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Taking Down the Totem: A Post-Keynesian Behavioral Critique of Neoclassical Economics

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Taking Down the Totem: A Post-Keynesian Behavioral Critique of Neoclassical Economics

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Thesis Advisor: Professor Edward McKenna, Ph.D

**AN HONORS THESIS PRESENTED TO THE ECONOMICS
DEPARTMENT IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR HONORS IN THE MAJOR FIELD**

Abstract:

This thesis critiques neoclassical economic theory. In each chapter, with the exception of the last two, I will examine a different neoclassical theory and reveal its lack of realism, and how said theory cannot apply to the real economy. With each critique, I show how neoclassical economic theories are built vindicate free market capitalism. Therefore, neoclassical theory cannot actually understand the real economy, and anticipate its movements. The lack of realism in their theories, and staunch commitment to free markets, suggests that neoclassical theories should not be at the forefront of economic policy decisions and education programs. In the last two chapters, I reveal how Post-Keynesian and Behavioral Economics are more effective economic schools, due to their emphasis on building realistic theories. I then conclude that Post-Keynesian economics could increase its superiority to neoclassical economics through engaging more closely with Behavioral Economics.

**Connecticut College
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Introduction

A physicist, a chemist, and an economist are stuck on a desert island with nothing but a can of baked beans for food. They need to come up with a way to open the can of beans. The chemist suggests he can start a fire using the island's palm trees, and can calculate the temperature at which the can will explode. The physicist says he can take a rock and calculate the trajectory and velocity by which the rock would break the can open. The economist says, "You guys are doing it the hard way. Let's assume we have a can opener."^{1,2}

The assumption made by the economist in the joke is not unlike the assumptions that actual economists regularly make. They hold assumptions that allow them to build theories and models that reach clean, often idealistic, conclusions. However, such assumptions restrict their theories from actually understanding and fixing the problems they aim to solve. This joke demonstrates the difference between economics and other sciences. While other sciences aim to model and understand reality, economics has constrained itself to idealistic assumptions which prevent its models from understanding the real world. Much of economics is useful theoretically, but often cannot apply to reality.

Economics is sort of a science. It is a social science: "Economics, like any other social science, is concerned with developing theories whose ultimate aim it is to help us better understand the world we live in" (Wilkinson and Klaes 2). Like other sciences, it has methods, models, and findings, so it can understand and anticipate the movements of the global economy, and the markets and agents within it. Other sciences aim to comprehend the real world so they can make realistic claims and predictions. The track record of

¹ Professor McKenna told me not to open with that joke, since economics professors are tired of hearing it, but I couldn't resist. It's going to make this easier for my dad to read.

² The joke comes from Keen 158-159, but I altered it slightly

economics at understanding reality is not great when compared to other sciences. Many prominent economists failed to anticipate the Great Recession of 2008. There was a major economic crisis that affected all corners of society, but it seemed like no one saw it coming. Much of mainstream economic theory has restricted itself to only understanding a theoretical world, which has prevented it from anticipating major economic events. While most other sciences try to understand and explain various aspects of life and the world we live in, economics limits itself to only understand a world simpler than our own.

Plenty of economists saw the most recent financial crisis coming. The reason why the majority of economists could not predict the crisis was due to the fact that they were working within, and committed to, a methodology that did not allow for economic booms and busts, market crashes, and recessions or depressions. This is a methodology that just assumes that market will be fine when left on its own, which is why it does not account for economic imbalances. This methodology is neoclassical economics.

The aim of this project is to critique various aspects of neoclassical economics. They hold assumptions that allow them to build theories that model the economy resting in a state of stable equilibrium in the long run. These theories let neoclassical economists justify that free market capitalism results in economic stability. Therefore, neoclassical economics is built to justify free market capitalism. When I mention free market capitalism, I am referring to a means of societal and economic organization that argues that if consumers, economic agents, and firms pursue their self-interest, and in which most property is privately owned, the economy will be in a position of stability (long-run equilibrium) and will grow. Therefore, since the economy is stable and growing in a capitalist system, neither intervention nor regulation will be needed. Neoclassical assumptions include linear

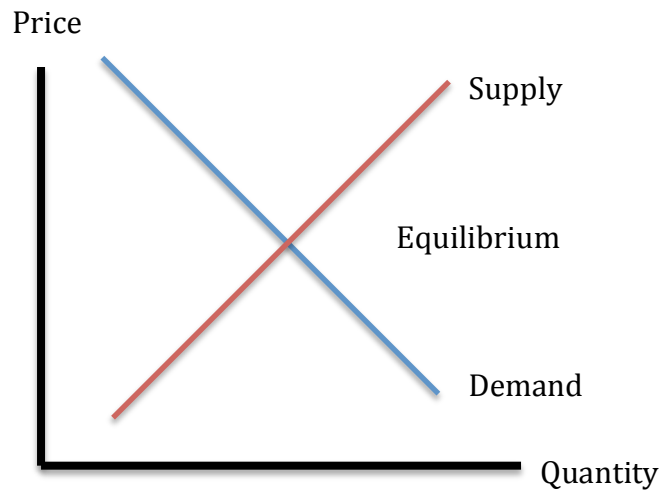
models that yield a single equilibrium point, rational consumer behavior and expectations, prices determine the distribution of income, static analysis, perfect competition and information, efficient markets, risk is the same as uncertainty, and that macroeconomics can be reduced to applied microeconomics. However, these assumptions do not describe reality accurately. Reality is nonlinear, dynamic, subject to uncertainty (which is not the same as risk), has imperfect competition, incomplete information, debt plays a major role in determining aggregate demand, irrational consumers and expectations, and constantly in a state of disequilibrium. Any theory that aims to understand and model the economy, and make realistic claims, needs to incorporate realistic concepts.

Neoclassical economics is designed to justify and reinforce capitalism, instead of understanding and commenting on the economy. The dominance of this school has prevented the development of economics as a more useful science. By turning to alternative schools of economics, like Post-Keynesian and Behavioral Economics, economics can become the effective and thorough science it aims to be.

Australian Economist Steve Keen's 2011 book *Debunking Economics: The Naked Emperor Dethroned?* contains a thorough critique of neoclassical economics, and introduces superior schools of economic thought, theories, and models. I will use Keen's book as my framework, but I will supplement his critique with other concepts along the way. I will start by critiquing the neoclassical model of aggregate supply and demand. Then I will critique their theory of capital and production function, followed by their theories of investment, their commitment to static analysis, and their emphasis on reducing macroeconomics to microeconomics. After the critique, I will introduce alternative models and schools that are superior to neoclassical economics. These schools are Post-Keynesian Economics, and

Behavioral Economics. Finally I will suggest some way these two alternative schools can work together to better assert their dominance over neoclassical economics.

Chapter One: The Totem is a Lie



Any person who has encountered economics at some point in their lifetime knows about supply and demand. They have probably spent hours staring at an image of one downward sloping line, intersecting with an upward sloping line. Much economic discussion and analysis conducted is related to that image, especially the point where those two lines intersect.

The downward sloping line illustrates a society's demand. The belief is that as price rises, quantity demanded falls, which is why the line slopes downward. The upward sloping line represents a society's supply. Economists state that higher prices lead to higher levels of output, which is why the supply curve slopes upward.

The two lines intersect at equilibrium, which represents the price level where firms are supplying a level of output that meets the quantity that all consumers in a society demand. If firms produce at this level, the economy will be stable.

Alfred Marshall developed this graph in the late 1800s, and it is still used today with relatively few modifications. The graph is mainly theoretical, and to draw it, many

assumptions are held that are false in reality. However, it is at the center of much neoclassical economic analysis of real world situations.

Swedish economist Axel Leijonhufvud referred to this graph in his satirical 1973 paper “Life Among the Econ” as the “Totem” of economics. He called it this because economists essentially worship this figure, and use it constantly. Steve Keen reflected this sentiment in his book *Debunking Economics*. Keen went even further in his criticism of the Totem, and went on to assert that it does not exist (74).

Keen argues that the demand curve is not necessarily downward sloping, and the supply curve is not upward sloping, so they will not meet at a single stable equilibrium point. Therefore, this graph (the totem of economics) might not actually exist on either a theoretical level or in actuality, so it might not be able to be used for real-world economic analysis.

Demand at the Individual Level

The first part of taking down the totem is proving that the demand curve is not downward sloping. Neoclassical economists derive the aggregate demand curve by summing up the individual demand curves of each consumer in society. Since each consumer has distinct tastes and preferences, each person will have a unique demand curve.

The downward slope of the individual demand curve comes from the idea that as price falls, quantity demanded rises. This is known as “The Law of Demand.” This simple concept initially makes sense. If a price of a good is lower, more people will be able to buy it, so quantity demanded for that good will rise. If the price of a Bugatti Veyron dropped from

\$2.5 million dollars to \$250,000, more people would be able to buy it (even if these additional buyers are still insanely wealthy), so a higher quantity will be produced.

The Law of Demand aims to model human behavior. Neoclassical Economics assumes rational behavior. If consumers and firms pursue their self-interest and act rationally, then the market will automatically reach equilibrium. When neoclassical economists use the term rationality, they mean that a consumer, when presented with a set of options, will choose the best option available. Rationality assumes transitivity: if a consumer prefers good A to good B, and good B to good C, they will prefer good A to good C (Keen 45). A rational consumer always knows which good is the best option in any situation, so they make that selection no matter what.

The Law of Demand is rooted in the concept of utility. Consumers gain more utility (satisfaction) as they consume more goods. Consumers will always get positive utility from consumption, but as they consume additional units of the same good, the amount of utility gained will drop. This is called the “Law of Diminishing Marginal Utility” and is “the key concept in the economic analysis of human behavior” (Keen 44).

For example, if a consumer is eating donuts, they eat one donut, and they get 10 utils. When they eat a second donut, it still tastes delicious, but it does not have the same impact as the first donut, so it only yields 6 utils. When they eat a third donut, they are feeling full, so the experience is not as great, and only yields 3 utils. Eating a donut will never yield negative utility, but as an additional donut is consumed, it will not yield as much satisfaction as the donuts preceding it.

Theoretically, the law of diminishing marginal utility makes sense. To hold true, it relies on the quantification of utility. However, utility is subjective: it changes from consumer to

consumer, since it is influenced by personal feelings and sentiments. This means it cannot be quantified. Utility is not a cardinal concept, meaning it does not have a specific numerical value. Utility is ordinal: it has to do with rankings. Consumers will rank the goods they will buy based on the theoretical value each good has to them (Keen 44-45). Assuming the consumer is rational (which neoclassical economics does) they will always make the same decision, based on the utility they receive from each good. Since utility is ordinal, it cannot be quantified.

Utility is used to map indifference curves, which depict individual consumer preferences. Utility rises as more units are consumed, so consumers will consume an infinite amount of goods. This is impossible, since people are constrained by the price of goods, and their income. Economists combine indifference curves, prices, and a consumer's income to model consumer demand.

The demand curve shows how a consumer's demand for a commodity changes as price changes. To measure this, economists hold the consumer's income constant. This means they are assuming that a change in prices will not change a consumer's income.³

When the price of a good falls, the consumer has more money to spend on that good, or others. That is the income effect. How the consumer allocates their income due to the change in prices is the substitution effect. Economists always assume that the substitution effect is negative, which means quantity demanded will always move in opposite directions. They assume that the income effect is positive: as price falls, consumers consume more because they have more real income. However, the negativity of the substitution effect outweighs the positivity of the income effect, so the overall result is

³ "... [economists] have to assume that a change in prices won't change the consumer's income" (Keen 47).

negative. These assumptions allow the Law of Demand to hold true. However, the substitution effect can be positive, which means consumers will consume less of a good when its fall in price increases their income.

Such a phenomenon occurs in the real world. When people's incomes rise, they demand goods of higher quality, and will thus spend more money on such goods. Lower quality goods are seen as undesirable, and people only consume them if that is all they can afford, like instant coffee. If the price of instant coffee falls, people could be willing to spend slightly more for fresh coffee. The fall in price gave them more income, so their demand for a certain product fell, directly violating the law of demand. The opposite is also true: there are goods where demand rises as price increases, also violating the law of demand. These are called Giffen Goods. They are typically inferior products that do not have any substitutes. For example, during the Irish Potato Famine, as the price of potatoes rose so did demand for the potatoes. This was because as potatoes got more expensive, Irish households had less money to spend on other more desirable foods (meat and dairy) so potatoes became a larger part of their diet. As the price of potatoes rose, people were eating more potatoes, so demand rose as well.⁴ With Giffen Goods, the income effect outweighs the substitution effect, so the result is an upward sloping demand curve.

If someone's income is high enough, they will no longer demand goods at lower prices. Income has a very direct impact on individual demand. As people age and their income rises and falls, their consumption patterns will change. As their income is lower, they will demand more necessities, and as their income rises, they will demand more luxuries.

⁴ The example was taken from "As price goes up, so does demand".

Neoclassical economics claims that individual consumers make consumption decisions rationally. When presented with a selection of goods, they evaluate the utility they would gain from each option, and choose the good that would net them the most utility. However, psychological research has shown that people do not evaluate utility in such a scientific manner. Humans do not have the mental capabilities to figure out how much utility they might receive from each option, nor can they rank options in terms of utility. Instead, humans make consumption decisions based on heuristics or shortcuts. For example, one might choose which car to buy by picking the car with the highest safety rating. Heuristics allow humans to make decisions, based on tricks that they have developed through time. If heuristics keep working, humans will keep using them. Humans do not make decisions using the neoclassical utility-maximizing model, because humans simply do not have the mental abilities to do so.

The use of heuristics shows that individual demand is not based on utility. Consumption is not rational: consumption decisions are not consistent; they might change over time depending on a variety of factors. Therefore, individual demand based on rationality and utility is flawed.

Aggregate Demand

To go from individual demand curves to an aggregate demand curve, economists add together a bunch of individual demand curves. However, what might be true for one isolated consumer is no longer true when there are multiple consumers.

For example, at the individual level, income is held constant. Such an assumption would be slightly reasonable when looking at an isolated consumer. A change in the price of

bananas will have little effect on someone's income. At the aggregate level, a change in prices will obviously have an effect on the income of many consumers, which will affect their spending patterns.⁵ An aggregate demand curve derived in such a way does not give the full picture of consumer demand.

Additionally, some issues with utility arise at the aggregate level. Since utility is ordinal, it cannot be compared between consumers, since consumers have their own preferences. Without specific utility values, how a consumer values one good cannot be compared with how another consumer values the same good. At the individual level, it is okay, but when multiple demand curves are aggregated, comparing each consumer's utility becomes very difficult.

Since each consumer has their own preferences and tastes, and since their demand curve might not be entirely downward sloping, aggregating these curves to create a downward-sloping aggregate demand curve is a daunting task. To do this, neoclassical economists held two assumptions:

1. All consumers have the same tastes.
2. Each person's tastes remain the same as their income changes.

The first assumption claims that everyone spends money identically. It is saying that there is one consumer in the economy. This is obviously false in reality, because it is suggesting, as Keen puts it, "society consists of a multitude of identical drones" (39). If this assumption were true, everyone would wear the same clothes, eat the same food, drive the same car, and society would look Orwellian. Although individual demand curves look

⁵ "changing the price of bananas didn't *directly* alter the individual's income. That condition fails when you move from a one-person, two-commodity model to a two-person, two-commodity world...because changing the price of bananas...will alter the incomes of both individuals" (Keen 51).

different, the only way they can be aggregated is if each person has the same tastes, which would make all demand curves look the same. Each individual has unique tastes.

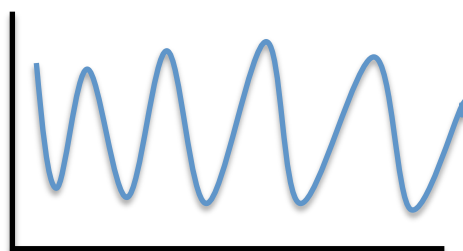
The second assumption claims that consumers spend money at a higher income level the same way as they did at a lower income level. This suggests there is only one commodity, because otherwise, spending patterns would have to change as income rose. This assumption is false in reality as well. If it were true, then people would not spend money on luxury goods, nor would they start taking nicer vacations, and would continue living as they did when they had less money to spend. As Keen puts it “there is simply no commodity which occupies the same proportion of a homeless person’s expenditure as it does a billionaire’s” (50). Tastes and spending will inevitably change as income changes.

These assumptions allow economists to model the demand curve as the sum of the actions of individual consumers in the economy. That aggregate demand curve is only applicable if there is one type of consumer, and a single commodity. Since the assumptions are violated in the real world, because everyone has unique tastes and there are infinite commodities, the individual demand curve cannot be used to accurately describe aggregate consumer demand in the real world.

A society cannot be modeled as the sum of independent individual actions, because a very important part of society is how various individuals interact with each other. These interactions include how one consumer’s spending affects that of other consumers. The neoclassical theory of demand ignores the interactions. When a demand curve is the sum of each consumer’s actions, it leaves out how consumers impact each other. Therefore, the aggregate demand curve ignores a crucial factor in consumer demand. The downward-sloping demand curve is far from realistic.

Ignoring changes of income at the individual level becomes a problem at the aggregate. At the individual level, when looking at a single consumer and a single commodity, income might not have an effect on demand. However, at the aggregate level, income will definitely affect demand. When the price of a good changes, people's consumption patterns change (illustrated by the income and substitution effects). When consumption patterns change, the quantity suppliers produce changes. A change in production will then change income levels. When consumers have more income to spend, their demand will change, and the cycle continues. Demand has a direct impact on income, and income has a very direct impact on demand. The relationship between individual demand and income illustrates a kind of "interaction" in the economy that the aggregate demand curve ignores.

An accurate individual demand curve will incorporate changes in income, and therefore will not always slope downward. It will occasionally show demand falling as price falls, which would make it slope upwards. Looking at demand as downward sloping is too narrow. As Keen put it, "[the demand curve] can take any shape at all – except one that doubles back on itself" (52).



A more realistic market demand curve, adapted from Figure 3.1 on Keen 52

If the law of demand applies to individual demand, it will not apply to aggregate demand. This is because the outcome of a change in price to one consumer will not describe the outcome of a change in price to all consumers in a society. When individual demand curves are aggregated, the law of demand no longer applies. As Keen put it "adding two or

more 'rational' consumers together generates an 'irrational' market" (54). The inverse is true: when the law of demand applies at the aggregate level, it cannot apply at the individual level. That is why the two assumptions are held to create the aggregate demand curve. At the aggregate level, "the Law of Demand will apply if, and only if, there is only one commodity and only one consumer" (Keen 55). However, such an aggregate curve does not represent how consumer demand actually works in the real world. Items like Giffen Goods show that the theoretical law of demand is constantly violated in reality. If individual demand curves slope downwards, aggregate demand cannot.

Individual demand has a rocky foundation, since it is based on utility, a concept that cannot be quantified, even though economists try to. If the law of demand applies to an individual, it will not apply in aggregation.

Therefore, one half of the "totem", the downward-sloping demand curve, will not exist. A rollercoaster will more accurately represent a demand curve, than the downward-sloping one in the graph. Since demand is not downward sloping, the concept of a single equilibrium point will not exist in the real world.

Supply

The second half of the "totem" is the upward-sloping supply curve. The upward slope of the curve comes from the neoclassical economic belief that to supply a higher quantity of a good, a higher price needs to be offered. Just like the law of demand, this makes sense theoretically. However, the supply curve will not be upward sloping in reality. As Keen argues, it can be horizontal, downward sloping, or it might not even exist (74-75).

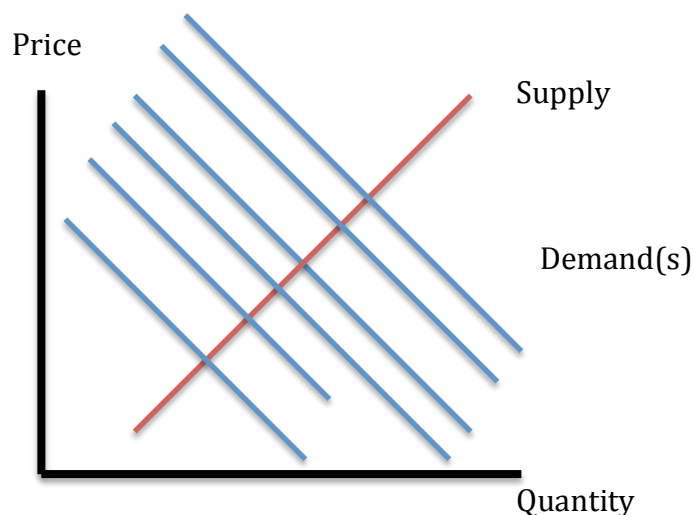
The supply curve depicts the quantity firms will supply in a society. According to neoclassical economic theory, individual firms will supply at the level that maximizes their profits. As output rises, costs (and marginal costs) will rise. Additionally, the theory holds that productivity falls as output rises. In other words, as additional workers are hired, the productivity of each additional worker, or marginal productivity, will decline. As firms hire more workers, who are producing less, the costs and price will rise. This connects marginal productivity to marginal cost. Neoclassical economics believes that firms should add labor as marginal revenue exceeds marginal cost, which is rising. When marginal revenue finally equals marginal cost, that's when the firm's profits are supposedly maximized. They will not add any additional labor or inputs, because that would make the marginal cost exceed marginal revenue. If there is perfect competition, price will equal marginal revenue, which equals marginal cost.

To go from an individual supply curve to a market supply curve, supply curves for individual firms are aggregated, like with demand. Theoretically, the neoclassical model of production works, if the following assumptions are held:

1. Firms have fixed factors of production in the short run
2. Supply and demand are independent
3. Markets are in isolation of other markets

The first assumption means that there are some costs in the short run that are sunk and will not change, so they will not be factored into marginal cost. At the aggregate level, this makes sense. When industries are defined broadly, there will be fixed factors of production, since in the short run, there will be factors of production they cannot change. For example, when looking at a broad industry like agriculture, a factor of production like land cannot

change, since the only way to get more or less of it is by converting existing land, which is an intensive process. Therefore, land will be a fixed factor of production, since it cannot change. However, when looking at an entire industry, changes in this industry's output will have to affect other industries. Fixed factors of production determine how much labor a firm can hire, which determines how much income consumers have to spend, which means that supply affects demand. Price changes consumer income at the aggregate level, and the distribution of income, so supply affects demand. If there are fixed factors, then supply and demand will not be independent. Therefore, when the first assumption is true, the second assumption is false. Keen argued when "some factor of production was fixed in the short run, supply and demand would not be independent, so that every point on the supply curve would be associated with a different demand curve" (109). This means that supply and demand cannot be drawn as two curves that intersect in just one place. The resulting graph will look significantly different than the neoclassical totem.



The third assumption claims that markets can be looked at independently from other markets. This is false in reality as well. Since industries are defined so broadly, and supply

of labor in the aggregate is fixed, if one industry hires workers, those workers will not be able to work in other industries, which will affect the outputs of those industries. Changes in output in one industry will affect the output of other industries. Since markets directly affect each other when there are fixed factors of production, markets are not in isolation of other markets. Therefore, when the first assumption is true, the third assumption is violated as well as the second assumption.

If the second assumption is true, then no factor of production can be fixed. This is because the cost of production will not affect the quantity that is demanded, so any input of production can be changed, without effecting output. Therefore, when the second assumption is true, then the first assumption is false. As was proved before, when the first assumption is true, the second assumption must be false. Therefore, the first two assumptions are contradictory.

All of the assumptions, at a theoretical level, allow there to be independent supply and demand curves intersecting at a single stable equilibrium point. However, since the assumptions contradict each other in reality, the graph cannot look like that. The assumptions can justify the appearance of an upward-sloping supply curve. However, the same assumptions: “[make] it impossible to derive an independent demand curve” (Keen 111). That is why the graph above (with multiple demand curves) can more accurately represent the relationship between supply and demand in reality. Furthermore, the upward-sloping supply curve cannot be justified in the real world.

The economist Piero Sraffa argued that at the firm level, all factors of production were variable. The factors of production that are seen as fixed can actually be varied in reality. This is because firms utilize resources in a way that net them constant productivity. They

will engineer their machinery and deploy their labor in such a way that each laborer is maximizing their productivity.

For example, if a firm builds a new factory, with all new machinery, but they do not have enough workers to productively utilize all the machinery, they have two options: they can use all their machines in a suboptimal way (which will lower output), or they can utilize a smaller amount of machines, where each machine is being used to its' maximum potential. Any rational firm will follow the second path. This way, although they are not using all of their resources, they are being as productive as they can, with as few costs as possible. The first path will be more expensive, and ineffective. With the second path, as production increases, firms will continue to reorganize labor and machinery in a way that continues to maximize productivity of labor. Hence, practically all factors of production are variable.

In the first option, diminishing marginal productivity of labor occurs. It will not occur in the second option, since each additional unit of labor will be utilized in a way that prevents productivity from falling. Therefore, diminishing marginal productivity of labor will not occur in the real world: "[it] is, in general, a figment of the imaginations of neoclassical economists" (Keen 115).

Sraffa's critique of the theory of the firm, and how factors of production are variable, shows that marginal costs are constant, and do not rise, which means that the rising marginal cost curve is false. If marginal revenue does not rise, but is constant as well, the neoclassical argument of profit maximization is derailed. Furthermore, it means that the upward sloping supply curve (and marginal cost and marginal revenue curves) does not determine the level of output nor price supplied for firms and markets.

The theory of the firm assumes that firms in the same industry will supply homogenous (identical) goods. Consumers are indifferent between goods, and make their purchases based solely on price, since they have perfect information.

That is false in the real world. In reality, firms do not determine their level of output and price based only on marginal cost and revenue: marketing and financing play a role in determining output levels as well (Keen 117-118). Neoclassical theory ignores marketing and financing. Coca Cola can charge more for their seemingly homogeneous product because their marketing gives it more of an allure over their competitors. In the real world, goods are heterogeneous. Consumers do not have enough information to decide between two goods, so marketing assists them in making purchasing decisions.

All these problems with the supply curve suggest that the upward-sloping curve does not say anything about a firm's level of output. Among other issues, the supply curve is static, which means it does not take time into account. Time is an essential part of economic behavior: firms must grow over time to survive. If the economy is dynamic, which means it includes time, a static supply curve cannot make any claims about the economy. Like the demand curve before it, the supply curve can be theoretically acceptable, but it cannot apply to the real world.

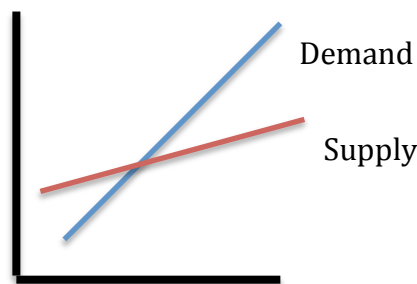
What does this all mean?

The totem that economists worship has a downward-sloping demand curve, and an upward-sloping supply curve, meeting at a single point. This diagram is supposed to represent how firms and consumers interact in the real world. However, this diagram's theoretical claims are unsound in reality, since they are based on faulty assumptions. The

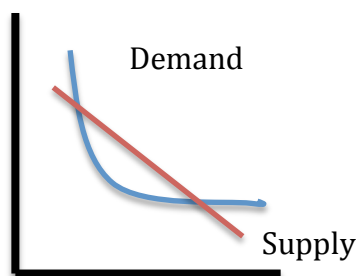
downward-sloping demand curve will slope upwards at times, and resemble spaghetti. The supply curve might not exist at all, and could even be constant or downward sloping.

Steve Keen in his takedown of the totem said, “The real Totem of Micro is not the [standard graph], but a couple of strands of noodles wrapped around a chopstick, with lots of toothpicks thrown on top” (102). The supply-demand graph will be a lot more complicated than neoclassical economics depicts it to be.

The noodles wrapped around a chopstick that Keen described is not necessarily how the relationship between supply and demand will be depicted. For example, supply and demand could both be upward sloping. However, in this case, equilibrium will not be stable.



In another case, if demand is a downward sloping curve, and supply is a downward sloping line, then there will be multiple equilibrium points, and neither of these points would necessarily be stable.



If the supply and demand curves do not behave as they are represented, then the whole notion of equilibrium is called into question. Adam Smith’s famous “invisible hand” metaphor is based on this concept of equilibrium. It argues that if the economy is left to its

own devices, without any intervention or regulation, the economy will reach stability as long as people and firms pursue their own self-interest. The long-run stability that the invisible hand mentions is the intersection of the supply and demand curves, or the equilibrium point.

If Keen's arguments about the nature of the supply and demand curves are valid, a single equilibrium point will not exist. Equilibrium might not exist at all, or there could be numerous equilibrium points. If supply and demand do not behave as neoclassical economics suggests they will, the invisible hand cannot exist in reality. This means that a real-world economy cannot reach long-term stability without any intervention. While holding variables constant, with some assumptions, the invisible hand can exist theoretically. However, real economies are far more complicated, and do not behave as theory predicts they will. Economists and policy makers need to be aware of the invisible hand's lack of real world applicability, when crafting economic policies and theories.

One of neoclassical economics' base assumptions is that consumers and firms behave rationally. All neoclassical theories and assumptions incorporate rational behavior. That is how the law of demand assumes people can maximize utility, and the theory of the firm argues that firms know how to maximize profits.

If a consumer prefers good A to good B, and good B to good C, they might happen to prefer good C to good A. The only thing the consumer picking good A does is reveal a preference for A at that point in time. That does not mean at another point in time the same consumer will not pick good B or good C over good A. Transitivity does not hold in reality.

In reality, people behave irrationally. Centuries of psychological research shows that humans are wired to behave irrationally, and do not know how to maximize their utility,

nor make the best decisions. Consumers will not always choose the good that nets them the most utility, nor will they constantly make the same choice, given the same set of options.

If people do not behave in a rational manner (by the way neoclassical economics defines it), any economic theory that assumes rational behavior will fail to have real world applicability. For economic theories to apply on both a theoretical and realistic level, they need to assume models of outside of neoclassical rational behavior, like irrationality or bounded rationality. As Keen put it, “the best research strategy to develop economics is to abandon the model of rational behavior – as neoclassical economics defines it – and adopt the behavioral perspective of satisficing or bounded rationality instead” (73).

Additionally, economics needs to abandon its emphasis on perfect competition and perfect information. Neither of those things exists in reality, and any theory based on those assumptions will lose real-world applicability.

If schools of economics are going to evolve, they need to abandon the standard economic model (of utility maximizing), and incorporate behavioral economics instead. By basing theories in behavioral economics, or integrating it into existing theories, economics can create stronger, sounder, theories that can apply to the real world. Assumptions outside of perfect information and perfect competition should be adopted as well, and would fortify economic theories. A behavioral perspective can allow economics to lose its depiction as the “dismal science” and can make theory far more powerful than it currently is.

Chapter Two: The Issues With the Neoclassical Theory of Production

As one learns from being a member of a capitalist society, consumable goods are made from various materials. iPhones are made out of glass and metal. Pizza is made from flower, cheese, and tomato sauce. Pizza uses a higher relative amount of labor, and a lower relative amount of machinery to be produced. iPhones use a larger relative amount of machines than labor to be produced.

Economics contains vocabulary to describe the production process. Any company, whether its Apple Inc. or a neighborhood pizzeria has inputs to produce their goods, and output, which is the good they are producing. Inputs are factors of production, which are generally categorized as land, labor, capital, and raw materials (Varian 332-333). Land and labor are self-explanatory. Raw materials are things that are extracted from nature, or chemical processes, and are ready to be used in production. These are items like coal, glass, metal, and plants.

Capital is trickier. Capital goods are inputs that are produced goods (Varian 333), meaning they have been turned from various raw materials to a good, which has its own use and utility. Unlike other produced goods, which are used by consumers, firms use capital goods to produce other goods. Examples of capital goods are items like tractors, computers, 3D printers, and screwdrivers. Capital goods make up one aspect of capital, known as physical capital.

The other aspect of capital is financial capital: the money that is needed to create a business, or maintain a business (Varian 333). The difference between the two is that physical capital is directly involved in production, while financial capital is used to fund,

fuel, catalyze, or expand production. Financial capital can purchase the physical capital and labor needed for production.

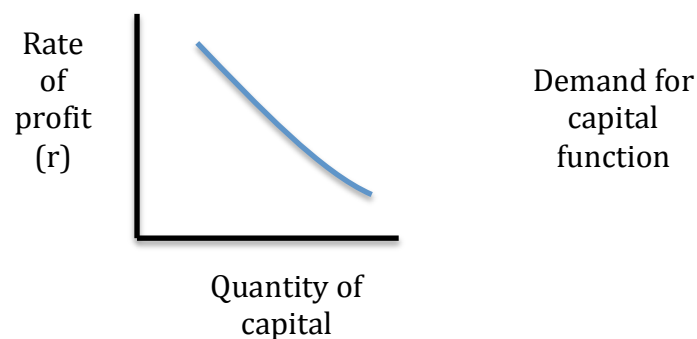
Nature gives production technological constraints. Only certain combinations of inputs can be used to produce a certain amount of output. For example, 1.5 ounces of tomato sauce and 2 cups of flour cannot yield 20 pizza pies, they can only yield two pies. If a pizzeria wants to produce 20 pies, they will have to use 15 ounces of tomato sauce and 20 cups of flour. That amount cannot yield 50 pies.

Like utility, inputs exhibit a similar diminishing pattern. Holding all other inputs fixed, as the amount of one input (or factor of production) is increased, the amount of output will increase as well. However, the amount of output that results from an additional unit of an input will decrease as each additional unit is added. This is called the law of diminishing marginal product (Varian 339).

If a pizzeria has one employee, with amount of ingredients, appliances, and kitchen space fixed, he or she can produce 10 pizzas an hour. If they hire another employee, that number goes up to 19. If they hire a third employee, since every other factor is fixed, he or she can only produce 7 extra pizzas an hour. The pattern continues. With each additional cook, the amount of pizza output increases, but the amount of extra pizzas that come from an additional employee falls.

Factor demand curves describe how the quantity demand for a factor of production changes as the price of that factor changes (Varian 354). Like all other demand curves, neoclassical economic theory assumes it has a downward slope. This is because of the law of diminishing product, since higher amounts of an input will yield less additional output, so as quantity rises demand falls. If the rate of profit rises relatively to the wage rate, the

value of capital will rise, which will make firms demand less of it. If the rate of profit falls relatively to the wage rate, the value of capital will fall, and firms will demand more of it. This is where the downward-slope comes from. Neoclassical theory predicts that if firms set the value of marginal product of a good equal to the price of each input where the marginal product of each input is at the level where it maximizes profits, industries will be in equilibrium.



In reality, the concept of factors of production is far more complicated than neoclassical theory makes it out to be. In the 1960's and 1970's there was a conflict going on between economists in Cambridge, Massachusetts and Cambridge, England over the state of mainstream economic theory. The Cambridge in Massachusetts, home to Massachusetts Institute of Technology (MIT), housed the economists who stood behind mainstream economic theory. England's Cambridge, home to University of Cambridge, contained the dissenters to mainstream economic theory. They engaged in a "Holy War" over this time period about the foundations of mainstream economic theory. Towards the end of the conflict, the heretics of mainstream theory emerged victorious. They had showed that many of the pillars of mainstream theory, and the assumptions that had appeared to support it, were unsound. These economists showed that neoclassical theory was

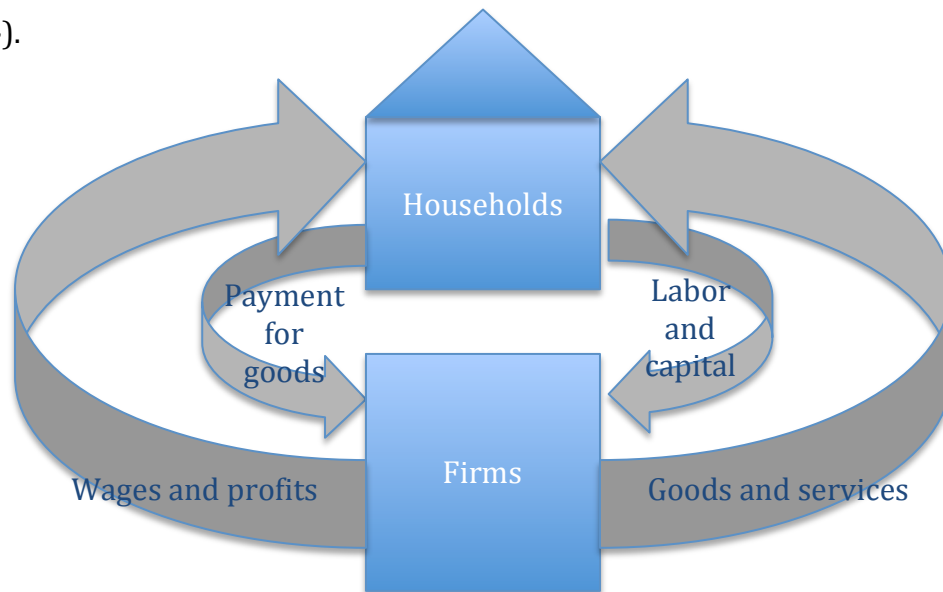
rampantly flawed. The mainstream theorists, on the other hand, had not provided much evidence to vindicate their theories (Keen 142).

Even though the British heretics revealed these flaws, and showed that mainstream theory was far from sound, their work was mostly ignored. Neoclassical theory proceeded to occupy the mainstream, and very little revision was done in neoclassical economic theory. This is because the supporters of neoclassical theory were practically unaware of the valid points of the heretics against their school of thought. They did not know that they had lost the war over the state of mainstream theory or that there was a war in the first place. Neoclassical economic theory continued to stand at the forefront of economic discussions, even though the British economists highlighted many of its internal inconsistencies and shortcomings.

The British economists heavily critiqued the neoclassical theory of production. It assumes that all industries act independently from each other. Already, this has been shown to be false. There is an economic butterfly effect of sorts where any action a firm takes will affect other firms, whether or not it is in their industry. If a firm purchases a new machine, it will affect the industry that produced that machine and the other industries that might have purchased that same machine. Any action a firm takes will have consequences, so production is not independent. The economist Piero Sraffa said this could not be ignored.

The neoclassical theory of production assumed independence of firms to justify that the costs of one industry would not affect the costs of other industries, creating equilibrium in the market for inputs (Keen 143). The notion of dependence already calls this equilibrium into question.

In an economy, there are households and firms. Firms engage in production, to create goods and services and sell them to households. Households and firms have multiple exchanges in an economy. Production is a circular process, meaning it can repeat itself (Keen 144).



In this process, everything is produced by factors of production. To reduce complexities, factors of production are limited to labor and capital. The process is represented in visual form by the circular flow diagram. It illustrates the movement of labor and capital in the economy between producers and households.

For the diagram to be circular, households have to convert goods into factors of production, and producers have to turn factors of production into goods. The latter transformation makes sense. Factories use a combination of labor and both physical and financial capital to create the goods they sell. This is a simplistic interpretation, but echoes reality. The latter conversion, that households convert goods into factors of production is more problematic.⁶

⁶ "...the questionable proposition is that households also convert goods into capital" (Keen 144).

Households do supply labor to firms, that proposition is sound. That is exactly how things work in reality. However, the concept that households turn the goods they purchase from firms into capital is awkward. It is confusing how this might happen. One knows what a good is, but if households turn goods into capital, what would that capital look like? Households, or typical households at least, do not build machines and sell them back to firms. This transformation calls into question what capital actually is, and what it might look like in the circular flow diagram.

Neoclassical theory states that the two branches of capital are physical and financial. If households turn goods into capital that they then supply to firms, goods could conceivably be turned into financial capital. When someone purchases a good, they exchange that good for money, which the firms can use to keep their company running. Additionally, households might deposit their wages in banks, which banks then invest in firms. This is another way households might supply financial capital. However, there is no way to justify that households turn goods into physical capital. This would suggest that when one purchases a good, they somehow turn that good into a mechanism that can be used in the process of production. This is not even the littlest bit possible. Actually, firms supply physical capital to other firms, not households. There is an intermediate step where firms supply physical capital to each other. This is completely ignored in the circular flow.⁷

A firm's supply of capital produces goods, which generates revenue for the firm. The amount of revenue that was not spent on production and other costs is the firm's profit. A firm's profits flow back to households as wages. Economic theory assumes that a firm's profits represent the marginal productivity of capital. This means that if a firm wants to

⁷ "...the model is not complete. Factories actually produce capital machines, and this is left out of the diagram" (Keen 145).

maximize their profits, they will accumulate capital up to the point that the capital's marginal contribution to output will equal the cost of acquiring that instrument of capital.

Since the demand curve for capital slopes downwards, and the capital supply curve slopes upwards (the quantity of capital that can be accumulated rises along with the interest rate), the intersection between the supply and demand curves for capital yields the equilibrium rate of profit.

Neoclassical economic theory uses the term “capital” very broadly, as it comprises so many different types of physical goods, and money. Capital is practically anything used in production that is neither labor nor land, so every single firm demands and uses capital. The market for capital is so expansive that a downward sloping demand curve, and an upward sloping supply curve, will describe the market.

Since capital is defined so liberally, if the price of a unit of capital is changed, all the industries that use that unit of capital in production will be affected.⁸ They might have to use less of that input, or use less of other inputs to keep their usage of the input constant. Their structure of production (how capital is used in production) and output will change. This means how firms demand labor, and how they pay wages, will change as well. The distribution of income (how income is divided between firms and workers) will be affected by a change in price of a unit of capital. Therefore, neoclassical economic theory assumes that prices determine the distribution of income. Price is an independent variable, while the distribution of income is the dependent variable.

⁸ “‘capital market’ is a broadly defined ‘industry’...a change in the price of such an input would affect numerous industries, and therefore alter the distribution of income” (Keen 145).

Economic theory assumes that:

$$\text{total income} = y = \text{total wages} + \text{total profits}^9$$

If there is a change in output, which will affect the total income, the change in output has to reflect a change in wages and a change in profits, so after some calculus, change in income will be represented by:

$$y' = \text{change in wages} + \text{change in profits}$$

To further derive the determinants of the change in income, the change in wages will be left alone, but the change in profits (or the rate of profit) will be further investigated.

$$\begin{aligned} \text{change in profit} &= (\text{rate of profit})(\text{change in capital}) \\ &+ (\text{amount of capital})(\text{change in rate of profit}) \\ y' &= \text{change in wages} + (\text{rate of profit})(\text{change in capital}) \\ &+ (\text{amount of capital})(\text{change in rate of profit}) \end{aligned}$$

At the level of one individual firm, neoclassical economic theory assumes that that a change in the firm's output caused by a change in their use of capital will have no impact on the rate of profit, nor will it affect wages. Therefore, it can be assumed that the change in wages and amount of capital multiplied by change in rate of profit will be 0 (Keen 146).

$$y' = \text{change in output} = (\text{rate of profit})(\text{change in capital})$$

$$\text{rate of profit} = r = \frac{\text{change in output}}{\text{change in capital}}$$

This means that the rate of profit will equal change in output affected by a change in capital. In other words, the rate of profit will equal the marginal product of capital.

⁹ Equation from Keen 146

Enter Sraffa's Critique

In his work, *The Production of Commodities by Means of Commodities*, Sraffa highlights inconsistencies in the neoclassical theory of production, and shows how the theory of production cannot be used to justify a market-determined distribution of income (Keen 144). He aimed to debunk the widely held theory that conditions of production, namely supply and demand of capital and labor, determine the rate of profit and the wage rate.

The distribution of income is determined by the wage rate (w) and the rate of profit (r). At the individual level, the rate of profit can equal just the marginal product of capital, as was derived before. However, at the aggregate level, the marginal product of capital becomes increasingly complicated. Changes in production in one industry will affect wages, how much capital they consume, output in their industry, and production in other industries (that need this industry's output as a factor of production) (Keen 147). This means the marginal product of capital has more determinants.

marginal product of capital

= change in wages due to a change in capital + r

+ (amount of capital)(change in the rate of profit due to a change in capital)

Unless the sum of the change in wages due to a change in capital and the amount of capital multiplied by the change in the rate of profit due to the change in capital is 0, the rate of profit will not equal marginal productivity of capital when more than one firm is considered. This proves Sraffa's claim that conditions of production change the distribution of income, when looking at a broadly defined industry. Industries are not independent since a change in production will change income, which will affect other industries.

Additionally, a change in capital inputs will affect output, which will change the wage rate

and the rate of profit. This changes the distribution of income between households and firms, which changes supply and demand. Since the rate of profit does not equal only the marginal productivity of capital, a person's income will not equal their marginal contribution to output.

What this shows is that the distribution of income cannot be determined by the marginal productivity of inputs, nor can it be determined by supply and demand for factors of production. This directly contradicts neoclassical economic theory, which argues that the market determines the distribution of income. Therefore, there is not a mechanism that determines prices. Prices will be determined by the relationship between r and w , which is the distribution of income (Schefold 5). For each set of values of r and w , different prices will be needed.

The distribution of income controls the market, and determines prices. Prices will not determine the distribution of income, as neoclassical economic theory claims. This calls the entire notion of the neoclassical economic theory of production into question.

Rethinking Capital

Before coming to an equation that determines prices, the economic concept of capital, its role in production, and how it is aggregated, must be investigated. Physical capital is complicated. It is too broad to simply define, as physical capital requires other types of physical capital to be produced. It "covers too great a multitude of things to be easily reduced to one homogenous substance" (Keen 148). Even though it is such a varied category, neoclassical production theory treats it as a single element. Not only do they treat physical capital as one type of good, they try to aggregate it with financial capital, making

the two categories into one. The way they aggregate the two types of capital is through price, as it is the only thing the two entirely different types of commodities have in common. This method of aggregation gives a base value to every form of capital. It allows economists to add a machine, shovel, and bond together. However, it does not permit a way to measure each unit of capital's contribution to output.

This method of aggregation assumes that the price of a unit of capital depends on its marginal productivity (the rate of profit), but the rate of profit varies as price changes. This circular logic shows that this method of capital aggregation could not possibly work.¹⁰ If price and rate of profit determine each other, aggregating capital by price is not theoretically sound.

Sraffa showed that the neoclassical economic theories of income distribution and price were invalid through a critique of the neoclassical interpretation of capital. He acknowledged that capital is not simply definable, but recognized that it needed a definition to prove that the rate of profit equals the marginal productivity of capital. The reason neoclassical economics defined capital the way they did was to vindicate the concept that the rate of profit equals the marginal productivity of capital. Sraffa aimed to prove that the neoclassical theory of production was flawed, through their broad definition of capital (Kurz 4).

He supported his critique of the theory through multiple models of production. Each model built on the one before it, and they ranged from simplistic (little-to-do with reality) to complex (more representational of reality). The only unrealistic assumption he utilized in these models was an economy in equilibrium. He acknowledged that equilibrium would

¹⁰ "There is an impossible circularity in this method of aggregation" (Keen 148).

not exist in real-world economies. He wanted to critique neoclassical economic theory on its own terms (Keen 149). Since neoclassical economic theory is built on the assumption of an economy in equilibrium, he held that assumption. To bring in a more realistic model, Sraffa had to critique an unrealistic economic theory by its own unrealistic standards. This allowed him to expose its flaws, and introduce alternative models and theories.

His first model of production was the most simplistic. This model economy was just able to reproduce itself, meaning there was production with no surplus. Since the economy does not produce a surplus, there cannot be an expansion of economic activities. In this model of production, no capital is fixed. There is only circulating capital, which gets completely used up in each round of the production process. Each industry produces just enough to supply it and other industries.

output of a sector

= amount to produce its own output

+ amount other sectors need to produce their outputs

The price of an industry's good has to enable it to only purchase its own inputs. If there is no surplus, the economy is in a self-replacing state, and prices are given by:

$$\mathbf{A}\vec{p} = \vec{p}$$

\mathbf{A} is the matrix of inputs, and fulfills the characteristic equation $\det(\mathbf{I} - \mathbf{A}) = 0$, meaning that \mathbf{A} will have an eigenvalue of 1. \vec{p} is the price vector, and \vec{p} is an eigenvector for \mathbf{A} where 1 is the eigenvalue for \mathbf{A} corresponding to \vec{p} (Schefold 2). \mathbf{A} will be a square matrix and houses all factors of production. All commodities in this matrix are basic commodities: each commodity enters into the production of other commodities either

directly or indirectly. This is because this model economy has no surplus, so if goods do not have a role in production, they will be extraneous. \vec{p} houses all the prices for the inputs.

If there were three sectors, grain, metal and meat, the subsistence economy would look somewhat like this:¹¹

Sectors	Grain input (qrs)	Metal input (tons)	Meat input (animals)	Total Outputs
Grain	200	15	20	450 qrs
Metal	100	10	15	30 tons
Meat	150	5	30	65 animals
Total Inputs	450	30	65	

The input matrix A is obtained by dividing each amount of input, by the total amount of that input. For the price equation to hold, A must fulfill the characteristic equation $\det(A - I) = 0$. The input matrix for this model economy would be:

$$A = \begin{bmatrix} \frac{4}{9} & \frac{1}{2} & \frac{4}{13} \\ \frac{2}{9} & \frac{1}{3} & \frac{3}{13} \\ \frac{1}{3} & \frac{1}{6} & \frac{6}{13} \end{bmatrix}$$

This input matrix fulfills the characteristic equation, so given a price vector, the equation would hold.

The second model was slightly more complex, and modeled a production process with a surplus. In this model, at least one sector produced more outputs than it and other sectors needed to maintain production. This model is one step closer to a real economy since it introduces the concept of profits, which were not present in the last model. Just like the last model, the inputs are housed in a square matrix A .

¹¹ Graph adapted from Table 7.1 on Keen 149

If there were two sectors in this economy, grain and metal, the economy would look along the lines of this:¹²

Industries	Grain Input	Metal Input	Total Output
Grain	250	15	500
Metal	150	10	25
Total Inputs	400	25	

Here, grain is the sector producing a surplus, while metal has an equal amount of inputs and outputs. Grain uses 400 inputs to produce 500 outputs, while metal uses 25 inputs to create 25 outputs. Since there is a surplus in this economy, non-basic commodities have now entered the economy.

If one sector is producing a surplus, they can earn above their revenues, and start generating higher profits. Thus, for this model economy to be in equilibrium, the rate of profit has to be the same across all sectors, even if only one sector produces a surplus. If different industries had different rates of profit, then capitalists in sectors with lower rates of profit would move into sectors with higher rates of profit, and the economy would not be in equilibrium. The surplus in income gets distributed according to the rate of profit. Therefore, the rate of profit, r enters the price equation. In simple terms:

$$price = (1 + r)(money\ value\ of\ inputs) = money\ value\ of\ outputs$$

Since labor and wage rates have not been introduced into the model, as of yet, all surplus income will be distributed back to the firms. The reason there is no inclusion of a wage rate yet is because the compensation of workers is included among the input matrix, as labor is an input of production (Keen 149). This means that the rate of profit (r) will equal the maximum rate of profit (R).

¹² Adapted from Table 7.2 on Keen 150

$$\vec{p} = (1 + R)\mathbf{A}\vec{p}$$

$(1+R)$ is the rate of growth in the economy at the maximum rate of profit. $\mathbf{A}\vec{p}$ is the input matrix multiplied by the price vector (Schefold 5). According to this equation, there are two factors that determine prices of goods in this economy. The first is conditions of production, $(\mathbf{A}\vec{p})$. The second is the rate of profit, which determines the distribution of the surplus, and is uniform across the model economy. The distribution of the surplus is synonymous with the distribution of income. In this model, the distribution of income will go solely to the producers.

Sraffa's third model is more realistic and complex than the previous two. The previous models did not include labor as its own variable. This new model introduced labor as the second determinant of the production process alongside commodities, which adds an extra degree of realism. Wage rate becomes an additional unknown. The new equation for prices looks like:

$$\vec{p} = (1 + r)\mathbf{A}\vec{p} + w\vec{l}$$

The rate of profit no longer equals the maximum rate, so it is represented by r , and the rate of growth is represented by $(1+r)$. The wage rate (w) is multiplied by the labor vector \vec{l} to include labor in the price equation. $w\vec{l}$ shows that labor gets a share of the surplus income according to the wage rate.¹³ Now there are three factors that determine the prices of goods in an economy: conditions of production, the rate of profit, and the wage rate.

This model introduced the concept of the distribution of income as a balance between the rate of profit (r) and the wage rate (w). The two variables determine the proportion of total income between firms and workers. They have an inverse relationship, where w falls

¹³ "labour gets a share of a surplus wage according to wage rate w " (Schefold 5).

as r approaches the maximum rate of profit. As w rises, r falls. If workers get a zero wage, the entire surplus goes to the producers. When w equals 1, the entire surplus goes to the laborers, and there are no profits.

This model became the springboard for Sraffa's critique of the neoclassical economic theory of income distribution. This equation shows that the distribution of income determines prices, or that the distribution must be established before prices can be calculated. This directly contradicts neoclassical theory, which asserted that prices determine the distribution of income, and he proved it was false.

The neoclassical theory of income distribution claimed that factors of production get compensated in respect to their marginal contribution to output. According to the law of declining marginal productivity, as supply of a factor increases, its individual return should fall.

The issue of aggregating capital still stands. As Keen said, "It is not easy to see how one can add units of capital together (152). Unlike the other factors of production, labor and land, capital cannot be aggregated in a straightforward way, but it needs to be aggregated to model the demand for capital function. Land can be aggregated through adding up acres. Workers can be aggregated through adding up hours worked. Machines and other instruments of production have no obvious common property apart from the price of acquiring the factor.

Aggregating capital is an arduous problem. There are two obvious ways to aggregate capital. The first is through quantity: if a firm has 12 machines and 4 shovels, their supply of capital is 16 units. This method is highly ineffective, since it assumes that all units of

capital have the same impact on production. Machines and shovels are incredibly different tools, so aggregating the two of them by units is preposterous.

The other way is to aggregate capital through value (or price). This is the method used by neoclassical economic theory. If a machine is worth \$100, and a shovel is worth \$15, the aforementioned company's supply of capital would be worth \$1260, and it takes into account the differences between various units of capital. Yet, this method of capital aggregation is flawed too.

The price of a unit of capital reflects the rate of profit expected from it, and the rate of profit (in neoclassical theory) depends on price, so there is circularity in the theory of capital aggregation. Circularity implies that price is not an effective means of capital aggregation. Sraffa devised a new means of capital aggregation, through his formula for price that is based on neither utility nor labor, but on the structure of production.

Capital Comes After the Distribution of Income

As Sraffa has shown, the distribution of income determines the value of capital. The distribution of income determines the prices of inputs through the equation $(1 + r)\mathbf{A}\vec{p} + w\vec{l} = \vec{p}$. The price will change according to the relationship between the value of inputs and the value of labor at each stage of production. Some processes might be more or less expensive, according to their proportion of capital inputs and labor inputs. If a production process uses more capital proportional to labor, it is capital-intensive. If it uses more labor proportional to capital, it is labor-intensive. If there is an equal proportion between labor and capital inputs, it is known as the standard commodity. The ratio of labor and capital inputs in a production process is:

$$\frac{\vec{q}A^{t+1}\vec{p}}{\vec{q}A^t\vec{l}}$$

\vec{q} is a vector representing an item or commodity, and t represents the passage of time. The numerator represents the amount of capital in the production process, and the denominator represents labor inputs (Schefold 6).

$$\vec{q}A^{t+1}\vec{p} > \vec{q}A^t\vec{l} \rightarrow \text{capital intensive}$$

$$\vec{q}A^{t+1}\vec{p} < \vec{q}A^t\vec{l} \rightarrow \text{labor intensive}$$

$$\vec{q}A^{t+1}\vec{p} = \vec{q}A^t\vec{l} \rightarrow \text{standard commodity}$$

This ratio numerically represents the difference between capital-intensive and labor-intensive industries. This difference embodies the distribution of income, as some processes will benefit the workers relative to the capitalists, and other processes will benefit the capitalists more than the workers. A process entirely carried out by robots and machines, with no human involvement, will give nothing to the workers, and capitalists will profit exclusively. That is practically impossible, but is a hyperbolic example of a pure capital-intensive industry.

Sraffa already established that price is determined, in part, by labor. Labor is involved in the production of every good, and every intermediate good. Sraffa's solution to aggregate capital was to reduce each unit of capital to dated inputs of labor. All items of capital are produced by other items of capital, and labor, at every step of production.

According to Sraffa, if an economy is in equilibrium, and has been for some time, it is possible to quantify the value of a unit of capital as the value of the machines used to produce it, plus the value of the labor involved, multiplied by a rate of profit to adjust the value of the unit of capital in accordance with the passage of time.

The equation for price can be used to represent the value of a factor of production by dated quantities of labor. To do this, one problem with the equation needs to be fixed: the price vector exists on both sides of the equation. This means that price and distribution of income are determined simultaneously. Sraffa is trying to argue that the distribution of income determines price, so to do this, \vec{p} has to be removed from the right side.

$$\vec{p} = (1 + r)\mathbf{A}\vec{p} + w\vec{l}$$

This means \vec{p} will be substituted with $(1 + r)\mathbf{A}\vec{p} + w\vec{l}$. \vec{p} will still exist on the right side, so it will be substituted again, this will happen an infinite amount of times, and the equation for price will become an infinite series (Kurz 10).

$$\vec{p} = w\vec{l} + (1 + r)w\mathbf{A}\vec{l} + (1 + r)^2w\mathbf{A}^2\vec{l} + (1 + r)^3w\mathbf{A}^3\vec{l} + \dots + (1 + r)^nw\mathbf{A}^n\vec{l} + \dots$$

$$\vec{p} = \sum_{s=0}^{\infty} (1 + r)^s w \mathbf{A}^s \vec{l}$$

If $s = 0, 1, 2, \dots$ then $\mathbf{A}^s \vec{l}$ represents the quantities of labor used up in the production of a commodity at step s of production. $\mathbf{A}^s \vec{l}$ gets adjusted by the value of the labor (w) and in accordance with the rate of profit at that step of production. The rate of profit (r) and the wage rate (w) are constant, but the exponent changes with each step of production, so each step will yield different values.

As the investigation into lower and lower levels of production continues, there will continue to be even lower levels: the process never ends. Therefore, the amount of dated units of labor at each step will continue to decline, but it will never reach zero. That's why \vec{p} is valued as an infinite series.

Looking at a shovel, it required one person to put it together. The wood required 2 people to cut down the tree, and 1 person to shape it into a thin cylinder. The metal for the

head of the shovel required one person to shape the metal. Since metal is a raw material, it gets difficult to track labor used in extraction of the metal and chemical processes.

Although there will be more levels of production, their impact can be ignored. There are only 3 levels of production (levels 0, 1, and 2), so the series will look something like:

$$\vec{p} = w\vec{l} + (1 + r)wA\vec{l} + (1 + r)^2wA^2\vec{l} + \dots$$

The residue can mostly be ignored. For each rate of profit, the amount of levels of reduction will vary. Sraffa claimed that the closer r is to the maximum rate of profit, the further the reduction should be carried out, since labor will be demanded more. Usually, when r does not equal R , the residue is not important. However, when r equals R , the residue becomes important since it is the only determinant of the price of the product (Schefold 7).

As the rate of profit increases, the value of an input falls smoothly, but after a certain amount of time has passed (depending on the structure of production and rate of profit), as the rate of profit increases, the value of the machine could rise for a short period of time, and then fall. As Keen put it, “measured value of a machine rises and then falls as the rate of profit rises, and also rises and then falls as the time at which the machine was used to produce a commodity becomes farther in the past” (155). The rate of profit’s effect on value can rise, and then fall. This does not happen immediately, when value and profit have a linear inverse relationship, but after the input has been used for a certain amount of years. This suggests that the rate of profit and value of capital might not have a strictly linear nor inverse relationship.

This directly contradicts neoclassical theory, which assumes that the value of a capital input will fall as the rate of profit rises. They held this to be true, because they assumed

that capital, like labor, would manifest diminishing marginal productivity (Keen 152). The fact that the value of a capital input can rise with the rate of profit, albeit briefly and after the input has been used for a certain number of years, suggests that inputs might not exhibit diminishing marginal productivity. Sraffa invalidated the neoclassical theory of production, by mathematically showing that the equation for the value of an input is non-linear. He used this equation to prove that there is no uniform relationship between rate of profit and rate of capital. Rather than the rate of profit depending on the amount of capital, the amount of capital depends on the rate of profit, as the rate of profit determines value.

This proof makes it impossible to argue that the rate of profit is determined by the marginal productivity of capital, which destroys the neoclassical economic theory of income distribution. The measurement between rate of profit and value of capital will behave differently. A rising rate of profit might make one method of producing a good cheaper than alternatives, but at a higher rate, it might make it more expensive. This means that as time and the rate of profit changes, different means of production might be more fruitful for firms than others, when another might be more effective at another time.

Switching Demand for Capital

Given a certain passage of time, the rates of profit where value of a capital input goes from rising to falling or vice versa are known as “switch points” (Schefold 8). The act of the value of an input going from rising to falling or vice versa is called “reswitching.”

Reswitching suggests that one method of production, that is capital-intensive, might become less profitable than a labor-intensive one at a different rate of profit, at certain points in time.

The relationship between r and w can be quantified as:

$$w = 1 - \frac{r}{R}$$

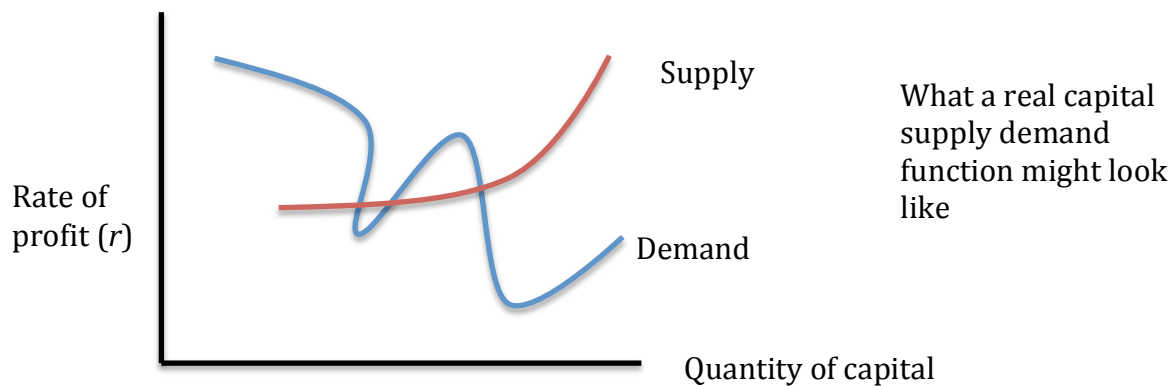
As r approaches the maximum rate of profit (R), w gets closer and closer to 0. As the rate of profit rises, less of the surplus income goes to the laborers (Schefold 9).

Sraffa used the production of wine to describe reswitching. When two commodities are at time zero, with $r=0$, they have equal values. There are two types of wine: one that is aged in a barrel, and one that uses advanced chemical techniques and is of identical quality. The former is far more time and labor intensive than the latter, and the latter uses so much advanced machinery that it is more capital intensive. At zero, each cask of wine equals the sum of wages paid to produce the wine. For this system to exist in equilibrium, the costs must be identical. As r rises, the cost to produce the barrel for the labor-intensive process is inexpensive, so the capital-intensive wine is more expensive. However, as r continues to rise, it will make the barrel have an even higher value, and the labor continues to be a factor, so the aged wine becomes more expensive than the high-tech process, as that is more conducive to scaling production. When r reaches R , wages fall to zero, and the cost of wine equals the irreducible commodity components (raw materials, grapes) so the two processes equal each other again.

This paradigm illustrates how one method of production could be more fruitful at a lower rate of profit, become less profitable at a higher rate, and then become the more profitable method again. Reswitching destroyed the neoclassical notion that if a means of production loses superiority, it can never become the most profitable again.

Reswitching and switch points show that demand for capital is not a linear function. This means it cannot be represented with a downward sloping curve (which neoclassical

theory is guilty of) is inaccurate. A representative curve might slope up at some points, and down at others. All this means that there will not be a single, stable, equilibrium point for capital, nor is there a single rate of profit that tells firms where they could maximize production.



Since capital demand and supply curves do not slope downwards, the notion of equilibrium in the market is called into question. It reveals that the market might not work itself out in a straightforward manner as neoclassical economics argues it might. Firms cannot find a method of production this way. The profitability of capital and labor intensive production processes switches back and forth, and is not linear. Sraffa's critique revealed that the quantity of capital in production depends on the rate of profit, and not the other way around. There is no consistent relationship between factor productivity and factor prices, as the function switches from sloping up to sloping down. The distribution of income between wages and profits (consumers and firms) is independent from the system of production, as it determines production. This shows that the distribution of income is a social phenomenon, not something that is systematically determined. This means things like regulation can manipulate the distribution, thereby echoing the works of Karl Marx.

Therefore, neoclassical economic theory cannot justify that the rate of profit reflects marginal productivity of capital. If economic processes cannot determine the distribution of income, it can be manipulated by regulation. This directly contradicts the neoclassical economic view of the invisible hand. The market cannot sort itself out, without any intervening bodies. It can be assisted and stimulated to achieve certain economic outcomes, and to share resources in a more reasonable manner. If the economy cannot be left to sort itself out, the invisible hand, as an economic philosophy, cannot be championed.

An economic theory that ignores the invisible hand, and encourages an economy driven by active agents should dominate economic discussions. Neoclassical economic theory cannot be the most beneficial philosophy for society, if it keeps standing by inconsistent theories. A more innovative and grounded theory must come to the forefront instead: one that acknowledges the very visible hand that must guide the world economy.

Chapter Three: The Issues with Static Analysis

Neoclassical economic theory is obsessed with equilibrium. Equilibrium is where supply and demand curves intersect at a single point, where the economy is secure and stable. Most neoclassical models and theories are built upon the assumption of stable equilibrium.

To neoclassical economists, the world is static; meaning that time does not affect economies. They ignore processes that take time to occur, like what happens if the economy falls out of equilibrium, and how it returns to equilibrium. By ignoring concerns like these, they can assume that the economy is always in equilibrium, and never slips into disequilibrium.

By sticking to static equilibrium analysis, neoclassical economic theory is ignoring the dynamic nature of the economy. This is a fatal flaw: the real economy is obviously affected by time, so analysis of it should be dynamic.¹⁴ Additionally, it is very unlikely a real economy would converge to a stable equilibrium. Theories that are built on the assumption of disequilibrium should be used instead, as disequilibrium is more likely.

Neoclassical economists do not incorporate time in analyzing supply, demand, or economic variables. This assumes that the economy magically jumps from an equilibrium point to another. Between equilibrium points, disequilibria will occur, which their models ignore. They see disequilibria as a short-term extraneous event, which is merely a footnote in the game of long-run equilibrium. This allows them to ignore dynamic analysis, and stick

¹⁴ “the procedures which apply in a static economy are irrelevant to a dynamic, changing one; the forces which apply in a static economy simply don’t exist in a dynamic one” (Keen 175).

to static analysis (Keen 176). Because the long run is at an indefinite point in the future, time does not affect it. Therefore, static analysis can be applied to the long run.

Not only do they ignore time, neoclassical economists go to absurd lengths to make it look like time does not matter in their models. They focus on situations in equilibrium, instead of the process of change over time in an economy. To do this, they liberally use the device 'ceteris paribus' thereby holding many important economic factors, including time, constant, and pretending they do not matter.

Since the neoclassical model focuses on static equilibrium, which misrepresents reality, their model avoids any possibility of realism. What they focus on is general equilibrium: a model that suggests that each sector of the economy will be in equilibrium, so the whole economy will be in equilibrium as well (Keen 177). For each market to be in equilibrium simultaneously, each must be at a price level where quantity supplied and demanded are equal. General equilibrium is a pillar of neoclassical economic theory, and "is at one and the same time the crowning achievement of economic theory and its greatest failure" (Keen 177). Although general equilibrium has a theoretical basis, it is not attainable in reality, making it a failure for neoclassical economic theory.

There are two presiding theories that explain how general equilibrium works. French economist Léon Walras, one of the forefathers of neoclassical economic theory, constructed the first explanation of general equilibrium. It was based in the concept of auctions. This auction is not a literal one that could be found at Sotheby's or eBay, but the concept of changing prices until a buyer demands the good being auctioned. Economies will converge to equilibrium in an auction since a price will be called out where buyers will demand all the quantity of goods being sold.

In Walras's model, a theoretical auctioneer will offer all goods to be sold at once, removing the concept of time (Keen 178). The auctioneer will offer the goods at certain prices. If there is no offer to buy all goods at that price, the auctioneer will adjust the price. This process continues, without any actual trades occurring, until there is a buyer for all goods. This process of auctioning all goods at once, and adjusting prices in an instant until there is a seller is known as tatonnement (Keen 179).

Walras acknowledged that his explanation was unrealistic in his writings. His goal was not to describe how economies actually work, but how they work in essence. His explanation of an economy is much more simple than representing it as a multi-commodity economy where trades happened at non-equilibrium prices in at least 2 markets, where humans and sellers were irrational. He aimed to show how economies converge to equilibrium without time being a factor. As the economist William Jevons put it, Walras simplified the economy because it would be “absurd to attempt the more difficult question when the more easy one is yet so imperfectly within our power” (Keen 180). Walras's theory was much more of a loose explanation, or a metaphor. It was not literal.

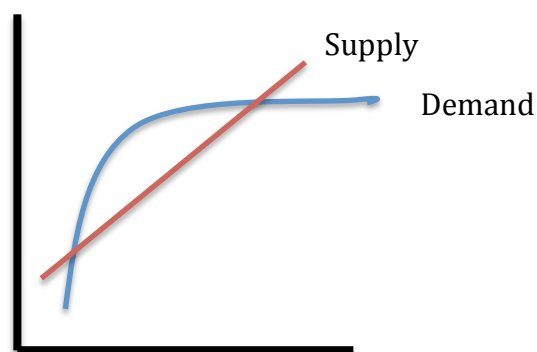
Neoclassical economic theory utilized tatonnement to justify the claim that general equilibrium existed in reality, and that general equilibrium is the optimal position for a society to be in. It was not the only theory utilized by neoclassical economists to build a model of general equilibrium, French economist Gerard Debreu developed the other one.

Debreu's model is even more misrepresentative of a real world than Walras's. His aim was to show that general equilibrium could exist in a society without time affecting it. In his model, there is a market for every good at every time period from now to infinity. All consumers and firms make their sales and purchases for all of time in a single instant. All

markets get sorted out simultaneously at a point in time, for all eternity. Consumers and firms have perfect information and complete certainty (Keen 181). Certainty is defined in this model as producers knowing what input-output combinations will be possible for production for now and the future. On planet Earth, this is not at all how transactions take place. Every second, purchases are being made around the globe. They do not happen in a single instance: they happen at every instance.

Walras's general equilibrium theory was abstract, but described how markets will balance out through the mechanism of price adjustments. The unrealistic part of tatonnement is its reliance on equilibrium and its dismissal of time. Debreu's model is not even slightly representative of real economies, and is a haphazard way to justify general equilibrium. The neoclassical theories of general equilibrium, which built upon the works of Walras and Debreu, could not make any claims about actual real-world economic systems, since they relied on phenomenon that did not occur in reality. All theories of general equilibrium could only represent an imaginary economy.

Walras's theories intended to show that equilibrium is stable: if the economy falls out of equilibrium, processes will occur that will drive the economy back towards equilibrium. However, much math has shown that equilibrium is inherently unstable (Keen 183).



According to the Sonnenschein-Mantel-Debreu conditions, “the market demand curve can have any shape at all” (Keen 53). This means that demand can slope upward, as it does in the graph above. If the economy is at a point of equilibrium, and falls out of it, it is in a state of disequilibrium. The economy could stay in this state of disequilibrium for an indefinite amount of time, or it could move to another point of equilibrium. Just because it reaches a point of equilibrium again does not mean it will then stay at this new equilibrium point. It might just be passing through another equilibrium point, on a path to another point of disequilibrium. If the economy is at disequilibrium at a price level where demand is lower than supply, then the economy is just as likely to move to infinity away from equilibrium, than it is to return to equilibrium.

If an economy falls into disequilibrium, does not mean they will automatically return to equilibrium. *Tatonnement* will not converge to the equilibrium set of prices, so if equilibrium is a prerequisite for trade in this model, it will never occur. This means *tatonnement* cannot ensure equilibrium.¹⁵ Since a system as simple as this cannot justify general equilibrium, a more complicated system will not be able to prove it either.

Economic models are supposed to be applied to real economies. Since general equilibrium theories assume the absence of time, they cannot be applied to the real economy. Time affects the economy in numerous and profound ways. Any theory that aims to have real life applicability must incorporate time. Keen agreed: “If economics is even to be internally consistent – then it must be formulated in a way which does not assume equilibrium. Time, and dynamic analysis, must finally make an appearance in economic analysis” (184). Since equilibrium can only be justified by theories that ignore time, and

¹⁵ “*tatonnement* will never converge to the equilibrium set of prices, so if equilibrium is a prerequisite for trade, trade will never take place” (Keen 183).

that utilize static analysis, it cannot be assumed that it could exist in reality. If economics wants to become the useful science it claims it is, it must champion theories that do not assume equilibrium, that utilize dynamic analysis and abandon static analysis.

Where did static analysis come from?

It is difficult to identify when economics became its own social science. Economics used to be part of various other academic disciplines, like political economy or applied mathematics. Static analysis has been used since the beginning of the discipline. The forefathers of economics utilized static analysis as a stopgap measure (Keen 184). They saw it was a way to introduce theories and start building them, without overcomplicating them. Static analysis was a transitional methodology: as theories got stronger and the discipline matured, dynamic analysis would eclipse its static counterpart, or so economists hoped. Static analysis allowed them to build models and theories, but did not give the theories much applicability to reality. However, static analysis is still used centuries later, and economic scholars and policy-makers, who see dynamic analysis as unnecessary, still use static analysis.

Neoclassical economists do not model with the assumption of equilibrium because they consistently see the real world economy in a state of equilibrium; they model with the assumption of equilibrium because they cannot get the results they want in dynamic analysis, so they stick to static analysis (Keen 186).

Economists should be abandoning static analysis, and work in disequilibrium, if they want their discipline to have real world applicability. Dynamic processes are far less likely to end in a stable equilibrium. Even if dynamic analysis processes happen to lead to the

same outcomes as static analysis, it cannot be justified that static analysis can be used to model the economy. The real economy is dynamic, so any analysis applied to it should be dynamic too.

John Maynard Keynes, an iconic economist, rejected the concept of a long-run static equilibrium. His detestation of it can be captured in his statement: “in the long run we are all dead.” Neoclassical economists focus on the long run, because that is where a stable equilibrium occurs. Keynes saw the focus on the long run as misleading. He believed that economists should instead focus on the near or immediate future, because that is where everything is faulty and imperfect. Humans live in a state of short run disequilibrium (Keen 187).

Despite Keynes’s valid criticisms of equilibrium and a fixation on the long run, neoclassical economics continues to be rooted in the concept of long run equilibrium. Since neoclassical economics is a prominent school of thought, equilibrium analysis dominates economic discussions and schools. Keen thinks, “the obsession with equilibrium analysis has imposed enormous costs on economics” (188). If economics embraced non-equilibrium analysis, it could become a more useful and relevant science. Keen thinks it might even become easier to use and understand.

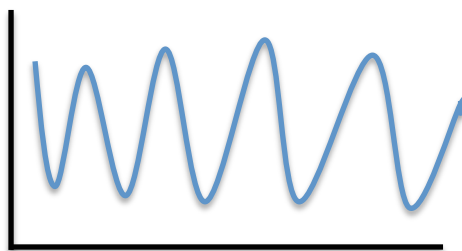
Despite what neoclassical titan Milton Freeman once claimed, which the neoclassical school has since rejected, unrealistic assumptions make theories unrealistic, and distance it from reality.¹⁶ Since equilibrium is established through unlikely assumptions, it becomes a misrepresentation of reality. Neoclassical economists know at some level that this is the case, but they reject that notion, and continue to develop their theories in ways that hide

¹⁶ “If you believe you can use unreality to model reality, then eventually your grip on reality can become tenuous” (Keen 188).

the implausibility of equilibrium. No matter how much they fortify these theories, as long as they argue for equilibrium, they will be unable to represent reality.

Models of general equilibrium have been shown many times over to be unstable in an unregulated market. Instability is not a guarantee, since it is hard to determine the shapes of supply and demand. Unless supply and demand have their conventional form, equilibrium will be unstable. If demand slopes up even slightly, when the economy falls out of equilibrium, it is just as likely to move away from equilibrium than to return to it. Economics' insistence on modeling everything in equilibrium, which makes it an unrealistic science, has isolated it from the more representative sciences, where dynamic analysis is dominant. Reality is never found in a state of equilibrium, just states of less severe disequilibrium (Keen 192).

Along with proving that demand curves can take any shape at all, Sonnenschein-Mantel-Debreu conditions also state that: "there can be two or more possible demand levels for any given price" (Keen 53). This is why equilibrium is unimportant, there are multiple price points where it could occur, in the midst of periods of disequilibrium. Therefore, market demand curves are likely to look like the one below.



Systems with unstable disequilibria do not break down, as neoclassical economics might suggest, they just keep moving and changing. The demand curve above is one Keen described in an earlier chapter. It depicts demand in an economy in constant change. This

economy is always moving, but it has upper and lower boundaries. This alternative viewpoint depicts how an economy can change over time, and does not have to stay in equilibrium. Equilibrium does not identify where the economy is, instead it “tells you where the model will never be” (Keen 192). Dynamic analysis is far from perfect, but it is going to be slightly right. At the very least, dynamic analysis will be more right than its static counterpart, 100 percent of the time.

The economy indefinitely orbits around equilibrium. By adopting dynamic analysis, economics might be able to finally make consequential observations and suggestions about society. As Keen put it, “what is to be abandoned is the economic obsession with achieving some socially optimal outcome” (194). Equilibrium is a utopian idea that just can’t happen. The easiest way to improve the science would be to abandon static analysis and equilibrium.

William Phillips, an economist from New Zealand, pushed for economists to build dynamic models of the economy. Phillips lent his name to his infamous creation, the Phillips Curve. To build the curve, Phillips looked at annual economic data in the United Kingdom from 1861 to 1957. Through this data, he found that years with high rates of inflation coincided with low rates of unemployment (Blanchard and Johnson 161). Years where there was a high rate of unemployment, there was a low rate of inflation. Phillips found a “trade-off” between inflation and unemployment.

This data suggested that there was a relationship between the two economic variables. If policy makers wanted to reach a lower rate of unemployment, they could raise the inflation rate. If economies aimed to lower inflation, they would need to expect

unemployment rates to rise. The Phillips Curve showed how dynamic analysis could explain various economic phenomena effectively.

Phillips's theory was intended to strengthen Keynesian economics. Through dynamic analysis, he proved that intervention in the economy could achieve desired economic outcomes, instead of leaving the market to its own devices. This allowed Keynesian economics to become the supreme school of economic thought for the 1960's with economic policymaking.

However, in the 1970's economic conditions arose that contradicted the Phillips Curve. At this time, high unemployment rates and a high rate of inflation existed simultaneously. These conditions became known as "stagflation." Stagflation led to a public rejection of the Phillips Curve, and Keynesian economics as a whole, with respect to economic policy (Krugman 5). Since the Phillips Curve trade-off was shown to be false, people responded by rejecting all Keynesian economic theories. The school of Friedman and neoclassical economics as a whole came back to the forefront of economic thought and policy. What was supposed to strengthen Keynesian economics ultimately dismantled it.

Keen described the abandonment of dynamic analysis as such: "Unfortunately, Phillips's noble intentions resulted in a backfire: far from helping wean economists off their dependency on static methods, the misinterpretation of his simple empirical research allowed the rebirth of neoclassical economics and its equilibrium methodology" (202). When the curve was debunked, economists went back to static analysis and their focus on equilibrium. Such a reaction was detrimental to economics: instead of improving dynamic analysis, it was abandoned in favor of static analysis. If they bolstered dynamic analysis,

economics as a whole would have improved as well. Since they resorted back to static analysis, economics became stagnant, and prevented any real development.

Stagflation dismantled the Phillips Curve, but it did not necessarily show that the “trade-off” was a lie. The curve showed that the trade-off existed throughout history, but it did not promise that high rates of unemployment and inflation could not happen at the same time. It just said that they tend to have an inverse relationship. The occurrence of stagflation in the 1970’s showed that at that point in time, raising the interest rate might not be the optimal way to solve unemployment. In fact, the Phillips Curve was later improved to more explicitly include the possibility of stagflation. The original trade-off was imperfect, but it did provide insights into how two economic variables behave in respect to each other, and how economic policy could be changed to better accommodate certain economic outcomes. Economists should have been wearier of the curve, and should have then devoted resources and time to improving dynamic analysis, and increasing its applicability.

In Praise of Dynamic Analysis

Dynamic analysis is flawed, but it allows economic theories to make claims about reality. Static analysis will never improve economic theory, as it allows no room for real world applicability.

The Phillips Curve illustrated certain defects in dynamic analysis. When dynamic analysis is shown to be incorrect, it should be improved, so future analysis can develop and avoid such errors. Even when dynamic analysis is wrong, it is still more right than static analysis.

Equilibrium can only be achieved through faulty static analysis. Therefore, it should be abandoned by economic theory. If economic theory dropped their intense focus on equilibrium, the discipline would automatically improve. The real world is usually in disequilibrium, which is not a bad thing. The economy will never be perfect. There will never be zero unemployment and recessions will happen from time to time. A state of disequilibrium always gives the economy room for improvement and growth. If economic theory began to focus on disequilibrium, and its theories provided ways to move into periods of less severe disequilibrium, economics might become able to lose its mantle as “the dumb science” and could start to become a useful tool.

Chapter Four: Neoclassical Economics and Investment

The stock market is a strange animal. The vast majority of people have no idea how it works, and are willing to pay people large amounts of money to decipher it on their behalf. It goes up and down. Companies are on it, but their names are abbreviated. There are bears and bulls involved. The stock market is an enigma, but it is a vital part of the economy.

Economic theory makes many attempts to explain the stock market, and why it goes up and down, how stocks behave individually and en masse, and what the state of the stock market means for the economy as a whole. The economists who can explain the stock market's behavior accurately become venerated, and get prizes thrown at them. Thus, many economists explain the stock market both accurately and inaccurately.

Neoclassical economic theory bases its theory of stock markets on the Efficient Market Hypothesis (or EMH for short). Before going into what the EMH actually is, it is first necessary to investigate the definition of the word "efficient." To the dictionary reader, efficient means something along the lines of "achieving maximum productivity" (*New Oxford American Dictionary*).

Efficient markets are not markets that are at their peak level of productivity; they are markets that accurately price stocks on the basis of expectations of their future earnings potential (Keen 272). To put it more simply, stocks in efficient markets have prices that reflect how much money they could earn in the future, and incorporate all available information. Neoclassical economic theory uses the word efficient quite liberally, as its economic meaning is quite different than its literal one. Economically efficient means something is performing the way it should, not that it is performing the best it can.

To establish the idea of efficient markets, three assumptions were held:¹⁷

- 1) Every single investor has identical expectations about the future prospects of all publically traded companies
- 2) Their identical expectations are correct: on average, expected value equals actual value
- 3) All investors have access to unlimited credit so they can borrow as much as they wish

These assumptions are uncharacteristic of reality. Much like many other neoclassical theories, all assumptions of efficient markets are not realistic, so the EMH cannot be applied to reality. As Keen put it, “the only way these assumptions could hold would be if each and every stock market investor were God” (Keen 272). Investors are actually irrational human beings who cannot predict the future, so they make unique investments the best they can. If those assumptions are needed to make markets efficient, than no real world stock market can be efficient in the way that economists define the term.

The Basis For Emerging Market Hypothesis

If there is one man to thank for neoclassical economics’ theories on stock markets, it is Irving Fisher. Prior to the Great Depression, he was one of America’s most celebrated economists, having crafted one of the dominant theories on investment and the stock market. The Great Depression lost him his fortune, and disproved his theory. After the depression, he built another theory of capital markets, which directly opposed his pre-depression theory. However, his later theory was mostly ignored, and his earlier theory is

¹⁷ Assumptions taken from Keen 272

still used by many economists, even though the Great Depression proved it false (Keen 273).

His pre-depression theory was on the value of money and time. It argued that the interest rate reflects a price determined by the value of present and future goods. It was basically furthering neoclassical economics' theory of interest rates. Jeremy Bentham first argued this theory in 1787, when he wrote about usury.

Usury has always had a negative connotation. In modern economic terms, it means lending money out at an extremely high rate of interest. Originally, it meant lending out money at any rate of interest at all, since lending was frowned upon. As trade became increasingly common its role in the economy grew, the stigma against lending weakened. Lending is a vital part of trade, so the threshold for usury shrunk. Eventually, usury constituted lending at a very high rate of interest. Lending at low rates of interest became encouraged (Keen 272-273).

Adam Smith, the father of laissez-faire economics, surprisingly supported a limit to the rate of interest.¹⁸ He outlined two types of people who want interest rates higher than the market rate. The first were the prodigals, those who waste money and spend it extravagantly, only to display their wealth. Then there were projectors, who cheat the greater public, by offering them money at rates they will not be able to pay back. The projectors invest inappropriately.

Adam Smith's argument for a ceiling on investment was mostly focused on macroeconomics. It stated that a legal limit would allow the greater public access to loans.

¹⁸ "The advantage of a legal limit, according to Smith, was that when set properly it excluded only loans to 'prodigals and projectors,' thus making more of the country's capital available for loan to industrious people" (Keen 274).

According to Smith, without a limit, only the prodigals and projectors could access loans. The limit would have to be set carefully, since one that would benefit the prodigals and projectors would give the economy's capital base only to those who would waste it. A ceiling would allow investment to occur in a broader manner, and would allow the economy to grow at a higher rate, since the greater public can borrow money. In a sense, the interest rate ceiling is a form of quality control in investment.

Jeremy Bentham rejected Smith's theory. His dismissal ignored macroeconomics, and mainly stuck to economics at the micro level to justify his rejection. He looked at individuals, arguing that no governing body should regulate someone's personal economic activity. He assumed that no one ever wants to borrow money: everyone will have enough money to support himself or herself. If they need to borrow money, they will do so at a rate they can pay back without defaulting. These people can get loans from those they have relationships with, like friends and family members (Keen 275).

Already, this is looking unrealistic. Quite often, people do not have the money to fund the lifestyle they seek, so they take out loans at very high rates of interest to purchase luxurious cars and large homes they cannot afford. Such lending played a vital role in causing the financial crisis of 2008. Such borrowing and lending wasn't restricted to the early 2000's; it has happened throughout history, and is still happening.

Bentham's argument was built on a model of economic behavior that is misrepresentative of reality and overly idealistic. However, neoclassical economists utilized Bentham's argument to justify the rejection of a ceiling for interest rates. To point out further flaws, Bentham's theory assumed that the economy was in equilibrium, which has already been shown to be problematic. The neoclassical theory of lending is based on a

theory that is inherently flawed, and uncharacteristic of reality. Therefore, neoclassical economic theory cannot justify their argument against a ceiling for interest rates in lending.

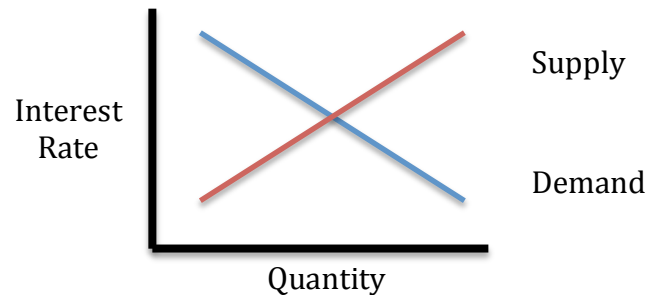
Irving Fisher's pre-depression theory built on Bentham's. He argued that the value of a good reflects an exchange between its present and future value through its price. He restated Bentham's theory through a barter system in terms of goods rather than money. There are two types of consumers in this society: lenders and borrowers (Keen 276). Lenders have a low time preference for present over future goods. According to Keen, these are the types of people who would prefer \$103 worth of consumption in a year to \$100 worth of consumption now. This means the lender would have a rate of time preference of three percent. If they lend out \$100 now at a rate of six percent, they can spend \$106 in a year, thereby yielding a financial gain.

A borrower, conversely, has a high time preference of present over future goods. They would need \$110 in a year to consider not spending \$100 today. If someone were lending out money at an interest rate of six percent, they would decide to borrow, since they can spend \$100 in the present at a cost of \$106 in a year (Keen 276).

Fisher stated that one's time preference depends on their personal income. Those with smaller incomes tend to borrow, while those with large incomes lend. The relationship between interest rate and demand for money gives a downward sloping demand curve: as the interest rate falls, demand for money rises. At high rates of interest, investment occurs less frequently since borrowing money is expensive. At low rates of interest, more investment happens, since borrowing is cheap and easy.

The supply curve for money is upward sloping. Lenders have low time preference, so they are more willing to lend at higher rates of interest. Low rates of interest are below

their time preference, so they are less likely to lend at low levels. The market for money will bring supply and demand together at a single equilibrium rate of interest. At this rate of interest, the market will be sound, and prices will reflect value. Fisher held two assumptions to ensure that lending took place: markets must be cleared, and debts must be paid.



This was all theorized before the crash. As it was happening, Fisher knew that his theory must have been wrong, but he was optimistic that the market would sort itself out and return to stability, as his theory predicted (Keen 278).

The crash occurred because the market was rising at such a fast rate, so people borrowed money in high volume to keep investing. However, what goes up must come down. As valuations skyrocketed, investors began to sell of their shares, and the market fell. Valuations decreased, so people were forced to sell shares at much lower rates than they bought them. Selling shares means companies lose money, so income falls, and people could not repay the loans they took out, so the supply of money fell. Companies were bankrupt, people were jobless and indebted, and the market had crashed, and showed no signs of recovery.

Fisher's Second Coming

The fact that the market crashed in such a drastic manner demonstrated how Fisher's theory was uncharacteristic of reality. Markets do not always exist in equilibrium, investors

are very willing to borrow money, and they cannot always pay off debts. Not only was his presiding theory debunked, Fisher lost his own fortune in the crash. In 1930, he published *The Theory of Interest*, which contradicted his previous theory. He previously argued that the market was indefinitely in equilibrium, and that all debts will be paid. Now, he recognized disequilibrium and that debts are not always paid, both at the individual and macroeconomic level. He now argued that if the economy reached equilibrium, it would be a momentary occurrence while the market returns to disequilibrium. Disequilibrium occurs because disturbances occur in equilibrium that makes the market go awry. In other words, he acknowledged that equilibrium was unstable.¹⁹

Having just witnessed the Great Depression, he included the possibility of crashes and depressions in his new theory. Excessive levels of debt (when large quantities of debts are broken in a short period of time) can turn disequilibrium into a collapse. Most interestingly, he argued that after a crash, there is no returning to equilibrium, which is the exact opposite of what he argued earlier before the Great Depression.

His new theory outlined the processes that can lead an economy to a depression. The two factors that he claimed caused a depression were too much debt, and deflation. When the two occurred in succession, crashes would follow soon after. Over-speculation, overconfidence, and overinvestment are the causes of the two factors. Then the chain reaction described earlier causes selling of investments, bankruptcies, falling income, and eventually, depression.

This theory was not based on data or any formal proof; it was based on logical reasoning. Economists used this to justify rejecting his new theory, and continued to utilize

¹⁹ "...now [Fisher] appreciated that even if the real economy momentarily reached equilibrium, this state would be short lived" (Keen 280).

his pre-depression work. The main problem with this rejection was that “the antipathy he saw between the formal concept of equilibrium and the actual performance of asset markets was also ignored” (Keen 281). People did not understand that the point of his new theory was to demonstrate how equilibrium could not exist in real markets. The reason he did not utilize any formal proof was because he intended for his theory to allow other economists to develop further theories that proved his logic. However, this did not happen, and economists continued to assume equilibrium when analyzing financial markets. The EMH was a prominent neoclassical theory of finance that assumed equilibrium.

Back to the Efficient Markets Hypothesis

Efficient markets are ones where investors make use of all possible information. Additionally, all information available is complete; meaning every player in the market has all the information needed about the market and other players. However, economists misconstrued efficiency to mean that expectations for future earnings of companies are accurate, and shares are priced accurately. When stock prices change, it is due to the arrival of new information about the future prospects of companies. Stock prices follow a “random walk” meaning that past price movements will not determine future ones. In other words, stock prices behave like dice rolls: previous rolls do to not determine what the next ones will be. These propositions of efficient markets come out of Fisher’s pre-depression theory of time and money (Keen 282). Therefore, these theories were microeconomic in architecture, even though they made macroeconomic claims about equilibrium.

Markets are built upon investment. Investment is fueled by two factors: risk and return. An asset with a higher potential return will be riskier than one with lower returns. This

makes sense, because for an investment to have a high return, there will be a possibility that its price could fall an equal amount. If investors want to make stable investments, they would be advised to put money in bonds, since they are the safest investment with the least amount of risk. If they seek high returns, they will put money in stocks, where prices rise and fall unpredictably. Therefore, there is a tradeoff between risk and return, since higher returns come at the price of increased risk.²⁰

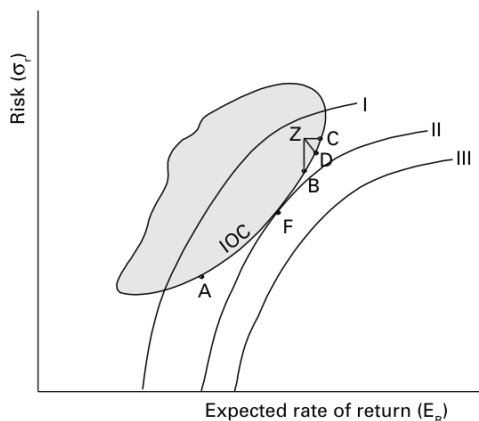
The American economist William F. Sharpe built a model of the individual rational investor. He claimed they invest based on the expected value of investments, and standard deviation, or upon basic statistics. Standard deviation, a statistical measure of variability, measures how values fluctuate (Keen 283). He basically assumed investors are innate statisticians: that they could accurately calculate statistical variables. This is highly inaccurate: humans are innately horrible at statistics (Kahneman 5), since various factors like emotions get in the way. Keynes originally argued this, “He also recognized that many of our long-term investments reflect “animal spirits”—intuitions and emotions—not cool-headed calculation” (*Mind, Society, and Behavior* 5). Years later, Daniel Kahneman won a Nobel Prize in economics for that finding, which does not seem that surprising, but it completely debunked tons of economic theories, like the one being talked about. If individual behavior is irrational and contradicts what is statistically reasonable, then similar occurrences will happen at the aggregate level. Large financial corporations, and even markets, can be affected by psychological factors like overconfidence.²¹

²⁰ “...there is a ‘trade-off’ between return and risk: a higher return can be earned, but only at the cost of a higher level of risk” (Keen 282).

²¹ “CFOs were grossly overconfident about their ability to forecast the market...Organizations that take the word of overconfident experts can expect costly consequences” (Kahneman 262).

Behavioral economics was founded on the concept that humans are not rational statisticians, but irrational, imperfect, and emotional individuals. The findings of the field apply not only to humans, but also to corporations, and even the macroeconomy. The World Bank Group, in a recent report, echoed this sentiment: “The findings [of behavioral economics] enhance the understanding of how collective behaviors—such as widespread trust or widespread corruption—develop and become entrenched in a society” (*Mind, Society, and Behavior* 2).

Sharpe assumed that investors get more utility from higher returns than lower ones, and from investments with lower standard deviations since they are less risky. This assumption allowed him to create indifference curves for investor’s preferences. The two “goods” in these indifference curves were risk and return. However, risk is a “bad” not a “good” because a consumer maximizes utility by taking on as little risk as possible. The indifference curves showed that the optimal investments were ones that had high returns with little to no risk. The budget line of these indifference curves represented the spectrum of possible investments. This argues that investment portfolios should have all levels of risk, to be safe.



Investor Indifference Curves and the Investment Opportunity Cloud, Taken from *Debunking Economics*

Every single investor will have their own indifference curves, reflecting their preferences on risk and return. Therefore, Sharpe faced a challenge when aggregating individual indifference curves to represent society's preferences. However, he had to go from individual curves to the aggregate to make claims on the investment behaviors of society. So instead of accepting that at the aggregate level people do not prefer low risk and high reward, "like every neoclassical economist, he took the time-honored approach of assuming the problem away" (Keen 285).

His two assumptions were:

- 1) All investors can borrow and lend as much as they like at the same rate of interest
- 2) All investors agree on the expected outcomes and prospects for each and every investment

The first assumption does not pertain to reality. The reasons people have credit scores is so different people have to borrow at different rates of interest. The 99 percent are forced to borrow at higher rates than the one percent. The second assumption is false as well. It means that all investors are identical. This assumption allows neoclassical economists to aggregate investors into one function, just as they did with individual demand functions. Assuming that all investors have the same investment outlooks is equivalent to assuming all consumers have the same utility functions. Sharpe even admitted that his assumptions were extreme, but justified it by stating that unrealistic assumptions do not make theories unrealistic. As was discussed before, this is false.

The assumptions allowed him to argue that all investors will want to invest in a combination of riskless asset and the same portfolio of shares (Keen 285). Although each investor will have their own preferences with respect to the risk-return tradeoff, they will

invest in the same portfolio. Each indifference curve touches the investment opportunity curve (IOC), which shows all possible rational investments. If someone tries to invest in an asset outside the universal portfolio, demand and price for that instrument will go up, which will make other investments fall in price, which flattens the IOC. If the EMH is actually true, then all investors' expectations (which will be the same) will accurately predict the future prospects of companies, and share prices will reflect all information about current and future prospects.

The Issues

The EMH and Sharpe's theory of investing are both flawed. Sharpe even acknowledged how unrealistic his theory was based on his unrealistic assumptions (Keen 287). Each of his assumptions has side effects that would contradict itself.

The assumption that investors agree on prospects for each investment means that trade will balance out, and equilibrium will be reached. When there is equilibrium, trade should cease, since it no longer needs to occur because the market is balanced out. The only time additional trading will occur is when new information arises, which will result in a temporary state of disequilibrium. In other words, the market mostly lies dormant, where trades occur occasionally. This means that people will only trade when information appears that others do not have, which contradicts the assumption, because everyone is supposed to have all the same information. Additionally, this is false, because the market is always moving up and down, and large amounts of trade happens at every moment: the market then never lies in equilibrium, as the assumption indicates.

The second assumption, investors can borrow and lend as much as they want at the same rate of interest, implies that all investors have the same and equal access to credit markets. This implies someone could borrow enough money to buy all the shares of a major company, and pay the riskless rate of interest to do so.²² This cannot happen in reality, and suggests a degree of liquidity that is unfathomable in the real world. If every investor could borrow at the same rate of interest, then as demand for money rises, rates should rise accordingly so equilibrium can be reached. If the rate rises, then not everyone can afford that rate, and not all investors can borrow at the same rate. Therefore, this assumption contradicts itself as well.

Each assumption is integral to his theory. Since they misrepresent reality, the theory will be misrepresentative as well. In reality, borrowing rate exceeds the lending rate, investors can only access a limited amount of credit, and borrowing rates rise as the amount borrowed rises. The theory can only be applicable in a world where the assumptions apply, which is not Earth. The EMH “cannot apply in a world in which investors differ in their expectations, in which the future is uncertain, and in which borrowing is rationed” (Keen 288). It could have been used as a stepping-stone to create a theory that was applicable to reality, but it never was, and was only used to rationalize investment behavior.

The biggest issue with the EMH is how it portrays investors as having perfectly accurate expectations. “Every stock market investor is assumed to be Nostradamus,” said Keen, of the EMH, “What economists describe as ‘efficient’ actually requires that investors be

²² “The second implies that anyone could borrow sufficient money to purchase all the shares in, say, Microsoft, and pay no more than the riskless rate of interest to do it” (Keen 287).

prophetic” (289). Investors cannot perfectly predict the future; they just do their best to guess what might happen. Shiller echoed these sentiments, “In fact, people almost never know the probabilities of future economic events” (2). Not all investors agree on investments; they will have different expectations and preferences. This will lead to disequilibrium, even though the EMH is a theory of equilibrium. Therefore, expectations will not be “efficient.” Markets are cyclical: they will rise and fall as people’s expectations and outlook of the markets change. The market follows a cyclical pattern, where bears and bulls alternate, which directly opposes what the EMH theorized.

Another problem with Sharpe’s theory was in his method of measuring risk: standard deviation. Standard deviation is a measure of variability, not risk. They are not the same thing. Variability shows how past outcomes have differed. Since prices are supposed to follow a random walk, past outcomes will not affect future ones, so variability cannot be used to predict future expectations. Variability cannot be used as a proxy to risk, as they are very different.

Standard deviation can be used when there are a set number of possible outcomes, like with a dice roll. However, with investment, there are an infinite number of possible outcomes, so standard deviation will be misrepresentative. Uncertainty, not risk, is applicable to investment, and it prevents investors from knowing what the future will be. Uncertainty and risk are different, “the probability of *risk* could be calculated; but Keynes distinguished this from *uncertainty* – that is, situations and circumstances in which we do not know and have no means of knowing how events will unfold” (Ingham 45). Risk pertains to a finite number of possible outcomes. Uncertainty implies that there are infinite outcomes, so unknown and unexpected outcomes can occur. Standard deviation can

measure risk, but nothing can measure uncertainty. Using risk to measure uncertainty is like using a bathroom scale to measure liquid: it will be unable to accurately gauge what needs to be measured, and will get messy.

The efficient market hypothesis argues a random walk in the market. However, investors utilize information from the past to predict the future, and determine investment behavior. Markets are uncertain, so there is no other way to act. Investors do not utilize rationality and perfect statistical analysis, their human limitations and emotions make them to act imperfectly. This contradicts neoclassical theory, which argues that people are rational, and therefore do not let emotion cloud reason. The market is not as efficient and methodical as the EMH and neoclassical economics states: it is a cyclical system that is forever in disequilibrium. Behavioral economics, with its focus on human behavior and biases, could potentially reveal ways that the stock market works, that are way more realistic than the EMH.

Keynes described the stock market as a game of musical chairs (Keen 292): everyone will play to his or her best ability, but when the music stops, someone will inevitably be left without a chair. The most effective way to play the stock market is not to invest based on what one's own expectations for what shares will be worth, but on what everyone else is likely to expect they will be worth. Instead of looking at the market, investors just look at each other, to predict how the majority will act. This is why when the market rises; it leads investors to think it will keep rising. If the market falls, investors will think it will keep falling. Rational investors do not control the market, irrational sentiments do.

Stocks are not accurately priced on their current and future earnings potential, as the EMH argues. They are priced according to how most people feel they should be priced,

which is not based on careful analysis, but flawed human intuition. Given that humans are not statistical machines, but emotional beings, the stock prices, and the market as a whole, will swing up and down, just as human emotions do. Therefore, the EMH cannot make claims about how investment works on planet Earth. Psychology and behavioral economics have far more potential to do so.

Chapter Five: The Macro Micro Conundrum

This paper, as a whole, is concerned with investigating macroeconomic theory. The macroeconomy is what crashed during the Great Depression and Recession. When politicians complain about the unemployment rate being too high, it is a macroeconomic issue. When inflation is too high, it is a macro concern. This is all a way to state that macroeconomics is important to society, so for macroeconomic policy to be effective, macroeconomic theory needs to be effective as well.

Macroeconomics, which is often the first, and only class students are exposed to in economics, studies the big-picture of the economy (Krugman 1). However, neoclassical economists have used reductionism to diminish macroeconomics to applied microeconomics. Problems arise from implying something small can also represent a larger aggregate view. This is the case with equating macroeconomics to microeconomics. The reduction is why “mainstream macroeconomics has gone off the track” (*Post Keynesian Macroeconomic Theory* 2). Macroeconomics is far more complicated, and things arise at the macro level that will go unnoticed at the micro. Therefore, macroeconomic theory needs to be its own discipline, and its theories need to be developed on their own. Microeconomics cannot masquerade as macroeconomics.

On Reductionism

Reductionism, in essence, is a ranking of sciences. It advocates that a simpler concept one level down can explain concepts that are more complex on a hierarchy (Wilkinson and Klaes 33-34). Keen exemplifies this process through the life sciences. Biology can be explained by chemistry, which can be explained by physics (Keen 208). The practice

implies that all large-scale systems can be explained by working up from systems that are small-scale. For economics, this means that the behavior of the macroeconomy can be explained through microeconomics.

Reductionism is acceptable as a thought exercise: it can help understand how different concepts relate to each other. However, it is problematic when used to justify the diminution of something large and complicated to its underlying concepts. Things happen high up that do not occur below: some phenomena cannot be explained by a lower occurrence, since they only arise at higher levels. Therefore, it is problematic to reduce macroeconomics to microeconomics.

An example of this comes from an earlier chapter. Individual consumer demand curves can be modeled as downward sloping since it is feasible that one consumer's demand will fall as costs rise. However, at the aggregate level, complications arise. As prices rise, the distribution of income changes, which causes aggregate demand to take on a shape that is not only downward sloping, and could slope upwards at points. According to the Sonnenschein, Mantel, Debreu theorem, it can take on almost any shape at all. Even though at the individual level demand can be downward sloping, at the aggregate (macro) level, it cannot be modeled that way, since complexities arise when scope expands.

Neoclassical economists are the culprits for the reduction of macroeconomics. Their motive is to represent the entire economy by individual rational agents, so they can imply that there are no macroeconomic problems. Basically, it is a way to suggest the entire economy is in a perpetual state of stable equilibrium. When problems arise, it is due to issues within individual sectors, not issues at the macro level. Some sectors will have

excess supply, others will have excess demand, but it all balances out so the entire economy is in equilibrium.

This is Where the Critique Comes in

According to the oft-mentioned economist Keynes, the confidence that all markets in the economy would balance each other out came from Say's Law. The law states that the sum of all excess demands is zero, so the economy balances out, implying that there could never be slumps in the economy due to deficiencies in demand. Slumps are the result of imbalances in individual sectors, according to the law. It assumed that money is neutral (more on that later), economy is fully employed, and monetary authorities intervening and increasing the rate of growth of money is what causes inflation (*Post Keynesian Macroeconomic Theory* 14-15).

Keynes, came to the rescue, and mathematically reasoned that aggregate demand could be deficient, so the macroeconomy could exist in disequilibrium. This invalidated Say's Law. However, his reasoning was so convoluted and complicated that economists could not fathom it. Keynesianism was popular throughout the 1960's and into the 70's. However, the rise of stagflation in the mid-70's, which contradicted the Phillips curve, lead to the rejection of Keynes. With the rejection, economists continued to use Say's law to justify macro equilibrium through micro means.²³

They went on to analyze the macroeconomy from the perspective of individual rational agents. These people are neither thieves (take more money than they contribute) nor philanthropists (who contribute more money than they take) so supply and demand will be

²³ The Keynesianism that was accepted in the 1960's-70's, and then rejected, is more reflective of the New Keynesian school than the Post-Keynesian school.

balanced for every single rational agent. Since every agent's supplies and demands are balanced, the economy will be balanced as well. This is the very notion Keynes tried to debunk, when he proved that there could be deficiencies in demand.

Marx pointed out one obvious flaw in Say's Law. The law suggested that no one would save money, since his or her demand and supply are balanced (Keen 222). Saving would imply excess supply. However, people obviously save in reality, as it is a reasonable action. People often hoard money, due to their desire to accumulate. These are what Marx referred to as capitalists. Both Walras's and Say's respective laws say that people do not want to save, yet the capitalists show that people indeed do save. Additionally, savings can occur in neoclassical theories, but savings must be balanced out by investment.

Marx's model, although far from perfect, described the economy as a process that changes over time. Both Say and Walras looked at the economy in one instance to show it was in equilibrium. They were static, while Marx's and Keynes's models were dynamic, much like the actual economy.

Walras's and Say's models were factually incorrect and theoretically unsound. Therefore, they cannot justify reducing macroeconomics to microeconomic theories. Since equilibrium could only be proved through microeconomic theories, they still cannot prove that the overall macroeconomy can ever be in equilibrium in the long run.

The alternative economists (Keynes, Marx, Schumpeter, Minsky) all used macroeconomic theories when studying the overall economy. They showed how disequilibrium was the state by which humans live. The economy will fall into slumps. Investment can alter the economy. Instability, which is absent in equilibrium, is what allows the economy to grow (Keen 224). In essence, neoclassical economics is a science of

equilibrium justification. This is “a hindrance to understanding the forces that enable the economy to grow” (Keen 224). Neoclassical economics, by focusing on equilibrium, cannot explain how the economy works, and the underlying mechanisms of growth and change in a capitalistic society.

Keynes, and his peers, tried to explain how Earth’s economy actually works. Two things happened that prevented him from improving mainstream economic thought. The first was that he was outright rejected by the neoclassical economists who worshipped the laws of Say and Walras. The second was that his writings were so complicated, that they got misinterpreted. Some who considered themselves Keynesian were building theories that were anti-Keynesian. Keynesianism could have been an improvement to economics as a whole, but instead became debilitated (Keen 225).

On Keynes

Keynes’s famous *The General Theory of Employment, Interest, and Money* was a complicated yet groundbreaking text. It launched a whole new school of economic thought, known as “Keynesianism” that challenged the status quo of economic theory. Keynesian Economics faced issues in the late 20th-century, but the school of thought still stands today.

However, Keynes’s writings were difficult and complicated, so as expected, people had trouble understanding it. Many economists took it upon themselves to interpret and summarize his writings, so many economists who can call themselves Keynesian, have never actually read any of Keynes’s works. The difficulty of Keynes’s writings is not even a secret, as the man acknowledged it himself: “The ideas which are here expressed so laboriously are extremely simple and should be obvious. The difficulties lies, not in the new

ideas, but in escaping from the old ones" (*General Theory of Employment, Interest, and Money* vii). Even though his ideas were obvious, he proved and explained them in a complicated manner. They were simple to him, but hard to fathom for everyone else.

Keynes was a staunch advocate for macroeconomics as its own discipline ("What is Keynesian Economics?" 53): he rejected the notion of applied microeconomics as a viable substitute. His embrace of macroeconomics put him in contrast with neoclassical theory.

Keynes theorized the role of uncertainty in the macroeconomy. As was stated before, uncertainty occurs when the eventual outcomes of an action are unknown, as with investment. Therefore, expectations play a large role in determining investment. He argued that even though this is the case, looking at past behavior (through measurements like probability) is not a viable way to form expectations and determine investments, since the future will be unlike the past. Expectations, consequently, are inevitably fragile, since circumstances will arise in the future that will be impossible to anticipate.

Keynes's attack on Say's Law was grounded in his theories of investment. He claimed that investment, along with consumption, was a key determinant of the entire economy's expenditure, and also employment and growth (*General Theory of Employment* 6). Since uncertainty is crucial to investment, it will also be crucial to the entire economy's expenditure. However, neoclassical economics does not consider uncertainty when theorizing how expectations are formed. As I discussed in the last chapter, risk and uncertainty are different. Neoclassical economists use risk in lieu of uncertainty, which is problematic. His critique unveiled numerous ways neoclassical theory misrepresented investment, and outlined various determinants that their models ignore. His vision is still the backbone for the Post-Keynesian school of economic thought that exists today.

However, there is another school, the New Keynesian school that claims to follow his theory, even though they have misinterpreted it.

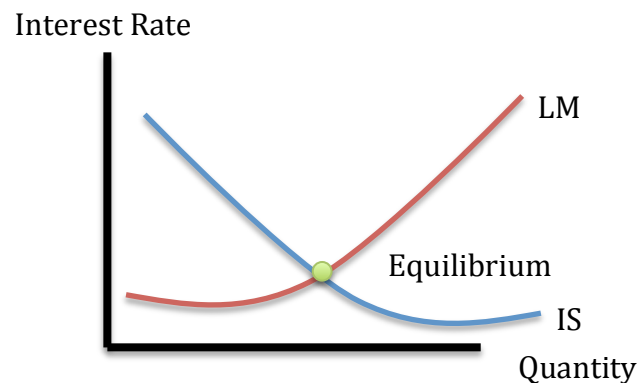
The Misrepresentation

One man who is notorious for his misunderstanding of Keynes's genius was Sir John Hicks. His misunderstanding was intrinsic to how he built his IS-LM model. He summarized Keynes's model in three parts: demand for money depends upon the interest rate, investment depends upon the interest rate, and savings is a function of income. This recap did not mention uncertainty or expectations, which were intrinsic to Keynes's writings. According to Keen, without uncertainty, one cannot build a theory and call it Keynesian. Hyman Minsky put it best: "Keynes without uncertainty is rather like Hamlet without the Prince" (75).

Hicks pretended that Keynesian theory said that demand for money depends upon the rate of interest and the level of income. However, Keynes actually said it depended upon "the degree of our distrust in our own calculations, and conventions concerning the future" (*General Theory of Employment* 216), or in other words, how sound predictions are and what the future could look like. Those are not the same. Hicks distorted Keynes, so he could masquerade his model as smart, sound, and "Keynesian".

The IS and LM curves were not much different than the supply and demand curves. IS was downward sloping, and represents all combinations of the interest rate and level of output, such that the output market is in equilibrium (Blanchard and Johnson 89). The IS curve looks at the goods market. The LM curve was upward sloping, and represents all combinations of the interest rate and income, such that the interest rate yields equilibrium

in financial markets (Blanchard and Johnson 92). The only difference between these curves and the supply and demand curves was that they had a curve on the bottom. Axel Leijonhufvud actually referred to it as the “Totem of Micro”. These were supply and demand on a microeconomic scale, yet Hicks’s model used it to justify macroeconomic claims.



He used these microeconomic curves to explain the Great Depression, a catastrophe of macroeconomic proportions. The part of the graph where IS exceeded LM was known as the Keynesian region. Here, monetary policy is ineffective, since changing the interest rate will not affect the money demand. This is why the LM curve is practically horizontal. This is where depression can happen, since changing the money supply will not affect the economy (Keen 233). However, fiscal policy will still be effective, and could possibly bring society out of recession. Hicks was arguing that everything in the economy was affected by the rate of interest, and therefore a change in the rate of interest could affect the entire economy. He justified this argument on the basis that Keynes believed this too. However, Keynes did not write that at all, and knew the economy was complicated and thus could not be boiled down to just the interest rates. Therefore, Hicks justified reducing

macroeconomics to microeconomics (the IS-LM) through misinterpreting Keynes and saying that his microeconomic tool could make macroeconomic claims.

Years later, Hicks acknowledged that his IS-LM model did not represent the work of Keynes accurately. He claimed it “omitted any discussion of uncertainty or expectations” (Keen 234). In a sense, he restated his own model, using some Keynesian-esque terminology. Apart from it being non-Keynesian, and a micro model making macro claims, there are more issues.

The main issue was in how Hicks’s model incorporated expectations. In his model, expectations were constant. However, expectations change over time and affect the macroeconomy, so if it ignored changing expectations, it could not make macroeconomic claims. Uncertain expectations would have made it increasingly sound on a theoretical level, and more applicable to the macroeconomy.

Through Walras’s law, Hicks omitted the labor market from his model. The labor market was an important aspect of Keynes’s theory, so its omission made Hicks’s model fundamentally non-Keynesian (Keen 240). The omission was, unsurprisingly, a ploy to vindicate a stable equilibrium in the market. It is far easier to establish equilibrium when the economy is comprised of two markets than when it is comprised of three. Walras’s law argues that if there are three free markets, and two of them are in equilibrium, the third will be in equilibrium as well. However, the omission of a very important market means it cannot be applied to reality. Furthermore, it is a static model. Any economic model that strives for real world applicability, whether it be macro or micro in scale, needs to be dynamic and incorporate the possibility of unstable disequilibrium. The IS-LM was not one of these models, and was plagued with internal errors that made it non-Keynesian, non-

macro, and non-applicable. However, many economists still utilize the IS-LM in macroeconomic analysis. Even worse, they think the model is Keynesian.

Squandered Potential

Ignoring its many issues, the IS-LM was an important achievement in economics at the time. It introduced the notion of building economic theories that were not just abstract drawings, but numerical simulations of the actual economy. The model showed promise of subsequent economic models being able to make claims about the real economy, and not of a theoretical economy. Econometric models were an improvement, but they had issues.

The first problem was that most of these models was that they present a one-to-one relationship between variables (Keen 237). Many of these models, not including the IS-LM, are linear. This means that the relationship between the variables will be one-to-one. However, that is unlikely to happen in reality. Real world variables have non-linear relationships. However, economists pretended that nonlinearity did not matter, and that linear models were representative enough. This is because it is exponentially easier to justify equilibrium through linear models than nonlinear ones. Nonlinearities move systems away from equilibrium. However, these economists hoped to justify equilibrium with their models, not reveal another concept, so they stayed linear.

Another issue was that these models assumed that all movements away from equilibrium were caused by events external to the economy. Disequilibrium is an economic phenomenon, and will be the result of economic events that are internal to the economy. Keynes argued this, but it went ignored by those building these models. The external approach made it easier to rationalize equilibrium.

These models' focus on equilibrium reveals how they were built on a neoclassical vision of the economy. They neglected variables that were instrumental to macroeconomics like credit, debt, and expectations formed under uncertainty, to increase the likelihood of equilibrium (Keen 238). These omissions made the models unrealistic, and prevented it from making real claims and observations about economies. They were flawed mathematical justifications for equilibrium based on impractical assumptions. These models had so much potential, but their fixation on equilibrium prevented any efficacy.

The Real Problems with these Neoclassical Models

As stated many times before, macroeconomic models built upon neoclassical foundations will misrepresent reality, and be unable to make claims about it. Economists like Hicks incorrectly interpret Keynes's writings to validate this. Keynes was a loud advocate for macroeconomics as its own discipline, meaning he was against equating it to microeconomics, and reductionism. Macroeconomics and microeconomics are fundamentally different, and should not be equated, which neoclassical economics is guilty of doing.

As explained in an earlier chapter, the Phillips Curve modeled the seemingly inverse relationship between inflation and unemployment. Robert Lucas disputed the Phillips Curve, and argued that it could not be used as a policy tool to control unemployment. He was not the first person to think this: Milton Friedman had argued the same thing years before (Keen 242). In his writings on money neutrality, he argued that the quantity of money would not affect the macroeconomy and macroeconomic variables. The only thing it would do is cause inflation. He claimed that the nominal quantity of money was not

important. In reality, it is very important. Since the actual value of goods and assets does not adjust when the money supply increases (inflation occurs) the supply of money can alter values, and change the market.

The reason Friedman assumed that a change in the quantity of money would not effect the economy was because his theory assumed equilibrium at full employment. Since the economy would automatically move to equilibrium, the money supply would not change anything; equilibrium would happen regardless. He used Walras's auctioneer to justify this assertion. He argued that the money supply was exogenous to the economy (Keen 243). This is highly false, and frankly, idiotic. Money fuels the economy, as it brings every consumable good and investible instrument under the same base value. Money allows people to compare apples and oranges. Therefore, any change in how much money there is will affect the market in profound ways.

Another issue with Friedman's theory of money neutrality was that he assumed the past was a reliable guide for future expectations. As said before, circumstances arise that make the future unlike the past. Friedman's theory of money neutrality was a way to argue that government intervention would not affect the economy. To do demonstrate this, he used a faulty metaphor for increasing the money supply called "helicopter money" and the fact that intervention would be unnecessary, since equilibrium would happen anyway (Keen 245). Keynes showed there were issues with this metaphor, since governments were needed to stabilize economic variables, since their actions could affect the macroeconomy. Even though Keynes's argument was sounder, when stagflation arose, Friedman's theory looked more applicable to reality.

Lucas wanted to improve Friedman's theory, and increase its applicability. However, his definition of improvement was not the same as a Keynesian: he wanted to make Friedman's theory more neoclassical. He did this by arguing that an increase in the money supply would not affect the economy in the long run. He contended that changing prices and income would not affect supply, and that unemployment could not be affected by government economic policy. He argued that there was a natural rate of unemployment that the economy would always return to, or that there was equilibrium for unemployment. To prove this, he assumed that, on average, actual inflation equaled expected inflation. This means that he assumed that people could accurately predict the future most of the time (Keen 247). This is unbelievably erroneous. No human is prophetic. Therefore, his theory is inapplicable to reality, so it cannot be used to justify that government intervention will not affect macroeconomic variables. This follows a very predictable pattern with neoclassical economic theories.

On Expectations

Expectations were an issue for neoclassical theorists. They assumed expectations away, which prevented their theories from having any applicability, and furthermore, from predicting economic events and crises. Keynes differentiated his writings by emphasizing the importance of expectations to the economy. He argued that expectations about the future profoundly affect decisions in the present.

Neoclassical economists like Lucas assumed the issue of expectations and uncertainty away, claiming that, on average, people could predict the future. The issue with these assumptions is perfectly explained by Keen: "[it] shows the extent to which neoclassical

economics is driven by a teleological desire to prove that capitalism is fundamentally stable, rather than by a desire to understand the empirical record of the actual economy” (248). Neoclassical economics masquerades as a discipline that can understand the economy, and provide insight into its workings. However, it is rigged to prove that capitalist economies are sound, instead of critically examining capitalism. That is the fundamental issue with neoclassical economics. Equilibrium is the theoretical manifestation for their insistence on capitalism’s stability.

Rational expectations, an assumption held by neoclassical economists to reach equilibrium. This assumes that humans and firms form expectations of the future by considering future policy decisions and expectations, so they can project what future economic activity will be (Blanchard and Johnson 366). Rational expectations considers that people might have incorrect projections, but overall, the expected value of all expectations will equal the actual level, so on average, expectations will equal reality. In a sense, it assumes that consumers are uber rational beings, since the average expectation about the future will be correct (Keen 249). Since rational expectations are assumed to validate equilibrium, they are misrepresentative of reality. The real world is uncertain, meaning predictions of the future will be impossible to accurately calculate. Davidson agreed, “The future is not calculable, even if the decision maker is competent to perform the mathematical operations necessary to calculate probabilities of conditional events given the necessary information” (*Post Keynesian Macroeconomic Theory* 89). Uncertainty prevents even the best conjecture from being accurate, and will therefore cause the average expectation to be far from correct. Rational expectations assume uncertainty away, making it unrealistic, and misleading.

Whenever economists, like Keynes, make strides in proving that the economy is in a state of disequilibrium, and build models that realistically describe how the economy works, neoclassical economists “dream up ways of relegitimizing equilibrium analysis once more” (Keen 249).

The fatal flaw of neoclassical economics is its insistence on proving equilibrium, instead of building theories that describe reality. The real world is imperfect, since humans who are emotional and irrational populate it. Any theory that assumes otherwise is examining an economy in another universe, and thereby unable to make claims about this world’s economy.

The Brunt of it All

Consumers are not rational beings that can predict the future, as neoclassical economics claims. In reality, they use heuristics (mental shortcuts) and conventions to guess what could happen in the future. Humans are uncertain, so they do the best they can. This is a relatively recent finding in behavioral economics (Wilkinson and Klaes 8), but Keynes actually first argued this years ago. Such a trick would be inferring the future would look relatively like the present. This is not the same as rational expectations: it means that they assume the future will maintain some proportion with the past, not that the two will be exactly the same. Rational expectations is such an unrealistic concept that it should have been rejected right away. However, when assumed, it could justify equilibrium and the lack of a need for government intervention (Keen 254), so neoclassical economists kept assuming it. Not only did neoclassical economics hold that government intervention would

have no effect on the economy, they argued it could even hurt the economy and the public by increasing inflation.

Neoclassical economists believe macroeconomics should have microeconomic foundations; basically a nice way of saying that macroeconomics shouldn't exist, and microeconomics is a suitable replacement. This is because it is easier to derive equilibrium in microeconomic models. This meant they were representing the entire economy through the actions of one individual who was rational and perfect. In reality, the economy is filled with uncertain agents with unique preferences. Therefore, their model of the macroeconomy was so far removed from reality that it could not understand nor make claims about the real macroeconomy.

In the late 20th Century, there was a reconstruction of macroeconomic thought (*Blanchard 3*). Two major schools came out of it. The first was the freshwater, or New Classical, school. The second was the saltwater, or New Keynesian, school. Both are neoclassical schools that believe that macroeconomic problems come out of microeconomic issues, which model in equilibrium. Freshwater economists model the economy based on one rational consumer who can maximize utility indefinitely. Consumption and investment are determined by overall output by firms, or supply.

New Keynesians are slightly more realistic, even though the “Keynesian” part of their title is misleading. They start from the freshwater approach, but add some realistic imperfections: monopolistic (imperfect) competition, and inflation caused by expectations of future inflation (so a difference between expectations and reality). This model is an improvement over new classical and neoclassical economics, but issues persist. They model an economy in equilibrium without any involuntary unemployment. That is utopian, not

realistic. The fact that the New Keynesian school is stuck on equilibrium, makes it non-Keynesian (Keynes was a critic of equilibrium analysis) and prevents it from making real world claims and predictions. John Taylor, who's eponymous rule was a function for a real interest rate, as a function of inflation and output, determined by a central bank, was integrated to the New Keynesian model. However, they adjusted his model to permit equilibrium, which prevented New Keynesians from predicting the recession. Taylor even admitted, "I have no doubt that in the future...a bright economist...will show that some of the explanations discussed here are misleading, or simply wrong" (Taylor 12). He only built his flawed model as a stepping-stone to better ones. Therefore, the New Keynesian model is not equipped to examine real economies, despite its prominence. Additionally, New Keynesianism cannot vindicate reducing macroeconomics to applied microeconomics (Keen 266).

Conclusion, and What's Next

Everything written thus far has been a critique of neoclassical theory. I have gone through many of their models of various aspects of the economy, revealed flaws, and described how those flaws prevent neoclassical theory from describing reality. Equilibrium is oft mentioned, but I have outlined other issues as well. Keen's critique has been my guide, and I have thrown other writings and thinkers in there to supplement the ideas. Although this is a critique, Keen put it best when he said, "this is no substitute for an empirical proof that neoclassical economics is wrong" (Keen 266). Verbal critiques are not proofs, so those who firmly stand by neoclassical theory can easily shrug them off. However, many events throughout economic history should be enough empirical proof to

reject neoclassical theory. Neoclassical economists “were the last people on the planet to see the Great Recession coming” (Keen 268). They also failed to anticipate the Great Recession. This is because their model does not permit for recessions, crashes, and slumps.

The assumptions that are intricate to neoclassical theory prevent the inclusion of economic crises. Humans are do not form choices under the neoclassical definition of rationality, the economy is dynamic, disequilibrium is more likely than general equilibrium, and uncertainty causes expectations to be far from perfect. Their assumptions contradict each of those concepts. Therefore, neoclassical economic theory will not be able to make substantial claims about the real economy. Interestingly, this appears to be deliberate (Keen 268).

Neoclassical theory masquerades as a study of reality, but it is not so secretly a discipline that is rigged to uphold the invisible hand, free markets, and the lack of a need for government intervention in the economy. Their theories are “useful to wealthy financiers, even though they are useless – and in fact outright harmful – to capitalism itself” (Keen 268). They are not capable of making claims about the real economy. Their goal is to sustain a free market. That is why their assumptions remain so illogical, and even get more absurd with the passage of time. Neoclassical economics is not a discipline to benefit the greater good; they are a science that allows the rich to get richer.

Neoclassical, New Keynesian, and New Classical economics are all lackluster theories that predict equilibrium in a world that is clearly not our own. If economists want their discipline to become more useful and beneficial to society, they would abandon these schools for ones that could actually describe reality. The school that has the most potential to save economics is the Post-Keynesian school.

Chapter Six: We Can Do Better than Neoclassical Economics – Here's How

Neoclassical economics is built to protect and preserve free markets and capitalism as a social system. It is not intended to interpret and identify weaknesses in the system and means of improvement.

One obvious and nearly fatal flaw of neoclassical economics is its inability to predict economic crises. This is due to their focus on equilibrium, which prevents slumps from occurring in their model. Neoclassical economists did not foresee the Great Depression, the Internet bubble, or the Great Recession.

Many other schools of economic thought saw the crash of 2008 coming. Post-Keynesian Economics was one of the schools that predicted the recession, but their prediction went unnoticed by the general public, since neoclassical economics was the presiding theory.

Good economic models will not hold back from critiquing capitalism, and questioning its viability. Neoclassical economics does the exact opposite, making it an ineffective model that is unable to understand and reveal insights about the real world. The lack of slumps and instability in the neoclassical model is reason to reject it, and replace it with a theory that is more realistic, and not tied down to one means of societal organization. That model is Post-Keynesian economics.

Up to this point, I have been following the writings of Steve Keen. The reason is that he outlined a very clear critique of neoclassical economic theory. After this critique, he brought up how neoclassical economists were unable to predict some of the most disastrous events in economic history. He then outlined his own model, which was able to see the crisis coming from miles away. I will look at Keen's model, and identify various factors that make it an effective economic model. I will then segue into an introduction of

Post-Keynesian economics, how it is consistent with Keen's criteria, and how it is superior to neoclassical economics.

What a Model Needs

In the last part of *Debunking Economics*, Keen introduced his dynamic mathematical model of the economy, which was able to predict the economic catastrophe of 2008, unlike neoclassical models. The reason for this was that his model included the possibility for slumps, bubbles, and depressions, which neoclassical models do not recognize, since they focus on equilibrium. If any economic theory aims to have real world applicability, it needs to include the possibility for unstable economic events, like booms and busts. The Yale economist Robert J. Shiller echoed this sentiment: "the idea that bubbles exist has become so disreputable in much of the economics and finance profession that bringing them up in an economics seminar is like bringing up astrology to a group of astronomers" (Shiller 1). Neoclassical economics does not include the possibility for bubbles, even though they are a realistic occurrence. Therefore, economics students do not learn about such concepts, which leave it out of future models. Anti-neoclassical economists have to take it upon themselves to build models that include the potential for unstable economic events. With the right school of economic thought at the forefront of economic policy, policy makers could have predicted the recession, and could have taken steps to soften the blow.

Recessions follow a fairly expectable pattern. Investment rises, allowing for economic growth. Investors get into a frenzy where they see the future as even more prosperous than the present, so they borrow money to increase investment. Interest rates rise, so credit gets more expensive, and less elastic, since investors are convinced they will be able to pay off

their debts in the future. Then the level of debt gets so high that there is not enough cash in the economy to pay off the debts. People start selling assets, and the market begins to decline, thereby ending the boom. The volume of assets being sold rises, and the fall turns into a slump. At this point, many investors cannot pay off their debts, since the value of investments has dropped, so they do not have the cash to do so: the economy is now in a crash. The aftermath of crashes contains high inflation and low economic growth (Keen 329). The right course of government intervention, can help cushion the blow of a recession, and even prevent a double-dip recession, and maybe expedite the process of growth and recovery.

Economic markets are incredibly complex organisms. There are strange economic occurrences and side effects that are unfathomable by even the most advanced economic models. Economic models will never be perfect, but they still need to be as effective as they can possibly be. Therefore, they need to incorporate unappealing economic occurrences, and accept more difficult forms of analysis. To put it bluntly, economic models should be mathematical, dynamic, and embrace disequilibrium. Models will never be perfect simulations of reality, but they can still do a solid job of predicting economic events.

Keen built his mathematical model on the work of the American economist Richard M. Goodwin. Goodwin built a mathematical model of cyclical growth in the economy. The model depicted the economy as a cycle: the economy went back and forth between good times and bad times, but it never broke down into recessions or depressions. This was because the model was linear, which is unrealistic, so it could not accommodate the realistic occurrence of economic busts. However, Goodwin's model paved the way for dynamic nonlinear models that were applicable to reality, like Keen's.

Keen took Goodwin's model, and removed the assumption that capitalists invest all their profits, creating a discrepancy between profits and investment (Keen 333). This means that the amount of money a company invests could be higher than their profit level. For a company to invest a larger amount of money than they have, they have to borrow money, or take out debt, to invest above their profit levels.

Since debt now affected the amount of money spent in the economy, Keen included the debt to GDP ratio into the model of aggregate demand, making the model more dynamic, since debt levels will change with time. Changes in the ratio affect the rate of profit, and the level of investment.

In Keen's model, aggregate demand has two determinants: expenditure and debt. Neoclassical economics does not consider debt a component of demand. Keen's key insight in this inclusion was that aggregate demand is determined by more than just income, it is also determined by debt. Debt is an important aspect of economic models because it allows economies to grow and shrink. This means that agents will spend more than the amount of their income, by taking out credit to do so. If people are borrowing to spend above their income level, then there will be more demand than supply, and the market will then be out of equilibrium. The inclusion thwarts aggregate demand from equaling aggregate supply, because whenever debt exists there will be a discrepancy between the two, and thus, disequilibrium. The amount of debt signifies how far out of equilibrium the economy is, and will affect expenditure. Neoclassical economics does not include debt in their models, which is why they cannot anticipate crashes (Keen 337).

Keen specified that there was a difference between private and public debt. When private debt levels rise to substantial levels, making the ratio high, debt would drastically

exceed spending in the economy. If debts are at such a high level that they cannot be paid off by the amount of money in the economy, supply, slumps, recessions, or even depressions will occur. The debt-to-GDP ratio allowed depressions to occur in the model, and also was the reason Keen could predict the recession of 2008. When the ratio got out of control, economic collapse was inevitable, since debts could not be paid off.

Keen's model was cyclical, but it included the possibility of falling outside the cycle: periods of immense prosperity, or conversely, depressions. He assumed that the economy could be kept within the bounds of the cycle, preventing breakdown, by two stabilizers: government spending, and taxation.

Debt is an instrumental component of any good economic theory. Keen identified factors that good economic theories need: "If we are to develop an economics that is relevant to capitalism, then it must be a strictly monetary, dynamic theory in which finance plays a fundamentally destabilizing role" (Keen 356). Neoclassical economics does not fit any of the above criteria. They held assumptions that were convenient to prove equilibrium in free market capitalism, rather than assumptions that were realistic. These assumptions were static markets, equilibrium, overlooking the role of money and uncertainty in the economy, that the future will be the same as the present, and that macroeconomics can be reduced to microeconomics. All those assumptions allowed them to pretend that capitalism worked, but in reality, it is an inherently unstable system. According to Keen, These actions and assumptions made neoclassical economics irrelevant to capitalism (356). Neoclassical economics will not acknowledge the flaws of capitalism, but other schools of economic thought that will.

Post-Keynesian Economics Enters From Stage Left

Post-Keynesian Economics directly opposes neoclassical economics. Their aim is to (accurately) interpret the writings of John Maynard Keynes, and apply it to the modern economy (Keen 449). Post-Keynesian economic analysis emphasizes the importance of money and uncertainty in the economy, which is taken right from Keynes. It is not a perfect school, but it is more realistic than neoclassical economics, and is strong where neoclassical is flawed.

The school is united in opposition to neoclassical economics. First, they do not need to make absurdly unrealistic assumptions to prove a certain point. The pillars of their theory are: the history of economic thought is important for the evolution of economics as a discipline, uncertainty is instrumental to the economy, the independence of macroeconomics, economic models need to be realistic, and the instrumental role of regulatory bodies (political and economic institutions) in the economy. Additionally, they argue that prices are not set by supply and demand alone, monopolistic competition is likelier than perfect competition, and that the neoclassical money multiplier is a fallacy.

Keynes showed that “the free market and the circular flow between the factors of production did not necessarily ensure full employment” (Ingham 43). He argued that the free market and capitalism would not ensure economic stability, and Post-Keynesian economists echo that message today. Post-Keynesian economists do not believe that the free market can stabilize any economic variable, and other regulatory bodies and agents need to actively work towards stability in the short-run.

Post-Keynesians emphasize the importance of uncertainty in the economy, and recognize that it can affect the market at the aggregate level. They acknowledge how

economic expectations can be flawed, and can cause movements in the market. They also acknowledge how uncertainty cannot be approximated by risk, which is what neoclassical economics assumes to remove uncertainty from their model. The recognition and treatment of uncertainty and expectations in Post-Keynesian models makes it overall one of the more realistic schools of economics.

Another way they directly oppose neoclassical economics is in their focus on macroeconomics. They hold that reducing macroeconomics to microeconomics will inhibit realism in macroeconomic theories. Unlike neoclassical economics, they argue that “the microeconomic foundations of macroeconomics must always be complemented with – indeed, it could be argued, dominated by – the macroeconomic foundations of microeconomics” (Harcourt 3). They believe that giving microeconomics foundations at the aggregate level is more important than giving macroeconomics foundations at lower levels. This means that they argue that microeconomic models should be built to comply with behavior and findings at the aggregate level.

Post-Keynesians are committed to building models as realistic as possible, so they can best comprehend the economy, so they can anticipate when it will go haywire. They understand that the real world is complicated and not perfectly competitive. Therefore, they recognize that capitalism is imperfect, and thus does not work in the flawless manner assumed by many neoclassical economists. Therefore, through a thorough understanding of the real economy, they try to find ways to improve capitalism, let it function more effectively, instead of justifying that it will work perfectly if left untouched.

Keen considers himself “as partisan to the Post-Keynesian approach” (444). This means that his theory could be considered Post-Keynesian in nature, and a testament to the

school's emphasis on realism, and prophetic capabilities. Even though Keen is somewhat Post-Keynesian, he also identified some of its' weaknesses.

The first weakness of Post-Keynesian economics is that they do not have a concrete theory of value. This means they do not know how consumers value goods and assets, and what they get out of them. They do not have a theory for individual behavior in the economy: "They have nothing to compare to the theory of utility maximization, or even the labor theory of value...This lack of a theory of value makes it difficult for Post-Keynesians to explain why their approach is superior" (Keen 450).

This claim is unfair. There are many Post-Keynesian theories that measure value. Post-Keynesians tend to use an equation where price is marked-up, which models aggregate supply in the economy. This price theory is like the Sraffa theory for price determination presented in an earlier chapter, where prices are marked-up over production costs by an amount determined by the rate of return. Prior to Sraffa, Michal Kalecki built a model for price markup formulation (Harcourt 12). There have been Post-Keynesian theories of value for since the days of Keynes. However, there have not been many Post-Keynesian theories of utility maximization. They are two entirely different concepts. Theories of value determine how goods and commodities are priced in an economy. Theories of utility maximization explain how economics agents determine expenditure decisions, and allocate their incomes.

A minor weakness is that Post-Keynesians tended to use static analysis in the past (Keen 450). If their aim is to create realistic models, then they need to be dynamic. However, Keen noted that "younger members of the post-Keynesian school are much more comfortable with dynamic analysis" (Keen 450). The static analysis was conceivably a

starting point, so Post-Keynesians could build fledgling models that would be enhanced with dynamic analysis in the future. That appears to be happening with the younger Post-Keynesians. Realism is their goal, and dynamic analysis will inevitably become the dominant method of analysis in Post-Keynesian economics. Additionally, Keen identified this problem in 2011. In 2014, Marc Lavoie identified how Post-Keynesian economists advocate for nonlinear dynamic analysis through differential equations (347).

Another issue is, “They are more united by what they oppose than by what they have in common” (Keen 450). The school is built upon their opposition to neoclassical economics, and backing of Keynes’s writing, but they have not coalesced over a unifying theory. Harcourt echoed this sentiment, “often reflecting little more than a shared hostility towards mainstream neoclassical economics and methodology” (2). Now this is not a clear-cut issue, and could even be considered a strong point. The Post-Keynesian opposition to neoclassical economics is evocative of their urge to build realistic economic models that can examine the economy. They are an ambitious school, working, both separately and in unison, to improve economics as a whole.

Just because they do not have an overarching theory does not mean they will not eventually develop one. The school has lots of improving to do, but their insistence on realism in models shows promise. Additionally, “Some Post-Keynesians are working actively towards a synthesis of the principal strands” (Harcourt 2). A unifying theory is in reach, and would be an important weapon for Post-Keynesians in their battle against neoclassical economics. There are journals that are devoted to advancing the school, like the *Journal of Post-Keynesian Economics*. Additionally, they are looking ahead to integrating

fledgling schools of economic thought into their theories and models, like Behavioral Economics (Jefferson and King 1).

Despite these weaknesses, Post-Keynesian economics is an impressive school of economic thought, with way more potential to understand the real world economy than neoclassical economics. They also have a strong track record of anticipating economic events, which is far more robust than neoclassical economists, who are unable to predict anything.

Every school of economic thought has weaknesses. Even with these weaknesses, “post-Keynesians are easily the most coherent alternative school of economic thought today” (Keen 450). It is a no brainer that Post-Keynesian economics is a more effective school than neoclassical. They can thoroughly explain how the real economy works, and predict, to a certain degree, how it will look in the near future. Their commitment to nonlinear mathematics, inclusion of variables like the debt-to-GDP ratio, and acknowledgment of disequilibrium, allows them to anticipate and understand financial crises.

Their focus on the short-run allows their theories to be more proactive and effective at ensuring economic stability than the neoclassical method of assuming that in the long run everything will be in equilibrium. Recognizing that regulatory bodies can ensure stability adds far more realism than pretending that the free market is fair. They acknowledge that supply and demand, both at the aggregate level and for capital, will not be linear, so price setting is not as simple as equilibrium models suggest. This allows them to theorize how price setting might work in reality. They err on the side of dynamic analysis, which also adds realism. Additionally, they focus on macroeconomics as its own discipline, rather than

pretending that it can be equated to microeconomics, allowing for more effective and robust macroeconomic theories than neoclassical economics.

Post-Keynesian economics has much room for improvement, but it is already the most eligible challenger to the neoclassical school. As for the lack of a Post-Keynesian theory of utility maximization, they could perhaps build one by investigating behavioral economics, and integrating it into their models. Both schools accept human irrationality, and theorize how it might affect markets. Given that there are plenty of theories of value in behavioral economics, Post-Keynesian economics could cement their position as the most effective economic school by extrapolating behavioral economics to work at the macroeconomic level.

Chapter Seven: Could Behavioral Economics Improve Post-Keynesian Economics?

Post-Keynesian economics is a strong contender to neoclassical theory. Their emphasis on building realistic theories has allowed them to comprehend the global economy, and anticipate its movements. As Davidson put it, “the Post Keynesians remains to carry-on in Keynes’s analytical footsteps and develop Keynes’s theory and policy prescriptions for a 21st century real world of economic globalization” (“Samuelson and the Keynes/Post Keynesian Revolution” 3). Their aim to accurately apply the works of John Maynard Keynes to the real economy of the present has allowed them to have this comprehensive understanding and predictive power, to a much higher degree than neoclassical theory.

Keynes and Post-Keynesians identified two potential flaws in the neoclassical theories of expectation formation, which prevented humans from formulating rational expectations. The first flaw was that the neoclassical theory didn’t account for uncertainty, which assumed that people can know the outcomes and associated probabilities of economic decisions. Uncertainty, which exists in reality, prevents people from knowing outcomes and exact probabilities of events.

The second flaw was that the neoclassical theory of human behavior claimed that people can form an accurate mathematical assessment of the value of decisions and that transitivity holds. Keynes disputed that agents act on a careful mathematical evaluation of prospects, and instead invest on urges known as “animal spirits”. Jonathan Kirshner represented this dichotomy best:

“Keynes did not view businessmen as hyper-rational technocrats dispassionately optimizing choices about allocating resources in an information rich environment. Rather, he emphasized the role of ‘animal spirits’ – of daring and ambitious

entrepreneurs taking risks and placing bets in an environment characterized by uncertainty: that is, by crucial unknowns and unknowables” (532).

Depicting capitalists as rational investors with sound expectations allowed economists to justify equilibrium in capital and investment markets. However, Keynes revealed that the issue was more complicated than was assumed by neoclassical economics. He revealed that emotions and desires prevented humans from forming expectations and acting in such a methodological and straightforward manner. Neoclassical economists assumed that these human issues would dissolve at the aggregate level, which is how they justified that investments and expectations were so straightforward. As a result, “The public, the government, and most economists had been reassured by an economic theory that said we were safe. It was all OK. Nothing dangerous could happen. But that theory was deficient...It had ignored the role of *animal spirits*” (Akerlof and Shiller 1).

Keynes acknowledgement of human psychology in investment and consumption decisions, thereby adding complexities that went ignored by neoclassical theory, was very ahead of its time. Keynes knew that psychology could provide explanations as to why humans do not rationally pursue their interests, and evaluate choices mathematically to determine the option that best maximizes utility.

Neoclassical economics continues to overlook the great impact psychology has on economic decisions, and thus, the economy. They do not believe that psychology does not affect decisions, but because it complicates the process, and thus their models, they assume these complications away. Their simplification of complex human minds led them to not notice the “collapse of banks, loss of jobs, mortgage foreclosures” (Akerlof and Shiller 1) until they happened. The neoclassical inability to understand the economy stems from their disregard of psychology, and the impact of the complex human mind on decision-making.

The economy is comprised of billions of decisions that occur daily. If they underestimate the complexity of each decision, they will fail to understand how those decisions affect the economy at the macro level, which is exactly what happened.

Behavioral Economics is a school of economic thought that has the potential to disrupt modern economic theory. As Colin Camerer and George Loewenstein put it, “Behavioral economics increases the explanatory power of economics by providing it with more realistic psychological foundations” (3). Behavioral economists try to build economic theories that are rooted in the psychology of human minds that can do a better job at describing the economy than neoclassical theories. Even though behavioral economics provides a new economic approach, it is “...not seeking to replace the standard framework of analysis. It seeks to add to this framework” (Wilkinson and Klaes 3). Given the lack of an emphasis on realism in neoclassical models, behavioral economics might not add to their framework. A school that prioritizes realism and builds it into their models, like Post-Keynesian economics, potentially has a lot to gain from embracing behavioral economics.

Both schools, and economics as a whole, could benefit from cooperation. Keynes’s focus on psychology in his writings and theories suggests how behavioral economics could potentially be integrated into Post-Keynesian economic theories. Both schools emphasize the importance of realism in economic models, so they both have a shared goal they could work together to achieve. In this case, two heads could be better than one.

Jefferson and King’s Work on the Question

Economists Therese Jefferson and J.E. King discussed whether or not Behavioral and Post-Keynesian economics could work together in their 2010 paper “Can Post Keynesians

make better use of behavioral economics?” In the paper, they acknowledge that even though many Post-Keynesian economists have called for greater utilization of behavioral economics, not much has happened. They tried to answer the question they posed for themselves by finding areas in which behavioral economics could fit into Post-Keynesian economics.

Behavioral economics is mostly microeconomic in scale, as it looks at individual behavior. There have been attempts to build behavioral macroeconomic theories, but not much progress has been made. Akerlof and Shiller’s *Animal Spirits* was an attempt to build a behavioral macroeconomic theory, but it was plagued with issues identified by Jefferson and King. The biggest issue is since behavioral economics is concerned with individuals, there are troubles that arise when applying it at the level of the firm. The problems that arise when aggregating individual behavior was the crux of the issue with *Animal Spirits*, along with the fact that they misrepresented many Keynesian concepts, including uncertainty, the savings-investment relationship, and the definition of the term animal spirits. Given its methodological issues, *Animal Spirits* did not advance the development of behavioral macroeconomics. However, just because not much groundbreaking behavioral macroeconomic work has been done, does not mean its development is impossible.

The first area the economists identify where behavioral economics could improve Post-Keynesian economics has to do with strengthening assumptions (Jefferson and King 220). Post-Keynesian economics distinguishes itself amongst its peers in the weight it places on building realistic assumptions, and thus, realistic theories, so they can better understand the causes behind economic phenomenon. Since behavioral economics aims to understand the human mind, Post-Keynesians can turn to behavioral economic findings to strengthen

the realism of its assumptions, theories, and models. The economists identified four ways in which Post-Keynesian realism can be boosted by behavioral economics. The first way is in labor markets. Post-Keynesians can look into behavioral economic research that might explain factors behind unemployment and labor movements. These findings could potentially strengthen Post-Keynesian macroeconomic labor models, by providing insights into the psychological elements that might cause unemployment, sustained unemployment, and movements, in, out, and within the labor market (Jefferson and King 221).

The second area where realism could be improved is with investment. Jefferson and King note that there are parallels between behavioral economic findings and Post-Keynesian investment analysis (222). Both schools acknowledge that agents do not invest in the mechanical manner assumed by neoclassical economics. Behavioral economics posits that investing, like consumption, is influenced by heuristics, or mental shortcuts or “rules-of-thumb” (Wilkinson and Klaes 8). Developing realistic assumptions through psychological findings can bolster Post-Keynesian investment models and theories by increasing realism by backing them up with insights into how the brain processes and evaluates information.

Additionally, behavioral economics can add realism to Post-Keynesian theories on financial instability (Jefferson and King 222-223). Psychology can reveal reasoning behind how human emotions drive optimism, and thus, how emotions and confidence at the aggregate level could cause movements and booms and busts in markets. Post-Keynesian economics already acknowledges how optimism cause rises in markets, these rises cause further optimism, which continues until the market reaches a breaking point where it will begin falling, and cause pessimism, which will make the market fall even faster. Since

behavioral economics already models how human emotions and sentiments affect economic decision-making, these models could increase the explanatory power of Post-Keynesian theories on finance and instability.

Finally, Jefferson and King suggested that behavioral economics could potentially explain the role of uncertainty in consumer expenditure decisions (223). They can help understand the psychological mechanisms by which consumers form expectations and decisions under uncertainty. Uncertainty is fundamental to Post-Keynesianism, so understanding how it affects the brain, and thus the decisions that will be made, will directly strengthen Post-Keynesian theories, while adding realism. Any Post-Keynesian theory of decision making under uncertainty, whether its at the individual or aggregate level, which is backed by behavioral economic findings, will inevitably be more realistic than the neoclassical theory of utility maximization.

Along with bolstering the realism of Post-Keynesian theories and models, behavioral economics can also benefit Post-Keynesianism by enhancing and broadening their research approach and methodology (Jefferson and King 226). Behavioral economics has a broad range of empirical research methods, since it exists at the intersection of economics and psychology. If Post-Keynesianism borrows research techniques and processes from behavioral economics, they can bolster their research methods, and thus their findings, and add realism. Using behavioral economics to enhance their research methods, and add realism and explanatory power to their theories, can make Post-Keynesian economics and even more formidable contender to overtake neoclassical economics at the forefront of economic thought and policy.

Even though there is potential from the two schools working together, there are some barriers that could prevent engagement. The first is that behavioral economics is mostly microeconomic, so issues could arise if Post-Keynesians try to apply their findings at the aggregate level. Another issue is that there are some theoretical flaws within behavioral economics, some of which they have in common with neoclassical economics, which might not allow it to easily integrate with Post-Keynesian (Jefferson and King 229). An example of this is their emphasis on modeling in equilibrium (Wilkinson and Klaes 3).

Despite these issues, there is potential for great work to arise from Post-Keynesianism and Behavioral economics working together. Behavioral economics could add realism to Post-Keynesian models, and thus bolster their theories and explanatory power. These behavioral insights and findings could strengthen Post-Keynesian theory on consumer behavior, and how agents form investment expectations and act under uncertainty. Additionally, behavioral economics could expand and improve Post-Keynesian research methods and findings.

As Jefferson and King put it, “Post Keynesians could enhance their efforts to examine these (and other) methods, both to widen their research agenda and to extend existing theories to reflect more closely to the dynamics of twenty-first-century economies” (230). By turning to behavioral economics, Post-Keynesianism can boost and advance their theories, by adding realism, and thus, their explanatory and predictive power. It could allow for Post-Keynesianism to become a highly innovative macroeconomic school, with the most realistic theories and models.

What about the theory of utility?

Keen identified that one weakness of the Post-Keynesian school was its lack of a theory of utility. Neoclassical economics has the standard economic model (SEM) as their theory of utility, which details the individual decision making process. It argues that consumers, presented with a set of choices, will maximize their utility in that they can accurately evaluate the probability and value for each option, and choose the one that best maximizes their utility. Probabilities and value outcomes will not change with the passage of time. The SEM is incredibly flawed, since it is static, and assumes rational expectations: that human decisions are not affected by various psychological and emotional factors (Wilkinson and Klaes 3). In reality, people cannot evaluate probabilities and utility outcomes as accurately as the SEM predicts. However, the SEM is a theory of utility maximization, albeit a flawed one, and Post-Keynesian economics does not have a theory of utility. Whether their flawed utility theory gives neoclassical economics an edge over Post-Keynesians is ambiguous.

Behavioral economics rejects the standard model on the grounds that it assumes “...that agents behave *as if* optimizing some underlying preference function” (Wilkinson and Klaes 160). However, the issue with this assumption is that, “the form of the function makes no claim regarding underlying psychological mechanisms or processes” (Wilkinson and Klaes 160-161). Basic psychology would argue that the brain is not able optimize choices in such a straightforward manner. Therefore, they have proposed alternative theories of preferences and values. These theories account for the complexities within optimization since time, resources, information, and emotions affect decision-making in ways that the SEM ignores. The most prominent alternative theory of choice and value to come out of

behavioral economics is Prospect Theory, which was developed by Kahneman and Tversky in the late 1970's, and has improved with time.

Prospect Theory is characterized by two phases: editing and evaluating.²⁴ Assume an individual is presented with a number of choices, or prospects. In the editing phase, analysis will occur to simplify each prospect so the individual could understand what they could get from each outcome. The editing phase attempts to simplify decision-making, but could potentially convolute the process.

In the evaluation phase, the individual will evaluate each of the edited choices, and determine the prospect with the highest value. In prospect theory, the value of an edited prospect, represented by V , is made up of two scales: v and π . v assigns a subjective value to each outcome, but doesn't take probability of each outcome into account. v integrates various behavioral economic concepts, like reference points, loss-aversion, and decision weighting. V and v are not the same, because V assigns value after decision waiting has been calculated, while v does not take weights into account.

$$v(x) = \begin{cases} -\lambda(r - x)^\beta, & x < r \\ (x - r)^\alpha, & x \geq r \end{cases}$$

r = reference point
 α = coefficient of diminishing marginal sensitivity for gains
 β = coefficient of diminishing marginal sensitivity for losses
 λ = coefficient of loss aversion

$\pi(p)$ represents the decision weight determined by the probability (p) of each outcome. π is an increasing function of p , where $\pi(0)=0$ and $\pi(1)=1$ so π can have any value ranging from 0 to 1 inclusive, since p will fall between that range as well. The probability value (p) is predetermined and given, and since the brain has not interpreted it yet, it is objective.

²⁴ All information on prospect theory comes from Wilkinson and Klaes pages 160-163

Each prospect is assigned a probability value. The point of the decision weighing function is to calculate how the brain will change and decipher a given probability value.

$$\pi(p) = \frac{p^\gamma}{(p^\gamma + (1-p)^\gamma)^{1/\gamma}}$$

where γ equals the curvature of the function, and p is a

predetermined objective probability value attached to each outcome. The π function calculates the subjective weight of the prospect in terms of the decision being made.

Human brains understand probabilities differently than the given value of the probability; most of the time, the brain will assign each probability value an amount that does not equal its given value. The decision weighing function demonstrates how the brain interprets and weighs probabilities differently from their objective value, and assigns it a subjective value.

For example, there are two prospects, one where there is a 100% chance of winning \$2400, or one where there is a 34% chance of winning \$2500 or 66% chance of winning \$2400. The second prospect has a higher expected value than the first, but behavioral economists found that when consumers were presented with the two prospects, 82% of respondents preferred the first one. This contradicts what the SEM would predict. The reason for this is that $\pi(1) = 1 > \pi(.34) + \pi(.66)$. According to prospect theory, people overweigh outcomes that seem certain, in respect to outcomes that are probabilistic. This example shows how the human mind understands probabilities differently than their given amount. The brain's misconstruing of given probabilities will affect how people value prospects, and how it will then affect decision-making. Unless the probability is 100% or 0%, the brain will weigh a probability differently than it objectively should. The SEM does not account for this, but Prospect Theory does.

The decision weighing function measures the impact of each choice on the desirability in terms of the other prospects. It does not measure the supposed likelihood of each

prospect. $\pi(p)$ is the ratio of the weight of probability p to the weight of a possible event. The numerator and denominator are modified by the curvature of the function, γ . The curvature of the function is determined by diminishing marginal sensitivity towards losses and gains (Wilkinson and Klaes 176-181).

If a prospect could yield outcomes x and y , where x corresponds to probability p , and y corresponds to probability q , then the value of the prospect under prospect theory will be:

$$V(x, p; y, q) = \pi(p)v(x) + \pi(q)v(y)$$

Prospect theory calculates value in a way that accounts for the psychological factors that affect how an individual determines value. It applies a decision weight to the value of each prospect, to determine the overall value. The subjective value function (v) calculates values in respect to a reference point, r , and measures deviations from that point, or gains and losses. Reference points have a psychological foundation in the concept of hemostasis (Wilkinson and Klaes 164), which reveals how the human body has set points, and will try to restore that point when the body moves away from it. Prospect theory also takes into account for loss aversion, how humans are more sensitive to losses than gains of the same amount. It accounts for this by including the coefficient λ , where $\lambda = \frac{-v(-x)}{v(x)}$ or the ratio of the subjective values of equivalent losses and gains (Wilkinson and Klaes 167-168). The diminishing marginal sensitivity for gains and losses determine the shape of the function $v(x)$. These coefficients for marginal sensitivity of gains and losses mathematically convey how humans are more sensitive to losses than gains, as stated by the concept of loss aversion (Wilkinson and Klaes 172-173). All four of these concepts express how Prospect Theory accounts for psychological factors when calculating the overall weighted value of an edited prospect.

The standard model does not acknowledge these factors, meaning the neoclassical theory of value will incorrectly assess how decisions are made. Any model that arises from the SEM will thus have flaws, and lack realism. Prospect Theory might have some flaws, but it offers exponentially more potential for realism than the standard model.

Since Post-Keynesian economics lacks a theory of utility, they can go to Prospect Theory to fix that issue. Prospect Theory is microeconomic, so if Post-Keynesians aim to aggregate it to apply at the macro level, they will have to do so carefully. Jefferson and King even recognized that, “In an important sense, Keynes’s notion of animal spirit anticipates modern prospect theory” (219). The fact that Keynes’s writings echoed what was later captured in Prospect Theory suggests that it could be integrated into Post-Keynesian theories. Neoclassical economics inadequately aggregated their theory of value to come to the downward-sloping aggregate demand curve, which misrepresented macro demand. Prospect Theory shows how there are various factors that influence human decision making, like framing, reference points, and loss aversion, that show how decision making is not a static process, and expected values of prospects can change over time. This violates the neoclassical notion of rationality through transitivity: if the same prospects are presented at two different points in time, and A is preferred to B, and B is preferred to C, then A might not necessarily be preferred to C. If C is framed in such a way that it could seem to have a higher value than A, transitivity could possibly not hold. The inclusion of these psychological concepts shows that decision-making is not a straightforward methodological process, as the SEM argues. Instead, the process is indicative of animal spirits, as psychological mechanisms prevent it from being static and a mechanical process. Prospect Theory quantifies how decision making under animal spirits could take shape.

Post-Keynesians aim to account for the impact of uncertainty on the economy in their models. Because of uncertainty, Post-Keynesians argue that there will be circumstances in which economic agents have absolutely no knowledge or ability to determine probability values. However, probabilities have to be given in order to determine utility values in Prospect Theory. Since Post-Keynesians claim that there are times when probabilities cannot be calculated, there could be a conflict between the two schools. There is not a straightforward answer to this issue. The probability values in Prospect Theory do not have to be correct; they are predetermined, and may reflect incorrect expectations, and therefore could inaccurately represent the decision-making scenario and its prospects. The probability values do not have to be perfect for Prospect Theory to work, they just need to reflect the decision-maker's knowledge of the situation going into their decision-making process. It is highly unlikely that the probabilities will be invalid due to their basis on imperfect expectations. The point of Prospect Theory is to show how economic agents evaluate the information they have, to then assign utility values to prospects in a decision. There will likely be situations where there is so much uncertainty where objective probability values will be impossible to calculate. In such a situation, the decision-maker can do their best to generate probability values from the information they have. If coming up with any probability value is impossible, then Prospect Theory might not be applicable in the situation. This means that Prospect Theory might not work in all cases presented by Post-Keynesians. Maybe it will work at a future point in time when there is less uncertainty, and probability values, albeit flawed ones, can be generated. Prospect theory could also be improved to work in such cases.

The issue of uncertainty in Prospect Theory is a major criticism of the theory. In recent years, there have been attempts to better integrate uncertainty into the model. For example, Schmidt, Starmer and Sugden developed a model for Third Generation Prospect Theory that allowed it to work at times where reference points are uncertain (Wilkinson and Klaes 197-198). However, there is still work to be done to allow the theory to work in times of great uncertainty.

Another issue with Post-Keynesians accepting Prospect Theory is over the issue of bounded rationality. Bounded rationality implies that in a dynamic decision making process, the decision maker has imperfect information and limited abilities to compute the value of outcomes. This theory is more realistic than the neoclassical assumption of rational expectations and preferences, but Jefferson and King pointed out that bounded rationality is not exactly consistent with Post-Keynesian models. Economist Stephen P. Dunn acknowledged that even though bounded rationality is a key concept, it is often equated with the concept of fundamental uncertainty. He emphasized the importance in differentiating the two concepts. Both approaches "...imply a conception of decision-making that is rooted in the actions of agents, which relates to their computational limitations" (570). The difference lies in their focus: "*Bounded rationality refers to a specific view of behavior. Fundamental uncertainty refers to a specific view of time.* Economists forget this at their peril" (584). Post-Keynesians do not have an issue with bounded rationality; they appreciate how it realistically depicts choice. However, they do have an issue when it is used interchangeably with fundamental uncertainty. If Post-Keynesians aim to embrace prospect theory, they must do so in a careful way that does not confuse it with fundamental uncertainty. To do this, they have to acknowledge that any use of

Prospect Theory does not account for uncertainty, so any theory of uncertainty cannot use Prospect Theory as a proxy for uncertainty. Post-Keynesian economists can use Prospect Theory, but if they aim to include the effect of uncertainty, they will need to complement it with an additional model that calculates the effect of uncertainty on the economic decision being made.

Despite the inevitable issues that arise from adopting Prospect Theory into Post-Keynesian models, its inclusion will give Post-Keynesians a theory of value that is far more realistic than that of neoclassical economics. Since Post-Keynesians aim to build realistic models, Prospect Theory could provide Post-Keynesian economics with a theory of utility, and add further realism to their existing models.

So What?

Overall, Post-Keynesian and behavioral economics have a lot in common, and further engagement would be beneficial to both schools. Behavioral economics would add realism to Post-Keynesian models, and expand and enhance their research methods. Post-Keynesian economics could potentially build a comprehensive model of behavioral macroeconomics, which could understand the economy in unprecedented ways.

Both schools emphasize the importance of realism in economic models, and by working together, they could build a formidable competitor to neoclassical economics, with superior predictive power, a greater understanding of the economy rooted in psychology, and more effective policy recommendations. Issues will arise from the two working together, but collaboration between the two schools could potentially provide an economic theory, more realistic and powerful than neoclassical economics. Although Post-Keynesian economics is

already more realistic than neoclassical economics, working with behavioral economics could increase its superiority.

Conclusion

The aim of this project was to critique neoclassical economics to demonstrate how the school is built to justify and reinforce a free market capitalist system. Their theoretical limitations, that stem from their insistence on proving that the economy will reach a stable equilibrium point, has prevented neoclassical economics from having a thorough understanding of the economy, commenting on its development, and predicting its movements. The dominance of neoclassical economics has stunted the development of economics, and prevented it from becoming a more versatile and valuable science. While neoclassical economics has stuck to interpreting a theoretical world, alternative schools of economic thought like Post-Keynesian and Behavioral Economics have demonstrated their commitment to improving economic theory, through their emphasis on realism. These schools have exponentially more potential to understand and improve the real-world economy than neoclassical economics. By turning to these alternative schools, economics can become far more effective and thorough, as it always has intended to be.

In the first chapter, I critiqued the neoclassical theories of supply, demand, and equilibrium. I showed how the neoclassical aggregate demand curve would not be downward sloping. To aggregate individual demand curves, neoclassical theory assumes that all consumers have the same tastes, and an individual's tastes will remain the same as their income changes. These assumptions do not apply in reality, and are based on flawed assumptions to build a downward sloping individual demand curve. Due to the issues that arise from aggregating individual demand curves, neoclassical economists cannot justify that a demand curve representing two or more consumers will have a downward slope. The Sonnenschein-Mantel-Debreu critique demonstrates how the law of demand does not

apply at the aggregate level, so aggregate demand curves can take any shape at all: they will not only be downward sloping, and all curves will slope up at times. Then I critiqued the neoclassical theory of supply, and showed how the upward-sloping supply curve might not exist. To prove the upward-sloping supply curve, they assume two contradictory assumptions, which show how it is not representative of reality. Additionally, since firms do not make output decisions by simply setting marginal revenue equal to marginal cost, because in reality other factors that marginal revenue and cost functions do not account for, like marketing and finance play a role in output decisions. This means aggregate supply will not be merely upward sloping. Since neoclassical theories of supply and demand are flawed, they cannot justify that the economy will settle into a single equilibrium point. There could be an infinite number of equilibrium points, since supply and demand can take any shape. Therefore, the neoclassical theories of aggregate supply and demand, and equilibrium, are unsound, and misrepresentative of reality.

In the second chapter, I critiqued the neoclassical theories of capital and production. Neoclassical economic theory claims that demand for physical capital is downward sloping, and that price determines the distribution of income. However, since their definition of capital is so broad, their method of capital aggregation is flawed. Since the rate of return is needed to calculate prices, the distribution of income determines prices and not the other way around, as neoclassical theory argues. The rate of return will determine the production, and since reswitching can occur in production, neoclassical theory cannot assert that the value of a capital input will fall as the rate of profit rises. Value and rate of profit will not have a purely inverse relationship, as neoclassical theory claims. Therefore, demand for capital is not a linear function, and there will not be a single rate of return

where firms will maximize production. There will not be a single stable equilibrium point in capital markets, and therefore, the market might not work itself out in a straightforward manner as neoclassical economics claims it will. Neoclassical theory cannot vindicate the superiority of free markets in production. The distribution of income determines production, and since the distribution is a social phenomenon, regulatory bodies can alter it. This suggests that regulation might be needed in markets.

In the third chapter, I revealed the issues with the neoclassical commitment to static analysis. Static analysis is only applicable to an economy where time does not affect economic variables. Since this is not the case in reality, where time plays a critical role in the economy's wellbeing, static analysis is not applicable to the real world; dynamic analysis is needed instead. Static processes and mechanisms will never occur in a dynamic world. Neoclassical economics utilizes static analysis because it is the only way to justify a single stable equilibrium point in the economy in the long run. This equilibrium, known as general equilibrium, is at the center of all neoclassical analysis, as it demonstrates how free markets will allow for economic stability. However, the neoclassical commitment to static analysis prevents them from being able to actually study the real economy, and make valid claims about it. Even though dynamic analysis proves that general equilibrium is not feasible in reality, neoclassical analysis continues to be rigged to conclude general equilibrium. In reality, equilibrium is highly unlikely. The real economy is in a perpetual state of disequilibrium. Any theory that aims to understand the actual economy must utilize dynamic analysis, and relegate static analysis to a mere theoretical or pedagogical exercise.

In the fourth chapter, I critiqued the Efficient Markets Hypothesis, a presiding neoclassical theory of investment. The EMH argues that investment markets will reach a

stable equilibrium state because shares are priced accurately regarding all available information investors have. The assumptions that are held to prove the EMH are misrepresentative of reality. According to the EMH, the investors' expectations (which will be the same) will accurately predict the future prospects of companies; it basically claims that all investors will be prophetic. Additionally, it equates risk and uncertainty, which is invalid. By doing this, it underestimates the effect of uncertainty on investments and markets. All of these highly inaccurate assumptions invalidate the EMH's claim that investment markets will reach a state of stable equilibrium in reality. Due to its faulty assumptions, simplification of human expectations, and misinterpretation of uncertainty, the EMH cannot accurately understand markets. In reality, markets are not in a state of equilibrium; they are cyclical and highly volatile. Markets are in a constant state of disequilibrium. Neoclassical theories of investment are another example of how neoclassical economics is structured to justify free markets, which prevents it from actually understanding the markets and the economy as a whole.

In the fifth chapter, I critiqued the neoclassical use of reductionism to equate macroeconomics with applied microeconomics. They assume that microeconomic theories can apply at the aggregate level, which means they analyze the entire economy from the perspective of individual rational agents. Their justification for this is that if each sector of the economy is in equilibrium, the entire economy will be in equilibrium too, so microeconomics can be used in lieu of macroeconomics. It is easier to reach equilibrium, and build linear models, at lower levels than at the macro level. However, the entire economy is far more complicated than any individual sector. Things arise at the macro level that cannot be explained at a lower level. By reducing macroeconomics to microeconomics,

they ignore the importance of variables like uncertainty and changes in the money supply. Reductionism is another neoclassical mechanism that allows a cleaner justification of equilibrium, and lack of a need for intervention in the economy. However, schools that are committed to studying the macroeconomy with macroeconomics can understand how the economy is far more complicated than any one of its sectors, and will thus not reach a stable equilibrium point. Any school that uses microeconomics in place of macroeconomics will fail to understand how the economy works.

In the sixth chapter, I investigated why neoclassical economists are unable to foresee economic crises. They failed to anticipate the recession, and thus did not know how to react when it hit. Their models do not allow for recessions, and periods of instability, to occur, because they focus on equilibrium. Their commitment to vindicating free market capitalism, and equilibrium, prevents them from actually being able to predict when the economy will fall into distress, and from understanding how the economy works. Keen's model of the economy, unlike the neoclassical one, includes the role of debt in the economy, which is how he was able to predict the recession. His key insight was that aggregate demand is determined by more than just income, it is also determined by debt. Debt allows economies to grow and shrink, which is why it should be a vital aspect of any economic model. Debt stops aggregate demand from equaling aggregate supply, because whenever debt exists there will be a discrepancy between the two, and thus, disequilibrium. Keen's model emphasized the importance of realism, which is why it was able to understand the economy and predict its movements. Any school that aims to build realistic models will be superior to neoclassical economics.

At this point, I demonstrated many ways how neoclassical economics is built to justify free market capitalism. Their focus on equilibrium, and impractical analysis techniques, is why they cannot understand the real economy, and anticipate its movements. Due to their focus on static analysis and equilibrium, they have prevented the development of more realistic economic theories that are dynamic and acknowledge disequilibrium. The popularity of neoclassical economics in universities and in policy decisions has encouraged more ineffective static equilibrium analysis. Therefore, neoclassical economics has stunted the growth and development of more effective and realistic economic theories: neoclassical economics has prevented economics from increasing its realism and scope of methods. I then turned to show economic methodologies that are more effective than neoclassical economics, which actually can understand the economy.

Post-Keynesian economics is united in opposition of neoclassical economics, and aims to build realistic economic models, to reach a thorough understanding of the economy. Their objective is to apply Keynes's theories to the modern economy. They emphasize the importance of money and uncertainty in the economy, and build these variables into their theories and models. Most importantly, Post-Keynesians acknowledge the imperfections of capitalism, and its flaws. Through their comprehensive understanding of the real-world economy, they aim to theorize means by which to improve capitalism, and allow it to function more effectively, instead of justifying that it will work perfectly if left untouched, like the neoclassical economists do. Keen himself considers himself partisan to the Post-Keynesian approach. Post-Keynesian economics is far more effective than neoclassical economics, and should be at the forefront of economic policy and education programs

instead. Their commitment to build realistic models demonstrates their intent to understand the world we live in, rather than studying a theoretical one.

Behavioral economics is school of economic thought that emphasizes the importance of realism. Their aim is to improve economic theories by providing them with a psychological foundation, thus adding realism. Behavioral economists build theories that are rooted in psychology, which will be more effective at understanding the economy than neoclassical theories. A school that prioritizes realism in their models, like Post-Keynesian economics, potentially has a lot to gain from embracing behavioral economics. Jefferson and King concluded that Post-Keynesians could benefit from engaging with behavioral economics. They argued that behavioral economics would strengthen Post-Keynesian assumptions, which would add realism to Post-Keynesian models. They also concluded that behavioral economics could expand and improve Post-Keynesian research methods and findings. Keen identified the Post-Keynesian lack of a theory of utility maximization as a weakness of the school. If they turn to Prospect Theory, developed by behavioral economists Kahneman and Tversky, Post-Keynesians would have a theory of utility more realistic than the neoclassical standard model. Prospect Theory suggests how economic agents come up with subjective values and weights when making decisions. This takes into accounts psychological factors like loss-aversion and reference points, which the SEM ignores. Prospect Theory would not perfectly fit into Post-Keynesian models, since it does not work in times of complete uncertainty, but it could be improved to integrate into Post-Keynesian models when there are increased levels of uncertainty. If Post-Keynesian economists work with behavioral economists, to give their theories psychological foundations, Post-Keynesian economics would be a formidable competitor to the neoclassical school. Post-Keynesian models would

have increased realism, and would have an even deeper understanding of the economy.

Post-Keynesian economics, with or without the support of behavioral economics, should be at the forefront of economic policy and thought, as it is more effective than its neoclassical counterpart.

Neoclassical economics is built to vindicate capitalism. Through my critique, I showed many ways by which this is the case. However, I am not arguing that their impulsive penchant for capitalism is deliberate. I am not trying to say that neoclassical economists are “Dr. Evil”-esque villains who sit around a room thinking of new ways to justify the superiority of free markets. There are many reasons why the school has become rigged to support capitalism. They are committed to a methodology that models in equilibrium. Their methodology allows them to avoid complexities and difficulties that exist in reality, and thus allow them to conclude that equilibrium will occur. Equilibrium allows them to support capitalism. This is a convoluted way of saying that I do not want to portray them as idiotic devotees to free market capitalism that will stop at nothing to assert its superiority. They are simply devoted to a flawed methodology, which makes capitalism seem stable, but the methodology prevents them from understanding how the economy works.

There is some value in neoclassical theories and models as a teaching tool. Their simplified system makes it easy for students of economics to understand how economic processes and variables work. It is far easier to understand linear supply and demand curves than nonlinear ones. It is also easier to understand a single stable equilibrium point than infinite unstable points of equilibrium. However, at a certain point, students should get introduced to concepts that actually describe how the real economy works. Students become equipped to analyze a theoretical economy, and do not have the tools to

understand the economy of the real world. Neoclassical economic models should only be used as an introductory tool. Economics students, who could plausibly become economic policy-makers down the line, should be introduced realistic models early on, since they are the only way they will be equipped to understand and improve the economy of the future.

Additionally, I am not trying to argue that free market capitalism is not the most effective system of societal organization. Every economic system has its values and weaknesses. What I am trying to say is that a school that is only committed to one structure shouldn't be at the forefront of economic thought. The economy changes and evolves with time, and a school that evolves alongside the economy should be at the forefront instead. Schools like Post-Keynesian and Behavioral economics, which are designed to find ways by which to improve and understand capitalism, should be championed over neoclassical economics, which is blindly committed to one system.

The economy is complicated. The neoclassical response is to assume the complications away, which hinders their understanding of the economy. The Post-Keynesian approach is to develop models that can actually attempt to understand these complications, which allows them to suggest more suitable ways to approach these difficulties and issues. If Post-Keynesian economics, with or without help from behavioral economic findings, can situate itself at the forefront of economic thought and policy decisions, it can give us a more thorough understanding of how the economy works. It can also provide ways to avoid economic disasters, by controlling investing and lending. If Post-Keynesian economics becomes the foremost school of economic thought, economics can become a more effective discipline, which will benefit society.

Works Cited

- Akerlof, George A., and Robert J. Shiller. *Animal Spirits: How Human Psychology Drives the Economy, and Why it Matters for Global Capitalism*. Princeton: Princeton University Press, 2009. Web.
- "As price goes up, so does demand." Free Exchange. *The Economist*. 18 Jul. 2007. Web.
- Blanchard, Olivier, and David R. Johnson. *Macroeconomics*. Ed. Donna Battista. 6th ed. USA: Prentice Hall, 2013. Print.
- Blanchard, Olivier. *The State of Macro*. National Bureau of Economic Research, Inc, NBER Working Papers: 14259, 2008. Web.
- Camerer, Colin F., and George Loewenstein. "Behavioral Economics: Past, Present, Future." *Advances in Behavioral Economics* (2004): 3; 3-51; 51. *EconLit*. Web.
- Davidson, Paul. "Samuelson and the Keynes/Post Keynesian Revolution: The Evidence Showing Who Killed Cock Robin." (2013): 1-27. Print.
- Davidson, Paul. *Post Keynesian Macroeconomic Theory: A Foundation for Successful Economic Policies for the Twenty-First Century*. Brookfield, VT: E. Elgar, 1994. Web.
- Dunn, Stephen P. *Bounded Rationality is Not Fundamental Uncertainty: A Post Keynesian Perspective*. M. E. Sharpe, 2001. Web.
- Harcourt, G. C. *The Structure of Post-Keynesian Economics*. Cambridge, UK: Cambridge University Press, 2006. Print.

Ingham, Geoffrey. *Capitalism*. Cambridge, UK: Polity Press, 2008. Print.

Jahan, Sarwat, Ahmed Saber Mahmud, and Chris Papageorgiou. "What is Keynesian Economics?" *Finance & Development* 51.3 (2014): 53-4. Print.

Jefferson, Therese, and J. E. King. "Can Post Keynesians make Better use of Behavioral Economics?" *Journal of Post Keynesian Economics* 53.2 (2010): 211-34. Web.

Kahneman, Daniel. *Thinking, Fast and Slow*. NY: Farrar, Straus and Giroux, 2011. Print.

Keen, Steve. *Debunking Economics - Revised and Expanded Edition*. London, UK: Zed Books, 2011. Print.

Keynes, John M. *The General Theory of Employment, Interest, and Money*. 1936. Print.

Keynes, John M. *The General Theory of Employment*. Harvard University Press, 1937. Web.

Kirshner, Jonathan. "Keynes, Legacies, and Inquiry." *Theory and Society* 38.5 (2009): 527-41. Print.

Krueger, Norris. "How Believing in Ourselves Increases Risk Taking: Perceived Self-Efficacy and Opportunity Recognition." *Decision sciences* 25.3 (1994): 385; 400. Web.

Krugman, Paul. *How did Economists Get it so Wrong?*. The New York Times Company, 2009. Web.

Kurz, Heinz D. "Sraffa's Contribution to the Debate in Capital Theory." *Contributions to Political Economy* 4 (1985): 3-24. Print.

Lavoie, Marc. *Post-Keynesian Economics: New Foundations*. Cheltenham, UK: Edward Elgar Publishing Limited, 2014. Print.

Leijonhufvud, Axel. "Life among the Econ." *Western Economic Journal* 11.3 : 327. Web.

Minsky, Hyman P. *John Maynard Keynes*. Columbia Univ. Press, 1975. Web.

New Oxford American Dictionary. Eds. Angus Stevenson and Frank Abate. 3rd ed. NY: Oxford University Press, 2010. Print.

Schefold, Bertram. "Joint Production: Triumph of Economic Over Mathematical Logic?".

International Conference on Piero Sraffa. Academia Nazionale Dei Lincei, Rome. 11-12 Feb. 2003. Reading.

Shiller, Robert J. "Reinventing Economics." *Project Syndicate* 14 Sept. 2009. Print.

Taylor, John B. *The Explanatory Power of Monetary Policy Rules: Simple Principles Have Big Impacts*. National Association of Business Economists, 2007. Web.

Varian, Hal R. *Intermediate Microeconomics: A Modern Approach*. Ed. Jack Repcheck. 8th ed. NY: W.W. Norton & Company, 2010. Print.

Wilkinson, Nick, and Matthias Klaes. *An Introduction to Behavioral Economics*. 2nd ed. NY: Palgrave Macmillan, 2012. Print.

World Development Report 2015: Mind, Society, and Behavior. Washington, DC: The World Bank Group, 2015. Print.