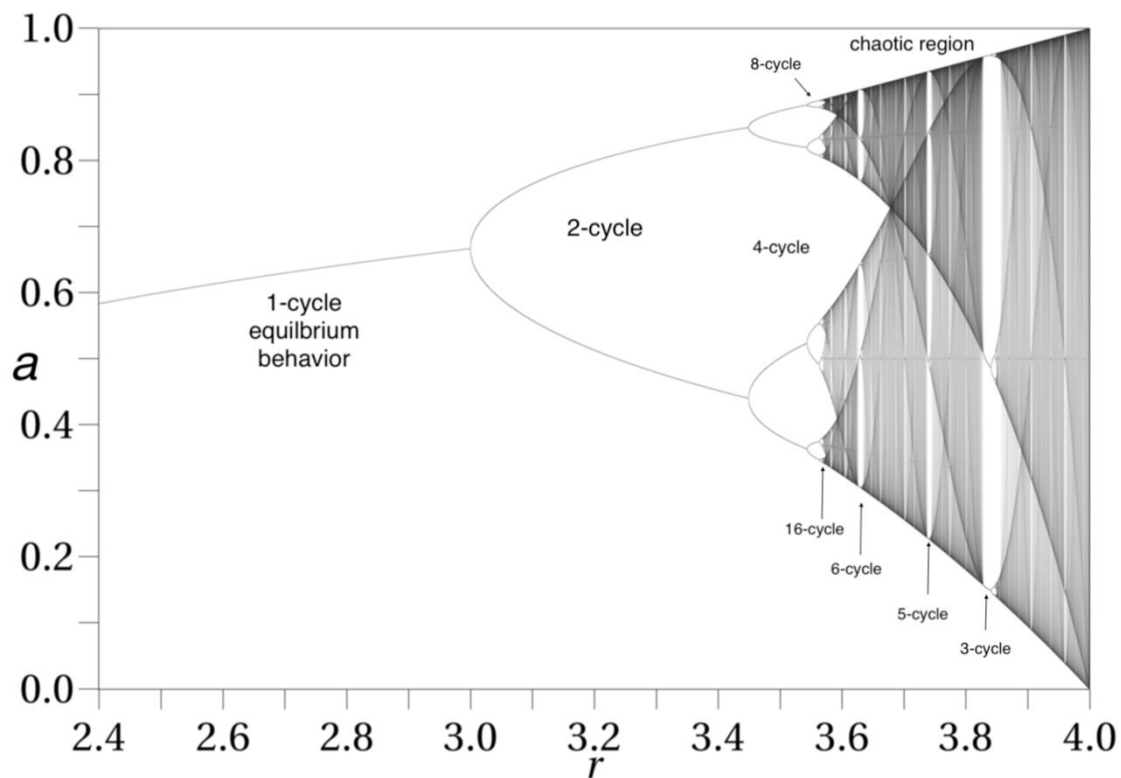
<sup>47</sup> This and the following sub-sections are unavoidably abstract, because they discuss the mathematics of linear vs. non-linear equations.

<sup>48</sup> The phrase "non-linear" generally refers to systems of partial differential equations where the unknown function and its derivatives appear as nonlinear terms. For example,  $f^2 \frac{d^2 f}{dx^2} + 2f \frac{df}{dx} - \frac{1}{3x} = 0$ , is a nonlinear equation because  $f$  is squared and is also multiplied by its first and second derivatives. This equation has a closed form solution  $f(x) = \sqrt[3]{x \log(x) + c_1 x + c_2}$ . But it is incredible rare for a second order nonlinear equation to have a solution that can be written down explicitly. Because a discussion of differential equations requires too much mathematical jargon, we chose a nonlinear recurrence relation as our example.

<sup>49</sup> This equation models the annual population of a species, and also has applications to economics when studying the growth and spread of innovation.

$r = 4$	This is a special case. Here the behavior is dependent not only on $r$ , but also on the initial value of $a_0$ . For all previous cases (i.e. for $r < 4$ ) the behavior was independent of $a_0$ . Most initial values of $a_0$ will exhibit chaotic behavior, but there are values of $a_0$ that will settle into cyclic behavior of any length.	
$4 < r$	If $r$ is bigger than 4, then the sequence of $a_n$ diverges to infinity. The model is no longer valid because we were looking for values of $a_n$ between 0 and 1	Actually, equilibrium analysis would not even notice that the model breaks down at $4 \leq r$ , because the equilibria at 0 and 0.75 still exist.

This is displayed in the diagram below. This is the famous bifurcation diagram. Values of  $r$  are plotted on the horizontal axis. Values of the long run behavior of  $a_n$  are plotted on the vertical axis. As you can see, until  $r=3$  there is a fixed point. Then a 2-cycle, then a 4-cycle, then an 8-cycle, the other  $2^n$  cycles are hard to see, but they are there. Then comes the onset of chaos. But almost magically, this chaos is interrupted by moments of cyclical behavior (around  $r=3.832$  one can easily see a 3-cycle). notice that for  $r>3$ , the equilibrium still exists at  $\frac{r-1}{r}$ , but the values of  $a_n$  never go there.



The trouble with equilibrium analysis is that the forces that are important in a dynamic situation do not even exist in a static one. By linearizing the equations and making assumptions that ensure an equilibrium exists, the problem is fundamentally changed. GE analysis searches for a static solution to an altogether different problem that is so far removed from the dynamics of a more realistic model that it does not even include time<sup>50</sup>.

The first point is that the GE project failed, not only because it neglected dynamics, but because even in the equilibrium case, in order to mathematically prove that equilibrium even exist, they needed to progressively make the assumptions more restrictive and less realistic. The failure of GE theory arose, of course, from the mistaken approach of assuming that there must be a general equilibrium and then trying to find a way to prove it. This began by imitating physics (thermodynamics in particular) because in thermodynamics equilibrium analysis is common. But thermodynamical equations are (1) linear and (2) involve time. As the economy is much more complicated than the flow of heat, economists could not analyze the non-linear equations (at that time nobody could) and so looked for a static (i.e. without any dependency on time) equation to analyze instead. But as the discussion of SDM theory showed, it was not even possible to demonstrate a static general equilibrium.

<sup>50</sup> note that in an exchange economy, the absence of time analysis implies that money also is neglected from the analysis because money is a means to facilitate exchanges that are dispersed in time.

As the mathematics of non-linear analysis developed in the 20<sup>th</sup> century it became clear that simplifying a nonlinear dynamical system and looking instead for equilibrium states is completely untenable (in any field). “Most modern-day economists believe, as did the founding fathers of economics, that dynamic analysis would simply ‘fill in the dots’ between the static snapshots, thus replacing a series of still photographs with a moving picture. In fact, modern research in mathematics ... has shown that dynamic analysis normally leads to results which contradict those of static analysis.”<sup>51</sup>

Dynamical systems tend to exhibit chaos, diverge, or fall into cycles of arbitrary length. The cyclical behavior is irregular and unpredictable. One can never predict where exactly they will go due to an extremely sensitive dependence on initial conditions, which means that two initial points that are arbitrarily close together will follow wildly different trajectories after a relatively short period of time. Small changes in the parameters of nonlinear equations can cause the entire dynamic to change form from cyclic, to divergent, to attracting; equilibrium points can emerge and disappear, and in ways that is hard or impossible to predict. In the example of the logistics equation above, for  $r \geq 3.449$ , the behavior is very sensitive to the parameter value, i.e. even small changes in the value of  $r$  will yield very different behavior.

## DSGE

Dynamic Stochastic General Equilibrium (DSGE), or some variant, stands as the central tool of NCE. They are based on the same models used in the early 1900's, which have absolute faith in equilibrium and ergodicity, and assume independent variables are normally distributed. They introduce a monetary authority that follows some simple (predictable) rule for adjusting interest rates.

Probability was introduced into economics as a small correction to the original equations by simply adding a small probabilistic *perturbation* onto the original deterministic aspects. This only works if (1) the original equations are linear and (2) the solutions are stable and unique; in that case the perturbations remain small and the solution is *close* to the original. On the other hand, if solutions are unstable then the small perturbation could quickly become larger than the original solution. So all the non-linearities were artificially removed from the equations, but those very non-linearities described the processes that determine how the economy and economic policy works! In addition, DSGE analysis is restricted to only consider small variations from a steady state of growth. DSGE models always move towards equilibrium because *they have been designed to perform in that way* in every circumstance. The problem is that the original equations were nonlinear and likely would not have moved towards equilibrium.

DSGE does not incorporate the financial sector; this should be surprising since they were the main tool used by Central Banks and advisers to policy makers in monetary policy. Neglecting the financial sector was based on four assumptions that are so blatantly false they do not require any commentary: (1) Financial sector *always* tends to equilibrium, (2) Private leadership in the financial sector will always manage any short periods of disequilibria to ensure that markets still clear until the next equilibrium, (3) Financial markets are complete: no defaults, insolvencies, illiquidity or other imbalances, (4) Financial markets are not subject to uncertainty.

The fact that DSGE models have a dubious performance record does not stop them from being taught in graduate programs and being the main tool of policy makers. “Most mainstream macroeconomic theoretical innovations since the 1970s ... have turned out to be self-referential, inward-looking distractions at best. Research tended to be motivated by the internal logic, intellectual sunk capital and esthetic puzzles of established research programmes rather than by a powerful desire to understand how the economy works.”<sup>52</sup> Shortly before the 2008 crisis, the FED presented a paper by Mishkin<sup>53</sup> to give “confidence” to the participants. This was already a year after the mortgage default had started. Based on a simulation done with a variant of DSGE, that assumes a quick clearing of all markets, Mishkin predicted that even if housing prices fell by 20% there would only be a 0.25% drop in GDP and a 0.1% rise in unemployment. Sadly, reality was much different and the economy was plunged into the worst depression since 1929.

## Chance, Econometrics and Financial Markets

Financial trading used to be based on rules of thumb and investigation. In 1961, the principles of NCE were used to create a rigorous model of finance, but they were based on an absurdly idealistic financial market and on the patently ridiculous assumption that price movements were disturbed according to the standard bell-curve. This eventually led to a formula that allowed traders to attach calculated values to financial assets. The formula was a gross approximation that could fail in a big way, but everyone used it because it was the only way to attach a standard value

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<sup>51</sup> Keen, Steve. *Debunking Economics*. Page 206

<sup>52</sup> <http://blogs.ft.com/maverecon/2009/03/the-unfortunate-uselessness-of-most-state-of-the-art-academic-monetary-economics/>

<sup>53</sup> Mishkin, F. “Housing and the monetary transmission mechanism” Proceedings of the Meeting at the Federal Bank of Kansas City, at Jackson Hole, Wyoming, September<sup>SEP</sup>2007. Referenced in *ibid*.

to financial assets—essentially the formula functioned because everyone believed in it. The risk factor was disguised in untenable assumptions. Financial market regulations were dismantled so traders could start inventing complicated financial products and then raking in the profits by hiding the risks in the false mathematics that make the inevitability of a large crash seem statistically impossible.

In the summer of 1982, large American banks lost close to everything they had cumulatively made in the history of American banking. In 1987, stock markets worldwide fell by 25% in one day. Another bank failure in the early 90's required bailouts of more than a half trillion taxpayer dollars. All of the crashes, however, are impossible according to the financial formula. According to the economic theories, the 2008 financial crisis was "equivalent to winning the lottery twenty-one or twenty-two times in a row,"<sup>54</sup> the 7.92% fall of the dollar to the yen was so unlikely that it should never have happened, not even once. In August 1998, the Dow fell by 3.5% on the 4<sup>th</sup>, by 4.4% on the 25<sup>th</sup> and by 6.8% on the 31<sup>st</sup>. The odds of a 6.8% drop are 1 in 20 million, i.e. it should only happen once in 100 thousand years of daily trading; the odds three big falls in one month is 1 in 500 billion, i.e. only once in 2.5 billion years. In August 1997 the Dow fell by 7.7%, which should only happen once in 250 million years; in July 2002 there were three falls in one week, which should only happen once in 20 billion years of trading. In October 1987 there was a 29.2% drop, which has only (10<sup>-50</sup>) odds of happening.<sup>55</sup> Economists ignore these anomalies because they make it all too clear that their theories are invalid.

Since the 1970's, the famous mathematician Benoit Mandelbrot has been detailing the manifold problems with theories used in the financial world (including systemic dishonesty in the use of data) and warning us that crashes were always forthcoming. He emphasized that these anomalies are the key to developing appropriate mathematics. We will not discuss the details; the interested reader may consult his book, *The Misbehavior of Markets*, or his manifold papers. While predictions of risk are not possible, his theories can provide predictions of volatility. For example, in order to build a dam to insure a stable supply of water, one is not interested in the probability of rain, but one needs to know how high to build the dam.

Mandelbrot gave a definitive answer to Friedman's statement that the realism of a theory or its axioms is irrelevant, as long as they have predictive power, by showing that Chicago style economics can never make predictions; *in fact making predictions should not be the focus of economics*. Assuming, as economists do, that we want to continue to have a capitalistic market system, then the question we need to ask is: how to build a dam and how high to build it? Our capacity for reason, which seeks above all things to understand the world, rebels against Friedman's suggestion that truth be acquiescent to the dis-elegant use of baseless axioms and poorly defined objects to produce something which is nonsensical yet useful. If mathematics is the abstract tool of our capacity for reason, then eventually it will call your bluff and make plain that truth cannot stand side-by-side with error.

## Summary

As can be seen from our analysis, the foundations of NCE are not as solid as economists tell us. No theory, no matter how clever or sophisticated, can be better than the assumptions that go into it. In the case of NCE, not only are all the basic assumptions completely false, they seem to have been made without any attempt to model reality. But if this is the case, it also means that economics does not say anything at all about economy in a general sense. However, this was not just an innocuous display of an intellectual problem solving. Although not useful, there would have been nothing wrong with economists making models just to exercise their brains. They were neither foolish nor were they just playing around. The development of economics was a purposeful undertaking, they released their theories into a world of competing ideologies with the intention to lull the common man in complacency and silence those who opposed the ideology of capitalism by giving those who supported the market ideology a claim to scientific objectivity and righteousness.

In this sense, NCE is precisely crafted. Economists have colluded with politicians and business leaders who share a common interest and vision about the way society should be structured and who should be in control. For all General Equilibrium's shortcomings in matters of rigor and believability, it was successful in its intended purpose of giving economists and politicians the authority to create the rules and regulations, to shape markets, and to author the development of countries in a way that corresponds with their theories of what a market economy should look like. It is as if you created a game, and then forced everyone to play by your rules. The way that soccer players act on the soccer field is a direct result of the rules that were established in the first place. If someone changed the rules, the

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<sup>54</sup> Chang, Ha-Joon. *Economics: The User's Guide*. 2014 Kindle edition location 3271.

<sup>55</sup> Mandelbrot and Hudson. *The Misbehavior of Markets*. Kindle edition location 322. How small is 10<sup>-50</sup>, imagine that around every single star in the universe there was a planet like earth orbiting around it, take the number of days in the age of the universe, and then extend each of those days to contain the number of days in the age of the universe and for each of those days imagine that they were trading on the stock market on all the earth-like planets orbiting every star...still it should not have happened.

players would play in a different way. Except that in a market economy, the rules are not created to give everyone the same fair chance of winning, and those who are in the most advantageous position do not even have to follow the rules because the referees will never call them for a foul.

Economics, as taught in schools and universities, has nothing to do with how people would innately tend to interact, trade and produce goods—even in a so-called market system, because an ideal market system was not supposed to need rules (that was the original argument for having a market system). It only showed that if you can forcefully impose certain rules on your fellow human beings, then the people will act according to these rules (except for those lucky few who are allowed to break the rules), and then it *tried* to predict what should happen when everyone played that game. Not surprisingly, it was a miserable failure at predicting anything (as the all-to-frequent economic downturns demonstrate). Initially, the rules were imposed using the threat of starvation; after a few centuries society became habituated, but the ever-present threats of debt, poverty and prison are the referees that keep everyone in line. Of course, just because they were able to craft a set of rules and create a situation where people have to play along, that does not mean that the set of rules are the optimum ones, or even good ones. It is quite likely that a different economic system, with different rules and different goals, would be far more favorable to humanity as a whole.

Economics is therefore not a science that explains how resources are best allocated or how to produce maximum output of goods and services. It is an ideological system that has created an artificial theory to justify policy decisions that, as history has proven, benefit the few at the expense of the many. Once we realize this simple truth, we are free to go back to the drawing board and rethink the way we want the world to function. Why would a system that benefits the many rather than the few be more utopian than one that benefits the few at the expense of the many?