This chapter introduces the key economic concepts, models, and methods that can help inform institutional research in higher education.

Overview of Economic Concepts, Models, and Methods for Institutional Research

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The discipline of economics can be traced back to the pioneering work of Adam Smith (1776). In the subsequent two hundred years, economics has blossomed into a social science that has contributed to countless fields. In this introductory chapter, we provide an overview of some of the key economic concepts, models, and methods relevant to the work of institutional research (IR) professionals. Given the size and breadth of the field, and the page constraints within which we have to accomplish this chapter’s goals, our review necessarily misses many important concepts that may be helpful to institutional researchers who want to understand economics. Therefore, at the end of this chapter, we provide a list of readings that may be of interest to those who want to delve further into the subject.

Economics as a discipline is greatly misunderstood by the general public. If one were to ask the person on the street to name the first word that came to mind when hearing the word economics, likely responses would include money, profit, business, and perhaps dull, boring, and difficult. Economics has even been referred to as the dismal science by various commentators. Although many people equate economics with professional fields such as finance and accounting, it has much more in common with other social and behavioral sciences such as sociology or psychology and even with natural sciences like physics.
The field of economics is frequently broken down into two main areas of inquiry: microeconomics and macroeconomics. Microeconomics examines the decision-making process for smaller units within the economy. A typical microeconomics course is broken into two parts: economics of the individual and economics of organizations. Macroeconomics deals with problems at a more aggregate level. Macroeconomists might study how to measure the performance of a state or national economy, whereas a microeconomist would focus on how the prices for goods and services are determined and how changes in such prices affect consumer (individual) or producer (organization) behavior. Another branch of economics, known as econometrics, cuts across all of these areas of inquiry. Econometrics is the application of statistics to the study of economic problems. Although there are macroeconomic topics of relevance for higher education, we focus exclusively on microeconomics in this chapter. For readers interested in more detailed and in-depth explanations of the general microeconomic concepts, models, and methods presented in this chapter, we encourage them to consult some of the fine microeconomic textbooks available at the introductory level, such as Mankiw (forthcoming) or McEachern (2006), or at the intermediate level, such as Pindyck and Rubinfeld (2005) or Frank (2003).

The Economic Approach

The textbook definition of economics is that it is the study of how best to meet unlimited wants when there are not enough resources to meet them all. Some common features of economic analysis underlie every aspect of work in the field. The first is the reliance on theoretical models to describe how decision makers act in different situations (see, for example, Pindyck and Rubinfeld, 2005). Economists ask the following three questions when examining a decision-making process:

• Who are the decision makers?
• What goals are the decision makers trying to achieve?
• What constraints do the decision makers face?

Because there are not enough resources to do everything that the decision maker would like, hard choices have to be made about what can, and cannot, be done in a given situation. Therefore, the economic approach views decision makers as using an optimization process to maximize goals subject to resource constraints. Table 1.1 shows some examples of pursuing goals in the face of limited resources that apply to higher education settings, such as a student deciding whether to attend college, a faculty member deciding how to allocate time between teaching and research, and an enrollment manager deciding which students to admit. Economists use this fundamental approach to conceptualize, model, and analyze decision-making processes in virtually any problem or situation.
Table 1.1. Examples of Economic Problems in Higher Education

<table>
<thead>
<tr>
<th>Topic</th>
<th>Deciding Whether to Go to College: High School Senior</th>
<th>Allocating Time Between Teaching and Research: Faculty Member</th>
<th>Deciding Which Students to Admit: Enrollment Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question 1: Who are the decision makers?</td>
<td>High school senior and her family</td>
<td>Faculty member</td>
<td>The enrollment manager; other administrators who set general admissions policies</td>
</tr>
<tr>
<td>Question 2: What goal is the decision maker trying to achieve?</td>
<td>Maximize her lifetime utility</td>
<td>Maximize her utility</td>
<td>Maximize reputation net income</td>
</tr>
<tr>
<td>Question 3: What constraints does the decision maker face?</td>
<td>Time and income/wealth</td>
<td>Time</td>
<td>Classroom and dormitory space; income from governments and donors to offset tuition</td>
</tr>
</tbody>
</table>

This optimization process may be characterized graphically as the point where the decision maker’s goals are consistent with the constraints. Figure 1.1 provides a general depiction of this optimization.

In this figure, a decision maker has to decide how to use two resources (A and B) to reach a goal, subject to the constraint that there are only so many units of A and B to use. At the point where the goal or objective function is tangent to the constraint line, the decision maker is maximizing the goal subject to this constraint because any other allocation of resources, aside from A* and B*, would not be as successful at achieving the goal.

Economics focuses on the way in which these decisions are made, and the emphasis on money in much of economics is a result of this approach because some organizations, such as business firms, have profit maximization as their assumed goal. The “dismal science” label perhaps reflects the emphasis on scarcity and the necessary decisions that follow from this. The labeling of economics as a difficult subject follows in part from the heavy reliance on mathematics and quantitative analysis to describe the actions of decision makers.

Economists typically make a series of assumptions in theoretical models about how decision makers act and the setting in which they operate. These assumptions—for example, ceteris paribus, or other things held constant—are intended to simplify the model so that attention can be focused on a particular aspect of the decision maker’s problem. For example, an economist who is studying the effects of financial aid on a student’s decision to attend college might make simplifying assumptions about...
the student’s sources of income, the choices available to her, and the satisfaction she receives from alternatives. These assumptions have led some to criticize economic models on the grounds that they are too unrealistic to describe the problem at hand. Without such assumptions, however, it would be very difficult, if not impossible, to examine the effects of particular factors on the behavior of individuals and organizations because the resulting model would be intractable. Furthermore, Friedman (1953) argued that the real value of a model lies not in the accuracy of its assumptions but rather in the accuracy of the predictions that are obtained from the model. Therefore, it is the capacity of economic models to predict and explain the behavior of individuals and organizations in response to changes in institutional policies or environmental factors that makes them particularly useful as analytical frameworks for institutional researchers and other data or policy analysts.

A second key feature of economic analysis is the notion of opportunity costs (see, for example, Frank, 2003; Paulsen, 1989). Whenever an individual or an organization makes a choice to do one thing, other alternative choices are forgone due to scarce resources. For example, when a high school graduate of traditional age decides to attend college full time and not enter the job market, that student’s forgone earnings while attending college constitutes a substantial opportunity cost of college. In fact, research has shown college enrollment rates to be positively related to changes in the overall rate of unemployment (Heller, 1999; Kane, 1999). Or when a college-bound student decides to enroll at Indiana University, she gives up the option of enrolling at the University of Iowa or at other universities due to her time and income constraints. Opportunity costs, broadly defined, rep-
Figure 1.2. Production Possibilities Frontier for an Individual Faculty Member

Suppose that the faculty member is currently at point A, where he spends nineteen hours each week on teaching activities and twenty-one hours each week on research. If his institution adopted a new policy requiring faculty to spend at least twenty-two hours each week on teaching, this would mean giving up three hours on research. Thus, the opportunity cost to the faculty member represents the value of those three hours that can no longer be spent on research.

A third important feature of economic analysis is the emphasis on comparative statics, which generally refers to how an equilibrium or outcome would change if something else (typically a constraint) changes. A graphical example of comparative statics would be to determine in Figure 1.1 how the resource allocation (A*, B*) would change if the constraint line were to shift outward or inward, or pivot to the left or right. In fact, much of policy analysis can be thought of as actions that lead to changes in the constraints that decision makers face. A comparative statics question in higher education research might be how the faculty member’s time allocation between teaching and research shown in Figure 1.2 would change if the rewards for teaching were increased. Economic tools are arguably
better at examining how an equilibrium will change than they are at determining how the equilibrium was reached in the first place. For example, the economic model of student choice may be less useful at predicting which specific institutions most students attend—due to the many factors that students take into account when forming preferences and making decisions—but would be more useful at determining how student decisions might change as their financial aid, family income, or another factor changes, all else equal.

**Economic Theory of Individual Behavior**

The first half of almost any principles-level microeconomics course is typically dedicated to the economic theory of how individuals make decisions. Individuals are the decision makers in this context. Every one of us makes countless decisions throughout the day: what to eat, what to buy, whether to work, and so on. This also applies to higher education in many different ways. Students must make decisions about whether to go to college and, if so, which institution to attend, whether to transfer or stay at their current institution, which major to pursue, and how much time and effort to devote to their classes. Faculty members also make decisions about how to allocate their time between teaching, research, and service activities; what research projects to pursue; where to seek employment; and whether to stay at their institution or look for another job.

Economists argue that the goal for individuals is to maximize the utility or satisfaction from their actions (see Pindyck and Rubinfeld, 2005). Utility is a construct used to represent the satisfaction that individuals receive from the goods and services that they consume. An indifference curve is used to represent the various combinations of goods and services that give an individual the same level of utility. It is important to note that economists do not assign fixed values of utility to goods and services, but rather allow for people to derive different levels of satisfaction from the same good or service.

Individuals face two major constraints that inhibit the amount of utility that they can achieve. First, they need income in order to purchase goods and services. Thus, a person’s income limits the amount of satisfaction that he or she can attain. Figure 1.3 shows an example for a student who wants to allocate her income between higher education (x-axis) and all other goods and services (y-axis). She has a fixed amount of income ($50,000) to allocate between higher education and all other goods. She also knows that she would receive utility from going to college and from buying other goods and services, and the utility from possible combinations of college and other goods are represented by the indifference curves. Given her budget constraint, the highest utility she can attain is 300 utils (U = 300). Although she would prefer any combination along the indifference curve labeled “U = 400,” this is not possible given her income constraint. Therefore, point A constitutes this consumer’s equilibrium, where her utility has been max-
imized, given her budget constraint, by optimally allocating her resources—that is, by dividing her budget between $X_A$ units of higher education and $Y_A$ units of other goods and services.

This economic model of individual decision making can also be used for a variety of analyses of consumer (student) behavior, using the method of comparative statics—comparing two states of equilibrium where an outcome differs because a parameter, such as a constraint faced by a decision maker, changes. For example, Figure 1.4 reconsiders the optimization process by which the student consumer portrayed in Figure 1.3 seeks to maximize her utility, given her budget constraint, by allocating her resources between units of higher education and other goods and services. Each of the colleges in the student’s choice set informs her that they are offering her a $1,000 tuition discount. This reduces the price of college for this student, and Figure l.4 represents the lower price of higher education by rotating the student’s initial budget constraint so that its intercept on the horizontal axis is farther from the origin. The new equilibrium is at point $B$, where the student once again optimally allocates her resources and achieves a higher level of utility ($U = 400$) with her new budget constraint, by allocating her resources between $X_B$ units of higher education and $Y_B$ other goods and services.

Another central feature of the economic theory of how individuals make decisions is the economist’s assumption of rational behavior on the part of decision makers (DesJardins and Toutkoushian, 2005. Although this assumption is very important for understanding the economic model
of decision-making behavior, the economist's conceptualization of rational behavior is often misunderstood and misused by social scientists—including some economists—and policy analysts. The economic concept of rational behavior assumes that the individual decision maker seeks to maximize his or her own utility subject to the limitations posed by his or her budget constraint. However, it is important to understand the meaning of this assumption in terms of the basic elements that, in combination, constitute the essence of the model of optimal decision making. First, the map of indifference curves represents the preferences of an individual decision maker and the utility or perceived values he or she assigns to each possible combination of goods and services. But a consumer's preferences for any particular combination of goods and services—and the perceived values and utilities the consumer assigns to it—are unique, subjective, and idiosyncratic. These preferences can vary considerably from one individual to another because of individual differences in factors that may influence one's preferences. For example, the formation of preferences may reflect individual differences in early home, school, and community environments; religious, moral, and ideological views; or access to relevant and accurate information or experiences with respect to each combination of goods and services. As a result, two individuals with the same budget constraint could make different choices about allocating their incomes between units of higher education and other goods and services; yet both would be behaving rationally if each acts to maximize his or her own util-
ity or satisfaction, based on his or her own unique and different preferences, subject to the budget constraints each faces.

The second element in the model of optimal decision making is the set of constraints, particularly income or time constraints, that a decision maker faces, which represent the decision maker’s resources or opportunities for use in the pursuit of higher levels of utility or satisfaction. Consumers clearly differ in the constraints they face in their decision making, particularly in terms of income constraints. As a result, two individuals with the same preferences for combinations of higher education and other goods and services but different budget constraints could make different choices about college attendance, yet both would be behaving rationally.

The economist’s framework for analyzing individual decision making, including its assumption of rational behavior, can also be used to look at how individuals allocate another important resource, their time, between competing activities such as work and leisure. The constraint in this model is not income but rather “time,” because individuals only have so many hours per day and days per year to divide among activities. The individual’s objective or goal is to maximize utility from how he or she spends time. According to this model, people derive utility from both the work that they do and the goods and services that they can buy with the income that they earn from working. People also obtain utility from not working because they can spend their time doing other things that give them pleasure; however, time spent in leisure has an opportunity cost because it takes time away from working, thus lowering income. Figure 1.5 depicts this situation for a faculty member who has to allocate discretionary time per day between doing faculty work and all other activities. The x-axis measures hours per day spent in non-work activities, and the y-axis represents the income earned from working.

**Figure 1.5. Depiction of Faculty Time Allocation**
Another central element of economic analysis is based on the concept of marginalism and the method of marginal analysis (Frank, 2003; Paulsen, 1989; Pindyck and Rubinfeld, 2005). Marginal analysis provides another way of representing and thinking about the economic model of optimal decision making. Economists emphasize decisions made “at the margin.” Examples of such decisions would include a current college student deciding whether to invest in an additional year of college, a faculty member deciding whether to engage in an additional research project, or a college’s office of admissions deciding whether to enroll an additional high-ability, high-income student with merit aid. In these cases, the term marginal is a synonym for additional, and the pursuit of the marginal year of college, the marginal research project, and the marginal student enrolled would yield marginal benefits (MB) and marginal costs (MC) for the decision maker.

The MB-MC analytical framework is highly generalizable and applicable to the analysis of optimal decision-making processes in many situations. The only element of the model that changes across situations is the nature of the marginal benefits or marginal costs that the decision maker considers. For example, what constitutes a marginal benefit or a marginal cost would vary across the three scenarios already introduced: a student considering investing in an additional year of college, a faculty member considering engaging in an additional research project, and an enrollment manager considering enrolling more high-ability students with merit aid. For the student, the MB of investing in an additional year of college would be the student’s perception of the marginal rate of return to college, and the MC would be the marginal interest costs of funds required to invest in another year of college (see, for example, Paulsen, 2001a). For the faculty member, MB could include additional compensation for publications, greater compensation, status and job security due to earning tenure, and the like. MC could include opportunities forgone due to less time spent on teaching, such as loss of income for teaching a summer course or an extra section of a regular semester course, and less positive student evaluations due to less time for improvement of teaching. Finally, for the enrollment manager, MB might include additional tuition and fee revenue and less tangible benefits such as a student’s contributions to the institution’s reputation, the quality of its educational experiences, or the diversity of its student body. MC would include the expense of merit aid and the additional instructional, technological, and other educational costs incurred.

Figure 1.6 illustrates optimal decision making using marginal analysis. As long as the MB of an additional unit of college, research, or student enrollment exceeds its MC, it is worthwhile to pursue or acquire additional units. In Figure 1.6, for any quantity of units below $Q_B$, such as $Q_A$, the MB from the last unit ($3) exceeds its MC ($1), indicating that $Q_A$ units represent a less than optimal quantity. However, if the MC of an additional unit exceeds its MB, then the decision maker would be better off by reducing the number of units acquired. In Figure 1.6, for any quantity of units above $Q_B$, such as $Q_C$, the MC from the last unit ($3) exceeds its MB ($1), indicating
that $Q_C$ units represent an amount greater than the optimal quantity. The decision maker reaches the optimal number of units of college, research, or student enrollment only when the last unit acquired yields marginal benefits equal to marginal costs ($MB = MC$). The optimal quantity is represented in Figure 1.6 by $Q_B$, which corresponds to point $A$ where $MB = MC$—that is, $MB = $2 and $MC = $2.

**Economic Theory of Markets**

In capitalistic societies, most goods and services are bought and sold in markets. Markets can vary greatly in size and scope and are used to determine the price charged for goods and services and how they should be allocated among potential buyers. The *economic theory of competitive markets* holds that these decisions are made based on the intersection of the market supply and demand curves, as shown in Figure 1.7 (Mankiw, forthcoming; Pindyck and Rubinfeld, 2005). These supply and demand curves come from the decisions made by individuals and organizations as described earlier. The individual’s demand curve for higher education, for example, is obtained by varying the price of higher education and observing the new amounts of higher education that she would consume at each price. By changing the wage rate and observing the new amounts of hours worked, one can obtain an individual’s labor supply curve.
Figure 1.7. Equilibrium in Competitive Markets

The market demand curve is the sum of all of the demand curves for individuals that arise from the decisions individuals make. The downward slope indicates that as the price of the good decreases, individuals would be willing and able to purchase more of the good. Similarly, the market supply curve is the sum of the supply curves for all suppliers of the good or service. As the price rises, the quantity supplied would also rise, leading to an upward sloping market supply curve.

The equilibrium price in a market is found where the quantity demanded equals the quantity supplied. If prices were set above this level, then quantity supplied would exceed quantity demanded and suppliers would have an incentive to reduce prices. And when prices are below equilibrium, quantity demanded would exceed quantity supplied; buyers would increase their offers and, as a result, drive up market prices. Because various forces lead to shifts in the market demand and supply curves, equilibrium can be thought of as a continuously moving target toward which the market is always being drawn.

Figure 1.8 illustrates one of the many applications of the economic theory of markets that can be very useful for institutional researchers and other policy analysts: how students with different characteristics can have very different degrees of responsiveness to changes in price—in other words, tuition in higher education settings (Paulsen, 1998). Economists use the concept of elasticity in two ways to describe the sensitivity of demand to changes in price. The first way is to calculate the elasticity at any point along the demand curve (point elasticity), which is discussed in Chapter Four of this volume. The second way is to describe the overall steepness of the demand curve as being either relatively high in its elasticity (flat or nearly flat) or relatively low in its elasticity (steep).
Figure 1.8. Demand, Supply, and Variations in Price Elasticity

Figure 1.8 presents one upward-sloping supply curve and two downward-sloping demand curves. One demand curve portrays students who demonstrate relatively high elasticity \((D_{Hi})\) in response to changes in the price of college—that is, tuition. The other demand curve portrays students who show relatively low elasticity \((D_{Li})\) in response to changes in tuition. Research has consistently shown that, just like consumers in other markets, students from lower-income backgrounds are highly elastic in their responsiveness to tuition increases, while their higher-income counterparts show relatively low elasticity (Heller, 1997). In the figure, the differences between high and low tuition elasticities are illustrated in the notable differences in the steepness of the two demand curves and in the decreases in the quantity of students enrolled \((Q)\) that accompany increases in the price of college \((P)\). In particular, as the price of college increases from \(P^*\) to \(P'\), the quantity of enrollment among high-elastic, lower-income students decreases by the amount \(Q^* - Q_{Hi}\), which is substantially greater than a corresponding decrease for low-elastic, higher-income students by the amount \(Q^* - Q_{Li}\). Finally, the elasticity construct is generalizable to applications assessing students’ enrollment responses to other changes in price-related variables besides just tuition, such as changes in student fees, institutional aid, state or federal grants, federal or private loans, and other price subsidies such as private scholarships.

Economists recognize, however, that for many reasons, higher education is a unique service that does not fit perfectly into the competitive market model. First, the model is premised on the assumption that the goal of the suppliers is profit maximization. It is generally understood that most
institutions of higher education do not act to maximize profits; however, economists have offered a number of alternative goals, including revenue maximization, cost minimization, maximization of discretionary income, and reputation (Bowen, 1980; Garvin, 1980; Paulsen, 2000).

A second important feature of higher education is that there are positive externalities associated with its consumption (Baum and Payea, 2004; Fatima and Paulsen, 2004; Paulsen, 2001b). This means that when individual students invest in higher education, not only do they benefit directly in the form of private benefits such as higher lifetime earnings, but others in society also benefit from their higher education. These benefits to society, which are often called external benefits or externalities, include monetary and nonmonetary benefits, and the latter can be particularly difficult to quantify; however, because of their existence, a competitive market would produce too little higher education from society’s point of view. This underinvestment occurs because individual students who are investing in higher education cannot capture or internalize these benefits to society. Indeed, such benefits are literally external to the investment decision of any individual student. The individual student’s willingness to pay for higher education is based on his or her perceptions of the value of the private or internal benefits he or she will acquire. However, society has a willingness to pay for the external benefits that accrue to it.

To remedy this problem of underinvestment in and underproduction of higher education in the presence of positive externalities, a number of entities, including governments and individuals, subsidize some of the costs of higher education. In the public sector, the primary source of such subsidies takes the form of state appropriations to institutions, whereas the primary source of such subsidies for institutions in the private sector arises from fundraising and endowment income. Growth in these subsidies slows the growth of tuition, which stimulates greater enrollment.

Because of the important role of subsidies in the higher education enterprise, Gordon Winston (1997) argues that higher education prices are set according to the following formula: Price = Cost − subsidy. In contrast, the equation Price = Cost + profit is often used to describe price setting in much of the for-profit world. Virtually all institutions use subsidies from one source or another to reduce the price charged to students. Toutkoushian (2001) showed, for example, that in 1995, state, national, and local governments covered approximately 72 percent of the net price of public higher education. Although private institutions are rarely subsidized by governments, they also receive significant revenues from private sources as well as sponsored research grants that also help to lower the net price charged to students by about 37 percent in 1995.

Winston’s pricing equation for institutions of higher education is also helpful for understanding the causes of trends in higher education pricing. This illustrates that price increases could be due to rising costs, falling subsidies, or some combination of the two. This point is often lost on policy-
makers and even the general public, who have observed a long history of tuition increases that exceed the rate of inflation. In the competitive market model, cost increases are the primary cause of rising prices. The history for the United States, in fact, shows that state funding for higher education has fallen as a share of total revenue, dropping from 57 percent in 1975 to 47 percent in 1995 (Toutkoushian, 2001). As Figure 1.9 shows, for public institutions in particular, increasing costs—such as administrative, student services or instructional costs, ceteris paribus—that are not offset by commensurate increases in state appropriations would lead to an upward shift in market supply, and for a given demand, would lead to higher prices—in other words, tuition inflation.

**Economic Theory of Organizational Behavior**

The economist’s model of how organizations such as colleges behave is also instructive for understanding many aspects of higher education. Economists think of colleges in much the same way as other organizations in that they rely on an input-production-output to deliver higher education services. In this model, organizations take a series of inputs, run them through a production process, and create outputs from the inputs (see, for example, Frank 2003). The outputs are then used to achieve particular goals and objectives for the organization. This model is most often used to describe for-profit firms that produce goods such as automobiles and books. The inputs are the raw materials that are converted into products. The production process represents the plant, equipment, workers, and technology used to make products. The
outputs then represent the final goods or products produced by the firm. In this instance, the goal of the firm is clear: maximize profits.

Does this description hold for institutions of higher education? There are a number of reasons that this model would hold at some level of abstraction for higher education (Hopkins, 1990). Both students and faculty can be thought of as inputs that colleges and universities use to produce teaching and research outputs. The classrooms, facilities, faculty, curriculum, and others are part of the production process institutions use for educational purposes. The knowledge gained by students; the articles, books, and patents derived from research activities; and the services provided to governments and other entities can all be considered outputs. This general framework can be applied to nonprofit as well as for-profit institutions.

Nevertheless, the production model in higher education is more complex than in other sectors of the economy in some important ways (Rothschild and White, 1995). First, students are both an input and part of the production process, in that they have to exert effort to learn. Similarly, faculty are an input for producing research and also constitute part of the production process for producing teaching. Second, postsecondary institutions produce multiple outputs in the areas of teaching, research, and service. Many policymakers fail to recognize this when they calculate statistics such as expenditures per student because some of these costs are incurred to produce research and service outputs. Third, institutions are constrained in their ability to acquire better inputs. If Ford or GM wanted to build better automobiles, they could easily go out and acquire better raw materials such as steel and glass (albeit at a higher price) to accomplish this goal. In contrast, institutions of higher education can use as inputs only the subset of students who apply to their institution, are admitted, and accept their offer. Economists would say that institutions are constrained by students’ demand for the institution. Similarly, institutions are constrained by faculty members’ demand and supply curves in their ability to acquire better faculty for producing research and teaching outputs. Finally, the production analogy is complicated by the fact that the goals of postsecondary institutions are sometimes ambiguous and difficult to measure. As we noted, most economists agree that institutions of higher education do not attempt to maximize profits, although some have suggested related goals such as maximizing revenue or maximizing the institution’s discretionary budget (Bowen, 1980; Paulsen, 2000). However, while other possible and probable goals, such as maximizing student learning and gains to society through research, are noble, they are also next to impossible to measure. Without such measures, it becomes difficult to examine the activities of institutions and determine without considerable ambiguity and imprecision how they contribute to these goals.
Recommended Readings

We hope that this chapter has helped provide some insight into how economists view the world and, in particular, how they approach problems facing higher education. For those who are interested in learning more about economic reasoning, we recommend a number of readings.

General Background. These readings explain in greater detail the general models and approaches that economists use. Excellent overviews of economic reasoning can be found in Hausman (1989), Hirshleifer (1985), and Aaron (1994). Among the countless introductory-level textbooks on microeconomics that have been published, two of the more successful and interesting of these are Mankiw (2006) and McEachern (2006). At the intermediate level, the textbooks rely more heavily on mathematics to explain key concepts. The textbook by Pindyck and Rubinfeld (2005) is among the more accessible in this group. Finally, for readers interested in the economics of labor markets, we recommend the textbook by Ehrenberg and Smith (2000).

Economics and Education. Relatively few books have focused on the application of economics to education. Among the exceptions are the early work by Blaug (1970), Thurow (1970), and Perlman (1973); the somewhat later work by Garvin (1980), Cohn and Geske (1990), Hoenack and Collins (1990), and Johnes (1993); and more recently, the books by Belfield (2000), and Paulsen and Smart (2001). In addition, Ehrenberg (2004) published an informative overview of the types of econometric studies that have been focused on higher education. It is more common for economists to focus on particular aspects of higher education in their work. For example, Hoxby (2004) edited an excellent volume on the economist’s view of how students make decisions about their postsecondary education. Toutkoushian (2003a) reviewed how economic models can be used to examine trends in the labor market for postsecondary faculty and looked at the economic approach to pay equity studies in higher education (2002, 2003b).

Historical Works. Many works in the field of economics have had particular significance for higher education. Here, we highlight a few of these. Schultz (1961, 1963), Becker (1964), and Mincer (1974) were among the first economists to describe the notion of human capital and how higher education is a means for individuals to acquire it. This work became the basis for much of the subsequent research conducted by economists and others on topics such as the investment in human capital, college choice, and the return on education. In addition, some economists have argued that colleges act as an efficient screening mechanism for employers (Spence, 1973; Stiglitz, 1975). This has spurred a debate that continues to this day as to whether colleges primarily sort students based on ability or impart knowledge and skills that become part of their human capital, or some combination of the two. Becker’s article on the theory of time allocation (1965)
emphasized that time is a scarce resource to be allocated in much the same way as income or wealth, thereby expanding economic reasoning to situations outside of product markets.

**Readings on Economics for the Layperson.** Several books and articles offer a more accessible and sometimes lighthearted look at economics. Perhaps the best known of these is the recent best-seller *Freakonomics*, by Levitt and Dubner (2005). The authors use economic reasoning to look at a wide range of topics, including the connection between sumo wrestlers and teachers. Although she was not an economist (and would have probably objected to being labeled as one), Ayn Rand used her novels such as *Atlas Shrugged* (1957) to describe key economic concepts such as rationality, the pursuit of self-interest, and the private and social benefits of capitalism and competitive, free markets. Finally, Roger Arnold’s recent book (2005) offers numerous illustrations of how economists think, each embedded in one or more “economic stories” on topics ranging from drug busts to SUVs to playing tennis.

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