CHAPTER

1

Why Study Economics?

■ What Is Economics?

Economics is the study of the **allocation** of limited, or scarce, resources among alternative, competing ends. We can choose, for example, to allocate steel to plowshares or SUVs. These products in turn are apportioned to different individuals—Somalian farmers or Hollywood stars, for example. Of course, as a society we don't consciously choose to allocate steel to a particular number of plows or SUVs. But we do have collective desires, the sum of the individual choices that each of us makes to buy one thing or another. Really, economics is about what we desire and what we're willing to give up to get it.

Allocation is the process of apportioning resources to the production of different goods and services. Neoclassical economics focuses on the market as the mechanism of allocation. Ecological economics recognizes that the market is only one possible mechanism for allocation.

In fact, three critical questions guide economic inquiry, and there is a clear order in which they should be asked:

1. What ends do we desire?
2. What limited, or scarce, resources do we need to attain these ends?
3. What ends get priority, and to what extent should we allocate resources to them?

This last question cannot be answered without deep reflection on the answers to the first two questions.

Traditionally, economists have said that the answer to the first question is "utility" or human welfare.[1] Welfare depends on what people want, which they reveal through market transactions—by what goods and services they buy and sell. Naturally, this reveals preferences for market goods, as not all goods are bought and sold in markets. Humans are assumed to

[1]Many neoclassical economists actually argue that economics s a positive science (i.e., based on value neutral propositions and analysis). Since desired ends are normative (based on values), they would therefore lie outside the domain of economic analysis.

be insatiable,[2] so welfare is increased through the ever-greater provision of goods and services, as measured by their market value. Thus, unending economic growth is typically considered an adequate, measurable proxy for the desirable end.

This view is fundamental to the main school of economics today, known as **neoclassical economics (NCE)**. Since neoclassical economists assume that markets reveal most desired ends and that most scarce resources are market goods, they devote most of their attention to the mechanism for allocating resources to alternative ends, which is, of course, the market. The reason the market is considered the appropriate mechanism is that under certain restrictive assumptions it is efficient, and efficiency is considered a value-free, objective criterion of "the good." **Efficient allocation** is shorthand for **Pareto efficient allocation**, a situation in which no other allocation of resources would make at least one person better off without making someone else worse off. (The name Pareto is for the economist Vilfredo Pareto). It is so important in neoclassical economics that it is sometimes taken to be an end in itself.[3]

Efficient allocation is shorthand for Pareto efficient allocation, a situation in which no other allocation of resources would make at least one person better off without making someone else worse off.

But we should bear in mind that if our ends were evil, then efficiency would just make things worse. After all, Hitler was rather efficient in killing Jews. Efficiency is only worthwhile if our ends are in fact good and well-ordered—a job not worth doing is not worth doing well. We will return to this in our discussion of an ends-means spectrum in Chapter 3.

Ecological economics takes a different approach than its neoclassical counterpart. In **ecological economics**, efficient allocation is important, but far from being an end in itself. Take the example of a ship. To load a ship efficiently is to make sure that the weight on both sides of the keel is the same, and the load is distributed from front to back so that the ship floats evenly in the water. While it is extremely important to load the cargo efficiently, it is even more important to make sure that not too much cargo is placed on the ship. It is of little comfort if an overloaded ship founders efficiently! Who is entitled to place their cargo on the ship is also important; we wouldn't want the passengers in first class to hog all the cargo space so that those in steerage lack adequate food and clothing for their voyage.

Ecological economists look at the Earth as a ship and gross material production of the economy as the cargo. The seaworthiness of the ship is determined by its ecological health, the abundance of its provisions, and its nautical design. Ecological economists recognize that we are navigating unknown seas and no one can predict the weather for the voyage, so we don't know exactly how heavy a load is safe.

[2]Insatiability means that we can never have enough of all goods, even if we can get enough of any one good at a given time.

[3]D. Bromley, The Ideology of Efficiency: Searching for a Theory of Policy Analysis, *Journal of Environmental Economics and Management* 19: 86–107 (1990).

Neoclassical economists focus solely on allocating the cargo efficiently. **Environmental economics**, a subset of neoclassical economics, recognizes that welfare also depends to a large extent on ecosystem services and suffers from pollution, but is still devoted to efficiency. As markets rarely exist in either ecosystem services or pollution, environmental economists use a variety of techniques to assign market values to them so that they, too, may be incorporated into the market model. Ecological economists insist on remaining within the weight limits (or in nautical terms, respecting the Plimsoll line[4]) determined by the ship design and the worst conditions it is likely to encounter, and making sure that all passengers have sufficient resources for a comfortable voyage. Once those two issues have been safely resolved, the hold is efficiently loaded.

Substantial evidence exists that the cargo hold is already too full for a safe voyage, or at least nearing capacity, and many passengers have not been allowed to load the basic necessities for the voyage. Certainly we seem to have too many greenhouse gases in the hold, too many toxic compounds. To make room for an ever-growing cargo, we have ripped out components of the ship we deem unimportant. But we live on a very complicated ship, and we know very little about its design and the impact of our choices on its structural integrity. How many forests and wetlands are required to keep it afloat? What species are crucial rivets, whose loss will compromise the ship's seaworthiness? Ecological economics addresses these issues. It also assumes that our goal is not simply to load the ship to the limit, but to maintain areas of the ship for our comfort and enjoyment, to revel in the exquisite beauty of its craftsmanship, and to maintain it in excellent condition for future generations.

So why study economics? If we do not, we will likely end up serving less important ends first and running out of resources while more important ends remain unmet. We are also likely to overload and swamp the ship unless we have studied the seas in which it will be sailing, as well as the ship's own design and functioning.

The Purpose of This Textbook

This textbook is designed to introduce ecological economics as a necessary evolution of conventional economic thought (neoclassical economics) that has dominated academia for over a century. Our text will

[4]In 1875, Samuel Plimsoll supported Britain's Merchant Shipping Act, requiring that a load-limit line be painted on the hull of every cargo ship using British ports. If the waterline exceeded the Plimsoll line, the ship was overloaded and prohibited from entering or exiting the port. Because of England's seafaring dominance, the practice was adopted worldwide. Yet shipowners who profited from overloading their ships fiercely resisted the measure. They could buy insurance at rates that made it profitable to occasionally risk losing an overloaded ship. The Plimsoll line has saved the lives of many sailors.

critique not only neoclassical economic theory but also the pro-growth market economy that in many people's minds has come to be virtually synonymous with American democracy. Ecological economists do not call for an end to markets. Markets are necessary. What must be questioned is the prevailing belief that markets reveal all our desires; that they are the ideal system not only for allocating all resources efficiently, but also for distributing resources justly among people; and that markets automatically limit the overall macroeconomy[5] to a physical scale that is sustainable within the biosphere.

Part of our goal is to explain markets and show what they do well. Another part of our goal is to show why the unregulated market system is inadequate for allocating most of the goods and services provided by nature. This portion of the text should not be controversial—most of the basic arguments actually come from neoclassical economics, and it is only by drawing attention to their full implications that we depart from orthodoxy.

Growth is a quantitative increase in size, or an increase in throughput.

Throughput is the flow of raw materials and energy from the global ecosystem, through the economy, and back to the global ecosystem as waste.

Development is the increase in quality of goods and services, as defined by their ability to increase human well-being, provided by a given throughput.

More contentious (and more important) is the call by ecological economics for an end to growth. We define **growth** as an increase in **throughput**, which is the flow of natural resources from the environment, through the economy and back to the environment as waste. It is a quantitative increase in the physical dimensions of the economy and/or of the waste stream produced by the economy. This kind of growth, of course, cannot continue indefinitely, as the Earth and its resources are not infinite. While growth must end, this in no way implies an end to **development**, which we define as qualitative change, realization of potential, evolution toward an improved, but not larger, structure or system—an increase in the quality of goods and services (where quality is measured by the ability to increase human well-being) provided by a given throughput. Most of you have ceased growing physically, yet are probably studying this text in an effort to further develop your potential as humans. We expect human society to continue developing, and indeed argue that only by ending growth will we be able to continue developing for the indefinite future. Fortunately, many desirable ends require few physical resources.

The idea of "sustainable development," to be discussed later, is development without growth—that is, qualitative improvement in the ability to satisfy wants (needs and desires) without a quantitative increase in throughput beyond environmental carrying capacity. Carrying capacity is the population of humans that can be sustained by a given ecosystem at a given level of consumption, with a given technology. Limits to growth do not necessarily imply limits to development.

Conventional neoclassical economists might define economic growth

[5]Microeconomics focuses primarily on how resources are allocated toward the production and consumption of different goods and services. Macroeconomics traditionally focuses primarily on economic growth (i.e., the size of the economy), employment, and inflation.

as the increase in an economy's production of goods and services, typically measured by their market value, that is, an increase in gross national product (GNP). However, an economy can develop without growing, grow without developing, or do both at the same time. GNP lumps together quantitative growth with qualitative development—two very different things that follow very different laws—and is thus not a very useful measure.

In spite of the distinction between growth and development, calling for an end to growth requires an almost revolutionary change in social perceptions of the good (our ends and their ranking), a theme that will recur throughout this text. As we are all aware, the transition from adolescence to maturity is a difficult time for individuals, and will be for society as well.

The market economy is an amazing institution. Market forces are justly credited with an unprecedented and astonishingly rapid increase in consumer goods over the past three centuries. Poor people in affluent countries today have many luxuries that kings of Europe could not have dreamed of in centuries past, and we have achieved this through a system that relies on free choice. In the market in its pure form, individuals are free to purchase and produce any market good they choose, and there is no controlling authority apart from the free will of individual humans. Of course, the pure form exists only in textbooks, but competitive markets do show impressive powers of self-regulation. Arguments for modifying such an admittedly impressive system must be persuasive indeed. However, a brief detour into the history of markets and economics suggests that such modifications occur all the time.

Coevolutionary Economics[6]

As Karl Polanyi showed in his classic *The Great Transformation*,[7] the economic system is embedded as a component of human culture, and like our culture, it is in a constant state of evolution. In fact, our ability to adapt to changing environmental circumstances through cultural evolution is something that most clearly distinguishes humans from other animals. Economic, social, and political systems, as well as technological advances, are examples of cultural adaptations. All these systems have adapted in response to changes in the environment, and these adaptations in turn provoke subsequent environmental change, to which we must

[6]Many of the basic ideas here come from the work of Richard Norgaard, including R. Norgaard, Coevolutionary Development Potential, *Land Economics* 60: 160–173 (1984) and R. Norgaard, Sustainable Development: A Coevolutionary View, *Futures*: 606–620 (1988).

[7]K. Polanyi. *The Great Transformation: The Political and Economic Origins of Our Time*. Boston: Beacon Press (2001).

again adapt in a coevolutionary process. Examples of some of the major coevolutionary adaptations and their implications for future change will help illustrate this concept.

From Hunter-Gatherer to Industrialist

For more than 90% of human history, humans thrived as small bands of nomadic hunter-gatherers. Anthropology and archaeology together provide us with a reasonable understanding of the hunter-gatherer economy. Rather than the "nasty, brutish and short" life that many imagine, early people met their basic needs by working only a few hours a day, and resources were sufficient to provide for both young and old who contributed little to gathering food. A recent study of the !Kung, who live in a very arid, marginal environment, found that 10% of the population was over 60, which compares favorably with populations in many industrialized countries.[8]

Small bands of hunter-gatherers would deplete local resources and then move on to places where resources were more abundant, allowing the resource base in the previous encampment to recover. Mobility was essential to survival, and accumulating goods reduced mobility. Numerous chronicles by anthropologists attest that hunter-gatherers show very little concern for material goods, readily discarding their possessions, confident in their ability to make new ones as needed.[9] Property rights to land made no sense in a nomadic society, and prior to domestication some 10,000 years ago, property rights to animal herds were virtually impossible. Food was also shared regardless of who provided it, perhaps partly because of technological limits. Some food simply cannot be harvested in discrete bundles, and if hunters bring home a large game animal, unshared food would simply rot or attract dangerous predators.[10] Studies of the !Kung and other tribes found that both young and old were generally exempt from food gathering, and even many mature men and women simply chose not to participate in this activity very often, yet were given equal shares of the harvest.[11]

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[8]R. Lee, "What Hunters Do for a Living." In J. Gowdy, ed. *Limited Wants, Unlimited Means: A Reader on Hunter-Gatherer Economics and the Environment*. Washington, DC, Island Press, 1998.

[9]M. Sahlins, "The Original Affluent Society." In J. Gowdy, op. cit.

[10]Recent anecdotal evidence supports this relationship between storage technology and property rights. In an indigenous community in Alaska, the government provided freezers for food storage, ad the impact was dramatic. Where previously successful hunters would share their game with the community, freezers (probably contemporaneous with the breakdown of other social structures) enabled hunters to store their game for their own leisurely consumption. Older, younger, or weaker members of the community were left without a source of subsistence.

[11]Lee, op. cit.

If for most of human existence, private property and wealth accumulation were impractical and absent from human society, it is hard to argue that these are inherent characteristics of human nature, rather than cultural artifacts.

Gradually hunter-gatherer societies developed the technology to store large quantities of food for months on end, an essential precursor to agriculture. Agriculture ended the nomadic lifestyle for many early peoples. People began to settle in towns or small communities, which led to greater population concentrations than had previously been possible.[12] The technologies of storage and agriculture changed the nature of property rights, and were in fact required before property rights could make sense. Certainly agriculture itself made some form of property rights to land essential. Surplus production allowed greater division of labor and specialization, which in turn led to ever-greater production, fostering extensive trade and eventually the development of money. Greater populations, the need to protect increasing riches against other groups, and the need to defend property rights within the community meant more need for government, and ruling classes developed.[13] Ruling classes and the needs of the state clearly had to be supported through the productive capacity of others, which inevitably led to some sort of tax system and concentrations of wealth in the upper echelons of the hierarchy.

The chain of evolutionary events did not end there, of course. Higher populations and agriculture would have disrupted local ecosystems, eventually decreasing their capacity to produce food and materials independently of agriculture. This only increased the demands society would place on agriculture. These demands, accompanied by a more rapid exchange of ideas in denser communities, stimulated new technologies, such as large-scale irrigation.[14] Irrigation over time led to increased soil salinity, eventually reducing the capacity of the ecosystem to sustain such high population levels without further agricultural innovations or migration.

The Industrial Revolution

Ever-greater surplus production, accompanied by better ships, allowed trade on an expanding scale. Traders exchanged not only goods but also ideas, further speeding up the rate of technological progress. Among the

[12]J. Diamond, J. *Guns, Germs, and Steel: The Fates of Human Societies*, New York: Random House, 1997.

[13]Many political philosophers argue that the primary purpose of government is to protect private property. In the words of John Locke: "Government has no other end but the preservation of property," from "An Essay Concerning the True Original, Extent, and End of Civil Government."

[14]Diamond, op. cit.

crucial technological leaps was the ability to use nonrenewable mineral resources. Trade also allowed specialization to take place across regions, not only across individuals within a society. Technological advance and global markets laid the groundwork for the Industrial Revolution.

The Industrial Revolution had profound impacts on the economy, society, and the global ecosystem. For the first time, human society became largely dependent on fossil fuels and other nonrenewable resources (partially in response to the depletion of forests as fuel). Fossil fuels freed us from dependence on the fixed flow of energy from the sun, but it also allowed the replacement of both human and animal labor by chemical energy. This increased energy allowed us ever-greater access to other raw materials as well, both biological and mineral. New technologies and vast amounts of fossil energy allowed unprecedented production of consumer goods. The need for new markets for these mass-produced consumer goods and new sources of raw material played a role in colonialism and the pursuit of empire. The market economy evolved as an extremely efficient way of allocating such goods, and stimulating the production of even more.

International trade exploded, linking countries together as never before. A greater ability to meet basic needs, and advances in hygiene and medical science, resulted in dramatic increases in population, whose needs were met through greater energy use and more rapid depletion of resources. Growing populations quickly settled the last remaining frontiers, removing the overflow valve that had allowed populations to relocate as local resources ran out. Per-capita consumption soared, and with it the waste output that now threatens to degrade our ecosystems.

The Era of Ecological Constraints

As we stated earlier, economics is the science of the allocation of scarce resources among alternative ends. The success of the Industrial Revolution dramatically reduced the scarcity of consumer goods for much of the world's population. The accompanying economic growth, however, now threatens the former abundance of the goods and services produced by nature upon which we ultimately depend. These have become the newly scarce resources,[15] and we must redesign our economic system to address that reality. Unfortunately, our ability to increase consumption while depleting our resource base has led people to believe that humans and the economy that sustains us have transcended nature. In the current system, the greatest claims to wealth have seemingly nothing to do with natural

[15] See r. Hueting, *The New Scarcity and Economic Growth: More Welfare Through Less Production?*, Amsterdam: North Holland, 1980.

resources, but rather are acquired through financial transactions on computers that physically do nothing more than move electrons. While knowledge and information are important, ultimately wealth requires physical resources. A recipe is no substitute for a meal, even though a good recipe may improve the meal.

Though the current economic system has been around for a remarkably short time in relation to past systems, it has wrought far greater environmental changes. These changes have redefined the notion of scarce resources, and they demand correspondingly dramatic changes in economic theory and in our economic system. Change in our economic system is inevitable. The only question is whether it will occur as a chaotic response to unforeseen disruptions in the global life support system, or as a carefully planned transition toward a system that operates within the physical limits imposed by a finite planet and the spiritual limits expressed in our moral and ethical values. The answer depends largely on how fast we act, and the burning question is: How much time do we have?

The Rate of Change

For the vast majority of human history, technological, social, and environmental changes occurred at a glacial pace. The agricultural revolution was really not a revolution but a case of evolution. For example, it probably took several thousand years to create corn from the ancestral stock of teosinthe.[16] People generally saw no evidence of change from one generation to the next, and human culture could evolve at a correspondingly slow pace to adapt to the changes that did occur. Only with the Industrial Revolution did change really begin to accelerate to the extent that we could notice it from one generation to the next. And much of what the Industrial Revolution did was to increase the extraction of nonrenewable resources, thereby increasing human material consumption. As a result of this subsidy from nature, the general perception was that the future would always get better, and all that was needed was more of the same. Our response has been to use up this finite subsidy at ever greater rates, so that now, for the first time in human history, we can dramatically change the Earth's systems on a human time scale (a truly new thing under the sun). In fact, it threatens to alter the ability of the Earth to support life. While cultures have continually and slowly evolved in adapting to new technologies and new constraints, the unprecedented rate of change in technology and ecological degradation means we no longer have the luxury of biding our time. Most likely we will have to change our cultural institutions and values in response, particularly the economic institutions and

[16]Diamond, op. cit.

values that have led to this state of affairs. Since there is certainly some limit to how fast we can adapt culturally, we need also to consider seriously how to slow down the rate of change that is forcing the adaptations. It is worth remembering that not all change is desirable, and that even desirable change can be too fast.

The Difficulty of Achieving Desirable Change

It would be foolish to underestimate the difficulty of finding the right balance between limiting and adapting to change. Currently, our economic system is focused primarily on the microeconomic issue of efficient allocation. Applied economics also focuses on the macroeconomic issue of maximizing growth. Ecological economics, however, focuses primarily on the larger macroeconomic issue of how big is too big. This is the question of **scale**. How large, in its physical dimensions, should the economic system be relative to the ecosystem that sustains it? As soon as we ask this question, we imply that there is an optimal scale (and many believe we have already surpassed it) and hence a need to end growth. If we accept a need to end growth, we must also accept a need to address the distribution issue much more seriously.

Scale is the physical size of the economic subsystem relative to the ecosystem that contains and sustains it.

The Link Between Sustainable Scale and Just Distribution

Distribution is the apportionment of resources among different individuals. Why does ending growth require us to focus on distribution?

First, it seems pretty likely that the negative impacts of our excessive resource use will be worse for future generations than for our own. Thus, concern with scale involves a concern for future generations, or intergenerational distribution. Yet some 1.2 billion people alive today live in abject poverty, while many others have so much wealth they scarcely know what to do with it. It would be a peculiar set of ethical beliefs that would have us care about generations not yet bon while ignoring the plight of the miserable today.

THINK ABOUT IT!

Why might excessive resource use have greater impacts on future generations than on the current one? Look back at the definition of Pareto efficient allocation. If the current generation is the de facto owner of all resources, could it be Pareto efficient for the current generation to consumer fewer resources so that future generations are better off?

Second, as long as the economy is growing, we can always offer to the poor the future prospect of a slice of a larger pie. We do not need to redistribute now, some argue, because concentrated capital feeds the capitalist system, and if the poor remain patient, their misery will soon be

relieved. This is certainly a much more politically palatable option than redistribution, but as soon as we call for an end to growth, this option is gone. We certainly can't ask today's poor to sacrifice their hopes for a better future so that unborn generations will enjoy necessities of which they can only dream—especially when a reluctance to redistribute wealth today would suggest that the future generations for whom the poor are asked to sacrifice are likely to be someone else's children. Thus, distribution is of central importance to ecological economics.

Neoclassical economics is concerned almost solely with efficient allocation. Ecological economics also considers efficient allocation important, but it is secondary to the issues of scale and distribution. As we will see, in fact an efficient allocation cannot even be theoretically determined without a prior resolution to the distribution and scale questions. Typically that resolution is to take the existing distribution and scale as "given."

Fortunately, as McNeill reminds us, it is only since the Depression that the growth fetish has taken control of economics. And as readers of this book will learn, if they don't know it already, there is a lot in economics that is true and useful—that is independent of the growth ideology, and that we could hardly do without. Indeed, as we shall show, the basic economic tools of optimization themselves provide the best means for arguing against the preoccupation with growth.

Why study economics, and in particular ecological economics? As we noted at the beginning of this chapter, economics is about what we want, and what we have to give up to get it. Growth is one more thing we may want, and like anything else, we have to give up something to get it. Ecological economists always ask if the extra growth is worth the extra sacrifice it entails. Neoclassical economists tend to forget this question, or to believe that the answer is always affirmative.

BIG IDEAS to remember

- Ends and means
- Pareto efficient allocation
- Allocation, distribution, scale
- Growth versus development
- Throughput
- Coevolutionary economics