

Syllabus for Economics 413R (History of Economic Thought)
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Course Description:

This course will use modern techniques to understand the evolution of our discipline. For this reason, the prerequisites—Economics 378, 380, 381, 382 and 388—should be taken seriously. By the end of the course, a successful student will have a deeper understanding of the provenance of modern ideas and their relationship to each other.

Class Policies:

Grading will be based on a midterm examination (30%), a final examination (40%) and a term paper (30%). There will be homework, but it will only count at the margin. However, I do not recommend attempting to pass the course without doing the homework.

Make-up exams are rarer than Giffen goods, and in any case are NEVER given early.

The midterm exam is scheduled for 31 October in class. The instructor believes the final is scheduled for 20 December from 11 am to 2 pm in class. (The student should verify this.) The term paper will be due on or before the last day of class at 12:30 pm.

Please notice the final is scheduled on the last day of finals. This does not give us any special privileges or flexibility to change the schedule. (If your brother's wedding plans conflict with the final, you will have a decision to make. Note that it would be a mistake to buy a non-refundable ticket in the hope that I do not really understand sunk costs.)

Course Outline: It is likely that reading assignments, or at least most of them, being from original sources, are online.

I. The All Too Relevant Mercantilists Readings: Smith, *Wealth of Nations*, Book 4, Chapters 1 and 8.

II. The Broad Shoulders of Adam Smith Readings: Smith, *The Theory of Moral Sentiments* *Wealth of Nations*, Book 1, Chapters 1,2,7,and 8. Modern Tools: Sard's Theorem, Euler's Theorem.

III. David Ricardo's Comparative Advantage: Not his Labor Theory of Value Readings: The Principles of Political Economy and Taxation, Chapters 2,4,7. Modern Tools: Linear Programming.

IV. Dreaming of a better world: The Utopian Socialists of the 19th Century. Readings: Doctrine and Covenants Section 104 Platt, Socialism vs. the United Order. Owen, TBA Modern Tools: Calculus and Optimization Theory.

V. The Revolutionary Karl Marx. Readings: Marx and Engels, Manifesto of the Communist Party. Marx, Capital Vol. 1, Chapters 1, 7-9, 12-15 Vol. 3, Chapters 13-15 Sweezy, The Theory of Capitalist Development, Chapters 1-11,17. Modern Tools: Linear Programming.

VI. The Neo-Ricardians. Readings: Sraffa, Production of Commodities by Means of Commodities. Steedman, Marx After Sraffa, Chapters 1-4, 9. Roemer, Free to Lose. Modern Tools: Linear Algebra.

VII. Augustin Cournot and the August Advent of Mathematical Economics Readings: Researches Into the Mathematical Principles of the Theory of Wealth, Chapter 7. Modern Tools: Game Theory.

VIII. Marshalling the Neo-Classical Economists Readings: Principles of Economics, Eighth Edition, Chapter TBA

IX. The Counter Cyclical Keynes and his critics Readings: Random pages from The General Theory of Employment, Interest, and Money Friedman, TBA Hayek, Road to Serfdom, TBA

X. The Rational Expectation Revolution Readings: Lucas, TBA

1 Introduction

Newton is quoted as saying, “If I see further than other men, it is because I stand on the shoulders of giants.” Physics students typically do not learn Newtonian Physics by reading Newton, not because the basic ideas of Newtonian Physics have changed, but because simpler methods of exposition have been developed. The same is true of ideas of those upon whose shoulders economists stand. Their arguments were verbal and, as such, were sometimes cumbersome and difficult to understand. Academic controversies continue concerning what some authors intended. Modern exposition is made simpler by using mathematics to prove and communicate the ideas, and is made more convincing by the application of the scientific method, so it is appropriate to begin the course with a brief discussion of these tools.

As with most words, science has been defined in many ways. My favorite definition suggests that any field of study that has science in its title probably isn't. In a more serious vein, science has been defined as any systematic body of knowledge. This definition is not very helpful since it is hard to think of any field of study to which it would not apply. The most useful definition of science asserts that a field of study is a science if it applies the scientific method. Thus chemistry, physics, and economics are sciences by this definition, whereas mathematics, English, and theology are not. Note that to assert that a field is not a science does not imply that the field is inferior to others that are sciences. Nor does it imply that the field is less challenging than others that are sciences. Different questions are best addressed by different methods.

The scientific method is comprised of three steps: observation, theory construction, and theory testing. Suppose an economist wished to understand the factors affecting the quantity of pizza purchased on Saturday nights. Of course, he must first have observed that there are such things as pizza and Saturday nights even to get started! He then can begin spending Saturday nights at pizza restaurants and observing pizza purchases. (With a little luck, and the right connections, this can be financed by a grant from the Nation Science Foundation.) After several weeks of observation, he may notice some regularities. The next step is to construct a theory that explains these regularities.

A good theory has at least two important qualities. First it must have content. This means that it must be possible to conceive a situation in which the theory, if not true, would be contradicted by the evidence. In other words,

the theory must be testable. Second the theory must provide insight.

To illustrate, the economist could theorize that people buy more pizza on Saturday nights when they prefer to buy more and that they buy less pizza on Saturday nights when they prefer to buy less. Such a theory would be without content because there is no situation that would lead one to reject the theory. Furthermore, the theory provides very little understanding about behavior: it begs the question of why people's preferences change from Saturday night to Saturday night.

By contrast, the economist may theorize that people have tastes, that is, that when offered a choice between two commodity bundles they can tell which of the two they prefer. The economist may then theorize that people purchase the best bundle (according to their taste) that they can afford. This may lead him to believe that people will purchase more pizza on Saturday nights when they are wealthier. This theory has content: if people consistently purchase more pizza on Saturday nights during recessions (when their incomes are lower) than otherwise, the economist would be led to reject the theory. This theory also provides some understanding: rather than attributing behavior solely to unobservable preferences the theory illuminates the role of income in consumption patterns.

The third step in the scientific method is the testing of the theory. In the most favorable circumstances, controlled experiments are possible. These circumstances, when they occur, are usually to be found in the physical and natural sciences. For example, Mendel was able to test his theories of genetics by studying pea plants. By strictly controlling their cross-pollination, he was able to impose the precise conditions he thought were necessary for the testing of the theory. In less favorable circumstances, the scientist must wait for nature to provide the necessary conditions for the testing of a theory. For example, when Einstein predicted (based on his theory of relativity) that light should bend when passing through a gravitational field, scientists had to wait for a total eclipse of the sun (during which they could compare the perceived to the actual positions of stars in the neighborhood of the sun) in order to test the theory. In the least favorable of circumstance, the scientist has no hope that nature will provide what is needed to test a particular theory. In such cases great cleverness is often required in order to make do with what nature offers. This is often the case in the social sciences.

Despite the great success of the scientific method, it is important to understand its limitations. The scientific method is fundamentally based on a logical fallacy. If a theory is not contradicted by an experiment, then the

theory is accepted as valid even though it can never be known that a future experiment using different methods and focusing on different implications will not contradict the theory. For example, it was centuries before the technology for measurement was sufficiently developed that anomalies in Newton's theories were discovered. The discovery of these anomalies opened the door for Einstein's work. Nevertheless, a well-tested theory is deserving of a great deal of confidence. (Newton's theories are still sufficient for the vast majority of applications.) Thus no one should ever dismiss an assertion by saying that it is only a theory. After all, it is only a theory that the bridges we drive across every day will support the weight of our automobiles and it is only a theory that antibiotics are useful in treating bacterial infections. Indeed, it is only a theory that the sun will rise in the morning. Nevertheless, these are well-tested theories upon which we rightly base decisions everyday. Of course, there are good theories and bad theories. A good theory successfully explains something about the real world while a bad theory does not. Thus no one should ever say that something is good in theory but bad in practice. If it is bad in practice then it is bad in theory. A good theory is good in practice by definition.

Theories are often criticized as being overly simple. Although sometimes this criticism is warranted, it is important to note that often it is not. All theories are too simple in the sense that no theory ever takes everything into account. The universe is a very complicated place and we are a rather stupid species. Thus to understand anything we are obliged to ignore a lot of things.

A good theory ignores only unimportant things. It is said that Eratosthenes, an ancient Greek philosopher, learned that on a certain day of the year the sun at noon was directly over a particular city in Egypt. Since such a phenomenon never occurred in his city in Greece, a theory suggested itself to him. If the earth were flat and the sun very far away, he reasoned, then the sun would at least be close to directly over his city on the same day as it was directly over the city in Egypt. It followed that either the earth was not flat or else the sun was not very far away. He concluded that the earth was spherical, assumed (obviously falsely) that the sun was infinitely far away, and using basic geometry calculated the circumference of the earth. Note that his theory was testable: if the earth is round someone could in principle travel around it and measure its circumference. By ignoring the fact that the sun is not infinitely far away, he was able to calculate the earth's circumference to within about 200 miles of our current estimates, a remarkable accomplishment. (Of course, that degree of accuracy is not sufficient for our

current requirements and modern navigators take more things into account in order to achieve the necessary precision of measurement.) In summary, to criticize a theory it is not sufficient to assert that it is too simple; one must assert that it ignores effects that are important in such a way that the conclusions are misleading. The most compelling method of doing so is to show how taking other things into account dramatically changes the conclusions that one may draw.

There are those who argue that careful theorizing gets in the way of understanding. They argue that the simplification necessary in order to construct a careful, testable theory is so severe and misleading that nothing is to be gained from it. From this point of view, ignoring enough to make a theory sufficiently simple for application is to ignore too much to make it useful. In my view, to argue that to understand anything one must understand everything is to argue that humans cannot understand anything, because understanding everything is clearly beyond us. To argue that we cannot understand anything contradicts the impressive technical and social accomplishments of our species. I suspect that such arguments come from those who do not like to be bound by the discipline that the scientific method imposes. My experience in economics leads me to believe that those who make such arguments are those who do not like the conclusions that certain careful theories offer but who find themselves unable to construct equally careful theories that yield conclusions more to their tastes.

Jonah Goldberg offers an enlightening discussion of these issues in the context of a controversy swirling around the creation of a memorial to the heroic fireman of 911. His article, published in the *National Review*, 18 January 2002, is quoted here in part. The reader should do himself a favor by finding and reading the entire article.

... For those of you who have better things to do, there's this school of "thought" called "postmodernism" which—kind of like WASPs with mayonnaise—put quotation marks on everything. The reason so-called "PoMos" do this is because they believe there are no "capital-T" Truths. Rather, everything is mired in "perspective," which in turn is determined by various "interests," "privileges," and other "biases" and "prejudices," etc., etc. It's no exaggeration to say that postmodernism, of one flavor or another, is the dominant way of thinking in academia and on the cultural Left.

The greatest exposé of postmodern asininity appeared, in 1996, in the pages of a respected postmodern magazine called *Social Text*. The editors of *Social Text*, as part of their long campaign against facts-without-quotation-marks, dedicated an entire issue to the problem of "science." for obvious reasons, PoMos hate science more than dogs hate vacuum cleaners, and they bark at it about as much. You see, scientists work on precisely the opposite assumptions as PoMos; they actually think that facts exist outside of clever word games. You can say all you like that physics is phallogocentric, but it's not going to change the rules of thermodynamics. This really [infuriates] PoMos, because scientists keep making really cool gadgets that work while, to date, Duke's English department hasn't been able to make an airplane run on metaphors or to illuminate a football stadium with the adverbs from James Joyce's *Dubliners*.

Anyway, a physicist named Alan Sokal decided to have some fun and submit a paper to *Social Text* entitled "Transgressing the Boundaries: Toward a Transformative Hermeneutics of Quantum Gravity." After a zillion pages of jargon, it concluded that "physical 'reality,' no less than social 'reality,' is at bottom a social and linguistic construct." The editors loved the piece and published it. At which point, Sokal admitted it was a parody and he was just kidding. A few PoMos insisted it didn't matter if Sokal was joking, because he was right anyway. But most of them were angry enough to spit hermeneutic nails.

Anyway, because there is no objective truth, only subjective arguments, everything becomes political: a contest about power and privilege. ...

The scientific method imposes discipline on the scholar, prohibiting him from making assertions that cannot be supported by a carefully constructed and well tested theory. It requires the construction of a framework of analysis that helps us gain deeper understanding of natural and social phenomena. Finally, it seems to work. It is application of the scientific method that has produced and given us confidence in most if not all of the great technical discoveries in history. Nevertheless, it is foolish to assert that the scientific method is the only way in which to approach the truth. Science cannot provide final answers to any questions (since future experiments and observation

might overturn current views) and it cannot even begin to be applied to the most important questions (that is, the existence and character of God and the purpose of human existence). Like any tool, there are jobs for which it is suited and some for which it is not.

Mathematics is useful in applications of the scientific method in two ways: checking the internal logical consistency of a theory and measuring the results of an experiment. Carlos V of Spain purportedly remarked that English is the best language for commerce, French the best language for love, German the best language for calling dogs, and Spanish the best language for communicating with the heavens. Whatever the merit of his list, mathematics is the best language for logic.

Mathematics is abstraction. Although some students feel incapable of abstraction, they engage in it every day. The number 2 is an abstraction. It does not exist: it is only an invented logical construct. If I see a collection of objects containing one object for each ear on my head I say that the collection contains two objects. The objects need have nothing else in common with my ears than their number. Similar statements hold for the other numbers.

The number system is an abstract, invented, construct that helps us keep track of things. The rest of mathematics is not different. By abstracting from (what we hope are) unessential things for the purpose at hand, we are able to concentrate on and keep track of what is essential.

If mathematics is not more than a language of logic, it seems that logical arguments should also be expressible in other languages. (English, after all, also works reasonably well for calling dogs.) Indeed, many arguments that can be made using mathematical symbols can be made in English. Ironically, it is actually harder to do so. The problem is that words are not very precise and they have a tendency to change meaning through the course of an argument. Mathematical symbols, by contrast, are precisely defined and one need not guard so carefully against changes in meaning. To illustrate how the meaning of words can change, consider the following fallacious argument:

Theorem: Every dog has three tails.

Proof: Step 1: No dog has two tails.

Step 2: every dog has one more tail than no dog.

Step 3: Thus every dog has three tails.

The problem is that the meaning of the phrase “no dog” changes between the first and the second steps. By treating the phrase as having the same

meaning throughout the argument, we arrive at an absurd conclusion. Of course, in any verbal argument one can be careful not to let words change meaning in this way. In practice it is not that easy, however; it is much easier to use the language created with the purpose of logical argument in mind.

Furthermore, even though many mathematical arguments can be translated into English if one is sufficiently careful, not all arguments can be. Natural and social phenomena are typically extremely complex, being composed of many countervailing influences. To see which influence dominates, it is often necessary to quantify and compare them, a task for which mathematics is much better suited than is English. For example, in a supply and demand model from economics, if the demand for some good increases the result will be upward pressure on the price. The higher price, however will illicit further supply, which in turn imposes downward pressure on the price. It is much easier to determine which effect dominates when one discusses the model in mathematical terms and is able to quantify and compare the two effect. For more complicated questions, the argument for a mathematical formulation is ever stronger.

Finally, as does the scientific method, mathematics imposes discipline on the scholar. The requirement that the scholar establish an argument in careful mathematical language prohibits him from making logically inconsistent assertions. (Of course, the scholar still may make mistakes in the argument, but when the argument is laid out in careful and rigorous mathematical fashion. Those mistakes are easier for the reader to discover. The scholar is unable to hide behind the fuzziness of the English language.) In the absence of this discipline, it is too easy to rely on intuition (often called common sense.) Intuition is extremely useful in the formulation of theories, but it is not very reliable. Intuition is derived from our experience: when confronted with a problem that is similar to problems we've seen before, we tend to think that the previous solutions will apply to the new problem. Indeed, most of the time we are right! It is a good rule of thumb to first try things that have worked before in similar circumstances. Unfortunately, the previous problems may not be as similar to the current problem as we think, and even if they are they may not be sufficiently similar for the previous solutions to work.

To take an illustrative example from mathematics, suppose the problem is to decide whether there are more whole numbers than even numbers. From common experience one would jump to the conclusion that there are twice as many whole numbers: just look at the list of numbers from one to ten wherein

there are ten whole numbers but only five even numbers. Indeed, since all even numbers are whole numbers but not the converse, isn't it intuitively obvious that there are more whole numbers than even numbers? It's just common sense... and it is just wrong. To see this, notice that if you wrote down all of the even numbers from left to right and, below that infinitely long line, you wrote the result of dividing each even number in turn by two, the bottom line would contain the whole numbers. Furthermore, there would be exactly one whole number for each even number, as illustrated below:

2	4	6	8	10	12	14	16	18	...
1	2	3	4	5	6	7	8	9	...

Hence the right answer is that there are exactly as many even numbers as whole numbers. The reason that one is misled by common sense in this case is that our common sense is derived from our experience with finite lists of numbers. That experience is not valid when dealing with infinite lists. Similarly, the common sense we derive from our experience and prior knowledge may not be valid when we embark on the study of complicated questions that are necessarily beyond our experience (since we can only observe a rather small part of the universe, or even the economy, at a time).

Another problem with common sense is that it is not unique. Several explanations of a given phenomenon may seem sensible even when they contradict each other. Many students think economics is very easy before their first exam, and then do very poorly on that exam. The reason is that when the theory is explained intuitively, it sounds reasonable. "It's just common sense." When confronted with two different intuitively reasonable but contradictory explanations, such students are often at a loss to choose between them. Mathematics, by testing their internal logical consistency, can sometimes provide a key.

An example of the usefulness of mathematics in theory building was hidden in the pizza on Saturday night example. Reconsider the argument. If people purchase the best bundle (according to their tastes) that they can afford, then when people are wealthier and hence can afford more pizza then they will purchase more pizza on Saturday nights. I think the reader will agree that this is a most reasonable sounding argument. It is, however, incomplete at best and wrong at worst. When people are wealthier they have more bundles from which to choose. Although a wealthier individual can afford more pizza, he can also afford more steak and caviar and may eat

enough steak and caviar that he no longer is hungry for pizza. Notice that there are countervailing effects: the direct effect of the higher income makes more pizza affordable, but the direct effect of the higher income makes other commodities more affordable as well, and they may crowd out the consumption of pizza. Economists through mathematical reasoning can quantify the various effects and, thanks to the resulting theory, can obtain further insights into the effects of income changes on consumption patterns.

The second role of mathematics in the scientific method is to measure the results of an experiment or, for that matter, to measure the results of observation in the first step of the method. Suppose an anthropologist lived in a primitive society of a few hundred individuals for a few months and, during that time, observed no murders. She might conclude, since a few days never go by in New York City without a murder, that modern civilization is more murderous. What this would not take into account is that if one were to observe a random sample of a few hundred people in New York City for several months, it is highly unlikely that one would observe any murders in that small sample either. Thus the empirical evidence for her conclusion would be extremely weak indeed. A basic knowledge of probability theory would allow her to take the difference in population sizes into account and would save her from making such a claim. Similar examples abound.

The search for truth is fraught with difficulties. The universe is a complicated place, and almost all of it is far beyond the direct experience of any of us. Wherever applicable, the careful scholar should willingly seek the discipline that a mathematical approach to the scientific method imposes. The scientific method properly applied results in well-tested theories: logical constructs with a good track record for prediction in the real world. A mathematical approach to the scientific method, properly applied, makes it easier to construct logically consistent theories that are supported by carefully measured empirical evidence.

2 Preliminaries

Heilbroner argued that there are basically three ways to structure economic activity: Tradition, Command, and Market.

2.1 Early thought

Western attitudes on economic questions are strongly affected by intuition and supposed biblical notions of fairness. Niehans (in *A History of Economic Theory*) lists seven statements that predate modern economics.

1. Successive units of a commodity are less urgently needed.
2. Abundance makes prices fall and scarcity makes them rise.
3. A decline in price stimulates demand but reduces supply.
4. Higher fertility and better location result in higher land rent.
5. An increase in the money supply raises prices.
6. Voluntary exchange is advantageous to both parties.
7. Trade occurs because different regions have different natural endowments.

These early observations lack a unifying paradigm, and the arguments are incomplete, but they echo down through history and seem familiar even today. A common thread in these seven statements is that they can be derived from direct experience. People are usually unable to observe the entire general equilibrium mechanism generating the empirical record, but they are aware of correlations of the variables that they deal with daily. Consider the following commentaries on each of these points:

2.1.1 Successive units of a commodity are less urgently needed

Need, like *freedom*, is a slippery concept. In particular, they depend on context: one must specify what one is free to do or what one needs in order to accomplish a goal. Various freedoms are likely to be contradictory: my freedom to play Wagner in the wee hours of the morning may conflict with your freedom to get a good night's sleep. In extreme situations, my need to consume enough calories to sustain basal metabolism may be inconsistent with your similar need. Freedom and need are not absolutes.

2.1.2 Abundance makes prices fall and scarcity makes them rise

Abundance and *scarcity* are also slippery concepts. Note that abundance and scarcity are treated as static notions in statement 2, whereas price changes are inherently dynamic. Even today, this seems to be a common failure of amateur (and occasionally even professional) economic analysis: namely, the confusion between levels and changes.

All goods are scarce in the sense that there is insufficient supply at a zero price. All goods are abundant in the sense that there is always enough to go around at a high enough price. Shortages and surpluses are meaningful concepts only in the context of non-market-clearing conditions.

2.1.3 A decline in price stimulates demand but reduces supply

Prices are often endogenous and, hence, cannot be considered causal. Individuals interacting with the market are likely, however, to observe their own quantity choices given change in prices. Since the prices are exogenous to the individuals, effects of price changes on their own quantity decisions will tend to be causal. The correlations asserted in statement 3 are sensible conclusions based on empirical observation and introspection.

2.1.4 Higher fertility and better location result in higher land rent

Once again, this statement is likely to be consistent with personal experience.

2.1.5 An increase in the money supply raises prices

In the economies of the time, money was commodity money (gold, silver, etc.) and thus this point is similar to point 2. Statement 2 asserts a negative relationship between the supply of a commodity and its price. Statement 5 asserts a negative relationship between the supply of commodity money and the price of commodity money, and hence a positive relationship between the supply of commodity money and the price level.

2.1.6 Voluntary exchange is advantageous to both parties

This is a tautology, since voluntary exchange is defined as making both parties better off. Since intensity of preferences is not yet measurable by neuroscientists, this is a useful assumption which however is unverifiable.

2.1.7 Trade occurs because different regions have different natural endowments

The incompleteness of this assertion will become clear when we stand on Ricardo's shoulders.

Early attempts to progress beyond these intuitive propositions are not apparent before the Middle Ages, and hence are heavily influenced by Church teaching of the time. Early writers discussed notions of a just price, often confusing ethics with description. They were suspicious of usury, which seems to be condemned in Ex. 22:25; Lev. 25:35–38; Deut. 23:19–21; Ezek. 18:8. Deuteronomy, in contrast to the other listed verses, seems to allow charging interest from non-Israelites. This apparent loophole allowed Jews to provide capital markets where Christians and Muslims could not. As Europe emerged from the dark ages, and nation-states formed, a new economic paradigm emerged.

2.2 Mercantilism: an infantile disease

What has become known as mercantilism is (1) intuitive, (2) self-serving to some politically powerful groups, and (3) mostly wrong. Yet, because of the first two properties, many politicians, voters, policy analysts, talking heads, and popular authors are willing to put up with the third property.

The original doctrine of mercantilism emerged with the nation-states of Europe. To oversimplify, mercantilism measured wealth by the amount of gold and other precious metals that a country owned. Adam Smith did not find it surprising that mercantilists would equate national wealth with gold.

That wealth consists in money, or in gold and silver, is a popular notion which naturally arises from the double function of money, as the instrument of commerce, and as the measure of value. In consequence of its being the instrument of commerce, when we have money we can more readily obtain whatever else we have occasion for, than by means of any other commodity....In consequence of these popular notions, all the different nations of Europe have studied, though to little purpose, every possible means of accumulating gold and silver in their respective countries. (Adam Smith, *Wealth of Nations*, Book 4, Ch 1)

Exports of manufactured goods were encouraged, especially in return for gold. Even piracy on the high seas was condoned, and indeed licensed by the various Crowns, as a way to enrich the country by mercantilist definitions.¹

¹The interested reader is invited to read about, for example, the exploits of Sir Francis Drake.

Raw materials were not to be exported but were to be used to further domestic manufacturing on the premise that manufactured goods were more expensive and hence more desirable to produce. Imports were discouraged for the same reasons exports were encouraged. Self-sufficiency of the country was highly valued.

In spite of important advances in economic understanding since the Renaissance, the first two properties of mercantilist thought make the third difficult to appreciate. Presidential candidates decry free trade policies on the grounds that they export jobs and make the country poorer. For a dated but particularly amusing example, Ross Perot, a former presidential candidate (1992), opposed the North American Free Trade Agreement (NAFTA) by saying that it would cause a giant sucking sound as American jobs were siphoned to Mexico. He also chided proponents of the treaty for thinking that it didn't matter whether the American workers produced computer chips or potato chips. No such sucking sound was heard after the treaty was signed, but its opponents might argue that the roughly 3000 pages of exceptions took the free out of free trade and hence reduced the effect.

Albert Einstein, a great physicist but not a great economist,² has been quoted as saying that nationalism is an infantile disease, the measles of the human race. Mercantilism is arguably the economics of nationalism. Although there is much to study about the specifics of the theory and implementation of mercantilism—it was not a unified doctrine and appeared in many forms in different times and places—in this course we will mostly study it by considering its critics, beginning with Adam Smith. Since mercantilist ideas are still with us, this approach will seem very topical and contemporary. More's the pity.

3 Adam Smith

The last half of the eighteenth century saw technological advances that created great wealth and made the prior modes of production obsolete and untenable. The first man to inhabit this new world intellectually was arguably Adam Smith.³ The scope of his contribution to our understanding of the new order is breathtaking. His first of two major works, *The Theory of Moral*

²See the first issue of monthly review, a Communist magazine that began publication in the 1950s.

³His first name is nevertheless undoubtedly a coincidence.

Sentiments, is seldom given the attention it deserves.

Adam Smith was interested in uncovering natural law. Understanding human nature was an important part of understanding the society of humans. This rather obvious tautology leads to a question of how the innate selfishness of individuals can be kept from generating a decline into chaos. Adam Smith's answer was two-fold, and neither part can be ignored if one is to do justice to Adam Smith's vision.

The first part is explained in the *Theory of Moral Sentiments*. Adam Smith explored the qualities of humans that would be necessary, or at least sufficient, to construct a well-ordered society based on private property and free trade. From the *Theory of Moral Sentiments* we can derive the following list: 1) sympathy, or empathy, 2) a common notion of propriety based on sympathy, 3) respect and shared definitions of virtue, 4) a rejection of unsocial passions, 5) the acceptance of respectable passions.

Much of Adam Smith's hope for success in this endeavor is based on his faith in human empathy.

How selfish soever man may be supposed, there are evidently some principles in his nature, which interest him in the fortune of others, and render their happiness necessary to him, though he derives nothing from it except the pleasure of seeing it. Of this kind is pity or compassion, the emotion which we feel for the misery of others, when we either see it, or are made to conceive it in a very lively manner. That we often derive sorrow from the sorrow of others, is a matter of fact too obvious to require any instances to prove it; for this sentiment, like all the other original passions of human nature, is by no means confined to the virtuous and humane, though they perhaps may feel it with the most exquisite sensibility. The greatest ruffian, the most hardened violator of the laws of society, is not altogether without it.

This sympathy for others provides a natural foundation for the golden rule and provides hope that humanity can avoid the worst.

"And hence it is, that to feel much for others and little for ourselves, that to restrain our selfish, and to indulge our benevolent affections, constitutes the perfection of human nature; and can alone produce among mankind that harmony of sentiments and passions in which consists their whole grace and propriety. As to

love our neighbor as we love ourselves is the great law of Christianity, so it is the great precept of nature to love ourselves only as we love our neighbour, or what comes to the same thing, as our neighbour is capable of loving us.”

The great law of Christianity, cited by Adam Smith, deserves careful thought. Put another way, how should one treat one’s neighbor as one would like to be treated? More specifically, how should one like to be treated? An ethical system built on the golden rule, to be workable and consistent, naturally places limits on transfers.

Adam Smith knew that empathy is not enough to control self-interested agents. For example, he noted “When the crown lands had become private property, they would, in the course of a few years, become well-improved and well-cultivated” (*Wealth of Nations*, Book 4, Ch 2).

The over-arching question is whether the qualities listed by Adam Smith (and the associated altruism) are sufficiently widespread to achieve the desired outcome. There are reasons to be optimistic and reasons to be pessimistic. Optimism springs from the realization that even the greatest ruffian is not altogether without empathy. Pessimism springs from the realization that there are a great many ruffians who are burdened by very little empathy.

In a society exhibiting much selfishness, many resources are required to defend property rights and the power required to defend those rights is likely to be abused.⁴ In a society too bereft of altruism to engender confidence in a desirable outcome based on these characteristics, is there something else that can substitute?

This brings us to his magnum opus, *An Inquiry into the Nature and Causes of the Wealth of Nations*, published in 1776, and to the second part of his answer. In one of the book’s most quoted passages he wrote “It is not from the benevolence of the butcher, the brewer, or the baker that we expect our dinner, but from their regard to their self-interest. We address ourselves, not to their humanity, but to their self-love, and never talk to them of our necessities, but of their advantages.” He reasoned that the interplay between the self-interested action of the members of society would naturally move resources to their most valued uses. In another highly quoted passage he wrote

⁴In a society ruled by pure altruism, it seems that much effort would go into undoing the good actions of one’s neighbor. Perhaps there is indeed something golden in the golden rule society.

Every individual necessarily labours to render the annual revenue of the society as great as he can. He generally, indeed, neither intends to promote the public interest, nor knows how much he is promoting it. By preferring the support of domestic to that of foreign industry, he intends only his own security, and by directing that industry in such manner as its produce may be of the greatest value, he intends only his own gain, and he is in this, as in many other cases, led by an invisible hand to promote an end which was no part of his intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest he frequently promotes that of the society more effectively than when he really intends to promote it. I have never known much good done by those who affected to trade for the public good. It is an affectation, indeed, not very common among merchants, and very few words need be employed in dissuading them from it.

The proposition that factors of production are lead as if by an invisible hand to maximize the value of production is far from obvious. In fact, most people probably don't believe it even today. Adam Smith did not have access to the tools that we use today to test the logical consistency of economic arguments. This makes his accomplishment all the more amazing.

To test these ideas more rigorously, consider a small open economy (so that output prices are exogenously given by world markets). Suppose there are two sectors which we will call Agriculture and Manufacturing, respectively. Suppose Agriculture employs Land and Labor while Manufacturing employs Capital and Labor. Let (L, K, T) denote the supplies of each of these three factors of production.

We suppose that suppliers are profit maximizers. Thus agents in Agriculture and Manufacturing maximize $P_A A(L_A, T) - wL_A - tT$ and $P_M M(L_M, K) - wL_M - rK$, respectively. An equilibrium is defined as a list of factor prices, (w, r, t) , that clear the factor markets. Specifically, the profit maximization problems deliver the following first order conditions:

$$(1a) P_A \frac{\partial A}{\partial L_A} = w \quad (1b) P_A \frac{\partial A}{\partial T} = t$$

$$(1c) P_M \frac{\partial M}{\partial L_M} = w \quad (1d) P_M \frac{\partial M}{\partial K} = r$$

Define national income as

$$(2) P_A A(L_A, T) + P_M M(L - L_A, K)$$

and maximize with respect to L_A . This yields the following first order condition:

$$(3) P_A \frac{\partial A}{\partial L_A} = P_M \frac{\partial M}{\partial L_A}$$

for national income maximization. Note that in equilibrium, w must be the same in both industries,⁵ therefore, (1a) and (1c) together are equivalent to (3).

It remains to be shown that the allocation of output is consistent with the level of output, that is, the payments to factors in each industry cannot (at least in the long run) differ from the output in each industry. This is a straightforward application of Euler's Theorem. It must be shown that

$$(4) P_M M(L, K) = wL + rK$$

If M exhibits constant returns to scale then

$$(5) P_M M(\gamma L, \gamma K) = \gamma P_M M(L, K)$$

differentiating this with respect to γ yields

$$(6) P_M \frac{\partial M}{\partial L} L + P_M \frac{\partial M}{\partial K} K = P_M M(L, K)$$

Substituting (1c) and (1d) into (6) yields (4).

Exercise:

1. Suppose the production function in Agriculture is $L_A^\alpha T^{(1-\alpha)}$ and suppose the production function in Manufacturing is $L_M^\beta K^{(1-\beta)}$.
 - a. In each industry, derive the first order conditions for the optimal use of labor in each industry.
 - b. Suppose output prices are exogenously given by world markets. Derive the first order condition for the national income maximizing allocation of labor.
 - c. How are the answers to a. and b. related?
 - d. In this example, prove that if each factor receives its marginal revenue product then output is exactly exhausted.

⁵Otherwise, labor has an incentive to move to the higher wage industry.

The caricature of Adam Smith's philosophy as a defense of unbridled selfishness, narrow self-interest and "the devil take the hindmost" is as shallow as it is misleading.⁶ Basic notions of moral sentiments must be in place for individualism and self-interest to yield desirable outcomes. With this foundation in place, private property and individual liberty can be consistent with a well-ordered, peaceful society.

Although Adam Smith's purpose may have been to unseat mercantilist thought and practice, *Wealth of Nations* is far more than a polemic. It spells out much of what has become known as classical economics. Consider the scope of his contributions.

3.1 Division of labor

Adam Smith recognized that efficient use of resources demanded a division of labor. His famous parable of the pin factory illustrated how workers, by dividing processes into parts could increase production. He identified three advantages of the division of labor: First, workers who specialize tend to become skilled at their specialty. (Practice makes perfect) Second, workers save time when they don't have to set up and take down numerous processing. (Start-up costs are reduced.) Third, narrowly focused workers are more likely to invent machinery that will help them be more productive. (Necessity is the mother of invention.)

3.2 Value

Adam Smith recognized two kinds of value: use value and exchange value.

The word VALUE, it is to be observed, has two different meanings, and sometimes expresses the utility of some particular object, and sometimes the power of purchasing other goods which the possession of that object conveys. The one may be called 'value in use;' the other, 'value in exchange.' The things which have the greatest value in use have frequently little or no value

⁶Emerson wrote that a foolish consistency is the hobgoblin of little minds. He apparently meant that holding the same beliefs over time either signals a remarkable lack of progress or is a sign of incredible good fortune. Although allowance must be made for Adam Smith's evolving beliefs, I believe his two most important works are remarkably consistent with each other."

in exchange; and on the contrary, those which have the greatest value in exchange have frequently little or no value in use. Nothing is more useful than water: but it will purchase scarce any thing; scarce any thing can be had in exchange for it. A diamond, on the contrary, has scarce any value in use; but a very great quantity of other goods may frequently be had in exchange for it.

The relative prices of diamond and water led Adam Smith to believe that the source of their value in exchange was fundamentally different from the source of their value in use. In some passages, Adam Smith appears to advocate a labor theory of value. The journey from there to here has been long and confusing, as will be seen hereafter.

3.2.1 A labor theory of value

Adam Smith recognized, unlike the mercantilists, that ultimately the wealth of a nation resided in what the people were able to consume. By maximizing the value in exchange of the commodities produced by the available resources, material satisfaction (later to be referred to as utility) is maximized. Material satisfaction is difficult to measure (and was even more difficult to measure in the eighteenth century.) Exchange value, by contrast, is directly observable in the market place. This makes exchange value a more appropriate vehicle for studying economics. This naturally makes exchange value the most important phenomenon to explain.

Adam Smith visited two possible explanations for the determination of exchange value. The first appears to be a straightforward (or perhaps somewhat less than straightforward) labor theory of value:

Every man is rich or poor according to the degree in which he can afford to enjoy the necessaries, conveniences, and amusements of human life. But after the division of labour has once thoroughly taken place, it is but a very far greater part of them he must derive from the labour of other people, and he must be rich or poor according to the quantity of that labour which he can command, or which he can afford to purchase. The value of any commodity, therefore, to the person who possesses it, and who means not to use or consume it himself, but to exchange it for other commodities, is equal to the quantity of labour which it enables him to

purchase or command. Labour, therefore, is the real measure of the exchangeable value of all commodities.”

Adam Smith was anticipated potential divergence between his labour theory of value and empirically observed prices. “But though labor be the real value of the exchangeable value of all commodities, it is not that by which their value is commonly estimated. It is often difficult to ascertain the proportion between two different quantities of labour.” In other words, if the theory contradicts observed practice, it is due to measurement error. This is yet another example of Adam Smith being ahead of his time.

3.2.2 A component parts theory of value

Adam Smith recognized, however that a strict labor theory of value would not explain the existence of payments to other factors.

In the price of corn, for example, one part pays the rent of the labourers and labouring cattle employed in producing it, and the third pays the profit of the farmer. These three parts seem either immediately or ultimately to make up the whole price of corn. A fourth part, it may perhaps be thought, is necessary for replacing the stock of the farmer, or for compensating the wear and tear of his labouring cattle, and other instruments of husbandry. But it must be considered that the price of any instrument of husbandry, such as a labouring horse, is itself made up of the same three parts; the rent of the land upon which he is reared, the labour of tending and rearing him, and the profits of the farmer who advances both the rent of his land and the wages of this labour. Though the price of the corn, therefore, may pay the price as well as the maintenance of the horse, the whole price still resolves itself either immediately or ultimately into the same three parts of rent, labour, and profit.”

It appears that Adam Smith did not consider the divergence in the two theories of value to be important, given the statement prior to the one just quoted:

“The real value of all the different component parts of price, it must be observed, is measured by the quantity of labour which

they can, each of them, purchase or command. Labour measures the value not only of that part of price which resolves itself into labour, but of that which resolves itself into rent, and of that which resolves itself into profit.

A complete theory of price determination requires a theory of input price determination and an accounting identity that insures equality of input cost and the value of output. In short, supply must equal demand. Adam Smith had some understanding even of this. The question of whether these requirements could be fulfilled simultaneously was not resolved for another two centuries.

3.3 Standing on Adam Smith's shoulders

Adam Smith induced inquiries into many other topics and much of the insight available from modern economics was anticipated within the pages of his magnum opus. Arguably, several subfields in economics were founded by him. Adam Smith discussed division of labor, specialization and exchange, monetary economics, price formation, wage determination, return to capital, land rent determination, inequality, the importance of property rights, tax incidence and more. His analysis lacks rigor by today's standards, but his intuitive grasp of what was salient has largely survived careful scrutiny using modern methods. The shortcomings of his work must be excused, for he is the giant upon whose shoulders we now stand. Adam Smith's ideas formed the basis for further inquiry. Some forays led to dead ends; others added fundamental insights. David Ricardo, worthy heir to Adam Smith's legacy, extended the analysis in several directions. Some of them are fruitful, others less so. Adam Smith's analysis necessarily fell short. Specifically, he lacked a complete theory for the determination of input prices. Specifically how were the wages, profits and land rents arrived at? It was brilliant and path-breaking to assert that self-interested behavior could lead to the highest valued use of available resources, but the mechanism that guaranteed this was a little vague. Also lacking was a proof that self-interested behavior by all economic actors is simultaneously possible. These issues were resolved two centuries after Adam Smith.

4 David Ricardo

David Ricardo is known primarily for three contributions: A Labor Theory of Value, A Marginal Theory of Rent, and the Doctrine of Comparative Advantage. In the first, he was not very different from Adam Smith. In the second, his analysis is tight but intuitive. As for the third, it is one of the most brilliant contributions to economic understanding ever achieved. The story is told that Paul Samuelson was challenged by a physicist to state just one result from the social sciences that was both true and non-trivial. His answer: The Doctrine of Comparative Advantage. It is indisputably true as a mathematical proposition. That it is non-trivial is evidenced by the refusal of many to understand it, much less believe it.

4.1 The Ricardian labor theory of value

Adam Smith did not completely spell out a consistent theory of value. David Ricardo attributed value to labor that in a sense followed suit. He began: "The value of a commodity, or the quantity of any other commodity for which it will exchange, depends on the relative quantity of labour which is necessary for its production, and not on the greater or less compensation which is paid for that labor."⁷

Ricardo realized that what mattered was not only the immediately supplied labor, but also the labor embodied in capital improvements. (See chapter 1 section 3). This introduces a dynamic element later exploited by Marx and still later by Sraffa and the neo-Ricardians.

The assertion that goods have a tendency to trade at prices proportional to the labor required to produce them is common to both Adam Smith and David Ricardo. They were also aware that labor did not receive all of the goods it produced. Their attempts to reconcile this led them to a component theory of value. The problem was deeper however than either of them supposed. If labor is a commodity, then it too should trade at a price proportional to its value. If labor is purchased for the price reflecting its labor content, then workers should receive all of the product. They don't. Ricardo somewhat anticipated the solution that was later suggested by Marx.

Labour, like all other things which are purchased and sold, and which may be increased or diminished in quantity, has its natural

⁷The principles of political economy and taxation, chapter 1, section 1

and its market price. The natural price of labour is that price which is necessary to enable the labourers, one with another, to subsist and to perpetuate their race, without either increase or diminution.

In other words, the natural price of the labor is proportional to the amount of labor required to produce what might be called the subsistence bundle. Later, classical economists would split into Marxist and Neo-classical economists, which would differ in their approach to deviation from the natural price of labor.

There is one case in which Ricardo's labor theory of value is accurate: when there is only one factor of production, which might be called labor. Although it is difficult to imagine a literal real-world example, Ricardo's framework also applies to cases where multiple factors are always used in the same proportions, and it is useful as a simplifying assumption in testing the logical consistency of ideas.

4.2 Ricardian Theory of Land Rent

Ricardo's theory of land rent is remarkably modern:

Now suppose land—No. 1, 2, 3—to yield, with an equal employment of capital and labour, a net produce of 100, 90, and 30 quarters of corn. In a new country, where there is an abundance of fertile land compared with the population, and where therefore it is only necessary to cultivate No. 1, the whole net produce will belong to the cultivator, and will be the profits of the stock which he advances. As soon as population had so far increased as to make it necessary to cultivate No. 2, from which ninety quarters only can be obtained after supporting the labourers, rent would commence on No. 1... (chapter 2)

In honor of Ricardo, payments to a unit of a factor that are due to greater productivity relative to the next best unit of the same factor are often called Ricardian rents and are distinguished from other payments to the factor.

4.3 Comparative Advantage

4.3.1 Comparative advantage from technology differences

Comparative advantage asserts that free trade will benefit all countries if they specialize in what they are relatively good at. This result is true even if a country is better at everything than its partners and even if a country is worse at everything than its partners.

A modern mathematical model that has only one factor makes it easy to see and gain intuition about comparative advantage. Suppose there are two goods, cleverly called Good 1 and Good 2, respectively. Suppose that domestic technology requires a_{Li} units of labor to produce one unit of Good i . If w is the wage then the domestic price of Good i , if both goods are produced, must satisfy $P_i = wa_{Li}$. The relative price of Good 1 in terms of Good 2 is $\frac{P_1}{P_2} = \frac{a_{L1}}{a_{L2}}$. In autarky, assuming a fixed labor supply, L , the country will have a production possibility frontier described by

$$a_{L1}X_1 + a_{L2}X_2 = L$$

and the wage will be

$$w = \frac{P_1}{a_{L1}} = \frac{P_2}{a_{L2}}$$

If the country opens to free trade, then it is straightforward to show that specialization (in the right direction) increases the real wage. Specifically, suppose in autarky a country consumes a bundle (X_1, X_2) . Define the real wage as $\frac{w}{P_1X_1 + P_2X_2}$. Note that the real wage is the number of (X_1, X_2) bundles the country can purchase. Suppose without loss of generality that $\frac{P_1^*}{P_2^*} > \frac{P_1}{P_2}$. Then the real wage increases with free trade if and only if

$$\frac{w^*}{P_1^*X_1 + P_2^*X_2} > \frac{w}{P_1X_1 + P_2X_2}$$

for fixed (X_1, X_2) , which is equivalent to $\frac{P_1^*}{P_2^*} > \frac{P_1}{P_2}$. Notice that this implies that the country is able to buy proportionally more of both goods with free trade even without changing its production. It can do even better by specializing in Good 1.

4.3.2 Comparative Advantage from Factor Endowments

The labor theory of value breaks down when more factors are added, but the Doctrine of Comparative Advantage does not. Relative factor endowments drive comparative advantage (rather than technology differences) and some may be made worse off.

Levels

$$a_{LM}w + a_{TM}r = P_M$$

$$a_{LF}w + a_{TF}r = P_F$$

Define $\theta_{LM} = \frac{a_{LM}w}{P_M}$ as labor's share of revenues and define the other expressions similarly. Then if hats denote percentage changes, the previous two equations imply the following two:

Changes

$$\theta_{LM}\hat{w} + \theta_{TM}\hat{r} = \hat{P}_M$$

$$\theta_{LF}\hat{w} + \theta_{TF}\hat{r} = \hat{P}_F$$

The differentials of the technological coefficients— a_{ij} —vanish because of the envelope theorem. Since the θ values sum to one in each industry, these two equations imply

$$(\hat{w} - \hat{r})(\theta_{LM} - \theta_{LF}) = (\hat{P}_M - \hat{P}_F)$$

So if $\theta_{LM} > \theta_{LF}$ and the relative price of M rises:

$$\hat{w} > \hat{P}_M > \hat{P}_F > \hat{r}$$

This is the Stolper-Samuelson theorem.

Homework on Comparative Advantage

1. When did Ricardo publish his most important work?
2. Suppose it takes one unit of labor to produce a unit of good 1 and 2 units of labor to produce a unit of good 2. Suppose labor is the only input in production. Suppose there are 5 units of labor and use good 1 as numeraire ($P_1 = 1$). Finally, suppose consumers have Leontief preferences: they always consume the output goods in equal (positive) amounts.
 - 2a. What is the wage rate in autarky?
 - 2b. How much of each output good is produced?
 - 2c. How much of each output good is consumed?
 - 2d. Sketch the country's production possibility frontier.

- 2e. If the country opens to free trade and the price of good 2 is 3 on world markets, what is the wage rate?
- 2f. Are workers made better off by free trade?
3. Now suppose capital is also required: in addition to the labor requirements described above, good 1 requires 2 units of capital for production of a unit of output and good 2 requires 1 unit of capital to produce a unit of output. $P_1 = P_2 = 2$. Suppose there are 4 units of capital.
- 3a. What is the wage rate and what is the return to capital in autarky?
- 3b. How much of each output good is produced in autarky?
- 3c. How much of each output good is consumed in autarky?
- 3d. Sketch the country's production possibility frontier.
- 3f. If the country opens to free trade and the price of good 2 is 3 on world markets, what is the wage rate and what is the return to capital in autarky?
- 3g. Who benefits and who loses from free trade?
4. Now suppose that only capital is used to produce Good 1 and only labor is used to produce Good 2. If the goods are perfect substitutes in consumption, that is, $U(X_1, X_2) = aX_1 + bX_2$
- 4a. What is the wage rate and what is the return to capital in autarky?
- 4b. How much of each output good is produced in autarky?
- 4c. How much of each output good is consumed in autarky?
- 4d. Sketch the country's production possibility frontier.
- 4f. If the country opens to free trade and the price of good 2 is 3 on world markets, what is the wage rate and what is the return to capital in autarky?
- 4g. Who benefits and who loses from free trade?

5 Karl Marx

5.1 The Communist Manifesto

Consistent with the classical tradition, Marx went beyond narrow economic issues. His was a big theory of history, wherein Hegelian dialectic idealism reigned supreme in its materialist garb. The analysis of capitalism was a special case of a much broader vision. The clearest statement of his view of history is in *The Communist Manifesto*, published in 1848 with Frederick Engels. It was commissioned by the Communist League at their London conference. The introduction spells out the purpose of the Manifesto:

5.1.1 Introduction

“A spectre is haunting Europe—the spectre of Communism. All the Powers of old Europe have entered into a holy alliance to exorcise this spectre: Pope and Czar, Metternich and Guizot, French Radicals and German police-spies. Where is the party in opposition that has not been decried as Communistic by its opponents in power? Where is the Opposition that has not hurled back the branding reproach of Communism, against the more advanced opposition parties, as well as against its reactionary adversaries?”

Two things result from this fact:

I. Communism is already acknowledged by all European Powers to be itself: a Power.

II. It is high time that Communists should openly, in the face of the whole world, publish their views, their aims, their tendencies, and meet this nursery tale of the Spectre of Communism with a Manifesto of the party itself.”

5.1.2 Marxist Dialectic

The Communist Manifesto goes far beyond its role as a political tract. It outlines Marx’s theory of history. It is difficult to underestimate the importance of this document for the international communist movement. Lenin wrote “This little booklet is worth whole volumes, to this day its spirit inspires and guides the entire organized and fighting proletariat of the civilized world.”

“The history of all hitherto existing society is the history of class struggle.”

Marx gave two examples: feudalism and capitalism. Feudalism declined as small towns developed, and therein the first elements of the bourgeoisie, that is, owners of the means of production and employers of wage labor. Markets expanded with the discovery of America (colonization and trade), the rounding of the cape (East-India and Chinese markets), feudal industry (closed guilds) could not supply markets (what could this possibly mean?), and manufacturing developed (note that technology is endogenous). The bourgeoisie developed and overthrew the feudal nobility, creating the modern State that rules according to the interests of the bourgeoisie.

The Achievements of the Bourgeoisie

They overturned feudal “divine right” relationships and replaced them with “self-interest” and “cash payment” relationships.

They equated personal worth with exchange value.

They revolutionized production techniques, weakened national boundaries by creating a world market, created large cities, and reduced the size of the illiterate peasantry.

They created, for the first time, crises of overproduction.

They created the working class that will bring about capitalism's demise.

The Condition of the Proletariat

Division of labor robs workers of individual character. (Cogs in the machine).

The creation of an unskilled proletariat.

At first, the struggle is against individual employers or against the means of production.

As capitalism develops, workers' numbers and concentration grow.

Workers develop class consciousness and struggle together.

Bourgeoisie often uses proletariat against the old order, but they are uneasy allies. Eventually, the proletariat must triumph.

The aims of the Communists are the formation of the proletariat into a conscious class, the abolition of private ownership of the means of production, abolition of the family based on property relations, and abolition of countries and nationalities.

According to Marx, the Means of production are socially produced and should be socially controlled.

“In bourgeois society, living labor is but a means to increase accumulated labor. In communist society, accumulated labor is but a means to widen, to enrich, to promote the existence of the laborer.” “In bourgeois society, therefore, the past dominates the present; in Communist society, the present dominates the past. In bourgeois society capital is independent and has individuality, while the living person is dependent and has no individuality.”

Intermediate Goals of the Working Class: (Inroads on private property; The Transition Period.)

The scale of intervention conducted by the two entities was large enough to matter a great deal.

1. Abolition of property in land and application of all rents of land to public purposes.
2. A heavy progressive or graduated income tax
3. Abolition of all right of inheritance.
4. Confiscation of the property of all emigrants and rebels.
5. Centralization of credit in the hands of the state, by means of a national bank with state capital and an exclusive monopoly.
6. Centralization of the means of communication and transport in the hands of the state.
7. Extension of factories and instruments of production owned by the state; the bringing into cultivation of waste lands, and the improvement of the soil generally in accordance with a common plan.
8. Equal liability to all labor. Establishment of industrial armies, especially for agriculture.
9. Combination of agriculture with manufacturing industries; gradual abolition of the distinction between town and country, by a more equitable distribution of the population over the country.
10. Free education for all children in public schools. Abolition of children's factory labor in its present form. Combination of education with industrial production.

5.2 Goods, Commodities, and Use Value

Following Adam Smith, Marx distinguishes use value and exchange value.

5.2.1 Use Value

All commodities have use value (i.e. they provide “utility”). Use value is not emphasized by Marx, but consistent with Marxist thought is a distinction between exogenous preferences as modeled by neoclassical economists and socially determined preferences.

5.2.2 Exchange Value

(Referred to simply as value.)

All commodities have exchange values. Average socially necessary labor time is the source of exchange value. Slothful laborers do not add more value. There is also labor embodied in training.

5.3 Simple Commodity Production

(Marx's Starting Point)

Producers own Means of Production. Goods Exchange at their values.

5.3.1 Comparison: Neoclassical View

Economics is the study of choices under scarcity. Theory is meant to apply to all times and places.

The Parable of Robinson Crusoe

The Parable of Robinson Crusoe and Friday

Subjective Value Theory

Neoclassical Value Theory = Neoclassical Price Theory.

5.3.2 Comparison: Marxist View

Under capitalism, values and prices are related but not the same. Deriving prices from values is called the Transformation Problem.

Analysis must be historical and depends on the mode of production: when a monkey picks up a stick it does not become a capitalist.

The Parable of Robinson Crusoe Revisited: When Robinson is alone, there are no commodities and hence no exchange values, only use values.

The Parable of Robinson Crusoe and Friday revisited: If both own their means of production, each receives all his produced value. If not, the class structure and the analysis differ.

Under capitalism, much of production is of commodities. There is private ownership of the means of production. Workers do not receive all the value they contribute. An idle class forms, and with it an impetus for class struggle.

Under socialism, the means of production are publicly owned and workers receive all value. Other classes, receiving nothing, disappear.

5.3.3 Commodity Fetishism

The inability to look beneath commodity forms to see social forms.

5.4 The Mathematics of Marxism

Measured in labor units, output is divided into three categories: Constant Capital, C, Variable Capital, V, and Surplus Value, S. Constant Capital is

the labor embodied in the means of production: machinery, buildings, and the like. Variable capital is the labor embodied in what is paid to the workers. Surplus value is the labor embodied in what the workers contribute but do not receive.

Marx resolved the confusion surrounding the labor theory of value by drawing a distinction between labor and labor power. Labor is the actual work done while labor power is the ability to labor. Labor power, then, is the commodity, not labor. The difference between labor and the amount of labor embodied in labor power permits the existence of profits, thus making the labor theory of value more coherent. This difference is what is meant by exploitation.

5.4.1 Surplus Value and Capital

A. Surplus value is the difference between the value of labor power and value created by labor power.

$$Y=C + V + S$$

Absolute surplus value refers to surplus value expropriated by the prolongation of the working day.

Relative surplus value refers to surplus value resulting from the reduction in necessary labor time. There are several mechanisms.

1. Increasing returns due to cooperation. (For example, 20 men can lift a big rock, which is not the same as 20 men lifting 20 small rocks.)
2. Division of labor.
3. Externalities
4. Invention of new machinery
5. Intensification of Labor (piece-work, taskmasters)

There are natural limits to absolute and relative surplus value. There are also artificial limits achieved by class action (of either class).

5.4.2 The rate of exploitation (or rate of surplus value) S/V

1. Determined by
 - a. Length of the working day
 - b. Productivity of Labor
 - c. Real wage, determined by the value of subsistence commodities, higher wages due to labor shortages, substitution into machinery, the reserve army of the unemployed.

5.4.3 Organic composition of capital and the rate of profit

The organic composition of capital is

$$\frac{C}{V} \text{ or } \frac{C}{C+V}$$

The rate of profit is

$$\frac{S}{C+V}$$

5.4.4 The Transformation Problem

The assumptions the goods trade at their values, that the rate of exploitation is equal across industries, and that the rate of profit is equal across industries is, in general, inconsistent.

First consider two industries, cleverly called industry 1 and industry 2, respectively. Denoting the return to capital by r , the relevant value equations are:

$$(1+r)(C_1 + V_1) = C_1 + V_1 + S_1 \text{ and} \\ (1+r)(C_2 + V_2) = C_2 + V_2 + S_2$$

Nota Bene: $S_1 = r(C_1 + V_1)$ and $S_2 = r(C_2 + V_2)$.

Dividing the relevant value equations by V_1 and V_2 , respectively, yields

$$(1+r)\left(\frac{C_1}{V_1} + 1\right) = \frac{C_1}{V_1} + 1 + \frac{S_1}{V_1} \text{ and} \\ (1+r)\left(\frac{C_2}{V_2} + 1\right) = \frac{C_2}{V_2} + 1 + \frac{S_2}{V_2}$$

Given the same rate of exploitation in both industries, these are consistent iff $r = 0$ or the organic composition of capital is the same in both industries.

Example of failure of goods to trade at their values:

$$\text{Commodity 1: } 10_c + 20_v + 20_s = 50_y$$

$$\text{Commodity 2: } 30_c + 10_v + 10_s = 50_y$$

Note: $\frac{S_1}{V_1} = \frac{S_2}{V_2} = 100\%$ However, $\pi_1 = 66\frac{2}{3}\%$ and $\pi_2 = 25\%$

Marx's solution (Except he did 5 departments)

1. Assume equal profit rates and rates of exploitation across industries.
2. Assume the price rate of profit, \bar{P} , equals the value rate of profit, π

For three departments solve the following 4 equations for \bar{P}, P_1, P_2 and P_3 :

$$(1 + \bar{P})(C_1 + V_1) = P_1$$

$$(1 + \bar{P})(C_2 + V_2) = P_2$$

$$(1 + \bar{P})(C_3 + V_3) = P_3$$

$$\bar{P} = \frac{S}{C+V}$$

Two errors:

- (1) Only inputs are transformed
- (2) In general, $\bar{p} \neq \pi$

Bortkiewicz's solution: Suppose the departments produce constant capital, worker consumption, and capitalist consumption, respectively. Then solve the following 4 equations for \bar{P}, P_1, P_2 , and P_3 .

$$P_1C = (1 + \bar{P})(P_1C_1 + P_2V_1)$$

$$P_2V = (1 + \bar{P})(P_1C_2 + P_2V_2)$$

$$P_3S = (1 + \bar{P})(P_1C_3 + P_2V_3)$$

$$P_1C + P_2V + P_3S = C + V + S \text{ (normalization)}$$

5.4.5 Why solve the Transformation Problem? (orthodox position)

1. Prices are observable, values are not.
2. Values explain the roots of class division. 3. Explanation of prices:
 - a. Neoclassical: Preferences and technology. (Equality in exchange)
 - b. Marxist: Value and exploitation. (Exploitation in exchange)
4. Workers cannot fight exploitation in a single industry since the industry's profit may include surplus value from other industries, etc.
5. For empirical analysis of exploitation or other "value" questions, the transformation problem must be solved.

Exercise

1. Consider an economy with three industries: a machine industry, an agricultural industry, and a luxury industry. One hundred workers contributing 200 units of labor and consuming agricultural goods embodying 150 units of labor are employed in each of the three industries.

a. If the constant capital in the three industries embodies 200 units of labor then derive the value of constant capital, variable capital, and surplus value in each industry. Then calculate the rate of exploitation, the organic composition of capital, and the value rate of profit.

b. Now suppose the constant capital in the three industries embodies 150 units of labor, 200 units of labor, and 250 units of labor respectively. derive the value of constant capital, variable capital, and surplus value in each industry and in the aggregate. Then calculate the rate of exploitation, the organic composition of capital, and the value rate of profit in each industry and in the aggregate.

c. Solve the transformation problem for parts b and c using Bortkiewicz's solution.

5.5 Falling profits and the crises of capitalism

5.5.1 Falling profits in pre-Marxian classical political economy

Malthus on subsistence wages

Ricardo on rising ground rents

“Marx’s aim was to show, on the contrary, that the rate of profit would fall as a consequence of the specific laws of motion of capitalist economy. As with so many other questions, he spurned general laws (that is, laws that purported to apply to all modes of production) and sought to locate developments such as a falling rate of profit in a historically specific context. Thus Marx proposed a falling-rate-of-profit theory that was driven by the specific form of technical change he conceived of as taking place under capitalism. There is no diminishing returns aspect to the argument. Although it will be shown ... that Marx’s theoretical conjecture was incorrect, his general methodological insight - that any crisis theory should be specific to the mode of production it seeks to describe - still stands. Furthermore, his skepticism of the diminishing returns argument has proved correct. At least so far in history, technology has succeeded in making obsolete all theories of diminishing returns.” (Roemer, *Analytical foundations of Marxian economic theory*)

5.5.2 Marx’s alternative falling profit reasoning

Marx argued that there would be a tendency for the organic composition of capital to rise as capitalists chose to substitute machines for labor. However,

the choice to substitute machines for labor is endogenous. Specifically, Marx seems to have believed (sensibly) that capitalists would adopt new techniques only if they were more profitable at prevailing prices. If this is true, Marx's theory of falling profit makes sense as a logical proposition only if the rising organic composition of capital results from profit maximizing choices by capitalists. Diving the numerator and denominator of profit by V yields

$$\pi = \frac{\frac{S}{V}}{\frac{C}{V}+1}$$

So if $\frac{S}{V}$ is constant and $\frac{C}{V}$ rising, π must fall. Marx's theory of falling profit requires that capitalists' choices of technology adoption be simultaneously consistent with profit maximization and a rising organic composition of capital. It turns out that this is a tall order.

6 The Neo-Ricardians

According to the Neo-Ricardians, value theory and the transformation problem are unnecessary. Fundamental are the technological parameters from which either values or prices can be derived.

6.1 Numerical Example

6.1.1 Deriving Values from Technology

-	Iron	Labor	→	Iron	Gold	Bean
Iron Industry	28	56	→	56	-	-
Gold Industry	16	16	→	-	48	-
Bean Industry	12	8	→	-	-	8
Total	56	80	→	56	48	8

Let l_i, l_g and l_b be the values of a unit of iron, gold and bean, respectively. Then, from the first row,

$$28l_i + 56 = 56l_i \text{ or } l_i = 2$$

Then it follows from the table that $\ell_g = 1$ and $\ell_b = 4$

Note that values come only from physical data, i.e. technical coefficients.
For value of labor power assume workers eat 5 units of bean.

$$\text{Then } V = 5\ell_b = 5 \cdot 4 = 20$$

For surplus value (since $(V + S) = \text{total live labor} = 80$)

$$S = 80 - V = 80 - 20 = 60$$

Note that gold has no effect on V or S which depend solely on ℓ_b (and, indirectly, ℓ_i)

Now we derive Marx's kind of table from the above, (hence, from technical coefficients alone)

-	C	V	S	→	Total Value
Iron	56	14	42	→	112
Gold	32	4	12	→	48
Bean	24	2	6	→	32
Total	112	20	60	→	192

6.1.2 Deriving Prices from Technology

Normalize with gold as numeraire, i.e. $P_g = 1$.

$$\begin{array}{llll} \text{Iron} & (1+r)(28P_i + 56w) & = & 56P_i \\ \text{Gold} & (1+r)(16P_i + 16w) & = & 48 \\ \text{Bean} & (1+r)(12P_i + 8w) & = & 8P_b \\ \text{Labor Power} & 80w & = & 5P_b \end{array}$$

Wage will purchase subsistence bundle.

These 4 equations and 4 unknown (r, w, P_i, P_b) can be solved as follows:

$$r = 52.08\% \quad w = 0.2685$$

$$P_i = 1.7052 \quad P_b = 4.2960$$

$$\text{Note } \frac{S}{C+V} = \frac{60}{132} = 45\frac{5}{11}\% \neq 52.08\% = r$$

It is tedious to show that the aggregate price of output \neq aggregate value of output.

6.2 Joint Production, Positive Profits and Negative Surplus Value

The Neo-Ricardians, although sympathetic to Marx, pressed their intellectual attack against his labor theory of value. Having asserted that labor values are not fundamental, they further argued that they could be nonsensical. Consider the following example that incorporate joint production. (Goods 1 and 2 can be thought of, for example, as mutton and wool.)

Example:

-	Good 1	Good 2	Labour	-	Good 1	Good 2
Process 1	5	0	1	→	6	1
Process 2	0	10	1	→	3	12

So if process 1 is run at level X_1 then 5 X_1 units of good 1 and X_1 units of labor will be used to produce 6 X_1 units of good 1 and X_1 units of good 2. Similarly, if process 2 is run at level X_2 then 10 X_2 units of good 2 and X_2 units of labor will be used to produce 3 X_2 units of good 1 and 12 X_2 units of good 2.

We will assume the real wage for 6 labor units is 3 units of good 1 and 5 units of good 2. Choosing labor is numeraire, we set the nominal wage $w=1$. Finally, suppose 5 labor units are allocated to process 1 and 1 labor unit is allocated to process 2.

Real wage for 6 labour units = 3 units of Good 1, 5 units of good 2.

Nominal wage = 1. 5 labour units do process 1 + 1 unit does process 2.

Example

6.2.1 The price system

$$\begin{array}{rcll}
 (1+r)5P_1 + 1 & = & 6P_1 + P_2 & \text{Process 1} \\
 (1+r)10P_2 + 1 & = & 3P_1 + 12P_2 & \text{Process 2} \\
 3P_1 + 5P_2 & = & 6 & \text{Labour Power}
 \end{array}$$

Solution: $r = 20\%$, $P_1 = \frac{1}{3}$, $P_2 = 1$

-	Good 1	Good 2	-
Net Product	8	7	-
Wage Bundle	3	5	-
Potential Investment	5	2	if capitalists invest all.

6.2.2 The Value System

$$\begin{array}{rcl}
 5l_1 + 1 & = & 6l_1 + l_2 \\
 10l_2 + 1 & = & 3l_1 + 12l_2
 \end{array}$$

Solution: $l_1 = -1$, $l_2 = 2$

$$\begin{array}{rcl}
 V = 3 \cdot (-1) + 5 \cdot 2 & = & 7 \\
 S = 5 \cdot (-1) + 2 \cdot 2 & = & -1
 \end{array}$$

$$V + S = 6$$

So surplus value is negative even though the price rate of profit is positive. (This need not be the case with joint production but it can be). Labor cannot be employed to produce solely one commodity for some commodities, so labor embodied in a single commodity is meaningless. Joint production is more important than one might think at first glance. Almost every productive process takes labor and some machines and turns them into an output and some older machines.

6.3 Morishima's Analysis (Wages paid in advance)

Motivated by the orthodox notion that exploitation was most clearly seen by keeping track of labor values, some authors attempted to make sense of the labor theory of value. Some of these attempts were fuzzy, verbal and of little use. (Propriety prevents mentioning names, which are available from the author.) An early formal attempt to rationalize value theory is due to Morishima.

Necessary labour: Smallest amount of labour required for producing the wage bundle given available methods (not just utilized methods).

Surplus labour: Total labor - Necessary labor.

Back to example.

Net outputs:	-	Good 1	Good 2
-	Process 1	1	1
-	Process 2	3	2

Remember that real wage is 3 units of Good 1 + 5 units of Good 2.

$X_i \neq$ labor allocated to the i^{th} process.

Minimize $V = X_1 + X_2$

s.t. $X_1 + 3X_2 \geq 3$ At least 3 units of good 1 is produced.

$X_1 + 2X_2 \geq 5$ At least 5 units of good 2 is produced.

$X_1 \geq 0$

$X_2 \geq 0$

The solution, $X_2^* = \frac{5}{2}$, can be found using techniques from linear programming. The labor minimizing way to produce the subsistence bundle is to only use process 2 and devote $2\frac{1}{2}$ labor units to it.

Remember that net outputs per labor-unit for process two are (3,2). So net production exceeds the subsistence bundle, i.e. $(7\frac{1}{2}, 5) > (3, 5)$. This is still the cheapest way.

So Morishina's necessary labor time is $2\frac{1}{2} \equiv V^*$.

His surplus value is then $S^* = 6 - 2\frac{1}{2} = 3\frac{1}{2}$

His rate of exploitation is $e^* \equiv \frac{S^*}{V^*} = \frac{3.5}{2.5} = 140\% > 0$

In general, $e^* > 0 \leftrightarrow \Pi > 0$.

Another example:

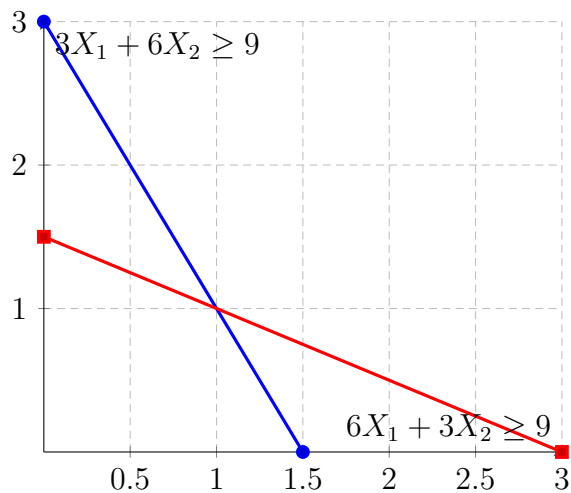
Workers consume (9,9) (good1,good2)

$$3X_1 + 6X_2 \geq 9$$

$$6X_1 + 3X_2 \geq 9$$

Process 1 at level X_1 (on net) $3X_1$ units of good 1, $6X_2$ units of good 2

Process 2 at level X_2 (on net) $6X_2$ units of good 1, $3X_2$ units of good 2



solution: $X_1 = X_2 = 1$

6.4 On Labour as the source of profit

6.4.1 A One-Good Example

a_{BB} units of bean + a_{LB} units of labor \rightarrow 1 unit of bean

Worker consumes a_{BL} units of bean

6.4.2 Labor Values (ℓ_B = value of bean ℓ_L = value of labor power)

$$\ell_B = a_{LB} + a_{BB}\ell_B \rightarrow \ell_B = \frac{a_{LB}}{1-a_{BB}}$$

$$\ell_L = a_{BL}\ell_B = \frac{a_{BL}a_{LB}}{1-a_{BB}}$$

There is exploitation iff $\ell_L < 1$, i.e. $\frac{a_{BL}a_{LB}}{1-a_{BB}} < 1$, i.e. $a_{BB} + a_{BL}a_{LB} < 1$

In words, the bean used directly and indirectly to produce a unit of bean must be less than one unit.

6.4.3 Prices

$$(1 + R)(a_{BB}P_B) + a_{LB}w = P_B \quad \text{Cost of Production}$$

$$w = a_{BL}P_B \quad \text{Real Wage}$$

$$P_B = 1 \quad \text{Numeraire}$$

Plug the last 2 equations into the first to write

$$R = \frac{1-(a_{BB}+a_{BL}a_{LB})}{a_{BB}}$$

Note that profit is positive iff $a_{BB} + a_{BL} < 1$.

Now, what if we use “embodied bean” instead of embodied labor?

6.4.4 Bean Values

μ_L = Bean value of labor μ_B = bean value of bean power

$$\mu_B = a_{BB} + a_{LB}\mu_L \Rightarrow \mu_B = a_{BB} = a_{BL}a_{LB}$$

$$\mu_L = a_{BL}$$

Bean is exploited iff $\mu_B < 1$, i.e. $a_{BB} + a_{BL}a_{LB} < 1$.

So there are profits iff all commodities are “exploited” and one commodity is exploited iff all are.

6.4.5 A Falling Rate of Profit?

Consider a one-good example described as follows:

a_{BB} units of beans and a_{LB} units of labor yield 1 unit of beans.

a_{BL} units of beans are consumed by each unit of labor.

Value Analysis:

ℓ_B is the amount of labor embodied in each unit of beans.

$$\ell_B = a_{LB} + a_{BB}\ell_B$$

so

$$\ell_B = \frac{a_{LB}}{1-a_{BB}}$$

This implies that Marxian constant capital is:

$$C = a_{BB}\ell_B = \frac{a_{BB}a_{LB}}{1-a_{BB}}$$

The labor embodied in what the worker consumes is

$$V = a_{BL}\ell_B = \frac{a_{BL}a_{LB}}{1-a_{BB}}$$

This leaves surplus value at $S = (\ell_B - C - V)$, or

$$S = \frac{a_{LB}(1-a_{BB}-a_{BL})}{1-a_{BB}}$$

The organic composition of capital is

$$\frac{C}{V} = \frac{a_{BB}}{a_{BL}}$$

and the rate of exploitation is

$$\frac{S}{V} = \frac{(1-a_{BB}-a_{BL})}{a_{BL}}$$

A necessary digression

Marx seemed to envision capitalists adopting new technologies, if they increased profits at current prices.

No capitalist ever voluntarily introduces a new method of production, no matter how much more productive it may be, and how much it may increase the rate of surplus-value, so long as it reduces the rate of profit. Yet every such new method of production cheapens the commodities. Hence, the capitalist sells them originally above their prices of production, or perhaps, above their value. He pockets the difference between their costs of production and the market-prices of the same commodities produced at higher costs of production. He can do this, because the average labour-time required socially for the production of these latter commodities is higher than the labour-time required for the new methods of production. His method of production stands above the social average. But competition makes it general and subject to the general law. There follows a fall in the rate of profit - perhaps first in this sphere of production, and eventually it achieves a balance with the rest - which is, therefore, wholly independent of the will of the capitalist Volume III, Part III, Chapter 15, section 4.

Price Analysis

Capitalists make their decisions based on price analysis. The cost of producing a unit of beans, P_B , satisfies

$$(1 + R)(P_B a_{BB}) + w a_{LB} = P_B$$

The real wage is $\frac{w}{P_B} = a_{BL}$

If beans are numeraire then $P_B = 1$ and the return to capital is

$$R = \frac{1 - a_{BB} - a_{BL} a_{LB}}{a_{BB}}$$

Suppose that a new technology (a'_{BB}, a'_{LB}) becomes available. By Marx's assumption on capitalist behavior, the new technology will be adopted if and only if $R' > R$ in prices at the prevailing wage $w = a_{BL} = a'_{BL}$. Now $R' > R$ and $\frac{C'}{V'} > \frac{C}{V}$ are satisfied if and only if:

$$a'_{BB} < \frac{a_{BB} - a_{BB} a_{BL} a'_{LB}}{1 - a_{BL} a_{LB}} \quad \text{and} \quad \frac{a'_{BB}}{a'_{BL}} > \frac{a_{BB}}{a_{BL}} \quad \text{respectively.}$$

So $R' > R$ and $\frac{C'}{V'} > \frac{C}{V}$

simultaneously require

$$\frac{a_{BB} - a_{BB}a_{BL}a'_{LB}}{1 - a_{BL}a_{LB}} > a'_{LB} \frac{a_{BB}}{a_{LB}}$$

which is equivalent to $a'_{LB} < a_{LB}$.

So if capitalists only adopt techniques that increase profits at current prices then the organic composition of capital can only rise if the rate of exploitation also rises. Given the natural limits on the rate of exploitation, such an outcome cannot persist at any meaningful magnitude.

Exercises

1. Suppose there are three goods: cotton, homespun, and costly apparel. Suppose $a_{cc} = .5$, $a_{CH} = .7$, $a_{CA} = .9$, $a_{LC} = .2$, $a_{LH} = .6$, $a_{LA} = .8$. Finally, suppose workers consume only homespun and capitalists only consume costly apparel.
 - a. Find the values of 1 unit of cotton, homespun, and costly apparel respectively.
 - b. Find the values of constant capital, variable capital, and surplus value.
 - c. Find the prices of cotton, homespun, and costly apparel respectively.

2. Suppose there are three goods: cotton, homespun, and costly apparel. A basket containing 1 unit of homespun and 1 unit of costly apparel requires $a_{LJ} = 1$ unit of labor.
 - a. Find the values of 1 unit of cotton, homespun, and costly apparel respectively.
 - b. Find the values of constant capital, variable capital, and surplus value.
 - c. Find the prices of cotton, homespun, and costly apparel respectively.
 - d. What Morishima's Socially Necessary labor for the production of homespun.

7 Exploitation, Wealth, and Class (Roemer)

7.1 Leontief Models and Matrix Notation

Suppose x and y are column vectors $x = \begin{bmatrix} x_1 \\ \cdot \\ \cdot \\ x_n \end{bmatrix}$ and $y = \begin{bmatrix} y_1 \\ \cdot \\ \cdot \\ y_n \end{bmatrix}$

$$\text{Rules for addition} \quad \begin{bmatrix} x_1 \\ \cdot \\ \cdot \\ x_n \end{bmatrix} + \begin{bmatrix} y_1 \\ \cdot \\ \cdot \\ y_n \end{bmatrix} = \begin{bmatrix} x_1 + y_1 \\ \cdot \\ \cdot \\ y_n + y_n \end{bmatrix} \equiv x + y$$

Similarly for row vectors or, in general, rectangular matrices. (Must be the same dimension.) x and y will be used to denote activity levels operated by own and hired labor, respectively.

Suppose p is a row vector and ω is a column vector. A is a $n \times n$ matrix.

$$\text{Rules for multiplication} \quad (p_1, \dots, p_n) \begin{bmatrix} \omega_1 \\ \cdot \\ \cdot \\ \omega_n \end{bmatrix} = p_1 \omega_1 + \dots + p_n \omega_n \equiv p\omega$$

$$\begin{bmatrix} a_{11} & \cdot & \cdot & \cdot & a_{1n} \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ a_{n1} & \cdot & \cdot & \cdot & a_{nn} \end{bmatrix} \begin{bmatrix} x_1 \\ \cdot \\ \cdot \\ \cdot \\ x_n \end{bmatrix} = \begin{bmatrix} a_{11}x_1 + \dots + a_{1n}x_n \\ \cdot \\ \cdot \\ \cdot \\ a_{n1}x_1 + \dots + a_{nn}x_n \end{bmatrix} \equiv Ax$$

General Rules: $C_{n \times m} D_{m \times t} = E_{n \times t}$

p will be a price vector, ω an endowment vector, A an input matrix.

$I_{n \times n}$ is the n-dimensional identity matrix.

$$I_{n \times n} C_{n \times m} = C_{n \times m} \quad D_{m \times n} I_{n \times n} = D_{m \times n}$$

A_j , the j^{th} column of A, is a list of inputs in process j. The Leontief model assumes process j produces one unit of output j.

Ax = column vector that lists all inputs when each process j is operated at level x_j .

$(I - A)x$ = column vector that lists net outputs when each process j is operated at level x_j .

$$\begin{bmatrix} x_1 \\ \cdot \\ \cdot \\ \cdot \\ x_n \end{bmatrix} - \begin{bmatrix} a_{11}x_1 + \dots + a_{1m}x_m \\ \cdot \\ \cdot \\ \cdot \\ a_{m1}x_1 + \dots + a_{mm}x_m \end{bmatrix}$$

$p(I - A)x$ = Price of net output (scalar)

$p\omega$ = Price of endowment.

Define $>$, \geq , \cong

Exercise

$$A = \begin{bmatrix} \frac{1}{4} & \frac{1}{2} \\ \frac{1}{2} & \frac{1}{4} \end{bmatrix} \quad x = \begin{bmatrix} \frac{1}{2} \\ \frac{1}{2} \end{bmatrix} \quad p = (2,1)$$

$$\text{Net outputs} \begin{bmatrix} \frac{1}{8} \\ \frac{1}{8} \end{bmatrix}$$

Price of net outputs $\left[\frac{3}{8} \right]$

7.2 Exploitation without a labor market (Subsistence Economy)

A: $n \times n$ input matrix.

L: row n -tuple of labor inputs.

x^ν : column n -tuple of activity levels operated by Mr. ν .

b: column n -tuple of subsistence requirements.

ω^ν : column n -tuple of ν 's endowments.

Institutional Arrangements:

Commodity market: n -tuple of prices, p . No labor market. No credit market.

Mr. ν takes p as given and chooses x^ν to

minimize Lx^ν subject to

$$p(I - A)x^\nu \geq pb \text{ (Reproducibility)}$$

$$pAx^\nu \leq p\omega^\nu \text{ (Feasibility)}$$

$$Lx^\nu \leq 1 \text{ (Length of working day)}$$

$$x^\nu \geq 0$$

Equilibrium Concept

$(\bar{p}; x^1, \dots, x^N)$ is a reproducible solution iff

(1) x^ν solves ν 's optimization problem $\forall \nu$.

(2) $(I - A)x \geq Nb$ where $x = \sum_\nu x^\nu$

(3) $Ax \leq \omega$ where $\omega = \sum_\nu \omega^\nu$

Let Λ be the n -tuple of labor values. This is well defined in this model.

ν is exploited if $Lx^\nu > \Lambda b$ in equilibrium

ν is an exploiter if $Lx^\nu < \Lambda b$ in equilibrium.

Individuals differ only by their endowments ω^ν . In equilibrium only labor of $N\Lambda b$ will be expended. So individuals working less than average will be exploiters and individuals working more than average are exploited. Hence

\exists exploitation iff the outcome $(p; x^1, \dots, x^N)$ is not egalitarian.

Theorem: $(p; x^1, \dots, x^N)$ is egalitarian iff p is proportional to Λ .

Theorem: Inegalitarian outcomes can exist in this type of economy.

Intuition: A poor producer must concentrate on labor intensive activities. A wealthy producer faces no such constraint (and, in fact, will concentrate on capital intensive activities.)

Remarks:

1) This is exploitation in the sense that if poor producers overthrew rich producers and appropriated their endowments they would be better off, i.e. work less.

2) No social surplus is produced, although exploitation exists in the sense of unequal exchange.

3) This is not a model of capitalism. (No classes.)

This section concludes with a simple example. Suppose there are two processes. Process 1 combines one unit of good 1 with one unit of labor to produce one unit of consumption. Process 2 combines two units of good 2 with one unit of labor to produce one unit of consumption. XXX

7.3 Exploitation and Class

7.3.1 A subsistence economy with a labor market

x^ν : column n-tuple of activity levels operated by ν himself.

y^ν : column n-tuple of activity levels operated by others hired by ν .

x_o^ν : Scalar labor time sold by ν to others.

ω^ν : Column n-tuple of ν 's endowments.

b : Column n-tuple of subsistence requirements.

Institutional Structure:

Commodity Markets: n-tuple of prices, p .

Labor Market: wage (paid after production), w .
 No Credit Market.

A: $n \times n$ input matrix

L: n-tuple of labor inputs (Row)

Mr. ν takes p and w as given and choose x^ν , y^ν and x_o^ν to minimize

$$Lx^\nu + x_o^\nu$$

subject to

$$\text{(reproducibility)} \quad p(I - A)x^\nu + (p(I - A) - wL)y^\nu + wx_o^\nu \geq pb$$

$$\text{(Feasibility)} \quad pA(x^\nu + y^\nu) \geq \omega^\nu$$

$$\text{(Length of working Day)} \quad Lx^\nu + x_o^\nu \leq 1$$

$$x^\nu, y^\nu, x_o^\nu \geq 0$$

An optimal solution is the triple (x^ν, y^ν, x_o^ν) . Classes are defined by how class members relate to the means of production. There are seven possible classes since $(0 \ 0 \ 0)$ is impossible:

$$\begin{pmatrix} 0 & + & 0 \end{pmatrix} \\
\begin{pmatrix} + & + & 0 \end{pmatrix} \\
\begin{pmatrix} + & + & + \end{pmatrix} \\
\begin{pmatrix} + & 0 & 0 \end{pmatrix} \\
\begin{pmatrix} 0 & + & + \end{pmatrix} \\
\begin{pmatrix} + & 0 & + \end{pmatrix} \\
\begin{pmatrix} 0 & 0 & + \end{pmatrix}$$

This society partitions (disjointedly) into 5 classes, ranked by wealth:

Class	(x^ν, y^ν, x_o^ν)	Lenin's Terms	Mao's Terms
1.	$(0, +, 0)$	big capitalists	landlords
2.	$(+, +, 0)$	small capitalists	rich peasants
3.	$(+, 0, 0)$	petty bourgeoisie	middle peasants
4.	$(+, 0, +)$	semi-proletarians	poor peasants
5.	$(0, 0, +)$	proletarians	agricultural laborers

The descriptions left out are $(+ + +)$ and $(0 + +)$. In equilibrium these are redundant. It doesn't matter if worker uses own capital or hires labor and sells his own labor for this purpose. In general, some individuals will have optimal choices of two types. These five classes are disjoint and exhaustive.

Class position depends entirely on wealth (ie. access to means of production.) let Λ be the vector of values. Mr. ν is exploited if $Lx^\nu + x_0^\nu > \Lambda b$ and an exploiter if $Lx^\nu + x_0^\nu < \Lambda b$.

The Class Exploitation Correspondence Principle

A. Members of classes 1 and 2 are exploiters while members of 4 and 5 are exploited.

B. If organic composition of capital is equal across activities then a unique wealth level is associated with class 3 and the class is exploitation neutral. Otherwise an interval of wealth is associated with class 3 and the class may contain some exploiters and some exploited. Note: $OCC = \frac{\Lambda A_j}{L_j}$

7.4 Exploitation and Class

7.4.1 A subsistence economy with a credit market and no labor market

x^ν : Column n-tuple of activity levels operated on own funds.

y^ν : Column n-tuple of activity levels operated on borrowed funds.

Z^ν : Scalar of funds lent out.

ω^ν : Column n-tuple of endowments.

b : Column n-tuple of subsistence requirements.

Institutional structure

Commodity Market: n-tuple of prices, p . Credit Market: Interest rate, r .
No Labor Market. $n \times n$ input matrix. Row n-tuple of labor inputs, L .

Mr. ν takes p and r as given and chooses x^ν and y^ν and Z^ν to

minimize $Lx^\nu + Ly^\nu$ subject to

(Reproducibility) $p(I - A)x^\nu + p(I - A)y^\nu - rpAy^\nu + rz^\nu \geq pb$

(Feasibility) $pAx^\nu + z^\nu \leq p\omega^\nu \equiv W^\nu$

(Length of Working Day) $Lx^\nu + Ly^\nu \leq 1$

$x^\nu, y^\nu \geq 0$

As before, society partitions disjointly into 5 classes

class	(x^ν, z^ν, y^ν)	
1	$(0, +, 0)$	Pure lenders
2	$(+, +, 0)$	Mixed lenders
3	$(+, 0, 0)$	Petty bourgeoisie
4	$(+, 0, +)$	Mixed borrowers
5	$(0, 0, +)$	Pure borrowers

Once again:

1. Individuals in lower classes work longer hours. 2. Individuals in lower classes are poorer. 3. Classes 1 and 2 are exploiters, 4 and 5 are exploited, and 3 will contain exploiters and/or exploited (iff OCC is not uniform) or else will be associated with a unique wealth level.

Generally consider 2 economies identical in every respect except one has a labor market and the other a credit market. For every w in the first economy there is an r in the second economy such that class divisions and labor time for each individual is the same in both economies.

Theorem 3.4 (from Roemer 1982 pg 90) Let (\bar{p}, \bar{r}) be a reproducible solution of the economy with credit market $\xi(p,r)$. Then there exists a wage \bar{w} such that (\bar{p}, \bar{w}) , is a reproducible solution of the economy with labor market $\xi(\bar{p}, \bar{w})$. The mapping $\phi : (\bar{p}, \bar{r}) \rightarrow (\bar{p}, \bar{w})$ is an isomorphism with respect to exploitation and class properties. That is, each producer works the same amount of time at both reproducible solutions, and each producer remains a member of the “same” class. Conversely, every reproducible solution $(\bar{\bar{p}}, \bar{\bar{w}})$ of $\xi(p,w)$ induces an isomorphic reproducible solution $(\bar{\bar{p}}, \bar{\bar{r}})$ of $\xi(p,r)$.

Conclusion: Exploitation stems from differential access to the means of production, not from the existence of a labor market.

7.5 A General Definition of Exploitation

Let N be the set of members of the society.

Informal Definition

$S \subset N$ is exploited if and only if

1. There is an alternative, which is hypothetically feasible, in which S is better off than at present.
2. Under the alternative, $N - S = S'$ would be worse off than at present.
3. S' is in a relationship of dominance to S.

Formal Definition

Let Z^1, \dots, Z^N be an allocation, so Z^ν is agent ν 's payoff measured in money, goods, utility, etc.

Let $\chi(S)$ be a characteristic function. (This is a common game theoretic concept.) It is interpreted as what S can get by withdrawing from society and depends on the rules of withdrawal.

S is exploited at $\{Z^1, \dots, Z^N\}$ with respect to alternative χ iff $\sum_{\nu \in S} Z^\nu < \chi(S)$ and $\sum_{\nu \in S'} Z^\nu > \chi(S')$.

The Core

An allocation $\{Z^1, \dots, Z^N\}$ is in the core w.r.t. χ iff $\chi(S) \leq \sum_{\nu \in S} Z^\nu$ for all coalitions S.

χ is super-additive iff $\chi(S) + \chi(T) \leq \chi(S \cup T)$ for all coalitions S, T.

Theorem. Let χ be super-additive and let Z^1, \dots, Z^N be Pareto Efficient (i.e. $\chi(N) \leq \sum_N Z^\nu$). Then S is exploited iff $\chi(S) > \sum_{\nu \in S} Z^\nu$ and T is exploiting iff $\chi(T) > \sum_{\nu \in T} Z^\nu$. Hence the core is precisely the set of non-exploitative allocations.

7.5.1 Feudal Exploitation:

Think of agents with various endowments who are engaged in production and consumption under feudal relations. A coalition is feudally exploited if it can improve its lot by withdrawing under these rules: the coalition can take with it its own endowments. Thus, feudally non-exploitative allocations are, in fact, precisely

the usual private ownership core of the economic game, as conventionally defined, for a private ownership economy. This withdrawal specification, it is claimed, is the correct one for capturing feudal exploitation as it gives the result that serfs are exploited and lords are exploiters, which is the result we wish to capture. Moreover, non-serf proletarians will not be an exploited coalition, under these rules, and so the definition captures only feudal exploitation. John E. Roemer (A general Theory of Exploitation and Class)

7.5.2 Capitalist Exploitation:

With homogeneous labor, constant returns to scale, and without joint production in a subsistence economy:

Capitalist Exploitation \iff Marxian Exploitation
 Not so more generally.

7.5.3 Socialist Exploitation

The socialists' problem in a subsistence economy:

Choose $x^\nu \in R_+^\nu$ to minimize Lx^ν

subject to $px^\nu - pAx^\nu \geq pb$

$Lx^\nu \leq 1$

$x_j^\nu = 0$ for $j \notin J^\nu$

where J^ν is the set of processes agent ν knows how to run.

Withdrawal rule: Withdrawing agent can run each process for $\frac{1}{N}$ of the day.

A reproducible solution, (p, x^1, \dots, x^ν) satisfies

1. $x^\nu \in a^\nu(p) \forall \nu$

$$2. x = \sum x^\nu \text{ and } (I - A)x \geq Nb$$

Theorem: Let (p, x', \dots, x^ν) be a reproducible solution. Then ν is socialistically exploited iff $Lx^\nu > \Lambda b$.

"Big Joe"⁸

I dreamed I saw Big Joe last night
Alive as you and me
Says I, 'But Joe, you're ten years dead.'
'I never died,' says he.
'I never died,' says he.

'In Moscow, Joe, by God,' says I,
'They killed you in your bed.
They framed you at that congress, Joe,'
Says Joe, 'But I ain't dead.'
Says Joe, 'But I ain't dead.'

'Big Joe ain't dead, ' he says to me,
'Big Joe ain't never died.
'Where bureaucrats drive Cadillacs,
'Big Joe is at their side.'
'Big Joe is at their side.'

And standing there as big as life
And smiling with his eyes,
Joe says 'What I forgot to kill
'Went on to terrorize.'
'Went on to terrorize.'

'From Brost-Litovsk to Vladivostok
In every mine and mill,
'Big Joe's old buddies run the show,
'So I'm the leader still.'
'So I'm the leader still.'

⁸The Big Red Songbook Page 354

7.6 The broad question

How can Marxism explain the apparent class phenomena and political behavior of socialist countries? This question has been posed by many; for me, it has been an issue since the late 1960s, but became particularly compelling with the war between Vietnam and China in 1979. These two countries both pass various tests for qualifying as socialist states, such as having fought long wars against capitalist and imperialist antagonists, led in each case by a communist party. But it is extremely difficult to understand how two socialist states can fight a war, against each other, according to the received theory. There is, of course, a certain Ptolemaic approach which constructs epicycles on the old theory to explain ex post each aberration. But I think any honest appraisal must conclude that, within the Marxian tradition, a quite radically new application of historical materialist methods must be made to provide useful and convincing analysis of the economic and political behavior of socialist states. Without such a development, Marxism will atrophy as a science of society, taking its place as an exhibit in the history of thought, a corner to which it has already been relegated by much of Western social science. John E. Roemer (*A General Theory of Exploitation and Class*)

8 The Utopian Socialists

Whereas Adam Smith and David Ricardo sought to harness the self-interest that they consider to be inherent in human nature, socialist thinkers counted on their ability to change human nature. The nineteenth century exhibited many attempts to create a new species of humans by controlling the environment or by directing religious fervor. These notes consider two examples who are a study in contrasts: Robert Owen and Joseph Smith Jr.

8.1 Robert Owen

Owen was in the right place at the right time to take advantage of the dawn of the industrial revolution. Through a combination of luck, talent, hard work, and marrying the boss's daughter, he soon took ownership of some

very lucrative mills at New Lanark. He believed that people were limited or empowered by their environment. As a corollary, he believed that changing the environment would allow humans to progress, change their nature, and live in peace and harmony.

At New Lanark, Owen attempted to make workers more productive by color coding their efforts. He eschewed child labor, at least before the age of 10 or 11, and made sure that children had the time to play as well as to read. He shortened the work day. The mills were immensely profitable.

Having become a wealthy man, Owen turned his attention to implementing his theories. He advocated the formation of Villages of Cooperation, and committed his own resources to the establishment of such a village in New Harmony, Indiana. On its opening day, July 4, 1826, he dedicated it to achieve independence from private property, irrational religion, and marriage. He then left town.

The New Harmony experiment failed miserably. However, some of Robert Owen's ideas survived. "Man is the creature of circumstances." Owen argued that by changing circumstances, one could change humankind.

8.2 Joseph Smith Jr.

8.2.1 Judeo-Christian economic principles

Matthew 26:11 (The poor you will always have with you.)

Leviticus 26-27

Mosiah 4

Doctrine and Covenants 104.

8.3 "Socialism and the United Order" by Brennan Platt

(Used with permission)

Economic inequality is an inevitable byproduct of free markets, since some resources will command higher prices than others. Concerned with this disparity, many people have sought alternatives that provide for all men equally, a philosophy known as socialism. In modern times, that term has taken a more specific meaning, inextricably linked with the ideas of Karl Marx and their implementation. Latter-day Saint theology also outlines doctrine and practices for reducing inequality. Early in the restoration, the Saints attempted an ambitious program called the United Order. Because socialism

and the United Order proclaim similar objectives and employ some common methods, members of the Church often confuse the two. However, there are substantial differences between them, which place them fundamentally at odds with each other. A careful review of these distinctions provides economic insights on the incentive problems in socialism, as well as spiritual insight on eternal principles that we strive to live today.

Socialism: Principles

During the Cold War, socialism was broadly studied and debated, but public interest quickly faded after the fall of the Soviet Union. While there are many variations on the socialist theme, they all share two foundational principles:

- Equality as an objective—The central tenet of socialism is that human needs (rather than wealth or ability) should dictate who gets what. Since our basic needs are essentially the same, socialists conclude we should have a fairly equal distribution of goods, adjusted for family size, illness, and other needs.

- Collective control of resources—The companion principle is that each individual should contribute to society according to his ability. Yet if abilities differ, then so will output, and that output may not correlate with needs. To achieve equal consumption despite unequal production, a socialist advocates for the collective ownership of all property. That is, the society as a whole decides where and how to use resources, and what to do with the output. Here, property is not just land and bank accounts, but also factories, inventions, and even labor.

Socialism: Practices

Large-scale experiments with socialism began in the last century, organized in the political form of communism: a powerful, virtually unchecked national government which directly manages economic decisions to achieve socialist aims. Communists believe that strong governments are only an intermediate step, necessary to wrestle away power from capitalists. Once people are freed from their selfish tendencies, they will naturally behave as good socialists without coercive government influence. This began with the 1917 Bolshevik revolution in Russia, but they were joined by all the Eastern European nations (some against their will) following World War II, as well as China, North Korea, and Vietnam. Communist governments began to

crumble during the 1980s as they collided with two forces. The first was the human desire for freedom, which constantly chafed at the coercion and punishment required to enforce communist planning. The second was economic inefficiency, as state planning mismanaged most aspects of production and distribution, and planning boards lacked the information needed to detect the waste and respond to inefficiency. Eventually, it became impossible to provide even the basic needs of citizens. Today, only North Korea practices Soviet-style communism. Others, like China and Cuba, are still politically communist but are opening large sectors of their economies to free markets. More often, socialist ideals are mingled with market institutions, such as the nationalization of select industries in Venezuela, or redistributive programs in the US and Europe.

United Order: Principles

The Lord also disapproves of inequality, yet He intends to solve the problem in His own way. He revealed to the prophet Joseph Smith an economic system known as the United Order. At its foundation are three fundamental doctrines:

- Consecration —The literal definition of consecrate is “to declare sacred.” In the context of the restored Church, consecration is when a member commits all of his or her property to the Lord and His purposes, including their time, talents, and everything God has given them.

One might appropriately ask how consecration differs from sacrifice. A sacrifice is when we give something up for the Lord. In this sense, consecration is a sacrifice of everything. However, the Lord may not have immediate need of a particular talent or resource for now, in which case it remains with the consecrated individual. Thus, consecration is not really an act, but an attitude that says, “All that I have is thine. Just say the word, and I will use it according to thy command.” In other words, consecration is a pre-commitment to total sacrifice.

- Stewardship—The Lord created all things, so ultimately any property belongs to him. Thus, when we consecrate our property, we are merely acknowledging His ownership of our resources. This places us in the role of a steward. We are entrusted with the Lord’s property and given full control over it, yet it is not ours — it is His.

This sheds significant light on our choices after consecration. Though we have pledged all, He may only require some at any given time. The remaining

properties are still His, but He leaves us as stewards over them. This gives us complete authority to use them as we will, but should also obligate us to use them as would please the Lord.

•Charity—The underlying motivation for participation in a United Order must be charity, “the pure love of Christ.” This love refers to both of the great commandments: love of God and love of fellow man.

We are primarily motivated out of a deep love for Christ and eternal gratitude for what He has given us. We want to emulate Him, take on His attributes, and align our will with His. Indeed, the only way to become a faithful steward is to want what He wants. We also care deeply for the plight of our fellow men, because they are literally our spiritual siblings. We are willing to place their welfare equal to our own and sacrifice on their behalf.

United Order: Practices The United Order is not exclusive to the restored Church. It was practiced by the City of Enoch, the apostles following Christ’s ascension, and in the New World following Christ’s visit. In each case, they eliminated poverty and experienced great unity. The Order was introduced to the restored Church in February 1831 as the Saints were migrating to Ohio, many of them quite destitute. If a member desired to join the United Order, he would initially consecrate all his properties to the Order, literally signing over the deed of ownership. Then, each member would be assigned a portion of the pooled resources (called a stewardship or inheritance), with the ownership literally changing hands back to the individual member. Whatever was not distributed (the residue) was maintained in the Lord’s storehouse to care for future needs of the poor. Each member would then use that stewardship to the best of his ability. From what he produced, he would provide for the needs of himself and his family; but he was expected to consecrate any surplus income to the Lord’s storehouse. If a member could not provide for all his family’s needs, the Order would make up the difference from the storehouse. However, the idler would receive no assistance. The Order incorporated both collective and individual decision-making. A bishop made collective decisions on behalf of the order regarding the distribution of stewardships and assistance to the needy. Yet the individual chose for himself whether to join the Order, how to employ his stewardship, and how much of his income was surplus. Although this system greatly reduced inequality, it did not produce complete uniformity of outcomes. Members may have differed in their inheritance precisely because some are able to make more effective use of the resources. Successful members were still expected to humble themselves by returning their surplus

income. The definition of surplus would also vary across individuals of the same income, since family size, health, and life events alter the family's needs. Through the Order, extreme deprivation would be completely eliminated; yet the poor were not guaranteed the same lifestyle as their neighbor. One can see how, if all members of the Order were sincere in assessing their needs, this system could create equality among men. But one can also imagine how man's selfish nature might undermine the system. This happened among the early Christians, and was repeated more broadly in Kirtland as members opted to speculate in land rather than return their surplus. These selfish attitudes became more entrenched over time, and many members apostatized when an economic downturn occurred. The Order fared somewhat better in Missouri, but by 1838 the saints were instructed to abandon the practice. The Church does not currently practice the United Order. However, the Law of Consecration is still in force; it is a celestial law, required of all exalted beings. We are accountable to the Lord in how we use our property, time and talents. There are several common methods by which the Lord asks us to make good on our pre-commitment to sacrifice.

- Tithing and Fast Offerings—Most obvious is the law of the tithe, which was revealed as the successor to the United Order in Section 119. Just as in determining “surplus” under the United Order, it is left to the individual to determine what constitutes an “increase” in their income. Similarly, our fast offerings and their use in the welfare program of the Church stem from the same guiding principles as the United Order.

- Callings and Service—Perhaps our most valuable donation to the Church is our volunteer work. The market value of our lay ministry's time is remarkable. Full-time missionary service is another prominent example of consecration. Indeed, the Church's current system of equalization (where missionaries contribute according to average wealth in their nation, rather than actual expenses where they serve) is an interesting application of these principles. More generally, whenever I am asked to accept a calling or assignment, it is really an invitation to act on my pre-commitment to sacrifice. Just as in the United Order, it is up to the individual to manage his or her stewardship and decide what is surplus. When I think of Church members that I deeply respect, the common adjective that applies to them all is consecrated. These are men and women who would be willing to drop anything to act on a prompting, doing so with a Christ-like love. While they have certainly sought first the kingdom of God, they rarely lack temporal well-being, nor have they lost balance among Church, family, and employment. It seems

that consecration is a capstone virtue, the culmination of discipleship.

Contrasting Principles

It is my intent to provide a fair comparison between these two systems, rather than shooting down a straw-man version of socialism. My hope is that the preceding discussion facilitates a comparison of the ideals and the experience, the intent and the outcomes. In doing so, I see four major areas which set the United Order fundamentally at odds with socialism.

Agency

Perhaps the most important difference between these two systems is on the principle of agency. The United Order respects man's moral agency. Joining the Order was entirely voluntary, and those who did join were not micromanaged in their stewardships. Moreover, each individual was left to his own conscience to determine how much income was surplus. In fact, members were also free to choose to leave the Order, though doing so would violate their covenant made on entry and could be punished by excommunication from the Church. Such a man could not reclaim his consecrated properties, but he would retain the inheritance he had been assigned while in the Order. Contrast this with the coercion that has accompanied socialist experiments. The socialists believed that people with large property holdings would never voluntarily abandon their exploitation of those who have none. A forced redistribution was needed, using the government's power to take resources against the will of those currently holding them. The idealists see this as a transitional phase, until men have been re-educated from their selfish ways, after which they will voluntarily redistribute as needed; yet the Soviet experience suggests that 70 years of brutal dictatorships and propaganda were not sufficient to accomplish this re-education. In fairness, there are some socialists who only advocate voluntary communal living, as in the United Order. However, that utopian branch of the philosophy finds no place in the modern experience. Coercion versus agency has definite doctrinal consequences. In the premortal realm, this was the principal distinction between Lucifer's and Heavenly Father's plans. Agency was vital to our mortal experience — we had to face choices and be free to act for ourselves. God wants the rich to choose to humble themselves, not have it forced upon them. Indeed, force is counter-productive to man's eternal progression. It may be hard to weigh my neighbors' needs versus my own, but I will never develop

god-like attributes unless I have to struggle with godly decisions. There is a more practical argument against coercion as well: such power is easily misused. Indeed, power attracts exactly the wrong type of people: unscrupulous and self-serving men who primarily use power to protect their own privileges. But even a well-meaning dictator could be mistaken as to what constitutes the common good. For instance, in the Great Leap Forward, Mao diverted resources from Chinese agriculture in an attempt to industrialize; over the 5 year period, somewhere between 20 and 40 million people died of the resulting famine. Of course, individuals often make mistakes in exercising their free agency, but if things are headed in a disastrous direction, it's hard to keep 20 million free men following behind you. A dictator will order them back in line, forcing a choice between starvation and the firing squad.

Private Property

The next most significant difference between socialism and the United Order is that the latter accepts and in fact requires private property, while the former forbids it. Members of the United Order legally own the inheritance they received, and have right to all the revenue that the inheritance produces, just as they would with any private property. While the Lord expects the steward to return the surplus, the steward decides this for himself; the Order does not have legal authority to confiscate it. In contrast, socialists insist on collective ownership of resources; no individual retains complete and total control over a particular piece of property. The state takes all surplus, and the state can replace managers of an enterprise at will. This matters because private property provides necessary incentives via the profit motive. When a capitalist reduces costs or improves his product, he is rewarded with higher profit. A socialist, however, is provided the same sustenance regardless of his firm's efficiency or his product's value. Ideally, the individual sincerely wants to raise the standard of living for the members of the commune. In practice, communist governments try to motivate with national pride ("Do it for the Motherland!") or the threat of violence ("Do it to avoid the gulag!"). History confirms that even these were not enough. People were neither ambitious nor inventive, because these qualities were not rewarded. In the United Order, the profit motive is muted, but not eliminated. If I sincerely evaluate my needs, I keep only sufficient for my needs and relinquish the surplus. However, if I produce more, I can increase both my consumption and the surplus. I can honestly retain more because everyone has more. The same cannot

be said of socialism, because my consumption is determined independently of my output; I have no direct claim on any surplus. Even so, the United Order does not provide as strong an incentive as capitalism does; only true charity can fill that gap. Compared to socialism, though, the incentives are definitely stronger. Risk-taking and experimentation carries reward rather than punishment, and members see direct benefit from their increased productivity. Moreover, if men fall into a selfish rut, they still have incentive to be productive in the Order (though they will retain their surplus), while selfish socialists become totally idle. In this sense, the United Order is much better suited for the “real world.”

Authority

The United Order is administered through priesthood authority, with bishops playing a pivotal role in the initial assignment of inheritances and in determining the needs of the poor. The analog in a socialist society is usually a planning commission, which derives its authority from the government and has power to reallocate resources as they see fit. Two questions may be raised regarding authority: Will these leaders serve the community or serve themselves, and even if they are sincere in their service, will these leaders have the information needed to make their decisions? On the first point, we have already noted that power of a socialist state is very tempting for those inclined towards unrighteous dominion. Such people will work their way to power by any means necessary, and serve their own agenda once they obtain it. Every communist nation thus far has seen this type of rise to power; it is foolishly naïve to assume this is accidental. What about within the Church? While we honor and sustain our priesthood leaders, we must also recognize that bishops are also subject to temptation and can fall from grace. A man could be intoxicated with power and use it to his own end. However, the Church provides three assurances that should allay our fears. First, the spiritual authority of such a man immediately terminates the moment he “exercise[s] control or dominion . . . in any degree of unrighteousness.” Though he may not be dismissed from his calling for a time, the Lord is no longer with him. Second, while one brother may fall, we can trust that the Brethren collectively will not. The Lord has a system to address individual apostasy, limiting the damage that one priesthood leader can do. Finally, a bishop wields less temporal power than a planning commission, and therefore, he has less opportunity to abuse others in self-service. He could embezzle funds,

or misallocate resources intended for the poor; but he cannot exact political retribution by revoking someone's stewardship. He has power to disfellowship but cannot take their property or inflict physical punishment. Yet good intentions are only part of the challenge, as the leader still needs significant information about the abilities and needs of the people if he is to assign resources to their highest value and distribute goods according to individual needs. This information is difficult to extract from individuals. A socialist planning commission has practically no hope of solving this information problem. Everyone would like to be categorized as having talents needed in comfortable jobs, so the difficult, dangerous, or unpleasant tasks would be left undone. Everyone would like to be labeled as having great needs, so it is difficult to distinguish true needs. In practice, the planning commission must take their best guess in making assignments, and could certainly get it wrong. Moreover, if they happen to miss a man's brilliance, sending him to work in the fields rather than in the laboratory, that man has no recourse to change his fate. As for the bishop, even with his priesthood mantle, he too is fallible; there is no guarantee of special business savvy. Yet the United Order has three advantages over socialism in addressing informational problems. First, it retains a free market and its price system. These prices provide important information about the relative value of various resources, and can guide the bishops in their use (as it does under capitalism). Second, the Order allows for the trade of private property. Thus, if a resource was misallocated to someone, that person would magnify his stewardship by selling the inheritance to someone better qualified, and purchasing other resources that he can more effectively use. Thus, misallocations are not permanent. Finally, on the difficult task of determining needs for those seeking help from the Lord's storehouse, it is comforting to know that bishops have the Holy Ghost to inspire them. In various callings, I have witnessed a bishop receive clear promptings in a difficult case, and later seen that decision validated by new information. Errors still occur, of course, but I have confidence that they are minor.

Motivation and Preparation

The final point of comparison is in the underlying motivation of individuals. At first glance, it seems that either system asks men to act out of a love for their fellow man, but that is not the whole story. In the United Order, love of man is not the primary motive; love of God comes first. The

distinction is important, especially in those moments when my neighbor is hard to love. Even when I suspect that someone is abusing the system, I can still contribute to the system out of a love of God. In socialism, love of man is meant to be the eventual motivation (once men have become re-educated). In the meantime, fear of the state is the primary motivation used. Another troubling aspect of socialist motivation is the rhetoric of class warfare. In order to get the revolution started, the rich must be demonized, encouraging the poor to “rise up and take what is rightfully theirs.” That sort of antagonism will not engender a love for your fellow man. Pride includes despising those of a lower or a higher economic status. The two philosophies also differ in how society will be transformed. Socialists believe that history is inevitably marching towards a socialist paradise, since (under capitalism) inequality and class distinction will deepen and become more intolerable over time. Thus, the proletariat does not need any special preparation other than to be sufficiently riled up to throw off their chains; thereafter, a socialist government could reshape their attitudes. The United Order, in contrast, does not claim any ability to transform the unwilling. Members must have already been transformed by the gospel before entering the Order. Of course, they are still imperfect, and much growth will occur while participating in the Order. Yet the transformation will start from the inside and work its way out. On this note, it is not surprising to me that almost all socialist thinkers were hostile toward religion. They saw belief in God and an afterlife as a sedative or “opiate,” keeping the masses complacent and thus delaying the revolution. To get the ball rolling, men needed to stop depending on God and take matters into their own hands. While socialism opposes religion, it seems the feeling is mutual. The Brethren have disavowed communism on many occasions; for example, Ezra Taft Benson said “But whenever the God of heaven reveals His gospel to mankind, Satan, the archenemy to Christ, introduces a counterfeit. . . . Communism introduced into the world a substitute for true religion. It is a counterfeit of the gospel plan.”

Conclusion

The Lord’s unique program is eloquently captured in His own words: “And it is my purpose to provide for my saints, for all things are mine. “But it must needs be done in mine own way; and behold this is the way that I, the Lord, have decreed to provide for my saints, that the poor shall be exalted, in that the rich are made low. “For the earth is full, and there is enough and

to spare; yea, I prepared all things, and have given unto the children of men to be agents unto themselves.” The United Order is not a socialist program. The underlying philosophies differ greatly, and these distinctions bear serious doctrinal weight. I testify to the evident superiority of the Lord’s own way, and look forward to the millennial reign when I might live under it.

9 Cournot and Game Theory

Cournot is unique. It is often the case that new ideas are distilled from discussions and arguments that are circulating at the time. Cournot’s book published in 1838 seems to have come out of nowhere. Cournot was born in 1801 and died in 1877, and thus was a contemporary of the utopian socialists.

First Cournot argued in a way largely unprecedented that mathematical modeling was essential for understanding political economy.

There are authors, like Smith and Say, who, in writing on Political Economy, have preserved all the beauties of a purely literary style; but there are others, like Ricardo, who, when treating the most abstract questions, or when seeking great accuracy, have not been able to avoid algebra, and have only disguised it under arithmetical calculations of tiresome length. Any one who understands algebraic notation, reads at a glance in an equation results reached arithmetically only with great labour and pains. I propose to show in this essay that the solution of the general questions which arise from the theory of wealth, depends essentially not on elementary algebra, but on that branch of analysis which comprises arbitrary functions, which are merely restricted to satisfying certain conditions. As only very simple conditions will be considered, the first principles of the differential and integral calculus suffice for understanding this little treatise. Also, although I fear that it may appear too abstruse to most people who have a liking for these topics, I hardly dare to hope that it will deserve the attention of professional mathematicians, except as they may discover in it the germ of questions more worthy of their powers.

Second, Cournot introduced what was apparently completely new analysis of all oligopoly. There had been previous discussions of perfect competition

and monopoly, but Cournot was the first to analyze competition among a few firms.

Cournot's approach was to argue that there will be a tendency for firms to produce output to maximize profit given the actions of their competitors. Cournot used stability arguments to buttress his equilibrium concept. Although his methods were sophisticated at the time, advances in mathematics allowed an even more satisfactory treatment over a century later. For example, a general proof that Cournot's equilibrium exists had to wait for the development of fixed point theorems. The evolution of our knowledge about equilibrium existence in game theory is interesting in his own right, but is of sufficiently narrow interest that we will restrict ourselves to the following brief outline.

In the 1940's John Von Neumann proved that an equilibrium exists in 2-person zero-sum games. In the 1950's John Nash proved that an equilibrium exists in all finite games if mixed strategies are allowed. Von Neumann, one of the great mind of the 20th century, was dismissive of Nash's contribution, calling it a straight forward application of Brauer's fixed point theorem. This straightforward application revolutionized game theory and qualified Nash for a Nobel Price in Economics. Arguments when there are infinitely many strategies require different methods.⁹

Cournot's intuition led him to believe that a large number of firms would behave like perfect competitors. This theoretical result was established by Roy Ruffin and others in the early 1970's.

Cournot was criticized a half century later by Bertrand, on two grounds. First, he asserted that firms would collude rather than behave as Cournot predicted. Second, he argued that if they did not collude, they would choose prices rather than quantity and the result would be marginal cost pricing.

The first criticism requires more careful analysis by modern standards. In particular, firms attempting to collude would have an incentive to deviate from that collusion. Modern treatments require a theory of cartel stability. Such a theory is attributed to James Friedman.

Consider a market with N identical firms that are expected to exist indefinitely. Let π_i^c be the profit of an individual firm in the Cournot Equilibrium, let π_i^* be an individual firm's profit in collusion, and let π_i^d be the profit a firm can obtain by deviating from the collusive agreement. Friedman argued that a collusive agreement could be sustained if

⁹See, for example, James Friedman's book, *Oligopoly and the theory of games*.

$$\pi_i^d - \pi_i^* \leq \frac{\delta(\pi_i^* - \pi_i^c)}{1-\delta}$$

It remained to be shown, as a small footnote in the vast scheme of things, that when collusion was modeled in this way, a collusive outcome cannot be sustained by a large number of firms. This was accomplished in the 1980's by your humble instructor.

Bertrand's second criticism was in some sense even more fundamental than the first. The question of the appropriate strategy space must always be approached with some care. The analysis may depend critically on the modeling choice. In this context, it is probably the case that the best choice depends on which lever is easier to pull. If prices are most difficult to change, as was the case with Sears Catalogs in the distant past, then quantity is probably the most appropriate choice for a strategic variable.

10 The Rise of Neo-Classical Economics

It is difficult for many to think of neo-classical economics as history because it is so familiar to us as present practice. Quite simply, neo-classical economics is what most economist do most of the time. The most complete early synthesis of neo-classical ideas is due to Marshall. His book, published in 1890, incorporated ideas that were based on classical thought but differed in important ways. For one thing, the questions were different. For example, classical economists searched for natural prices reflective of some underlying notion of value with the idea that there would be a tendency for prices to return to such values. By contrast, neo-classical economists dispensed with a separate notion of value and focused on price determination. Classical economists were interested in dynamic processes with the hope of predicting future evolution of economic systems. Neo-classical economists, although interested in dynamics, were more content to explain market outcomes at an instant in time. Classical economists were less likely to ignore historical context; neo-classical economists were more prone to seek universal propositions. Finally, neo-classical economists proved to be more scientific than even "scientific socialism". Their universal analysis made empirical work more plausible and more amenable to replication.

Although a widely accepted definition of neo-classical economics does not exist, most would agree that the following propositions are quintessentially neo-classical.

1. Consumers have preferences over possible consumption bundles. Given the resources at their disposal, they consume the best bundle they can afford relative to their preferences. Under assumptions, their preferences can be characterized by a utility function. They can then be modeled as attempting to maximize utility, subject to a budget constraint. From this behavior, one can derive a demand function.

2. Firms attempt to maximize profit. Thus, for a given level of output, a firm attempts to minimize the cost of production. Given this minimizing behavior, a relationship between output, factor prices, and cost of production can be derived. Furthermore, given the output price, profit maximization generates a supply function.

3. Equilibrium in the market for an output is a price such that, demand aggregated over consumers is equal to supply aggregated over producers. For neo-classical economists then, price and value are different names for the same concept. No long term law of value is sought. Price depends on transitory interaction between supply and demand.

The neo-classical approach to economics is readily mathematized. Comparative static analysis is natural. Another strand of neo-classical thought takes into account the interaction between various markets. This collection of results and methods is attributed to Leon Walrus, Vilfred Pareto, and more recently, Kenneth Arrow, Gerard Debreu, Lionel McKenzie, and others. This “general equilibrium theory” culminated in the discovery of general proofs of equilibrium existence and insights concerning the welfare properties of market systems.

10.1 The Basic Neo-Classical Consumer

Consumer i 's preferences are exogenous. They satisfy completeness, transitivity, continuity, non-satiation, and convexity. These axioms imply the existence of a continuous utility function, $U^i : \mathfrak{R}^L \rightarrow \mathfrak{R}$. Let $V^i \in \mathfrak{R}^K$ be consumer i 's endowment bundle, composed of factors of production, where K is the number of factors of production. Let P_ℓ be the price of consumption good ℓ . Let W_k be the price of factor k . Let θ_{ij} be the fraction of firm j owned by consumer i and let π_j be the profit of firm j . Consumer i 's maximization problem is to choose $X^i \in \mathfrak{R}^L$ to

$$\text{maximize } U^i(X^i)$$

$$\text{subject to } \sum_{\ell=1}^L P_\ell X_\ell^i \leq \sum_{k=1}^K W_k V_k^i + \sum_j \theta_{ij} \pi_j$$

where π_j is the profit of firm j . First order conditions from the constrained optimization problem with langrange multiplier λ are:

$$\frac{\partial U}{\partial X_\ell} = \lambda P_\ell$$

for all ℓ , and

$$\sum_\ell P_\ell W_\ell + \sum_\ell \Theta_{ij} \pi_j - \sum_\ell P_\ell X_\ell = 0$$

The maximizing values of the various commodities can be denoted $(d_1(P), \dots, d_N(P))$, to suggest consumer i 's demand for each commodity. The total demand for commodity ℓ is $\sum_{i=1}^N d_\ell^i(P) = D_\ell(P)$.

10.2 The Basic Neo-Classical Firm

Firms are presumed to maximize profits and so are modeled as solving the following maximization problem: choose $V^j \in \mathfrak{R}^K$ to maximize

$$Max \sum_{k=1}^K P_k f^k(V_1, \dots, V_L) - \sum W_k V_k$$

First Order Conditions:

$$P_\ell \frac{\partial f_\ell}{\partial V_k} - W_k = 0, \forall_k$$

Summing over producers generates market supply for each consumption good and market demand for each factor.

10.3 Equilibrium

Equilibrium is a price vector for consumption goods and factors such that markets clear when consumers and producers solve the maximization problems.

Homework problems

1. Consider an economy with two consumers, two consumption goods and no production.

Mr. A has preferences represented by the utility function $X^{1/3}Y^{2/3}$.

Ms. B has preferences represented by the utility function $X^{2/3}Y^{1/3}$

Mr. A begins with two units of X .

Ms. B begins with three units of Y .

Find the equilibrium.

2. Now consider an economy with two consumers.

Mr. A has preferences represented by the utility function $X^{1/3}(1 - L)^{2/3}$.

Ms. B has preferences represented by the utility function $X^{2/3}(1 - L)^{1/3}$

There is also a firm that behaves as a price-taker. It has production function $F(L) = L^{\frac{1}{2}}$. Mr. A owns $\frac{1}{3}$ of the firm and Ms. B owns the rest.

Find the equilibrium (or at least sketch how you would do it if the algebra were not so messy).

11 Keynes vs His Teacher

The most significant economic events of the 20th Century were the Great Depression and the World War that followed it. The Neo-classical economists believed, based on what they perceived to be the historical record, that economies tended to correct themselves. Politics being what they are, there was no future for an American president who did not do something to give the appearance that he was, well, doing something. The intellectual foundations for doing something were provided by Alfred Marshall's star pupil: John Maynard Keynes. His ideas still carry great weight. The cynical view attributes this to the license they offer for politicians to spend great quantities of money in any way that suits them. In any case, a convincing explanation for the Great Depression is still lacking. This is not for want of trying. The fundamental problem, after all, is that the Great Depression is only one observation. The lack of data could in principle be compensated for by running experiments, but the prospect of scholars manipulating the economy in order to trigger Great Depressions for systematic study is likely to be frowned upon.

Keynes attempted to explain the Great Depression by arguing that it was due to insufficient consumption. He presented his approach in his book "*The General Theory of Employment, Interest, and Money*". He attributed the following assumptions to his predecessors:

At different points in this chapter we have made the classical theory to depend in succession on the assumptions:

1. that the real wage is equal to the marginal disutility of the existing employment;

2. that there is no such thing as involuntary unemployment in the strict sense;
3. that supply creates its own demand in the sense that the aggregate demand price is equal to the aggregate supply price for all levels of output and employment.

These three assumptions, however, all amount to the same thing in the sense that they all stand and fall together, any one of them logically involving the other two. (p. 21)

He emphasized the dynamic aspects of market activities:

All production is for the purpose of ultimately satisfying a consumer. Time usually elapses, however, and sometimes much time—between the incurring of costs by the producer (with the consumer in view) and the purchase of the output by the ultimate consumer. Meanwhile the entrepreneur (including both the producer and the investor in this description) has to form the best expectations he can as to what the consumers will be prepared to pay when he is ready to supply them (directly or indirectly) after the elapse of what may be a lengthy period; and he has no choice but to be guided by these expectations, if he is to produce at all by processes which occupy time. (p.46)¹⁰

These dynamic issues would be of little consequence if markets—including labor markets—could adjust quickly. Keynes, however, believed that prices—including wages—were sticky, or in other words, sluggish to adjust. In his view, this resulted in a chronic tendency for under-consumption and lagging aggregate demand.

The principal objective factors which influence the propensity to consume appear to be following:

1. A change in the wage-unit.
2. A change in the difference between income and net income.
3. Windfall changes in capital-values not allowed for in calculating net income.

¹⁰By contrast, Hicks' IS-LM description of Keynesian economics—referred to by Joan Robinson as “[illegitimate] Keynesianism”, albeit with stronger language—has no explicit dynamics.

4. Changes in the rate of time-discounting, i.e. in the ratio of exchange between present goods and future goods.
5. Changes in fiscal policy.
6. Changes in expectations of the relation between the present and the future level of income. (p.91)

There are, in general, eight main motives or objects of a subjective character which lead individuals to refrain from spending out of their incomes:

1. To build up a reserve against unforeseen contingencies;
2. To provide for an anticipated future relation between the income and the needs of the individual or his family different from that which exists in the present, as, for example, in relation to old age, family education, or the maintenance of dependents;
3. To enjoy interest and appreciation, i.e. because a larger real consumption at a later date is preferred to a smaller immediate consumption;
4. To enjoy a gradually increasing expenditure, since it gratifies a common instinct to look forward to a gradually improving standard of life rather than the contrary, even though the capacity for enjoyment may be diminishing;
5. To enjoy a sense of independence and the power to do things, though without a clear idea or definite intention of specific action;
6. To secure a masse de manoeuvre to carry out speculative or business projects;
7. To bequeath a fortune;
8. To satisfy pure miserliness, i.e. unreasonable but insistent inhibitions against acts of expenditure as such. (p.107)

Insufficient aggregate demand

When involuntary unemployment exists, the marginal disutility of labour is necessarily less than the utility of the marginal product. Indeed it may be much less. For a man who has been long

unemployed some measure of labour, instead of involving disutility, may have a positive utility. If this is accepted, the above reasoning shows how "wasteful" loan expenditure may nevertheless enrich the community on balance. Pyramid-building, earthquakes, even wars may serve to increase wealth, if the education of our statesmen on the principles of the classical economics stands in the way of anything better. It is curious how common sense, wriggling for an escape from absurd conclusions, has been apt to reach a preference for wholly "wasteful" forms of loan expenditure rather than for partly wasteful forms, which, because they are not wholly wasteful, tend to be judged on strict "business" principles. for example, unemployment relief financed by loans is more readily accepted than the financing of improvements at a charge below the current rate of interest; Whilst the form of digging holes in the ground known as gold-mining, which not only adds nothing whatever to the real wealth of the world but involves the disutility of labour, is the most acceptable of all solutions. If the Treasury were to fill old bottles with bank-notes, bury them at suitable depths in disused coal-mines which are then filled up to the surface with town rubbish, and leave it to private enterprise on well-tried principles of laissez-faire to dig the notes up again (the right to do so being obtained, of course, by tendering for leases of the note-bearing territory), there need be no more unemployment and, with the help of the repercussions, the real income of the community, and its capital wealth also, would probably become a good deal greater than it actually is. It would, indeed, be more sensible to build houses and like; but if there are political and practical difficulties in the way of this, the above would be better than nothing. The analogy between this expedient and the gold-mines of the real world is complete. At periods when gold is available at suitable depths experience shows that the real wealth of the world increases rapidly; and when but little of it is so available, our wealth suffers stagnation or decline. thus gold-mines are of the greatest value and importance to civilization. Just as wars have been the only form of large-scale loan expenditure which statesmen have thought justifiable, so gold-mining is the only pretext for digging holes in the ground which has recommended itself to bankers as sound fi-

nance; and each of these activities has played its part in progress - failing something better. To mention a detail, the tendency in slumps for the price of gold to rise in terms of labour and materials aids eventual recovery, because it increases the depth at which gold-digging pays and lowers the minimum grade of ore which is payable. In addition to the probable effect of increased supplies of gold on the rate of interest, gold-mining is for two reasons a highly practical form of investment, if we are precluded from increasing employment by means which at the same time increase our stock of useful wealth. In the first place, owing to the gambling attractions which it offers it is carried on without too close a regard to the ruling rate of interest. In the second place the result, namely the increased stock of gold, does not, as in other cases, have the effect of diminishing its marginal utility. Since the value of a house depends on its utility, every house which is built serves to diminish the prospective rents obtainable from further house-building and therefore lessens the attraction of further similar investment unless the rate of interest is falling *pari passu*. But the fruits of gold-mining do not suffer from this disadvantage, and a check can only come through a rise of the wage-unit in terms of gold, which is not likely to occur unless and until employment is substantially better. Moreover, there is no subsequent reverse effect on account of provision for user and supplementary costs, as in the case of less durable forms of wealth. Ancient Egypt was doubly fortunate, and doubtless owed to this its fabled wealth, in that it possessed two activities, namely, pyramid-building as well as the search for the precious metals, the fruits of which, since they could not serve the needs of man by being consumed, did not stale with abundance. The Middle Ages built cathedrals and sang dirges. Two pyramids, two masses for the dead, are twice as good as one; but not so two railways from London to York. Thus we are so sensible, have schooled ourselves to so close a semblance of prudent financiers, taking careful thought before we add to the "financial" burdens of posterity by building them houses to live in, that we have no such easy escape from the sufferings of unemployment. We have to accept them as an inevitable result of applying to the conduct of the State the maxims which are best calculated to "enrich" an

individual by enabling him to pile up claims to enjoyment which he does not intend to exercise at any definite time. (p. 128)

Investment markets are also forward-looking and hence dynamics are important in that sector as well.

When a man buys an investment or capital-asset, he purchases the right to the series of prospective returns, which he expects to obtain from selling its output, after deducting the running expenses of obtaining that output, during the life of the asset. This series of annuities $Q_1, Q_2 \dots Q_n$ it is convenient to call the prospective yield of the investment.

Over against the prospective yield of the investment we have the supply price of the capital-asset, meaning by this, not the market-price at which an asset of the type in question can actually be purchased in the market, but the price which would just induce a manufacturer newly to produce an additional unit of such assets, i.e. what is sometimes called its replacement cost. The relation between the prospective yield of a capital-asset and its supply price or replacement cost, i.e. the relation between the prospective yield of one more unit of that type of capital and cost of producing that unit, furnishes us with the marginal efficiency of capital of that type. More precisely, I define the marginal efficiency of capital as being equal to that rate of discount which would make the present value of the series of annuities given by the returns expected from the capital-asset during its life just equal to its supply price. This gives us the marginal efficiencies of particular types of capital-assets. The greatest of these marginal efficiencies can then be regarded as the marginal efficiency of capital in general.

The reader should note that the marginal efficiency of capital is here defined in terms of the expectation of yield and of the current supply price of the capital-asset. It depends on the rate of return expected to be obtainable on money if it were invested in a newly produced asset; not on the historical result of what an investment has yielded on its original cost if we look back on its record after its life is over.

If there is an increased investment in any given type of capital during any period of time, the marginal efficiency of that type of capital will diminish as the investment in it is increased, partly because the prospective yield will fall as the supply of that type of capital is increased, and partly because, as a rule, pressure on the facilities for producing that type of capital will cause its supply price to increase; the second of these factors being usually the more important in producing equilibrium in the short run, but the longer the period in view the more does the first factor take its place. Thus for each type of capital we can build up a schedule, showing by how much investment in it will have to increase within the period, in order that its marginal efficiency should fall to any given figure. We can then aggregate these schedules for all the different types of capital, so as to provide a schedule relating the rate of aggregate investment to the corresponding marginal efficiency of capital in general which that rate of investment will establish. We shall call this the investment demand-schedule; or, alternatively, the schedule of the marginal efficiency of capital.

Now it is obvious that the actual rate of current investment will be pushed to the point where there is no longer any class of capital-asset of which the marginal efficiency exceeds the current rate of interest. In other words, the rate of investment will be pushed to the point on the investment demand-schedule where the marginal efficiency of capital in general is equal to the market rate of interest. (p. 135)

Keynes' own summary of his general theory follows:

Let us now attempt to summarize the argument of the previous chapters; taking the factors in the reverse order to that in which we have introduced them. There will be an inducement to push the rate of new investment to the point which forces the supply-price of each type of capital-asset to a figure which, taken in conjunction with its prospective yield, brings the marginal efficiency of capital in general to approximate equality with the rate of interest. That is to say, the physical conditions of supply in the capital-goods industries, the state of confidence concerning the prospective yield, the psychological attitude to liquidity and

the quantity of money (preferably calculated in terms of wage-units) determine, between them, the rate of new investment. But an increase (or decrease) in the rate of investment will have to carry with it an increase (or decrease) in the rate of consumption; because the behaviour of the public is, in general, of such a character that they are only willing to widen (or narrow) the gap between their income and their consumption if their income is being increased (or diminished). That is to say, changes in the rate of consumption are, in general, in the same direction (though smaller in amount) as changes in the rate of income. The relation between the increment of consumption which has to accompany a given increment of saving is given by the marginal propensity to consume. The ratio, thus determined, between an increment of investment and the corresponding increment of aggregate income, both measured in wage-units, is given by the investment multiplier. Finally, if we assume (as a first approximation) that the employment multiplier is equal to the investment multiplier, we can, by applying the multiplier to the increment (or decrement) in the rate of investment brought about by the factors first described, infer the increment of employment. An increment (or decrement) of employment is liable, however, to raise (or lower) the schedule of liquidity-preference; there being three ways in which it will tend to increase the demand for money, inasmuch as the value of output will rise when employment increases even if the wage-unit and prices (in terms of the wage-unit) are unchanged, but, in addition, the wage-unit itself will tend to rise as employment improves, and the increase in output will be accompanied by a rise of prices (in terms of the wage-unit) owing to increasing cost in the short period. Thus the position of equilibrium will be influenced by these repercussions; and there are other repercussions also. Moreover, there is not one of the above factors which is not liable to change without much warning, and sometimes substantially. Hence the extreme complexity of the actual course of events. Nevertheless, these seem to be the factors which it is useful and convenient to isolate. If we examine any actual problem along the lines of the above schematism, we shall find it more manageable; and our practical intuition (which can take account of a more detailed complex of facts that can

be treated on general principles) will be offered a less intractable material upon which to work. (p.247)

12 Austrian Economics

Machlup's list of Austrian Tenets:

- (1) Methodological Individualism: Groups or "collectives" cannot act except through the actions of individual members.
- (2) Methodological Subjectivism: Individuals make choices on the basis of knowledge they have or believe to have and whatever expectations they entertain.
- (3) Tastes and Preferences: An individual's subjective valuations of goods and services determine his demand for them.
- (4) Opportunity Costs: Production costs reflect the alternative opportunities that must be foregone.
- (5) Marginalism: In all economic designs, the values are determined by the effect of the last unit added to or subtracted from the total.
- (6) Decisions to save reflect "time preferences" regarding consumption.

Contributions:

Opportunity Cost: Von Weiser 1851-1926

Capital and Interest (Time Preference): Bohm-Bawerk 1851-1914

Economic Calculation: Hayek 1899-1992

Business Cycle Theory: Various