Deforestation and the Economizer

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Carl Menger, thought of as the founder of the Austrian School of Economics with his book Principles of Economics (Grunsätze der Volkswirtschaftslehre) was instrumental in developing the theory of marginal utility. This theory answers the question that confounded classical economics, the so-called diamond-water paradox. Adam Smith, if not the originator of the idea is often cited as putting it most succinctly. "Things which have the greatest value in use have frequently little or no value in exchange; and, on the contrary, those which have the greatest value in exchange have frequently little or no value in use." (Smith, 2007) Menger goes further to distinguish goods of an economic and non-economic character. (Menger et al., 2011) The topic of deforestation immediately calls to mind the resource that is the forest unperturbed along with its most obvious produce, timber, and the land as a resource in and of itself. While in the context of discussing the environment and environmental policy, there is no shortage of considerations such as wastewater runoff and biodiversity, for the purposes of this essay, I will hold these exogenous at first. Instead, I will limit my focus to the forest's utility as a carbon sink, the use of timber, and the viability of cleared forests as farmland.

Economic Character of Goods

I will be using Menger's understanding of goods, both economic and non-economic, throughout this essay so I think it's beneficial if not necessary to provide some explanation in preparation for examining the economic character of a forested area, and how people make decisions in relation to them and what the impacts on the environment will likely be. Menger considers a good to be one that can be used by humans for the satisfaction of their needs. Goods of the first order are those that "can be used directly[1] for the satisfaction of their needs." Goods of the second and higher orders are goods that can have labor applied to them to be used as inputs to produce goods of the first order. A good does not necessarily occupy a single order in all contexts. For instance, water would be considered a good of the first order in the human need to quench thirst but would be a good of the second order as an ingredient in the production of bread. Non-economic goods have a tendency to occupy multiple orders. (Menger et al., 2011)

Menger differentiates between goods of economic and non-economic value. It is vital not to conflate goods of non-economic value with goods of no value whatsoever, which really wouldn't be considered goods at all. On the contrary, goods of non-economic value are often essential to life. This begs the question:

What constitutes a good of economic value? Menger identifies four objectives in human activity that constitute **economizing**:

(1) To maintain at their disposal every unit of good standing in [a quantitative relationship in which the requirements are larger than the available quantity]
(2) To conserve [a good's] useful properties.

[1] Emphasis added

(3) To make a choice between more important needs, which they will satisfy with the available quantity of the good in question, and needs that they must leave unsatisfied, and
(4) To obtain the greatest possible result with a given quantity of the good or a given result with the smallest possible quantity. (Menger et al., 2011)

Thus, economic goods are goods in which people exhibit economizing behavior, whereas non-economic goods are those that do not. Of course, what constitutes an economic good cannot be held equal for all people, in all places, and at all times. Technology shocks[2], changes in tastes or attitudes, or relative abundance available to one group or another can change what constitutes an economic good among people, places, and times.

The Economic Character of Forested Space

To a European settler of the North American continent the supply of forested green space does not meet the definition of an economic good. The settler would seek to divest himself of as much forested space as possible as it impedes his aims to develop the land for agriculture. The timber he obtains by cutting down as many trees as possible would constitute a non-economic good. While he would need timber to build himself a home, a barn, or other structures, the quantity of timber available to him would far outstrip his needs for it. He would have no opportunity to sell timber to his neighbors as they would be similarly overendowed with timber. Instead, the excess greenspace and timber would constitute an economic **bad**. He would be willing to divest himself of as much timber and forested space as possible as quickly as possible and would not want more at any price save for the opportunity to clear it. It makes no difference to the settler that Native Americans would likely still consider forested space a good.

In a modern context we have the benefit knowing the benefits of unmolested or at least renewed green space. We now know, for instance, forests are essential in the regulation of carbon dioxide in the atmosphere. This would not have occurred to anyone at the time, as the existence of CO_2 was not discovered until early in the same century by Jan Baptista van Helmont. (Britannica, 2024) It wasn't until Joseph Priestley's experiment in 1772 that there was even a rudimentary understanding that plants metabolize CO_2 into oxygen. (Shipunov, 2024)

Given this new context would a hypothetical American of the middle class consider forested space an economic good? To answer this question, we need to make some assumptions. (1) Our hypothetical subject must have his most basic needs met. (2) They must believe that forested space is in and of itself, a good, economic or not. These assumptions made, we can ascertain whether this individual would engage in economizing behavior. (3) The subject must be convinced that an overabundance of carbon dioxide in the atmosphere is a direct cause of climate change, man-made or not.

Does a hypothetical American meeting our assumptions maintain every unit of forest at their disposal and is the amount required less than their requirement? Our hypothetical

[2] In this context a technology shock can be positive or negative. This could mean an innovation; it could also mean a natural disaster that disrupts the flow of a river. Technology shocks by this definition form the basis of real business cycle theory.

subject undoubtedly needs the process of photosynthesis to continue with aplomb. Oxygen is necessary for human survival and our subject understands critical necessity of forests to remove carbon from the atmosphere. Nevertheless, they do not need to per se own, maintain control of, or otherwise serve as direct caretaker for forested areas for these needs to be met. Others, be they public or private entities can fill this role and the subject will have the benefits provided by a forest. Even if we were to change the use of the forest from a preservation approach to a conservation approach: Our subject's needs for timber likely occupy a higher order of goods than they would have an early colonist. Timber to a colonist would not likely be much higher than a second order good. The colonist would cut down trees, and with his own labor build a house from the timber or use the timber directly as a first order good to provide heat for his home in the winter. It does not appear that forests constitute an economic good by the first objective.

Does the subject wish to maintain the forest's useful properties? Again, our hypothetical American does in fact benefit from a forest's useful properties. However, if we presuppose that an area of forest is under the subject's direct control, we can then present the subject with economic choices. If such a person were to own 100 acres of forested land and can either sell the land to a developer for the construction of middle-class housing and turn a significant profit or retain the land as preserve it and reap the benefits to the environment in which others will share. It is here we must look to marginal utility and marginal cost to arrive at the decision that is *most likely* to be made. The benefits provided by forests, such as oxygen and preservation of the global climate are undoubtedly of higher immediate need than accumulation of capital. However, the marginal cost of sacrificing 100 acres of forest is practically nil to the subject. There plenty of other forests in the world to help maintain ecological balance, and 100 acres of forest is a minute percentage of the available resource. On the other hand, the marginal utility of the land for development purposes is extraordinarily high in comparison. Sale of the land would make our middle-class American quite wealthy. The land does not become an economic good until it is sold, the forest itself never meets the definition of an economic good by the second objective. It is unlikely that the subject will want to maintain the forest's useful properties, rather they will likely greatly benefit by not doing so.

Will the subject make a choice to acquire more or maintain control of preserved forested land and in doing so leave other needs unsatisfied? If we continue to only consider the effects of a forest as an engine of photosynthesis as the utility afforded by a forest, it would seem unlikely. Our subject may have a philanthropic disposition or may have another need that would be met by controlling and preserving a forest. The need to fulfill a philanthropic end or other need would be exogenous to the need of caring for the environment. These ends would likely not be tenable for a middle class American. The marginal opportunity cost of preserving the forest is probably far higher than what a middle-class American can reasonably accept.

Will preserving a forest offer the greatest possible result with the given quantity or the greatest possible quantity with a given result? We can look to the other three objectives to answer the fourth. Marginal utility and marginal cost can be thought of the most relevant factors in wellbeing, and wellbeing can be understood to be the measure of "result" in context. It isn't necessary to define wellbeing, this is subjective to the individual ceteris paribus. Our hypothetical subject has same wants and needs that a reasonable person would expect another reasonable person to have. A reasonable person is assumed to want a stable and clean

environment, to have means beyond their needs, to be a good citizen, etc. In this context we would expect the average American to want preserved acreage of forest in the abstract but would be unlikely to directly purchase and preserve such land in practice.

Current State of American Forests

Today there are more than 765 million acres of planted in natural and planted forest land in the United States. (Potapov et al., 2022) Of this total, about 35 percent is owned by family forest owners[3]. This immediately appears to contradict of what we would expect from an economizer. This is where the exogenous factors come into play.

According to the USDA, "there are four major 'types' of family forest owners:

1. Those who seek to establish a woodland retreat with high amenity values (49 percent).
2. Those attempting to meet multiple aesthetic, recreational, and financial objectives (28 percent).
3. Those focused primarily on the financial gains they can earn from their land (5 percent).
4. Those who do not express clear objectives for their property (18 percent)." (Perry et al., eds. 2022)

Ironic that the country that is commonly held to have the most advanced economy on Earth and a champion of free-market capitalism to boot, would have so many private individuals holding forested land and with so few of them holding the land for primarily financial gains. Does this contradict Menger? On the surface it would appear so, but there are more factors to consider. Needs are not necessarily matters of life and death. The diamond-water paradox does not suggest that people are irrationally putting high value on diamonds. Adam Smith and Carl Menger would on the contrary contend that the high value of diamonds is perfectly rational, as they take as a given that people are inherently rational in their acquisition of goods. Marginal utility does solve the paradox but is insufficient to fully explain behavior. If we loosen the shackles and allow for the factors previously held to be exogenous Menger is fully vindicated. Our supposition that economizing people would not hold on to forested land for purely environmental reasons holds up to the empirical reality that economizing people still do hold on to forested land.

Deforestation and a Values Chain

If I were to keep the scope of an essay on deforestation constrained to the American experience, I would rightly be accused of being hopelessly nearsighted. Deforestation, while an area of domestic concern to Americans, does not appear to be an urgent American issue. We can look to Maslow's Hierarchy of Needs to provide some insight why the United States appears

[3] According to Perry et al: "families, individuals, trusts, estates, and other groups who are collectively referred to as family forest owners."

to have relative success in conservation and preservation efforts and deforestation appears to remain a global concern. I will hold as a given that Menger is correct in that people will generally exhibit economizing behavior ceteris paribus. I will also hold as a given that this can be applied universally. People will economize without regard culture tradition, religious affiliation, sex, gender, etc. A distinguishing characteristic of our species is to exhibit economizing behavior and therefore is a key assumption in analysis. Using data from both the World Bank (2023) and Global Forest Watch (Potapov et al., 2022) there appears to be a correlation between GDP and deforestation.

Table 1 - Grouping each country into quartiles and aggregation of forest coverage

GDP Per Capita Quartile (2023)[4][5]	Total Stable Coverage in Hectares (2020)[6]	% World Coverage	Net Acreage Change in Hectares (2000-2020)[6]	% Change	% of all loss
1	761,128,745.99	21.87%	(13,871,951.69)	-1.8%	13.94%
2	1,174,129,701.78	33.74%	(4,111,267.28)	-0.4%	4.13%
3	968,398,317.33	27.83%	(49,354,733.97)	-5.1%	49.59%
4	576,257,964.10	16.56%	(32,188,431.61)	-5.6%	32.34%
World	3,479,914,729.21	100.00%	(99,526,384.55)	-2.9%	100.00%

These data are telling. Despite holding 44.49% of the world's stable forest coverage the bottom half in GDP of all countries accounts for a staggering 81.93% of the loss in acreage of forest between 2000 and 2020. I confess, I expected there to be a difference among bands. I am not terribly surprised at there being a significant difference between the top half and the lower half. Nevertheless, the sheer scale of the difference did come as a surprise. Note that Global Forest Watch's data (2022) indicates that 51.6% of the worlds stable forest cover is held by five countries: Russia, Brazil, Canada, United States, and China. Brazil alone accounted for 28.21% of all world forest cover loss between 2000-2020.

Table 2 – Top five forested countries

Country	% Stable Forest	Stable Acreage	Net Change	% Change	% of all loss	GDP Per Capita 2022	GDP Quartile
Russia	19.7%	686224764.9	-176088.7	-0.03%	0.18%	27450	2
Brazil	11.9%	413722809.3	-28078920.8	**-6.79%**	**28.21%**	15093	3
Canada	7.4%	257102961.5	-8200181.5	**-3.19%**	**8.24%**	49296	1
United States	6.8%	237725811.8	-3485991.4	-1.47%	3.50%	64623	1
China	5.8%	202215007.6	2144851.9	1.06%	-2.16%	18188	2

[4] World Bank (2023) – with minor processing by Our World in Data

[5] I divided each country's per capita GDP as provided by the World Bank into quartiles and aggregated forest coverage and net change by each GDP quartile.

[6] Accessed through Global Forest Watch on 04/10/2022. www.globalforestwatch.org.

Without Brazil and, to a lesser extent, Canada's overwhelming influence, the data correlates even more clearly and the differences even more stark. The circumstances surrounding the rates of deforestation in the top five countries for forest cover, especially in Brazil and Canada are an opportunity for future research and analysis.

Table 3 - Grouping each country into quartiles and aggregation of forest coverage minus Brazil and Canada

GDP Per Capita Quartile (2023)	Total Stable Coverage in Hectares (2020)	% World Coverage	Net Acreage Change in Hectares (2000-2020)	% Change	% of all loss
1 minus Canada	504,025,784.49	14.48%	(5,671,770.18)	-1.1%	5.70%
2	1,174,129,701.78	33.74%	(4,111,267.28)	-0.4%	4.13%
3 minus Brazil	554,675,508.03	15.94%	(21,275,813.14)	-3.8%	21.38%
4	576,257,964.10	16.56%	(32,188,431.61)	-5.6%	32.34%
World without Canada and Brazil	2,809,088,958.41	80.72%	(63,247,282.22)	-2.3%	63.55%

Recall that the need for forested land is not exclusive to any person or country. Every person on Earth needs a stable climate[7] and oxygen to breathe. An essay by Walsh (2011) indicates that sustainable development falls on a "values" chain, a marrying of Porter's Value Chain and Maslow's Hierarchy of Needs.

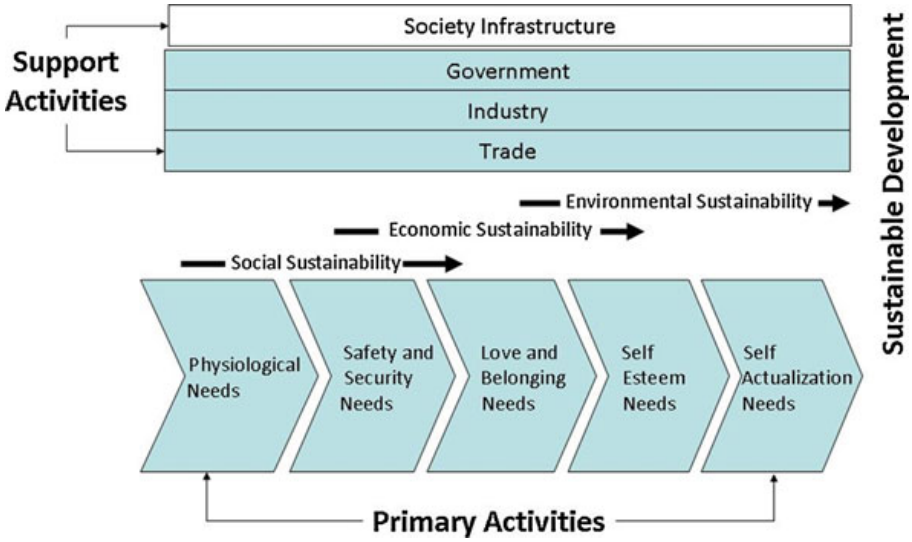


Fig. 1 - Walsh's values chain (2011)

[7] For the purposes of this essay, I will hold this need equivalent for all people regardless of economic or technological means, further analysis could and likely would indicate that developing countries are more reliant on a stable climate than developed countries.

Walsh (2011) is proposing that as the overall development increases the likelihood of sustainable development along the values chain. A country with a GDP in the 4th quartile is likely to rate high on the Global Hunger Index (GHI) and be primarily concerned with Physiological and Safety needs, whereas a country in the 1st quartile is likely have these needs met and will likely rate higher on the Environmental Performance Index (EPI) as they will be concerned with the Self-Esteem and Self-Actualization components of the values chain.

This can explain the observation with forests in the United States and the data put forward by the USDA. Recall that the motives for ownership among private family owners were activities that fulfilled needs higher on the values chain. A desire for the recreation and amenities provided by a forest were the primary motivators for ownership. Note that the USDA made no mention of ownership for the purpose of conservation and preservation as ends in and of themselves. The primary motivators for ownership nevertheless imply that American forests under private ownership will remain relatively untouched and the benefits to the environment will nevertheless be realized.

For countries the bottom quartile, that are primarily concerned with fulfilling Physiological and Safety needs, the concept of the forest as an amenity is incompatible. Much like an early European settler, the forest serves as an economic bad to one trying to meet the basic needs of life. Therefore, it would be unsurprising that the forest would be cleared as much as possible and as quickly as possible in these countries for agricultural or developmental use to meet these immediate needs. Long term sustainability *cannot* be considered in development when short term needs such as food security are met.

The "Five Ws" of Environmentalism and Environmental Policy

I've set the stage for answering the who, what, where, and why in terms of Environmentalism and Environmental Policy. I hope to do this in practical terms within the context of environmental decisions. It is important that we establish what is before we address what can be. In any attempt to affect change, one must know where they are and just as importantly what is possible given the world we live in. While few may disagree that it is beneficial to improve the global environment and that humans can exert a great deal of influence on it, few would agree on how to go about this and to what extent this is feasible.

The global environment affects all life on Earth. All activity, economic or otherwise, depends on Earth's ability to sustain life. Therefore, everyone is affected and everyone has a marginal power to contribute, positively or negatively, to how well the Earth continues to do so. In terms of deforestation, those who control forests be they private entities or governments get to control how the forest is used. People whether as individuals (families or entrepreneurs) or collectives (governments and corporations) ultimately have the power to maintain, increase or decrease the level of forest cover throughout the world.

Positive or negative change in the environment are subjective qualifiers. A colonist clearcutting a forest in what is now Hampton Roads, would have likely viewed this as an overwhelmingly positive change in the environment. There was *no* concern to the colonist that this could contribute to wholesale changes in the climate centuries later. With the benefit on scientific progress, we now know that it does make a difference to the climate and the very existence of Hampton Roads in the future could be at stake. Suppose that the colonist did know

that deforestation contributes to climate change, is it likely that he would have had the luxury of changing his behavior? I think this would be a dubious proposition at best. The early colonists were trying to survive by any means necessary. It is a fanciful proposition to suggest that someone in the modern era would make any other decision when the stakes are life and death. Maintain biodiversity and the climate for future generations and starve next winter or cut down the forest and develop for agriculture? No reasonable person would choose the former and it is unrealistic to expect this. Nevertheless, the changes are occurring. “Earth’s temperature has risen by an average of 0.11° F per decade since 1850, or about 2° F in total.” (Lindsey, 2024) This is a global phenomenon and a global problem, and deforestation undoubtedly plays a part.

Concern about preservation of the forest can be dated as far back as the Magna Carta. Before the Magna Carta “roughly a third of England had been turned into Royal Forests.” While it is unlikely that the English kings were concerned about preserving the forest for a secretly altruistic environmental cause, rather they preserved the forest as a personal refuge and for the amenity it provided, namely hunting. (Irvine, 2023) However, with nearly a third of England deemed a Royal Forest by 1215 the environmental benefits are manifest. This however was a point of contention among the king’s subjects. Royal Forests could not be used by anyone for its resources, no land could be cleared, no lumber extracted, no hunting, fishing, grazing, etc. This ultimately changed with the Magna Carta and it’s supplement document “The Charter of the Forest” granting rights to barons and commoners access to the Royal Forest. (Irvine, 2023)

There is a corollary here to the modern day. The forest is still preserved primarily for the value of its amenity and not for its impact on the global environment. Menger and Walsh’s work held even in the 13th century, well before their births. Preservation and conservation is the luxury of those with the most means and therefore occupying the highest echelons of the values chain. Motive does not appear to change this. Paradoxically, it would appear that the most effective environmental policy is policy that does not have the environment as its end goal.

Environmental damage, at least the damage caused by human activity is caused by economic decisions. Economic decisions are made by individuals trying to fulfill their needs. For people in developing countries, particularly those in the bottom quartile of GDP make these decisions in the context of their immediate survival. They cannot afford to put much if any energy into sustainability and preservation. In the words of Keynes “In the long-run we are all dead.” To those on the lower end of the values chain, this can be taken far more literally. If they think too much about the long-run environmentally, they won’t survive to see it. Therefore only people and countries at the self-actualization end of the spectrum can afford to consider the effects of deforestation as their immediate needs are met.

Conclusion

Deforestation vs conservation and preservation is first and foremost an economic decision. By looking at the forest as a good, we can see how decisions are made by individual people. The forest itself only becomes an economic good once lower levels of the value chain are met, however, empirically, it never becomes an economic good when only viewed in the context of the global environment. People will economize according to their needs. While everyone needs the forests to stand as much as possible, the effect of the loss of forests must

be viewed in terms of marginal utility and marginal cost. The cost to the global environment by the destruction of one unit of forest under any one person or group's control is so small that no rational person who stands to meet an immediate need by its destruction would preserve it. This is what Hardin (1968) called "The Tragedy of the Commons."

Although Hardin (1968) believed that a the tragedy had "no technical solution; it requires a fundamental extension in morality." I would argue that an indirect approach can be taken toward the commons and economizing behavior can be harnessed rather than opposed in addressing environmental problems. People can and do make economizing decisions that are beneficial to the environment and preservation and conservation of forests is no exception. When people can make decisions that are beneficial to the environment, even when it isn't their primary motive, that can be observed doing so. Economic development appears to be key. Development need not be to the level of the United States. However, there are limitations; the significant deforestation occurring in Canada serves as a counterexample. On the other hand, the level of deforestation in Russia is virtually nil compared to the acreage under its control. In China, a country that has been experiencing vast economic gains in the 21st century has seen a net gain in forest cover. The cause of these observations deserves a further look.

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