

Economics 3250
Spring 2017

Dr. Lozada
Final Exam

This exam has 50 points. There are ten questions on the exam, each worth 5 points. The exam has three figures, some of which appear more than one page after the question that refers to them.

Put your answers to the exam in a blue book or on blank sheets of paper.

Answer the questions using as much precision and detail as the time allows. *Correct answers which are unsupported by explanations will not be awarded points.*

Answer all of the following ten questions.

1. **[5 points]** Use Figure 1 to prove the superiority of taxes over standards in the case that figure illustrates. Explain thoroughly.
2. **[5 points]** Many elementary discussions of economics use a “circular flow” diagram; the one in Figure 2 is from https://en.wikipedia.org/wiki/Circular_flow_of_income. Ecological economists, such as Herman Daly, criticize these types of diagrams. Why?
3. **[5 points]** John Bellamy Foster, in his 1995 article “Marx and the Environment” (*Monthly Review: An Independent Socialist Magazine*, July/August, Vol. 47 No. 3), begins with the long quotation which appears below. (The footnotes of the original text have been deleted; the footnotes below have been added to help you understand the quotation.) The quotation expands on something I said in class. **Use the quotation to help you answer the question, “What was the attitude of Karl Marx to the environment?”** (I should note that this is a controversial topic, and later in his article J.B. Foster himself takes a very different view from the views he describes in the quotation below. I have mainly presented you with only one side of the argument, not with a balanced viewpoint.) It is OK if you do not understand each part of the quotation below; mostly I am including it to explain a bit more about what I said in class.

It has become fashionable in recent years, in the words of one critic, to identify the growth of ecological consciousness with “the current postmodernist interrogation of the metanarrative of the Enlightenment.” Green thinking, we are frequently told, is distinguished by its postmodern, post-Enlightenment perspective. Nowhere is this fashion more evident than in certain criticisms directed at Marx and Engels. Historical materialism, beginning with the work of its two founders, is often said to be one of the main means by which the Baconian notion of the mastery of nature was transmitted to the modern world. The prevalence of this interpretation is indicated by its frequent appearance within the analysis of the left itself. “While Marx and Engels displayed an extraordinary understanding of and sensitivity toward the ‘ecological’ costs of capitalism,” socialist ecofeminist Carolyn Merchant writes, “. . . they nevertheless bought into the Enlightenment’s myth of progress via the domination of nature.”

It is of course undeniable that many of those who claimed to be following in Marx’s footsteps treated nature as an object to

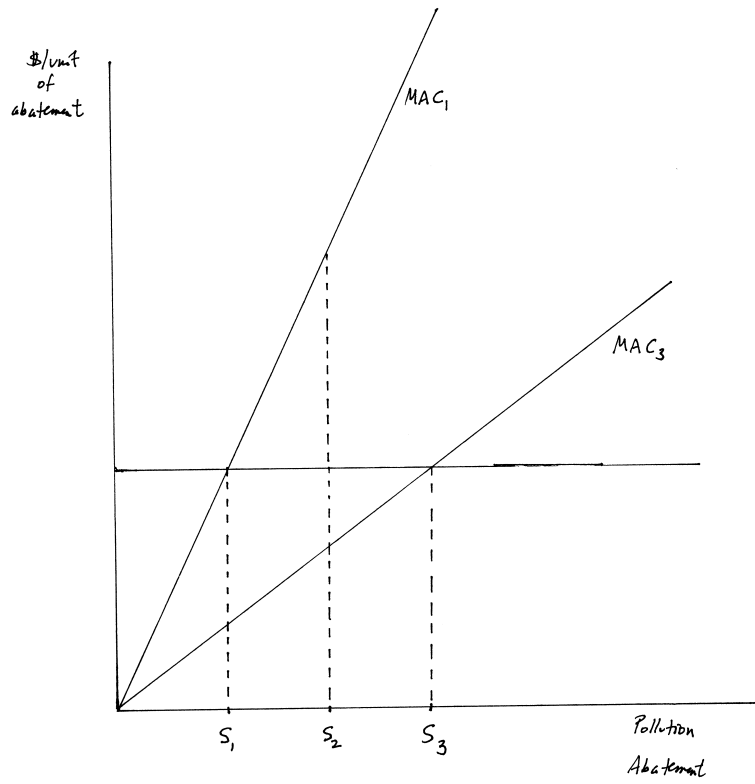


Figure 1

Figure 1.

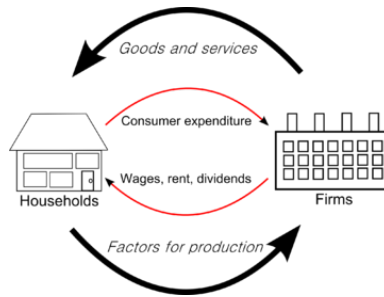


Figure 2.

be exploited and nothing more. It is common for today’s critics, however, to argue that the worldview of Marx and Engels themselves was rooted before all else in the extreme technological subjugation of nature, and that despite the ecological sensitivity that they displayed in particular areas, this remains the primary context in which their theoretical contributions must be judged. Marxism and ecology are therefore never fully compatible.

The chief complaint upon which this general criticism is based is that Marx adopted what the socialist environmentalist Ted Benton—himself a critic of Marx in this respect—has called a “Promethean, ‘productivist’ view of history.” Reiner Grundmann concurs, writing in his *Marxism and Ecology* that “Marx’s basic premiss [sic]” was “the Promethean model” of the domination of nature—an [sic] position that Grundmann attempts to defend. For liberal¹ Victor Ferkiss, no defense is possible: “Marx’s attitude toward the world always retained that Promethean thrust, glorifying the human conquest of nature.” Social ecologist (ecological anarchist) John Clark goes further:

Marx’s Promethean. . . “man” is a being who is not at home in nature, who does not see the Earth as the “household” of ecology. He is an indomitable spirit who must subject nature in his quest for self-realization. . . . For such a being, the forces of nature, whether in the form of his own unmastered internal nature or the menacing powers of external nature, must be subdued.

There are of course other common environmental criticisms directed at Marx and Engels (not to mention Marxism as a whole) in addition to this one. Benton, for example, argues that Marx

¹“Liberal” here means 19th century liberal, meaning someone who is pro-free-market and anti-government regulation, not what the term “liberal” means in the context of 21st century U.S. politics.

was “unmistakably anthropocentric” and that he resisted any framework that would recognize the natural limits to economic advance. Marxian value theory, we are frequently told, designated labor (power) as the source of all value, thereby denying any intrinsic value to nature. Then there is the dismal ecological performance of the Soviet Union and other Eastern European regimes before the fall,² which is seen as a general reflection of Marx’s failure to incorporate ecological concerns into his master narrative.

Yet it is the charge of Prometheanism that occupies central place in green criticisms of Marx. True environmentalism, we are led to believe, demands nothing less than a rejection of modernity itself. The charge of Prometheanism is thus a roundabout way of branding Marx’s work and Marxism as a whole as an extreme version of modernism, more easily condemned in this respect perhaps than liberalism³ itself. Thus postmodern environmentalist Wade Sikorski writes that, “Marx... was one of our age’s most devout worshippers of the machine. Capitalism was to be forgiven its sins because... it was in the process of perfecting the machine.”

This claim that Marx’s work was based on a crude “Prometheanism,” it is worth recalling, has a very long history. [...]

4. **[5 points]** What do the terms “regulatory capture” and “rent-seeking” mean in the context of this class?
5. **[5 points]** Explain in words—no diagram is necessary, although you may include one if you wish—why, in a *very simple* model of the economy, imposing tariffs on food imports is a bad thing. Be sure to precisely define what “a bad thing” means in this context.
6. **[5 points]** Argue that the McKelvey Box is more compatible with a “Ricardian” outlook to resource scarcity than to a “Malthusian” outlook to resource scarcity. (Do not forget to define the terms you use, such as “Ricardian” and “Malthusian.”)

²“The fall” here means the collapse of the Soviet Union and its allies. For an example of how the Soviet Union under Joseph Stalin treated environmentalism, see <http://isreview.org/issue/72/marxism-and-environment>: “To examine just the Ukraine, formerly a center of ecological research, every single voluntary scientific or professional society concerned with conservation or nature protection was terminated in the 1930s. Many were accused of cooperating with ‘counterrevolutionary nationalist groups,’ due to their continued opposition to economic issues taking primacy over those of conservation. This amounted to a certain death sentence; more than a third of the Ukrainian Committee for the Preservation of Monuments of Nature were executed.”

³See footnote 1 for what “liberalism” means in this sentence.

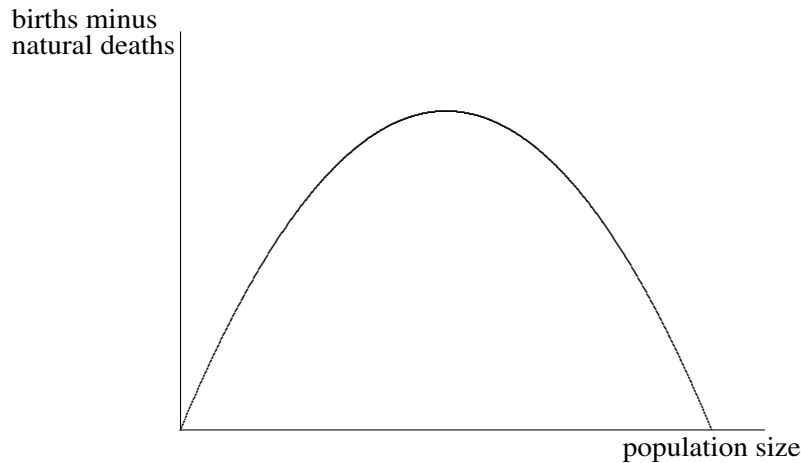


Figure 3.

7. **[5 points]** In class, we argued that Figure 3 could be used to approximate the growth of fish. How did we derive Figure 3? (That is, what graph did we use to obtain Figure 3, and how did we use it to obtain Figure 3?)
8. **[5 points]** What is the “starting point bias” of contingent valuation studies? How might it be eliminated or partially eliminated?
9. **[5 points]** Some authors have predicted that global warming’s effect on agriculture will be a smooth transition in which, for example, the wheat-growing region in North America will gradually move north further into Canada, in a way that changes where wheat is grown but not resulting in much change in the amount of wheat grown. Give an example of a crop for which such a smooth transition is unlikely to occur, and explain why.
10. **[5 points]** What is the effect of the following government policies on biodiversity? Why?
 - Subsidizing the price of agricultural land (to make it less expensive to buy)
 - Subsidizing agricultural credit
 - Subsidies on fertilizer, pesticides, irrigation infrastructure, irrigation water, grazing rights, agricultural machines
 - Tariffs on food imports.

Answers to Final Exam, Econ. 3250, Spring 2017

1. If both firms are subject to the same standard that pollution abatement must be at least S_2 , then both firms will choose to be at S_2 if neither firm chooses to disobey the law. For the purposes of the rest of this answer, assume that in fact neither firm does disobey the law, even though we have discussed the possibility of disobeying the law, and we discussed possible consequences of disobeying it. With no disobeying the law, the firms will be at S_2 , so firm 1 will be at A and firm 3 will be at C .

We can find total abatement cost by recalling that the total value of anything is the area under its marginal curve, so the total abatement cost is the area under the marginal abatement cost (“MAC”) curve. It follows that firm 1’s total abatement cost is OAS_2 and firm 3’s total abatement cost is OCS_2 .

Suppose that instead of using a standard, the government imposes a tax on non-abatement of pollution, and suppose the tax is at the level “ t ” shown in the diagram. I claim that firm 1’s response to this tax is to choose pollution abatement S_1 . Proof: if it chose more abatement than S_1 , MAC would be higher than t , so it would save money by reducing abatement (on the margin, saving MAC) and instead paying more tax (on the margin, paying t). If, on the other hand, it chose less abatement than S_1 , MAC would be lower than t , so it would save money by increasing abatement (on the margin, paying MAC) and therefore paying less tax (on the margin, saving t).

It follows that under the tax, firm 1 is at X and, correspondingly, firm 3 is at Y . Firm 1’s total abatement costs are OXS_1 and firm 3’s total abatement costs are OYS_3 .

Claim 1: Total pollution abatement is the same under the standard S_2 and under the tax t . Proof: Under the standard, total abatement is $2S_2$. Under the tax, total abatement is the following, where the term in brackets is zero because the distance from S_1 to S_2 is, by construction, the same as the distance from S_2 to S_3 .

$$\begin{aligned} S_1 + S_3 &= S_1 + S_3 - [(S_3 - S_2) - (S_2 - S_1)] \\ &= S_1 + S_3 - S_3 + S_2 + S_2 - S_1 \\ &= 2S_2. \end{aligned}$$

Claim 2: Total abatement costs are lower under the tax t than under the standard S_2 . Proof: We wish to show that total abatement costs

under the standard, from above $OAS_2 + OCS_2$, minus total abatement costs under the tax, from above $OXS_1 + OYS_3$, is positive. We have

$$\begin{aligned}
 (OAS_2 + OCS_2) - (OXS_1 + OYS_3) &= (OAS_2 - OXS_1) - (OYS_3 - OCS_2) \\
 &= XAS_2S_1 - CYS_3S_2 \\
 &> XBS_2S_1 - CYS_3S_2 \\
 &= BYS_3S_2 - CYS_3S_2 \\
 &= BYC > 0.
 \end{aligned}$$

Claims 1 and 2 prove the superiority of taxes over standards in this case.

2. The circular flow diagram presents the economy as being like an isolated perpetual motion machine, neither taking resources from nature nor emitting wastes into nature. However, such flows of resources and waste products are essential to the operation of the economy. A better diagram would embed the economy into the environment and show how the economy depends on the environment.
3. As the question says, in class, and in the test question's excerpt, I only present one point of view, not both points of view. The point of view I presented in class and in the test question's excerpt is that Karl Marx did not have "environmentally-friendly" views. Marx thought that humans benefitted from continued technological change and industrialization, since this enabled mankind to exploit nature in ever more complete ways. Marx's critique of modern capitalism was not that modern capitalism was bad because it hurt workers and poor people. Marx used the term "Utopian Socialists" to describe authors who thought that "modern capitalism was bad because it hurt workers and poor people," and he thought Utopian Socialists were sentimental and confused. Marx's theory, which he called "Scientific Socialism," was that modern capitalism was bad because it hindered the conquest of nature by technology. In his theory, each "stage of production"—for example, ancient slavery, then feudalism, then capitalism—aided the conquest of nature by technology when the stage was young, but hindered the conquest of nature by technology when the stage was old. It was this hindering that eventually caused (or would cause) each stage of production to collapse and be replaced by the next stage, which would unleash the forces of science and technology again.

4. “Regulatory capture” refers to unduly large influence by a regulated industry on the government employees who regulate that industry. The term comes from the idea that if this happens, then the regulators (who are supposed to represent the interests of the general public) become “captured” by the industry they are supposed to regulate. One way this can happen is because the regulators spend more time interacting with employees of the firms they regulate than with members of the “general public” or with “representatives” of the general public, and humans often try to establish friendly relationships with people with whom they have to have frequent interactions. This type of regulatory capture through legal means is probably more common in the U.S. than regulatory capture through illegal means, as when a regulated firm gives a bribe to a regulator in return for the regulator engaging in lax or no enforcement of laws vis-à-vis that firm.

“Rent seeking”: Economists use the term “rent” to denote any payment to a factor of production (such as a payment to labor) in excess of the minimum factor payment needed to induce the factor owner to supply that amount of the factor. For example, the “economic rent” of a professional basketball player is the difference between his salary and the salary he could earn if he did not play basketball. (Economists typically call “economic rent” simply “rent.”) For another example, any payment a landlord receives for the temporary use of the landlord’s completely unimproved (“raw”) land which the landlord has no alternative use for is completely rent, because the landlord would be willing, given these assumptions, to allow temporary use of his land in return for a payment of one cent.

Generally, then, rent is a transfer of wealth with nothing beneficial given to the economy in return. If a professional basketball player earns \$1 million, and if he did not play basketball he would earn \$50,000, then \$949,999.99 is given to the player with nothing in return, because he would supply his basketball-playing if the basketball team paid him \$50,000.01. The \$949,999.99 is rent earned by the player.

One example of “a transfer of wealth with nothing beneficial given to the economy in return” occurs when a regulator or legislator acts in a way that benefits one firm at the expense of the public good. In this case, the firm gets a transfer of wealth with a harmful effect (not merely a “non-beneficial” effect) on the economy as a whole. For example, if a regulator (possibly influenced by regulatory capture)

allowed a firm to violate a socially-optimal pollution emission regulation, this would help the firm but hurt society as a whole. A firm which is trying to get the regulator to do this is engaging in “rent-seeking” behavior.

5. Without the tariff, low-cost foreign producers can out-compete higher-cost domestic producers. With the tariff, production shifts away from the low-production-cost foreigners and towards the high-production-cost domestic producers.

As an example, suppose 1 unit of food shifts from being produced by foreigners at a price of \$1 to being produced domestically at a cost of \$1.25 and a price of \$1.30 (as might happen if domestic producers had a rising supply curve). Domestic food buyers’ costs have gone up by \$0.30. Consider this policy: “eliminate the tariff (saving domestic food buyers \$0.30), tax domestic food buyers \$0.26, and give that \$0.26 to domestic food producers.” That would:

- make domestic food buyers better off by $\$0.30 - \$0.26 = \$0.04$.
- make domestic food producers better off because with the tariff, on this unit of food their revenue was \$1.30 and their costs were \$1.25 so their profit was \$0.05, whereas now they do not get this profit but they do get \$0.26 from the government (which got it from the food buyers).
- make foreign producers better off (or at least not worse off) because they could sell their product without a tariff.

So that policy has no “losers” and is a “win-win-win” (for domestic food buyers, domestic food producers, and foreign food producers). It follows that the tariff on food was inefficient (because there was an alternative policy which made everyone better off (or at least made some people better off and made no one worse off)).

In mainstream economics, “inefficient” policies are considered “bad.” “Inefficient” means “not Pareto Optimal.” (A policy is Pareto Optimal if there is no alternative policy making one person better off and no one worse off.)

Note: In more complicated models, for example with two market imperfections one of which is a tariff, eliminating the tariff can be bad; or put another way, in a model where a non-tariff market imperfection already exists, imposing a tariff on top of the non-market imperfection might be good.

6. “Ricardian”: emphasizes that resources differ in expense of extraction and in certainty with which they exist. Instead of having a fixed stock of resource which we will run out of, “Ricardians” prefer to think not of running out but of gradually shifting to ever-more expensive deposits and exploring for new deposits in ever-less-promising areas. “Malthusian”: emphasizes that resources are fixed and finite in supply.

The McKelvey Box has “cost of extraction” along one axis, reflecting the Ricardian idea that there are resources of greater or lesser extraction costs. On its other axis is “certainty of existence,” showing that some resources are certain to exist, while others are less so. This emphasis on the qualitative differences between resource deposits is quite Ricardian.

7. The attached figure shows how Figure 3 can be derived from a graph which separately shows “births” and “natural deaths” versus population size. (“Natural deaths” means deaths not caused by humans.) The idea is that the number of births rises more or less linearly with population size. However, the number of deaths does not rise linearly with population. At small levels of population, deaths rise slowly, since food is abundant and communicable diseases are rare. As population size increases, however, deaths begin to rise more rapidly, as the increased population pushes harder on its available food supply and as communicable diseases spread more rapidly among the increasingly-crowded species members.

(The point where the two lines cross is the carrying capacity of the environment for this species.)

8. For an example, suppose one randomly assigned survey respondents to one of two groups. Both groups are asked the question, “How much are you willing to pay to save the polar bears?” The first group is asked to respond by choosing one of the following four options:
 - (a) less than \$20
 - (b) \$20 to \$40
 - (c) \$40 to \$60
 - (d) \$60 to \$80
 - (e) more than \$80.

The second group is asked to respond by choosing one of these following options:

- (a) less than \$60
- (b) \$60 to \$80
- (c) \$80 to \$100
- (d) \$100 to \$120
- (e) more than \$120.

We often observe that the average willingness to pay (“WTP”) reported by the first group is much less than that reported by the second group, although since membership in the groups was decided randomly, we expect their true WTP should be approximately the same. This is “starting point bias.” It is presumably due to the respondents not having strong fixed ideas about how to answer the question, which is after all hypothetical and which the respondents have probably never thought about before. They then use the scale given in the survey as a guide to some sort of socially-accepted or typical answer. For example, many people in both groups might want to choose what they hope is an average answer, leading them to pick (c), although they have no good reason to believe that (c) actually is a typical answer. The (c) choice for the first group is clearly less than that for the second group.

Starting point bias could be eliminated by asking an open-ended question (a fill-in-the blank question rather than a multiple-choice question), but they are more expensive to tabulate.

9. Coffee beans grow on shrubs located in mountainous or hilly tropical regions. With global warming, their cultivation would have to be moved higher up (to higher altitudes) of these regions, where temperatures are lower. However, if temperatures rise enough, the appropriate altitude would rise above the height of the mountains or hills on which the plants are grown. Cultivation would then suddenly have to move very long distances away, but finding an appropriate new location could be difficult.
10. All of these policies encourage the expansion of agriculture (cropping or ranching) onto land which previously was in its natural state. When this happens, biodiversity is greatly reduced: the plants growing often change to mainly one species, and that species (the crop or range for

grazing) often supports many fewer types of animals than the natural environment did.