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PAPER

The Economics of Early Childhood Policy

What the Dismal Science Has to Say About Investing in Children

M. Rebecca Kilburn, Lynn A. Karoly

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1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138
1200 South Hayes Street, Arlington, VA 22202-5050
4570 Fifth Avenue, Suite 600, Pittsburgh, PA 15213-2665
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Preface

Scientific discoveries over the past two decades have transformed the way in which researchers, policymakers, and the public think about early childhood. For example, recent research on brain science has provided a biological basis for prevailing theories about early child development, and cost-benefit analysis has reoriented some of the discussion about early childhood toward prevention programs. Several recent reports have been particularly helpful in translating research findings into practical information that improves policy. Among these is a 2007 report by the Center on the Developing Child at Harvard University, the National Forum on Early Childhood Program Evaluation, and National Scientific Council on the Developing Child that integrates advances in neuroscience, developmental psychology, and program evaluation to develop a unified framework that provides evidence-based guidance for policymaking related to early childhood policy. In this paper, we summarize the contributions from another field—economics—that has played an increasingly prominent role in discussions about early childhood policy. The insights from economics also have broader implications for social programs focused on prevention, especially during childhood, rather than later-in-life remediation. This research will be of value to individuals who are interested in early childhood policy, including decisionmakers in the public and private sectors, service providers, and the public more generally.

This publication is based on a literature review and synthesis that was funded and comanaged by Casey Family Programs, a foundation with a mission to provide and improve—and ultimately to prevent the need for—foster care. The research was conducted within RAND Labor and Population, a unit of the RAND Corporation. Any opinions, findings and conclusions, or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of Casey Family Programs.

RAND Labor and Population

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For more information on RAND Labor and Population, contact Arie Kapteyn, Director, RAND Labor and Population, RAND, Corporation, 1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138, (310) 393-0411 x7973, Arie_Kapteyn@rand.org.

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Abbreviations

ACE	Adverse Childhood Experiences
CPC	Child-Parent Center
ER	emergency room
HIPPY	Home Instruction for Parents of Preschool Youngsters
HV	Home Visiting for New Families at Risk of Child Abuse and Neglect
IHSF	Integrated Health Services for Foster Care Children
IRR	internal rate of return
NACCRRA	National Association of Child Care Resource and Referral Agencies
NFP	Nurse-Family Partnership

CHAPTER ONE

Introduction

The economic and business communities are known for basing decisions on the results of financial calculus and the joyless reality of allocating scarce resources among a seemingly limitless list of personal and societal demands. Furthermore, these fields are also often associated with the view that the private sector is best positioned to meet most of these personal and societal demands. So people have taken notice when an increasing chorus of Fortune 500 CEOs, Federal Reserve Bank analysts, Nobel Prize–winning economists, and other business and economic leaders have led the call to increase public "investments" in early childhood. This paper helps decisionmakers in the public and private sectors, service providers, and the public more generally master two economic concepts that have implications for early childhood policy: human capital theory and monetary "payoffs" from early childhood investments. First, we briefly review some of the factors that contributed to the evolution of economists' and business leaders' support for early childhood investments.

An Accumulating Body of Scientific Findings

With the increase in computing power and data availability came the first building blocks of the growing body of scientific findings that help motivate more emphasis on early childhood. Specifically, the past two decades have witnessed a proliferation of data and report cards on child well-being that have facilitated the widespread knowledge of how poorly U.S. children fare compared to their counterparts in other developed countries. Such projects as the Annie E. Casey Foundation's Kids Count and the Federal Interagency Forum on Child and Family Statistics' signature report raised awareness that, in the United States,

- babies are increasingly born at low birth weight
- elementary-aged children are overweight and asthmatic at growing rates
- more than 700,000 children spend time in foster care each year
- levels of achievement in math and science lag behind those of the rest of the developed world
- nearly a quarter of all violent victimizations involved a juvenile offender (Federal Interagency Forum on Child and Family Statistics, 2007).

In short, data clearly show that large numbers of children in the United States are at risk of experiencing poor outcomes.

A second type of research finding that lays the foundation for an increasing emphasis on the importance of early childhood is that this period provides the underpinnings for physical, cognitive, and emotional development in childhood and outcomes later in life. For example, a recent report by the Center on the Developing Child at Harvard University, the National Forum on Early Childhood Program Evaluation, and National Scientific Council on the Developing Child (2007) integrated advances in neuroscience, developmental psychology, and program evaluation and drew the following conclusions:

- Early experiences help determine whether a person's brain architecture develops in ways that promote future learning, behavior, and health.
- Rigorous evaluations show that there are effective early intervention strategies that can improve a wide range of outcomes from childhood through early adulthood.

Furthermore, in a decade-long ongoing project, the Adverse Childhood Experiences (ACE) Study demonstrates that very common, stressful experiences in childhood—"adverse experiences"—are pathways toward bad outcomes in adulthood, including premature mortality, disease and disability, and unhealthy behaviors (Felitti et al., 1998; CDC, 2005). The study found that two-thirds of adults in a well-educated population had experienced at least one of the following adverse childhood experiences: abuse, neglect, witnessing domestic violence, growing up with alcohol or other substance abuse, mental illness, parental discord, or crime in the home. An implication of the study is that preventing these experiences during childhood may help improve individuals' long-term well-being.

Hence, research findings from the past decade and a half increasingly emphasize the importance of laying a strong foundation in early childhood and that there is a range of early childhood programs that can successfully put children on the path toward positive development and prevent poor outcomes in adulthood.

Paradigm Shift: Treatment to Prevention

A second factor that fits with the economic and business approach to decisionmaking is a shift in thinking in the public-health and social-service sectors from a treatment paradigm to a prevention paradigm (Halfon, DuPlessis, and Inkelas, 2007; Yach et al., 2004). Indeed, most social-service systems are organized to deliver services to individuals who have been identified as having poor outcomes, such as substance-abuse treatment, incarceration, and child-protective services. Combined with results from early childhood–program evaluations, which show that preventive services may yield better outcomes for participants than a treatment approach, a new crop of studies in the past decade also indicate that this approach may have benefits for the people who foot the bill for these services. For programs ranging from Home Instruction for Parents of Preschool Youngsters (HIPPY) (a low-intensity parent-education program being implemented in thousands of sites across the country) to the High/Scope Perry Preschool Project (a two-year, model early childhood–education program implemented in the 1960s), cost-benefit analyses have demonstrated that early childhood interventions can reduce the costs of future treatment by promoting positive development of participants and mitigating future poor outcomes. In fact, an increasing number of studies document that these programs can save so much money in terms of future reductions in treatment costs that they more than pay

for themselves. Economists and business people would characterize this as an "investment"—an outlay of funds now that would produce a future return.

Next, we discuss human capital theory and show how it is consistent with patterns observed in evaluations of child outcomes. Then we describe cost-benefit analysis and related tools as they apply to early childhood issues. Our concluding section summarizes the implications of economic concepts for early childhood policy.

CHAPTER TWO

Human Capital Theory

The science of economics as originally practiced by Adam Smith focused on measuring and explaining the production, distribution, and consumption of goods and services. Economists developed models of production processes and investment, which were mathematical representations that were judged by whether they matched patterns observed in data about these phenomena. Contemporary economic theories use similar mathematical representations or models to provide a unifying framework for a variety of human behaviors ranging from crime to who marries whom. Using minimalist mathematical representations to depict the qualities that uniquely characterize humans may not be the first inclination of most social scientists when they try to explain complex and rich behavior, such as taking care of one's children or spending years in school studying literature. We will illustrate here how an economic model known as *human capital theory* is, in fact, a useful unifying framework that encompasses many of the disparate threads of current thinking about early childhood policy, including these concepts:

- Later skills build on earlier skills.
- Development occurs in multiple stages.
- Human development involves the interaction of nature and nurture.
- Human capital, skills, and capabilities involve multiple dimensions.

The fundamental insight of economics for discussion of skill formation is this: *Human capital theory provides a simple framework that is consistent with observations about skill formation and helps us predict how various policies would be likely to affect skill formation.*

Over the past 30 years, the human capital model has evolved to incorporate features and generate conclusions that are highly consistent with the leading frameworks in other fields, such as human development (see Center on the Developing Child at Harvard University, National Forum on Early Childhood Program Evaluation, and National Scientific Council on the Developing Child, 2007). This chapter provides an overview of the basics of the human capital model, highlighting the parallels between the economic approach to skill formation and the framework from disciplines that are more traditionally associated with child development. Rather than being alternative approaches, the various fields examining the process of skill formation are increasingly converging toward a unified framework.

A Model of Skill Formation

The economic model of skill formation is known as *human capital theory*. In his path-breaking book *Human Capital,* Becker (1975, p. 9) described human capital as "activities that influence future monetary and psychic income by increasing the resource in people." He included in the set of such investments on-the-job training, schooling, and migration. In sum, the term *human capital* encompasses the productive capacities embodied in people and may include knowledge, health, experience, skills, and other characteristics.

Economic models have been called *metaphors* (McCloskey, 1990), and they are representations of real-world human behavior that strip out extraneous information, leaving only the essential factors needed to explain observed patterns (Boulding, 1970). The model of productive human capacities is called *human capital theory* to highlight the features that are analogous to money, physical capital, and other types of investments. We now provide a brief overview of the essential elements of the human capital model, walking readers through a transition from a narrative version to the mathematical exposition. This illustrates the concept that economic models use math simply as a shorthand way of presenting concepts that can also be presented using prose (McCloskey, 1990).

To begin, note that human capital develops or is produced over time, as shown in Figure 2.1. A child's human capital in the second period is transformed through a human-development process that builds on the human capital embodied in that child in the previous period. This transformation of human capital over successive periods is known as a *human capital–production process*, which evokes further analogies between the process of accumulating human capital and the processes that generate other valuable goods in society.

Now note that, while the human capital that one has in the first period is the basic building block on which one can build additional human capital in the second period, there are other important inputs into the development of human capital. Figure 2.2 shows some of these additional inputs, including the time that parents spend with children, the human capital of the parents themselves, the time devoted to these children by other individuals (such as grandparents, child-care providers, or teachers), the human capital of these other individuals, material goods (such as food or books), and service inputs, which might include health care, English tutoring, or transportation to school. Increases in all of the inputs shown here should raise the amount of human capital produced.

A key feature of this representation of skill formation is that both nature and nurture are represented. Nurture is represented by parents' time and human capital, as well as the material good and service inputs that are put into the process. One way that nature is represented in these models is through the human capital in the very first period, which one could think of as innate abilities present at birth. Additionally, human capital is really a set of

Figure 2.1
Producing Human Capital

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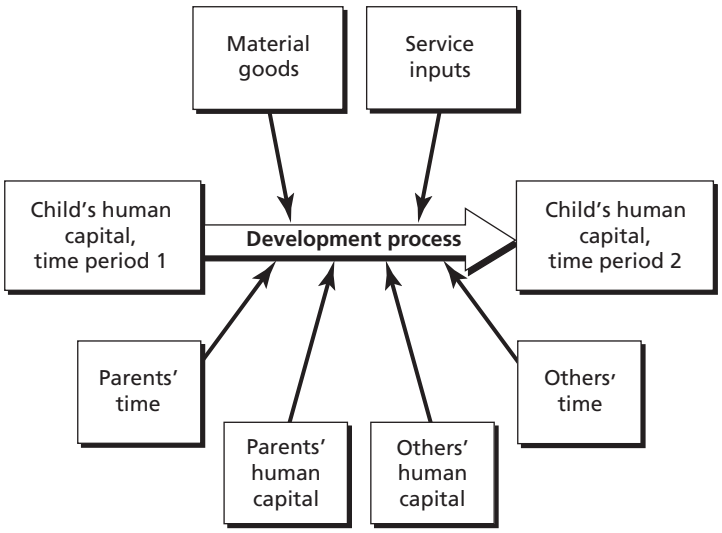
Figure 2.2
Other Inputs in Developing Human Capital

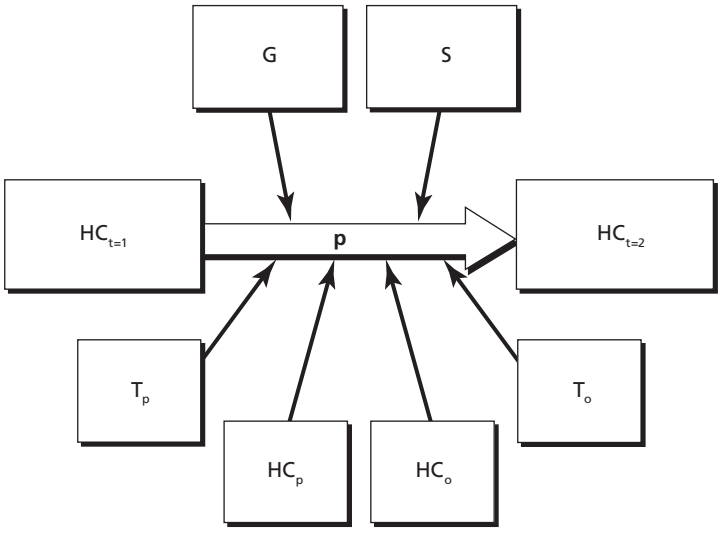


RAND *OP227-2.2*

characteristics, such as health, experience, cognitive and noncognitive skills, and other productive capabilities.

Now we will begin to transform this literary and pictorial representation of the human capital–production process into the mathematical representation of the same process, which economists use. In Figure 2.3, we have substituted the statements $HC_{t=1}$ and $HC_{t=2}$ for the terms representing human capital in the first period and human capital in the second period, respectively. We also represent the development process with the symbol p. The mathematical representation also shows the human capital of parents and others as HC_p and HC_o,

Figure 2.3
Symbolic Representation of Human Capital Production



RAND *OP227-2.3*

respectively. In the same manner, we convert the terms for parents' time and others' time to the symbols T_p and T_o, respectively, and the terms for material good and service inputs to G and S.

Now that we have converted all of the essential elements of the model into symbols, we translate the diagrammatic representation of development into the mathematical representation. In Figure 2.4, the two terms for human capital in the first period and the second period stand alone as terms that can be used in an equation rather than their physical representation as in Figure 2.3. Instead of using an arrow to represent that transformation of human capital in the first time period into human capital in the second time period, we now represent this using function notation. The terms inside the parentheses, such as human capital in the first period, are the inputs, the function p represents the production process that transforms these inputs into the output (human capital production in the second period), which is shown on the right side of the equation in Figure 2.4. We also show parents' time, T_p, and parents' human capital, HC_p, as inputs into the production of human capital by putting them inside the production equation. We complete the conversion of the diagrammatic representation of the model into an equation by adding the remaining inputs—others' time and human capital, material goods, and service inputs—into the equation.

To complete the model, note that this process is repeated in every time period over a person's life starting at birth, when $t = 1$. Assuming that a person lives to be 100 years old and each time period represents a year, the model would look like a set of 99 equations stacked on top of each other (see Figure 2.5).

Note that, under different conditions, the importance of different inputs varies. For instance, parents' time and human capital inputs may become less important as a person ages, while service inputs, such as graduate school or on-the-job training, may become more important. Another example is that, for families in which the parents' ability to provide inputs is compromised, the time and human capital inputs of other caregivers might be particularly important. For example, in cases in which the parents have mental health challenges, foster families might be the most important sources of time and human capital inputs. While we do not show the mathematical representations of these features here, they can easily be incorporated into the notation.

Elaborations of this basic model are more explicit about the nature of the production process, p. For example, Heckman (2007) described a model in which increases in human capital stocks in each period actually raise the efficiency of human capital production, so that

Figure 2.4
Human Capital Production as an Equation

$$p(HC_{t=1}, T_p, HC_p, T_o, HC_o, G, S) = HC_{t=2},$$

where

p is the developmental process
$HC_{t=1}$ is human capital at time period 1
T_p and HC_p are the time and human capital inputs of parents
T_o and HC_o are the time and human capital inputs of other caregivers
G and S are purchased goods and services.

RAND *OP227-2.4*

Figure 2.5
Lifetime Model of Human Capital Production

$$p(HC_{t=1}, T_p, HC_p, T_o, HC_o, G, S) = HC_{t=2}$$
$$p(HC_{t=2}, T_p, HC_p, T_o, HC_o, G, S) = HC_{t=3}$$
$$p(HC_{t=3}, T_p, HC_p, T_o, HC_o, G, S) = HC_{t=4}$$
$$\ldots$$
$$p(HC_{t=98}, T_p, HC_p, T_o, HC_o, G, S) = HC_{t=99}$$
$$p(HC_{t=99}, T_p, HC_p, T_o, HC_o, G, S) = HC_{t=100}$$

RAND *OP227-2.5*

the more human capital one has acquired, the more one's human capital grows for any given level of inputs. Heckman related this variant of the model to argue that investments early in the lives of at-risk individuals should be more productive than remediation of disadvantages later in the life cycle. Although economic theory does not suggest the exact form of the production process, *p*, economists can empirically test the relationship between various inputs and the production of human capital to quantify the strength of the relationships.

Insights from the Human Capital Framework

This model of how human capabilities develop incorporates features that are central to current thinking about child development:

- Child development is a process that happens over multiple time periods.
- The stock of skills generated in one period depends critically on the stock of skills that served as a foundation in the previous period.
- Both nature and nurture play roles in further skill development, and, in fact, they complement each other.
- Human capabilities include a set of productive characteristics, including cognitive and noncognitive skills, experience, and health.

A fifth point also emerges from this framework, but it is dependent on the strength of the relationship between inputs at different points in the life course and the production of human capital:

- Investing in human capital formation early in the life cycle is likely to be more efficient than mitigating disadvantage at older ages. Indeed, research on attempts to provide remedial human capital investments for adults in the form of job training, for example, have often concluded that these efforts have been largely unsuccessful (Heckman, 2000).

It is worth noting that these five features match five of the six core concepts highlighted in the Center on the Developing Child at Harvard University, National Forum on Early Childhood Program Evaluation, and National Scientific Council on the Developing Child (2007) report, in the section that summarizes the basic science of child development based on findings

from neuroscience, developmental psychology, and program evaluation. The only one of the report authors' six core concepts that is not explicitly captured by this exposition of the human capital framework is the relationship between toxic stress and compromised human development, although the role of factors (such as stress) can readily be incorporated in the model as another input—albeit an unproductive one—into the human capital–production process.

The value of the economic model lies not only in providing a unified framework for depicting the development process, but also in its ability to help understand the likely consequence of changes, including policy changes, on development. The predictions of human capital theory are consistent with patterns documented in the evaluation literature. Here are just a few examples:

- A policy that increased the education level of women would be expected to have a positive impact on their children's human capital. In terms of the model in Figures 2.1–2.5, this policy would be shown by an increase in HC_p, and an increase in the level of this input into child development would be expected to raise children's human capital. In fact, research by Currie and Moretti (2003) demonstrated this effect for young children.
- A program that successfully promotes children's human capital development would be more effective if it served children in preschool than if it were delayed until after school entry. This is because raising human capital at age 4, or increasing HC_4, would lead to higher levels of human capital in more successive periods than would raising human capital at a later age, say age 8. This is consistent with the results of Reynolds, Temple, Robertson, and Mann (2001), who found that the Chicago Child-Parent Center (CPC) produced bigger reductions in special education placement and grade retention when provided in preschool than when provided in elementary school.
- Conducting screening of children as soon as they enter the foster care system so that they can be referred to mental health services would be likely to promote healthy development and prevent problems later in childhood (Rosenberg et al., 2007). Research suggests that early access to quality mental health services for children in foster care helps reduce later emotional disorders in young adulthood, enhance academic success, reduce social isolation, and prevent the placement of their own children, with considerable savings to society (Pecora, Kessler, O'Brien, et al., 2006; Pecora, Kessler, Downs, et al., forthcoming).

In sum, human capital theory suggests that investments in individuals' productive capacities have the potential to improve individual outcomes and that these investments might produce the greatest payoffs when made early in individuals' lives. This characterization of the development of human potential as a production process with parallels to other outlays of money and time that would produce returns in the future helps motivate the analysis of the monetary payoffs to early childhood programs, and we discuss this next.

CHAPTER THREE

Monetary Payoffs

Perhaps the most widely recognized intersection between economics and early childhood policy is the analysis of the costs and benefits of early childhood programs and related analyses that describe the rate of return on investments in early childhood programs.

The fundamental insight of economics when comparing early childhood policies with other social investments is that *a growing body of program evaluations shows that early childhood programs have the potential to generate government savings that more than repay their costs and produce returns to society as a whole that outpace most public and private investments*.

Next, we briefly summarize the related strands of research evidence regarding the monetary returns of early childhood policies: cost-benefit analysis and return on investment. Then, we summarize the economic underpinnings of the potential trade-off between quality and quantity inherent in early childhood services. We end this chapter with an overview of how the analysis of the payoffs from early childhood programs fits in a larger context of early childhood–policy decisions.

Throughout this chapter, we use two fictitious programs to help make the abstract concepts more concrete. While these are not real-world programs, the costs and outcomes we use are based on data on programs that are being provided in early childhood. The two programs are

- *Integrated Health Services for Foster Care Children (IHSF)*. Following the recommendations of the 2004 issue of *Future of Children*, this program provides initial screening for children under age 3 in the foster care system and provides well-baby care, oral care, mental health services, and other preventive care in a continuous, comprehensive, primary-care setting (Bass, Shields, and Behrman, 2004).
- *Home Visiting for New Families at Risk of Child Abuse and Neglect (HV)*. This program offers free home visits to new parents who have been identified as being potentially at risk of perpetrating child abuse or neglect. It begins at the child's birth and continues until the child turns three.

Using these two programs as examples, we show how the tools of economics related to monetary payoffs can help policymakers make decisions related to early childhood initiatives.

Cost-Benefit Analysis

Cost-benefit analysis (and the related approach of cost-saving analysis) is a tool that can be used by decisionmakers to decide whether a program is of value to the relevant stakeholders. Value is determined by comparing program costs and benefits and by comparing measures derived from costs and benefits (discussed next). Later in this chapter, we present alternative decision-making rules that may be used in selecting the best program or group of programs in which to invest with the objective of putting available dollars to their most valued use.

The logic inherent in the idea that effective early childhood programs might repay their costs is a very reasonable one. Rigorous program evaluations have shown that nearly two-dozen early childhood programs improved children's outcomes in the short run and about a third of them with longer follow-up show improved outcomes in the longer run, as late in adulthood as age 40 (see Promising Practices Network, 2008, for a review of early childhood–program evaluations). Furthermore, many of the positive benefits of these programs represent reductions in poor outcomes that are very expensive to government, society, or both: remedial education, crime and delinquency, use of income supports, lost wages, and health care treatment. However, a compelling logic model does not guarantee that the dollar value of the benefits is greater than the dollar value of the costs—this is really an empirical question. And indeed, the empirical evidence is encouraging. Several reviews of evaluations from the early childhood–intervention field have calculated the benefits and costs of these programs and generally have found that some, but not all, of these programs generate future savings to government and benefits to society more generally that are at least as large as the programs' costs (Aos et al., 2004; Karoly, Kilburn, and Cannon, 2005).

When examining the returns from early childhood programs using the cost-benefit methodology, analysts can take several different perspectives, each from the vantage point of a different stakeholder. One stakeholder is the government or, collectively, all individuals as taxpayers. From this perspective, the appropriate calculation is to compare costs borne by the public sector to provide a given program versus those benefits (or costs) that accrue to the public sector as a result of the changes caused by the program. This approach is often called *cost-saving analysis*. Cost-benefit analysis takes the broadest perspective and accounts for the returns to society as a whole, both private returns and public returns. Private returns may accrue to program participants, where those returns are the net monetary gain accounting for both costs of participation (e.g., time spent participating) and the value of favorable (or unfavorable) outcomes (e.g., higher wages or lower transfer payments). Other members of society may experience private gains as well, beyond the benefits obtained as taxpayers (e.g., reductions in crime-victim costs). In other words, cost-saving analysis compares program costs to savings to government, while cost-benefit analysis compares program costs to savings to government and savings to individuals in society, including participants and other members of society.

A recent review of 20 early childhood–program evaluations (Karoly, Kilburn, and Cannon, 2005) identified 12 outcomes affected by the programs that generated monetary savings (or costs) to government, and these spillover benefits are shown in Table 3.1. In addition, as noted earlier, other private benefits from these improved outcomes may accrue to program participants and nonparticipants. As indicated in Table 3.1, some program effects may generate costs or negative benefits if there are unfavorable outcomes or spillover costs (e.g., reducing dropout rates raises the costs of secondary education, since more children stay in school

Table 3.1
Child Outcomes Improved and Monetary Benefits or Costs to Government from Early Childhood Programs

Child Outcome Affected	Monetary Benefits (or Costs) to Government
Reduced child maltreatment	Lower costs to child welfare system
Reduced child accidents and injuries	Lower costs for emergency room (ER) visits and other public health care costs
Reduced incidence of teen childbearing	Lower costs for public health care system and social welfare programs
Reduced grade repetition	Fewer years spent in K–12 education
Reduced use of special education	Lower costs for special education
Increased high school graduation rate	(More years spent in K–12 education [drop-out rates are reduced])
Increased college attendance rate	(More years spent in postsecondary education)
Increased labor force participation and earnings in adulthood	Increased tax revenue
Reduced use of welfare and other means-tested programs	Reduced administrative costs for social welfare programs; reduced welfare-program transfer payments
Reduced crime and contact with criminal justice system	Lower costs for criminal justice system
Reduced incidence of smoking and substance abuse	Lower costs for public health care system and from premature death
Improved pregnancy outcomes	Lower medical costs due to fewer low birth weight babies

SOURCE: Adapted from Karoly, Kilburn, and Cannon (2005, Table 4.1).

NOTE: Parentheses indicate monetary costs to government on net (rather than savings to government).

longer). Other program effects may not be readily translated in dollar terms and are therefore omitted from the cost-benefit calculations.

Which type of analysis is most relevant—cost-saving or cost-benefit—will depend on the circumstances and motivation for the economic analysis. For example, a public sector decisionmaker (such as a mayor, governor, or legislator) may prefer a cost-saving analysis because it will indicate whether a program implemented with public funding can be paid for within the existing structure of taxes and government services. A program that does not generate sufficient government savings to pay for itself may still provide positive benefits to society as a whole, but those societal benefits can be used to offset the program's costs only by raising taxes or reducing government benefits.

Spending on programs typically happens up front, while the benefits may not accrue until many years in the future. A dollar accrued in the future is valued at a lower amount than a dollar available now, so the value of those costs and benefits that are at different points in time are converted to a common point in time, called *present value*, through discounting. Future dollars are typically downweighted by 3 to 6 percent per year for social spending (Bradford, 1975; Karoly, Kilburn, Bigelow, et al., 2001), and the costs and benefits are generally converted to the year in which the program would begin.

Since many of the benefits of early childhood programs are realized well into the future, discounting implies that benefits from early childhood programs are downweighted in cost-benefit analysis more than similar benefits from programs provided later in childhood. For instance, if an early childhood program and a program delivered at age 15 both raised high school graduation rates by 12 percent, and both programs' costs and benefits were compared when services were delivered, the early childhood program's benefits would be discounted at least an extra 10 years relative to the program provided in the teen years. Another way of stating this is that investments that pay off in a shorter period of time are preferred. If the programs in this example each generated $150 in benefits per student and each cost $100 per child to provide, the program delivered at age 15 would be preferred, because it generates the same benefits in less time. Hence, while human capital theory suggests that investing earlier in a person's life would have greater returns (see Heckman, 2007), it would need to be the case that the rate of return from these early investments was greater than the discount rate in order for early childhood programs to be preferred over approaches delivered later in life. This could be true if the rate of improvement in child outcomes from an early investment were greater than the discount rate or if early investments changed the capacity of individuals to convert later investments into productivity at a greater rate (see the discussion in Heckman, 2007).

In sum, cost-saving and cost-benefit analyses convert program effects into net monetary savings or benefits at each point in time for relevant stakeholders, adjust them for inflation, and discount them to express them in dollar values at the same point in time. Present-value benefits are then compared with present-value costs. We provide one example of the calculation of the dollar benefits due to a positive program outcome. The evaluation of the Nurse-Family Partnership (NFP) implemented in Elmira, New York, in the late 1970s found that participating children visited the ER 0.54 fewer times between the ages of two and four than did nonparticipants (Olds, Henderson, and Kitzman, 1994). To calculate the value of this reduction in ER visits, we multiply 0.54 by the average cost of an ER visit for children of this age. The most recent approximation to this value is the average cost of an ER visit for children under age 18 in 2003: $423 (Machlin, 2006). Hence, in 2003 dollars, this would be an average reduction in ER spending of 0.54 × $423, or $228. Using a price inflator to convert this to 2007 dollars yields a value of $257. Using a 4 percent discount rate to convert dollar values to the start of the program at the birth of the child, the discounted value of the ER-cost savings at ages 3 and 4 for our example would be $224.

We further illustrate some of these concepts using our two fictitious programs. The IHSF program's costs, in present-value terms, are $4,800 per family over three years, while the HV program's present-value costs are $12,000 per family over three years, as shown in the first row of Table 3.2. The discounted benefits to government, as measured until the children are 15 years old, are $5,000 and $16,000, respectively. This implies that the IHSF program just breaks even with present-value savings to government of $200. The HV program saves government $4,000 on net in present-value terms, since it costs $12,000 and provides $16,000 in savings. Another way in which relative benefits and costs are sometimes presented is using a benefit-cost ratio. Benefit-cost ratios greater than 1 indicate that the benefits are greater than the costs. For this example, the benefit-cost ratio for the IHSF program is just over 1, while the benefit-cost ratio for the HV program is 1.3. In the last row of Table 3.2, we show that, with a $12 million budget to allocate, 2,500 families could participate in the IHSF program and 1,000 families in the HV program, if the funds were allocated to only one program. We will return to these numbers later, when we discuss policy decisionmaking.

Table 3.2
Costs, Savings to Government, and Number Served for Hypothetical Program Examples

	Hypothetical Program	
Cost or Benefit	**IHSF**	**HV**
Total cost over three years (present value) ($)	4,800	12,000
Benefits (savings) to government through age 15 (present value) ($)	5,000	16,000
Net benefits (savings) to government (present value) ($)	200	4,000
Benefit-cost ratio	1.04	1.33
Number served with budget allocation of $12 million	2,500	1,000

The cost-benefit methodology has been applied to a number of real-world early childhood programs that have been rigorously evaluated to measure the associated program effects (see Table 3.3). Our earlier research brought together results from various analyses of the costs and benefits of seven early childhood programs, including programs that provide parent education or home visiting and those that combined parent education or home visiting with early childhood education (Karoly, Kilburn, and Cannon, 2005). In the case of the NFP home visiting program, cost-benefit results are available for the group of higher-risk mothers served (those who were unmarried and had low socioeconomic status) and the lower-risk group (either married mothers or those with higher socioeconomic status). In addition, by combining results across evaluations of specific program types, specifically home visiting programs and center-based early childhood (preschool) programs, costs and benefits have been estimated on average for these program types. The program benefits may accrue to different stakeholders, as noted—for example, higher after-tax earnings might benefit the program participant, while higher tax revenue benefits the government.

There are several important overarching lessons from this set of findings, based on results available as of the last age of follow-up listed in the table. First, there is clear potential for early childhood programs to produce benefits that offset their costs, but not every early childhood program does so. Seven of the nine analyses found benefit-cost ratios greater than 1, implying that the benefits outweighed the costs, with a range between $2 and $17 in benefits for every dollar invested. However, even for those programs with positive net benefits to society as a whole, when viewed only from the perspective of the government, not all programs generate net savings to government sufficient to offset a full public sector investment in program delivery. A key area for future research is to identify the features of cost-effective programs (Elliot and Mihalic, 2004; Karoly, Kilburn, and Cannon, 2005).

Second, some of the variation in benefit-cost ratios results from differences in the length of follow-up for the program evaluations and the range of outcomes measured in the evaluations. For example, the highest benefit-cost ratio is for the Perry Preschool Project, which has followed participants until age 40, long enough to measure an array of adult outcomes that showed improvements, such as increased earnings and decreased criminal activity—outcomes that contribute significant benefits to one or more of the stakeholders shown in Table 3.3. Notably, two of the seven programs summarized in Table 3.3 did not generate positive net benefits based on outcomes measured as of the last follow-up. In the case of the Comprehensive Child Development Program, there were no significant improvements in the outcomes measured as of age 5. In the case of the Infant Health and Development Program, the

Table 3.3
Cost-Benefit Results of Selected Early Childhood Programs at Most Recent Follow-Up

Program	Age at Last Follow-Up	Program Cost ($)	Distribution of Benefits ($)			Total Benefit to Society ($)	Net Benefit ($)	Benefit-Cost Ratio
			Participants	Government Savings	Rest of Society			
Comprehensive Child Development Program: Case managers provide coordinated services to low-income families with children under 5	5	37,388	91	–101	0	–9	–37,397	—
HIPPY USA: Paraprofessionals provide home visits to disadvantaged families with children ages 3–5	6	1,681	1,940	485	607	3,032	1,351	1.80
Infant Health and Development Program: Home visiting and center-based child development program for low birth weight babies from birth to age 3	8	49,021	0	0	0	0	–49,021	—
NFP (full sample): Public-health nurses provide home visits to low-income first-time mothers from prenatal period to age 2	15	9,118	2,674	9,548	14,075	26,298	17,180	2.88
NFP (higher-risk sample): Public-health nurses provide home visits to low-income first-time mothers from prenatal period to age 2	15	7,271	1,277	32,447	7,695	41,419	34,148	5.70
NFP (lower-risk sample): Public-health nurses provide home visits to low-income first-time mothers from prenatal period to age 2	15	7,271	2,051	5,095	2,005	9,151	1,880	1.26
Home visiting for at-risk mothers and children (meta-analysis): Average effect across 13 home visiting programs	Varies	4,892	6,194	1,815	2,960	10,969	6,077	2.24
Abecedarian Program: Comprehensive, center-based child development program for at-risk children from infancy to age 5	21	42,871	NA	NA	NA	138,635	95,764	3.23
Chicago CPC: Center-based, one- or two-year, part-day academic-year preschool program with parent participation	21	6,913	22,715	19,985	6,637	49,337	42,424	7.14
Perry Preschool Project: Center-based, one- or two-year, part-day academic-year preschool program with home visiting	40	14,830	61,866	191,288		253,154	238,324	17.07
Early childhood education for low-income 3- and 4-year-olds (meta-analysis): Average effect across 48 preschool programs	Varies	6,681	6,036	4,329	5,377	15,742	9,061	2.36

SOURCE: Adapted from Karoly, Kilburn, and Cannon (2005, Table 4.4).

NOTE: All dollar values are 2003 dollars per child and reflect the present value of amounts over time where future values are discounted to age 0 of the participating child, using a 3 percent annual real discount rate. NA = not available. Meta-analysis is from Aos et al. (2004).

favorable effects as of age 8 were found on such outcomes as achievement tests, which are not readily monetized. Results from a follow-up through age 18 show sustained gains on achievement measures among program participants, but, again, such outcomes do not have a direct monetary impact (McCormick et al., 2006). Thus, the lack of any dollar benefits attached to the Infant Health and Development Program reflects the limits on expressing some of the benefits from early childhood programs in dollar terms.

Third, these results demonstrate that a spectrum of early childhood–program types can generate payoffs for society. For example, it was not just small-scale model programs that demonstrated favorable benefit-cost ratios. The Chicago CPC program is a large-scale program that has been implemented by the Chicago Public Schools and has been operating for four decades. HIPPY has sites in more than half the states in the United States and has been in operation for nearly a quarter century. Additionally, both very expensive and intensive programs, such as the full-day, full-year, Abecedarian program and the less expensive HIPPY program, have a positive monetary payoff. We also observe favorable returns for both home visiting programs and early education programs.

Fourth, there is some evidence that returns from early childhood programs may decline under certain conditions. For example, the separate results for the higher-risk and lower-risk mothers served in the NFP program show larger gains for the higher-risk group, the group for which the program could make more of a difference. Other research on preschool programs indicates that, while monetary payoffs may still be positive for universal programs, the rate of return may be higher when programs are targeted toward the groups that are likely to benefit from them most (Karoly and Bigelow, 2005). There is also limited evidence suggesting that there can be diminishing returns to program length—that is, that the incremental impact from each additional month or year of a child's enrollment might decline, implying that the returns are highest for the first increments of service tenure. For example, results from the Chicago CPC and Perry Preschool Project evaluations indicate that the effects of participating in the preschool program for two years are not double the effect of one year of participation (Reynolds and Temple, 1995; Reynolds, Chang, and Temple, 1997; Berrueta-Clement et al., 1984). The same may hold for the effect of service intensity for a given program length. Indeed, the design of many home visiting programs reflects this possibility: For example, the NFP provides weekly home visits for newborns up to six weeks of age, visits every other week until the child is 20 months old, and then monthly visits until the child turns two (NFP, undated). Note, however, that there may be minimum levels of service required to realize effects, and more intensive programs may offer greater total benefits (Karoly, Kilburn, and Cannon, 2005).

Return on Investment

Expressing the monetary payoffs of early childhood programs in terms of costs and benefits is appealing to most people, as this addresses the question of whether the benefits outweigh the costs—in other words, whether a program "pays for itself." Another way of expressing these monetary payoffs is by using the concept of an internal rate of return, or IRR. The IRR is calculated as the rate of return that equalizes the stream of costs and benefits and can be thought of as the effective annualized return that a program would produce given the stream of net benefits. Two programs with the same net present-value benefits may have different IRRs if the pattern of costs and benefits through time differs. For example, if two programs have the

same net present value but one has a benefit stream that is shifted toward younger ages, that program will have a higher IRR.

This approach was first popularized in a report by two economists from the Federal Reserve Bank of Minnesota (Rolnick and Grunewald, 2003). They estimated that the Perry Preschool Project yielded a real IRR of 16 percent for society as a whole, with an IRR of 12 percent accruing to government. They argued that this level of IRR compared favorably with most investments that government could make and even most investments in the private sector. The recommendations stemming from this report were that the public sector include investments in human capital—particularly those for early childhood development—in the suite of physical-capital projects that currently comprise economic-development programs, and the authors outlined a strategy for funding this type of investment.

The IRR for our two examples is shown in Table 3.4. With a small positive net benefit, the IHSF program has an IRR that is slightly above the assumed discount rate of 4 percent. In contrast, the larger positive net benefits associated with the HV program generate an IRR of 8.5 percent. Although the IRR approach has some methodological shortcomings (Karoly and Bigelow, 2005), the advantages of expressing the monetary payoffs in terms of an IRR are that it facilitates the comparison of the future stream of returns from early childhood programs to the returns from other investments, such as the stock market or a transportation project, and the terminology is familiar to the business and financial community.

While the cost-benefit and IRR findings from early childhood evaluations are very persuasive, it is important to note the weaknesses of relying exclusively on information provided by these calculations. In general, results of cost-benefit analyses of social programs can be sensitive to various methodological choices, such as the discount rate, which stakeholders are accounted for, which program benefits are expressed in monetary terms, the monetary values assigned to valued outcomes, and how to capture uncertainty associated with cost-benefit estimates (Gramlich, 1990). Often, because of different methodological choices, cost-benefit analyses performed by different groups of researchers will not necessarily be comparable.

There are also issues that arise in the context of applying the cost-benefit approach to early childhood programs (Karoly, Kilburn, Bigelow, et al., 2001). As noted in our examples, not all of the important benefits can be expressed in monetary terms in a straightforward manner. For example, the press and policymakers often focus on whether programs influence test scores as a key benefit, but there is no consensus on how best to reliably convert children's test scores into a monetary benefit. For this reason, this outcome is not included in most cost-benefit analyses of early childhood programs (Aos et al., 2004, is one exception). Another limitation is that most evaluations of early childhood programs do not follow participants long enough into the

Table 3.4
Internal Rate of Return for Hypothetical Program Examples

Hypothetical Program	IRR (%)
IHSF	4.6
HV	8.5

NOTE: The IRR is calculated based on the assumed present value of costs and benefits shown in Table 3.2. For each program, we assume that the costs are distributed evenly over the first three years of the child's life, while the benefits accrue in an even stream from age 4 to age 15. The present values were calculated assuming a real discount rate of 4 percent, discounted to the birth of the child.

future to measure some of the potential benefits, such as teens' criminal activity or adult earnings, which generate large government savings or benefits to society. As a result, since these potential benefits are not observed, unless they are projected based on other available information, they are not included in the cost-benefit calculations.

Finally, a challenge for the investment-paradigm arguments is that early childhood investments may take years or even decades to break even (Karoly, Greenwood, et al., 1998), and today's stakeholders, such as politicians and taxpayers, may not be willing to foot the bill for such investments if they have to wait so long for returns. Moreover, the primary beneficiaries may actually be future generations of taxpayers.

Quality Versus Quantity Trade-Offs

There is growing recognition in the early childhood–policy field that the child development benefits of early childhood services are tied to the quality of those services (Center on the Developing Child at Harvard University, National Forum on Early Childhood Program Evaluation, and National Scientific Council on the Developing Child, 2007). At least in the early childhood–education field, quality has been subdivided into two types: structural quality and process quality (Shonkoff and Phillips, 2000; Bowman, Donovan, and Burns, 2001). *Structural quality* refers to characteristics of quality that can be counted or measured quantitatively. These include child-to-staff ratios, amount of services provided, and caregiver education. *Process quality* refers to the more qualitative features of the services, such as the nature of child-caregiver interactions, how the classroom or group is managed, and approaches for supporting learning and healthy development.

The relationship between various elements of both structural and process quality in early childhood–education programs and child outcomes has received extensive study, although some results (such as the relationship with teacher education and training) are more controversial (see, for example, recent reviews provided by Shonkoff and Phillips, 2000; Bowman, Donovan, and Burns, 2001; Layzer and Goodson, 2006; and Gormley, 2007; and the discussion in Bogard, Traylor, and Takanishi, 2008; and Early et al., 2008). Generally, this literature shows that higher quality is associated with better child outcomes, although the relationship is stronger for some measures of quality than others.

However, there is relatively little information about the relationship between either structural or process quality and child outcomes from studies of other types early childhood services. One exception is Olds, Robinson, et al. (2002), who reported that greater levels of provider education improve children's outcomes in a home visiting program—the outcomes of children served by registered nurses were significantly better than those of the randomly assigned control-group children, but the outcomes of children served by individuals with less education and training were not significantly better than the those for control-group children. Similarly, positive organizational climate and treatment of staff are linked with more positive child and parent outcomes in the child welfare arena (Glisson and Hemmelgarn, 1998; Glisson and James, 2002).

Improving the structural quality of children's programs generally increases the cost of delivering services (Zerbe et al., 2008; Zellman and Gates, 2002). The National Association of Child Care Resource and Referral Agencies (NACCRRA) reported that staff salaries comprise the bulk of costs involved in providing early child care (Mohan, Reef, and Sarkar, 2006).

Improving child-care quality by reducing child-to-staff ratios or raising educational requirements would be expected to raise the staff salaries required to provide care. It is less clear whether services with greater process quality are necessarily more expensive to deliver, although it is not unreasonable to expect that higher process quality would raise program costs, as such quality is often attained by having better-trained, more-qualified, or better-compensated staff.

Raising the quality of early childhood services in the public or private sector, through such mechanisms as stricter regulations or a quality-linked reimbursement scale, may be appealing to policymakers, in that it is often viewed as a way to promote child well-being without any explicit budgetary impact. However, since features associated with higher quality almost always require more resources, in the absence of an associated increase in funding, a shift toward higher quality will entail a reduction in services offered. Thus, the fundamental insight of economics for discussion of early childhood quality is this: *There is generally a quality-quantity trade-off in early childhood services unless budget outlays grow.*

This is illustrated by a simple hypothetical example of a state that has allocated $60 million to a part-day, academic-year early childhood–education program for at-risk children. The relationship between quality and quantity and the total budget of $60 million in this case would be the price per child times the number of children:

$$\$60 \text{ million} = \left(\text{quality}\right) \times \left(\text{quantity}\right).$$
$$\$60 \text{ million} = \left(\text{price per child}\right) \times \left(\text{number of children}\right).$$

If the state decided to allow spending of $4,000 per child per year, one would expect that the care and education services provided would not achieve the quality of the programs that have been shown to improve child outcomes (Karoly, Kilburn, and Cannon, 2005). Raising the structural quality and, hence, spending per child to $6,000 per year would be more likely to achieve acceptable quality marks and is close to the per-child costs estimated for the Chicago CPC program, which has been shown to improve outcomes for low-income preschoolers in Chicago (Reynolds, 2000). A program costing $12,000 per year would still be spending less than the costs of well-known early childhood–education programs, such as the Carolina Abecedarian program and the Perry Preschool Project, which have demonstrated impacts on at-risk children's outcomes well into early adulthood (Karoly, Kilburn, and Cannon, 2005).

The $60 million for early childhood education serves very different numbers of children at the varying levels of quality, as shown in Table 3.5, and demonstrates the quality-quantity trade-off. The implications of this example are very clear: Providing higher-quality services

Table 3.5
Quality and Quantity Trade-Offs for an Early Childhood–Education Program with a $60 Million Annual Budget

Quality (price per child per year) ($)	Quantity (number of children served per year)
4,000	15,000
6,000	10,000
12,000	5,000

entails serving fewer children. Alternatively, to serve the same number of children, a rise in quality standards must be accompanied by a budget increase.

What is less clear in this context is the changes in child outcomes or other program effects that result from making these trade-offs between quantity and quality. For example, there is little information about how much the monetary benefits of early childhood programs will rise as quality is increased and whether the increase in the monetary value of program benefits as quality increases will be sufficient to offset an increase in program costs associated with higher quality. Furthermore, there may be minimum threshold levels of quality required to realize any benefits of early childhood services, meaning that trading off quantity for quality has different implications for program benefits at lower versus higher levels of program quality.

Historically, in the United States, child-care services were often viewed through the lens of maternal labor force–participation policies. This emphasis favored providing care for as many children as possible. More recently, child-care policy has increasingly focused on the child development and human capital–investment aspects, even shifting the semantics to use the term *early childhood education* in place of *child care*. The latter view, with its emphasis on child development, requires that the services meet minimum quality standards in order to achieve these positive developmental effects, although there is no consensus on the threshold levels of quality required to achieve developmental benefits (Karoly, Kilburn, and Cannon, 2005). In sum, early childhood policy wears two hats—one for supporting maternal labor force participation and one for child development—and these two goals, which could be approximated by "quantity" and "quality," are inherently competing against each other in a world of limited resources. Improving quality often requires quantity trade-offs and vice versa. Making choices among different quality-quantity combinations requires that decisionmakers prioritize the objectives of the policies and how they are going to rank alternatives. We now discuss how cost and outcome analysis fits into a broader context of policy-decision rules and how these can be used to help select among trade-offs.

Policy-Decision Rules

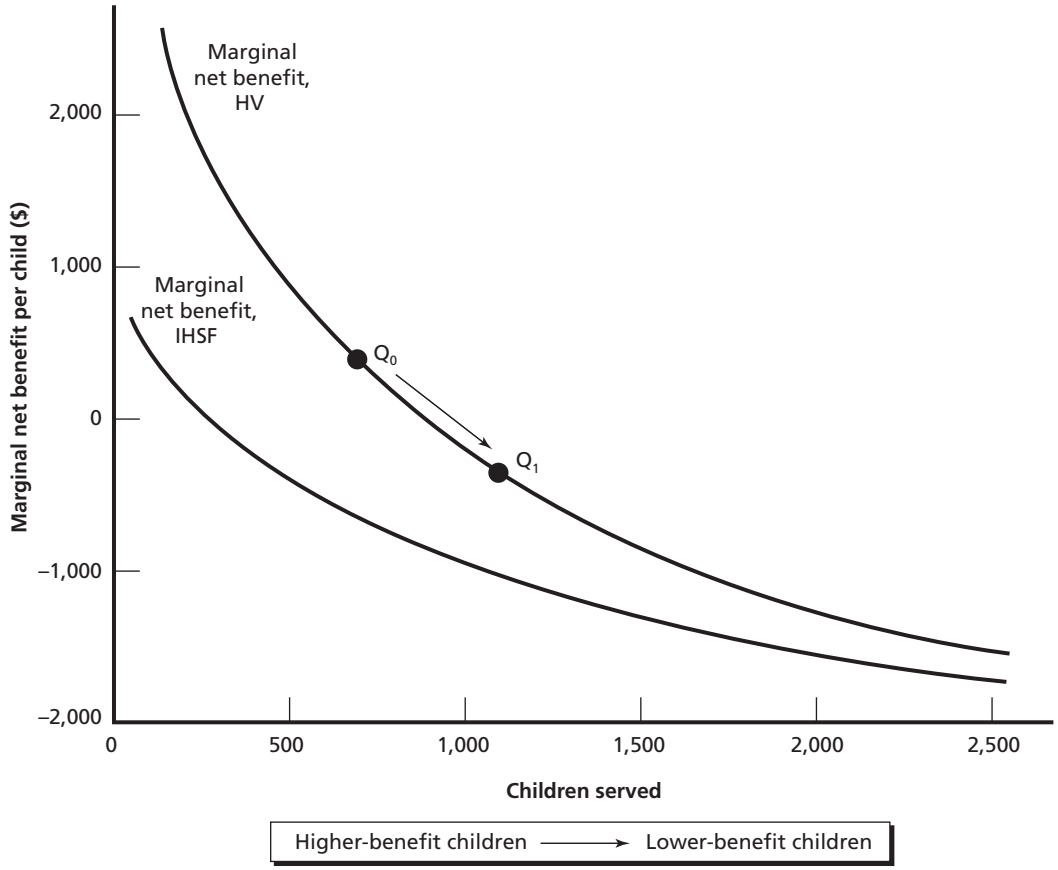
Using the tools of economics and business to characterize the monetary payoffs from early childhood programs expands the types of considerations that decisionmakers can use to choose among policy alternatives. In this section, we discuss various decisionmaking rules for choosing among alternatives that have their foundations in the world of business and economics. This guidance is related to optimization in policy analysis (Quade and Carter, 1989), but economics provides some unique insights.

We now discuss some alternative decisionmaking rules that policymakers could use to select among various early childhood alternatives. We begin by reviewing a related concept from economics—that social services, including early childhood services, are likely to be subject to the law of diminishing marginal returns. That is, children and families will typically not all benefit from a program or service by the same amount, and it is theoretically possible to target services to families who would get the most benefit. For example, as discussed earlier, the NFP program had larger benefits for a higher-risk group of mothers and their children compared with a lower-risk group. It is worth noting that those who will benefit the most from a given program are not necessarily those with the highest risk. For example, the Infant Health and Development Program showed stronger benefits for the larger low birth weight babies

compared with the smallest low birth weight babies (McCarton et al., 1997; McCormick et al., 2006). The idea here is that we first serve the children or families that can benefit the most from the services, and, as we serve each additional child or family, the marginal net benefit (benefits minus costs) per child or family declines.

Social services in the United States are often targeted to children or families that are believed to yield the most benefit from a program. Additionally, not all families have the same needs: A family with a parent facing substance-abuse challenges would benefit from different services from those that would benefit a family whose baby has been diagnosed with a developmental delay. These differences are illustrated in Figure 3.1, which shows the marginal net benefit from our two hypothetical programs. The top curve shows the marginal net benefit from the HV program, and the bottom curve shows the marginal net benefit from the IHSF program. In both cases, the marginal net benefit is highest when a more limited number of children and their families—those who can benefit the most—are served. The marginal net benefit declines as additional children, those who will benefit less, are served by the program, as in moving from a point such as Q_0 to Q_1. Hence, in the figures that follow, the marginal net benefits decline not because the program becomes less effective when serving a larger number

Figure 3.1
Marginal Benefit per Child Declines as Additional Children Who Benefit Less Are Served: Two Hypothetical Programs



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of children, but rather because the figures assume that programs serve the children who benefit most first and then serve children who will benefit less.

Now we describe several alternative decisionmaking rules and show how they would result in different choices regarding the level of services provided in HV and IHSF. As before, we assume that the government has $12 million to allocate between the programs and that HV costs $12,000 per child over three years and IHSF costs $4,800 per child over three years.

Need based. In this scenario, policymakers implement policies that address outcomes on which a jurisdiction does particularly poorly. For example, if data suggest that child abuse and neglect are higher than in most other peer communities, a community might decide to focus on HV, the program that specifically addresses this shortcoming. In our hypothetical example, if this community identified the outcomes improved by HV as its greatest need, it would choose to implement only HV, serving 1,000 children as shown at point Q_1 in Figure 3.2.

Outcome based. Policymakers may simply prioritize particular outcomes based on such considerations as the values of their constituents rather than using their comparative ranking on indicators. For instance, a governor might choose improving the well-being of children in the foster care system as his or her signature issue and, as a result, focus on implementing programs that target foster care children during his or her tenure. In this case, assuming that IHSF addressed the prioritized outcome, the community would choose to provide only IHSF, serving 2,500 children as shown by point Q_2 in Figure 3.3.

Figure 3.2
$12 Million for Early Childhood Programs Allocated to HV Based on Need Assessment

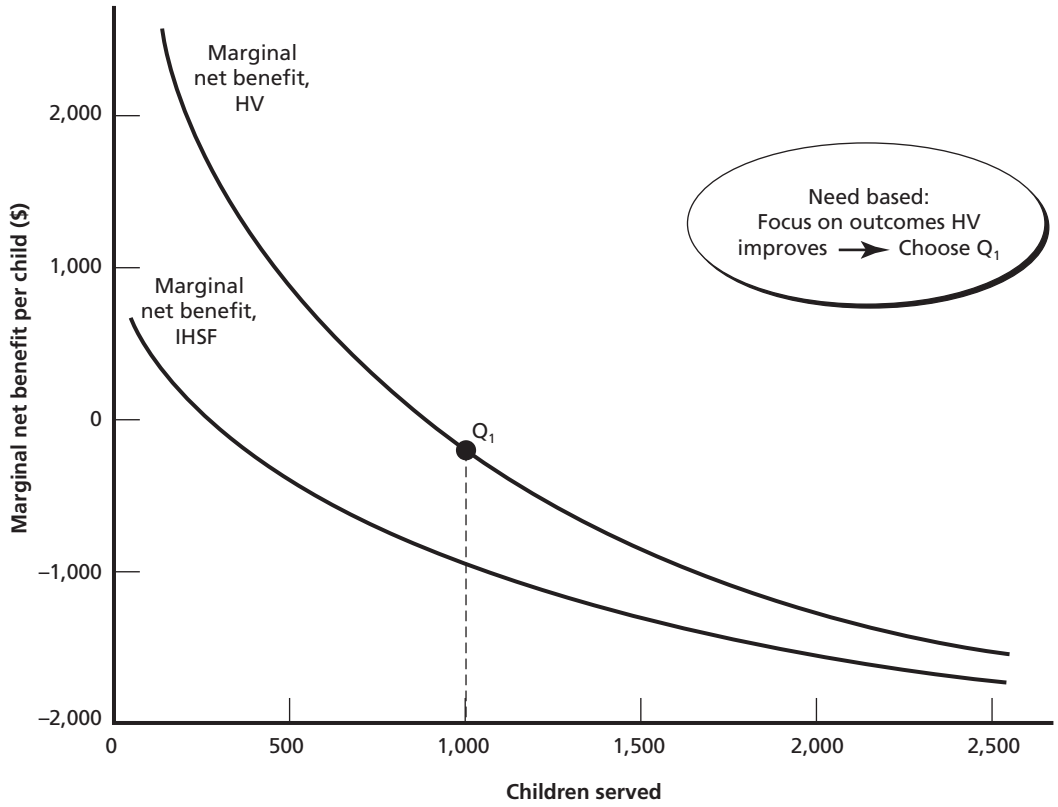

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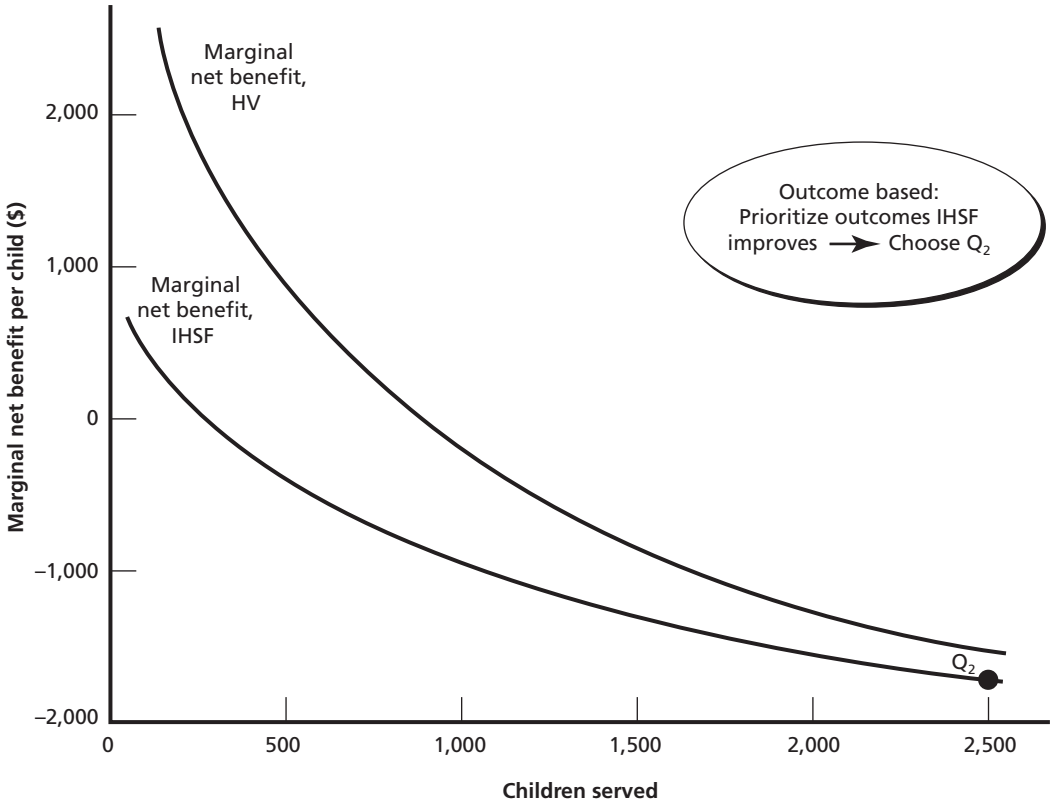
Figure 3.3
$12 Million for Early Childhood Programs Allocated to IHSF Based on Outcome Priorities



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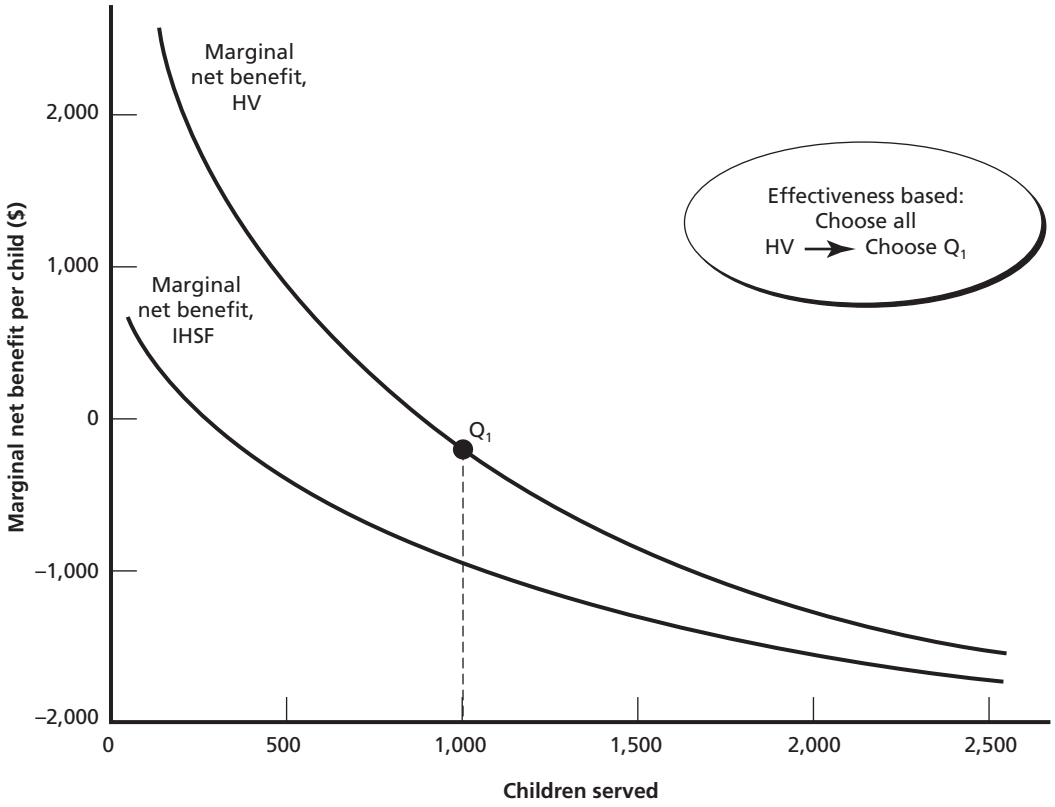
Effectiveness based. This decisionmaking rule endorses the one program or alternative that provides the greatest impact on outcomes for a given level of funding. This is related to the monetary-payoff discussion earlier. In our example, HV provides greater marginal net benefits and greater marginal benefits than IHSF at each number of children served. Total benefits at the maximum number of children who can be served with the budget are larger for HV as well. Thus, maximum dollar benefits are achieved when the community selects HV as shown in Figure 3.4.

Cost-saving based. Also related to monetary payoffs, this decisionmaking rule requires that programs or strategies produce enough savings to pay back their costs in the long run. In contrast to the effectiveness-based approach, in this case, a program might have the biggest effect on outcomes of all the programs, but, if it did not pay for itself in the long run, it would still not be selected. Instead, the community would choose the program that produces the greatest total net benefits with the given budget. If this were the decisionmaking rule selected, then IHSF would not be offered, because, as illustrated, marginal benefits fall short of the program cost of $3,600 per child at all but the level serving a small number of families who would benefit the most. However, rather than using the entire $12 million to provide HV, the community would offer HV only up to a certain amount, such as Q_3 in Figure 3.5, where the marginal benefits provided by HV just equal the $4,000-per-child annual cost (i.e., marginal net benefits are 0). After that point, each

Figure 3.4
$12 Million Would Be Allocated to HV If the Rule Examined Total Benefits for Each Program



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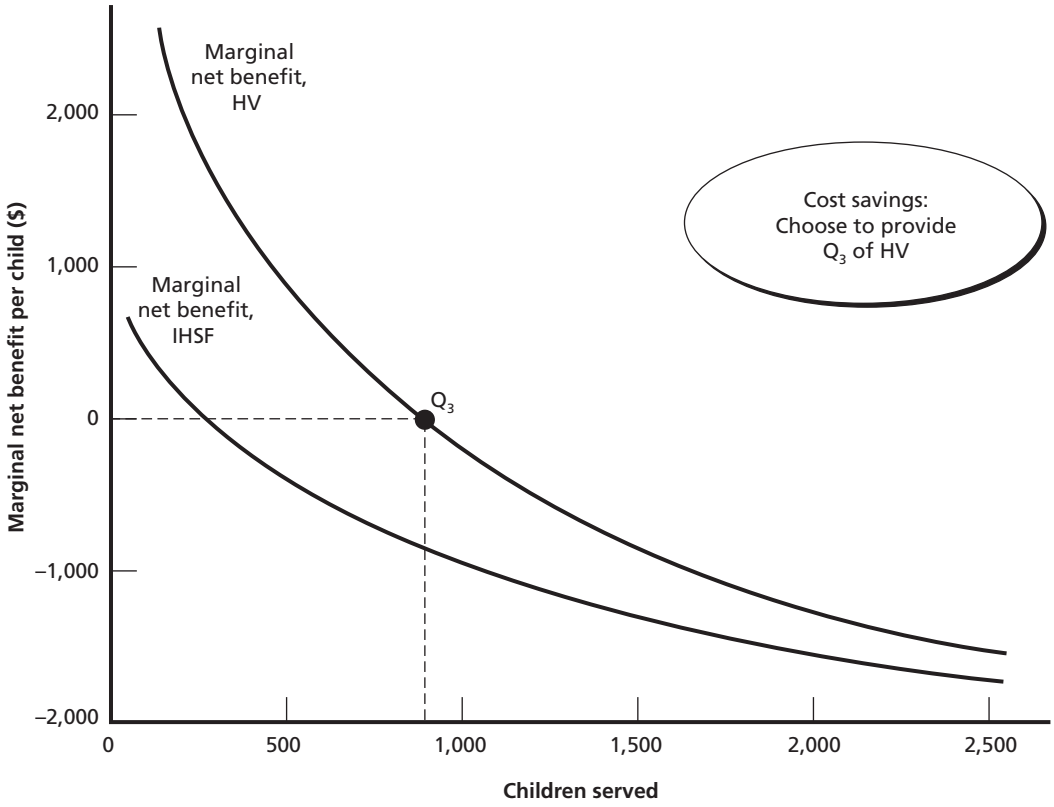
additional child served would reduce total net benefits. Thus, under this decisionmaking rule, the entire $12 million might not get allocated because total net benefits are maximized before reaching the maximum number of children who can be served (see point Q_1 in Figure 3.2).

Marginal net benefit based. In this case, policymakers would fund programs or approaches up to the point at which the net benefits to the next person served are equal across programs. This decisionmaking rule would generally result in funding multiple programs up to the levels at which the marginal net benefits were equal in contrast to the effectiveness-based rule, whereby one "most effective" program is selected. This final decisionmaking rule is the least intuitive and requires the most explanation, so we discuss this rule in more detail.

Economists would argue against choosing one "best" program for early childhood, such as funding only universal preschool and not child-abuse prevention. Rather, economists would urge policymakers to fund each program or service up to the point that the last person served by each is getting a similar net benefit. This is true because, if you were funding at other levels, you could raise the total net benefits to society by providing fewer services to families in the program that provided the lower marginal net benefits and more services to those in the program that provided the higher marginal net benefits. This is demonstrated in Figure 3.6 by moving from a combination of HV and IHSF shown by the B points to a combination represented by the C points.

Figure 3.5
Requiring Programs to Cover Their Costs Would Result in Choosing HV Only



RAND *OP227-3.5*

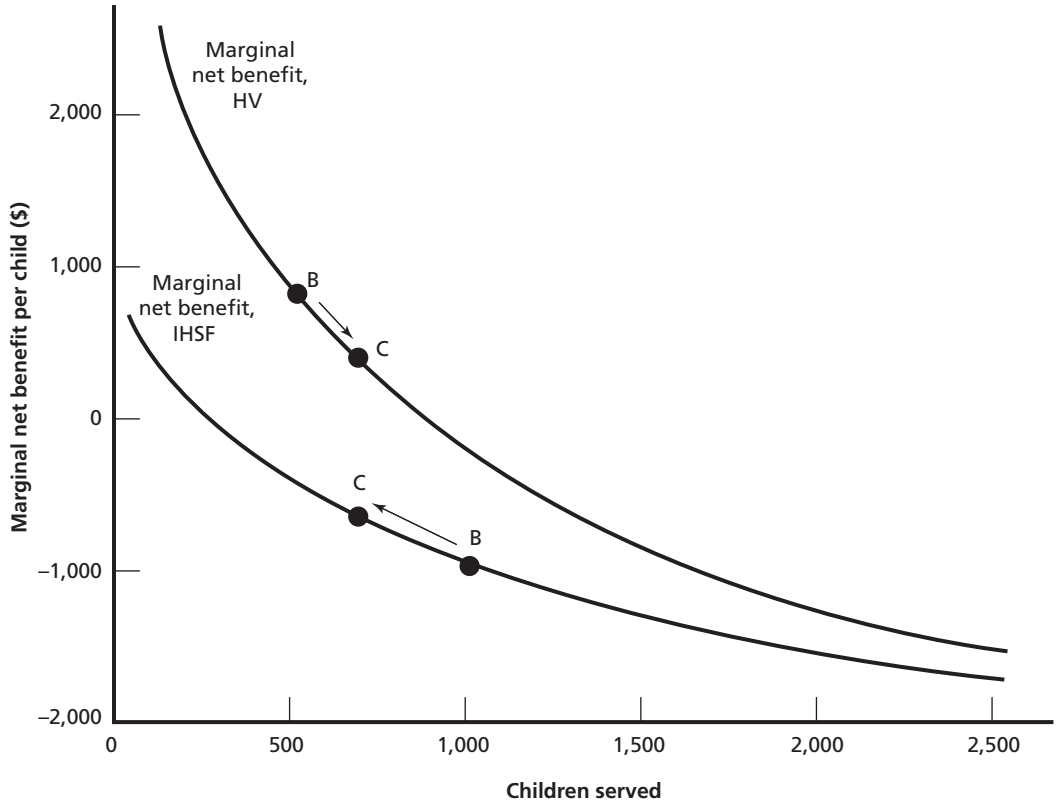
Note that this decisionmaking rule, whereby a spectrum of programs would be provided, each at its optimal level, is also consistent with one of the leading take-away messages from the Center on the Developing Child at Harvard University, National Forum on Early Childhood Program Evaluation, and National Scientific Council on the Developing Child (2007) report: that a spectrum of services that address the varying needs of families is preferred over a single-program approach or mode of service delivery.

Hence, the fundamental insight from economics for decisionmaking rules that help policymakers choose among alternatives is that *not only should early childhood policy include a spectrum of services rather than one "best" approach, but economic theory also provides some guidance regarding how to choose an optimal level of each type of service or program given the total budget available for all services*.

This decisionmaking rule would suggest increasing the amount of the program with the higher marginal net benefit and decreasing the provision of the program with the lower marginal net benefit up to the point at which their marginal net benefits were the same. This "efficient" allocation is shown in Figure 3.7 by the combination that allocates the $12 million such that HV serves 900 families children and IHSF serves 250 children.

While this decisionmaking rule is probably the most defensible theoretically, it is difficult to operationalize and would require sophisticated enumeration and analysis of marginal benefits for a range of programs. At present, information on the marginal benefits across the

Figure 3.6
Moving from a Combination Like B to One Like C Raises Total Net Benefits



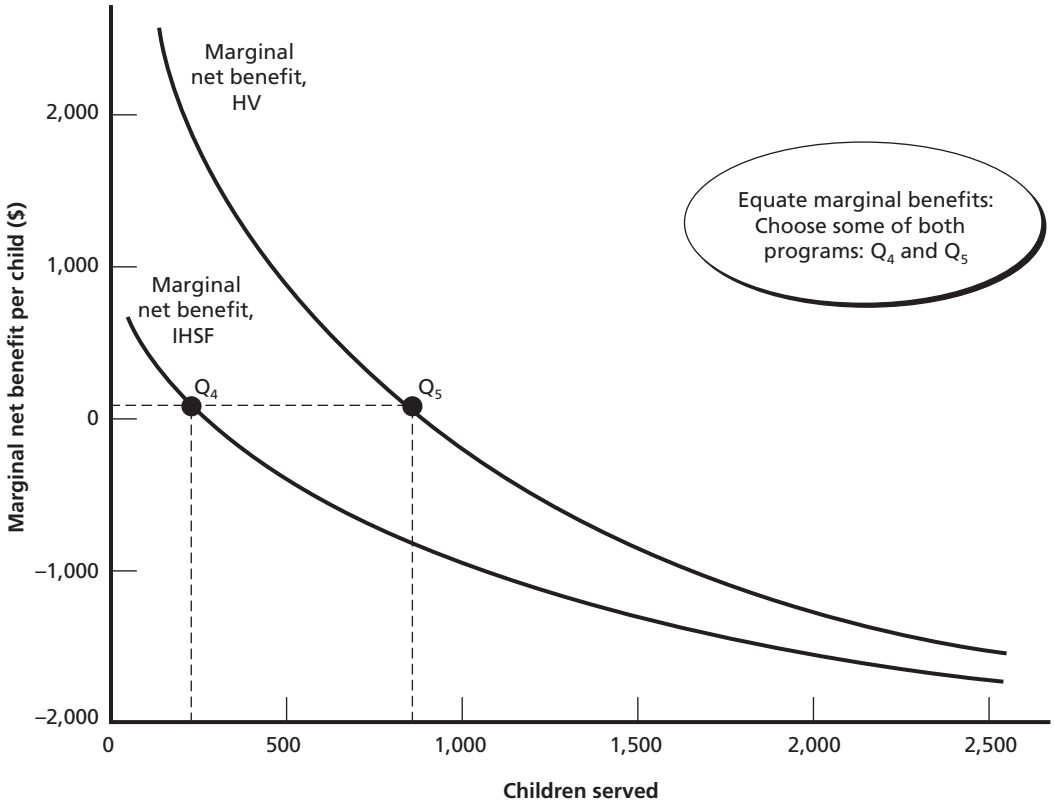
RAND *OP227-3.6*

full spectrum of children and families that might be served by a given program is not available, even for proven early childhood programs, such as the successful programs listed in Table 3.3. These relationships are potentially quantifiable, which points to the value of continued evaluation of existing and new program models as they are implemented. Hence, the desirable features of using this decisionmaking rule are countered by the practical challenges in implementing it. Nevertheless, this decisionmaking rule strongly suggests that a diversity of services will have greater total net benefits to the community than choosing one strategy.

The application of the decisionmaking rules also requires taking into account other issues when choosing among alternatives. Here, we highlight two of them. One consideration, which is related to cost-benefit analysis, is the time frame that applies when considering alternative policy options. A short time horizon favors strategies that do not require a long payback time, a characteristic inherent in many early childhood policies—that is, you pay now and reap the rewards well into the future. A longer time horizon offers more options, and it supports explicit investment approaches or prevention rather than mitigation of poor outcomes later in life.

Another consideration is who benefits from the policy. If the primary beneficiaries are intended to be disadvantaged children and families, for example, then approaches that explicitly improve the monetary income or psychic well-being of these families, such as income supports or health care programs for very low birth weight babies, have more credibility. From this perspective, benefits or net benefits to program participants or society as a whole

Figure 3.7
"Efficient" Allocation Would Equate Marginal Net Benefits of the Two Programs



RAND *OP227-3.7*

would receive more weight in choosing among alternatives. If the taxpayers are intended to be the primary beneficiaries, then approaches must save government money or generate future savings that pay back their costs. This puts more weight on the savings or net savings to government as the relevant perspective.

Economics does not value one of these decisionmaking rules over another but rather provides this as a framework for selecting optimal service levels given that a community has established its goals and priorities in the early childhood field. Economists generally assume that the efficient approach to providing services is to select the allocation that provides the community with the greatest total net benefits, and this would favor the final decisionmaking rule described previously. However, even when a community decides to choose an allocation based on other priorities—such as addressing their weakest outcome area or making sure programs pay for themselves—this decisionmaking framework provides guidance on how best to achieve those objectives as well.

CHAPTER FOUR

Implications for Early Childhood Policy

The use of analytical tools more associated with the cold calculus of business decisions and economic analysis for early childhood programs took root in the 1990s (for early examples, see Barnett and Escobar, 1990; Barnett, 1993; Karoly, Greenwood, et al., 1998) and quickly shifted the terms of debates about these policies. Previous arguments for public support of early childhood programs focused on equity, promoting individual well-being, and, to some extent, the spillover benefits (also known as *externalities*) to the rest of society from adding more productive citizens to the labor pool and civil society (see Leibowitz, 1996).

Cost-benefit analysis and rate-of-return calculations have provided evidence that early childhood programs have the potential to save government money in the long run and produce benefits for society as a whole. The costs savings for government could be large enough to not only repay the initial costs of the program but also to possibly generate savings to government or society as a whole multiple times greater than the costs (Karoly, Kilburn, and Cannon, 2005). These findings moved early childhood policy from being strictly a social-service policy and philanthropic endeavor that might benefit only participating children and families to also be considered an economic-development strategy. Increasingly, alongside the reports on building new stadiums, technology corridors, or transportation improvements, policymakers had information about the potential labor force development, workforce development, regional development, and public returns from early childhood programs (see Rolnick and Grunewald, 2003).

Another outcome from the growth in cost-benefit and related analyses of early childhood policies is that a new constituency joined the chorus of voices supporting expansion of early childhood programs. In addition to the traditional cadre of educators, parents, and others advocating for children, a new group of economists and business leaders became vocal in the call for early childhood investments (see, for example, Committee for Economic Development, 2002). This development is noteworthy not only because it added a new, sizable, and powerful group to the early childhood alliance, but also because it represented a distinct departure from the past association of early childhood advocates with a narrow range of public interests. The novelty of having a Federal Reserve Bank or Nobel Prize–winning economist speak out strongly in favor of early childhood issues using the analytical tools and language of the finance world is likely to have contributed to the persuasiveness of the arguments (Starr, 2002).

This review has described the two primary theories from the field of economics and business that currently contribute to early childhood policy based on human capital theory and the analysis of monetary payoffs from early childhood investments. Despite emerging from very different theoretical and analytic traditions, the contributions from economics to early childhood policy closely parallel and reinforce the insights provided by disciplines more tradition-

ally associated with early childhood, such as developmental psychology and neuroscience (on this, see the discussion in Knudsen et al., 2006).

One of the common themes that emerges from economic theory and analysis and from other disciplines is the crucial role of early experiences in laying a foundation for ongoing development and the fact that development is a multiperiod process whereby outcomes in each period build on those of the previous period. Both on theoretical grounds and given findings from empirical analyses, including cost-benefit analysis, economic research promotes a reorientation of child and human services toward investment and prevention, in contrast to the current approach of attempting to "treat" poor outcomes that manifest themselves later in the life cycle. Implementing such an approach would require a fundamental rethinking of the way in which nearly every human service is delivered, ranging from child-protective services to health care to education (Halfon, DuPlessis, and Inkelas, 2007; Yach et al., 2004). Shifting toward a paradigm in which resources are invested in early human capital might produce better outcomes, save taxpayers money, and improve the quality of life for the people in whom we as a society invest.

Economics contributes a unique insight into the way policymakers think about selecting how to invest in early childhood. Traditionally, policymakers have sought to identify the "best" program, policy, or approach and support that. *Best* might be defined as the approach that provides the greatest improvement in outcomes, addresses the community's greatest weakness, or other metric. Economics would argue that an approach that would generate the most benefit per dollar allocated would be to identify an optimal portfolio of early childhood investments, rather than selecting one early childhood approach and putting all resources in that basket. This is a complicated proposition with demanding information requirements, but it is not a dramatic change from the current patchwork of early childhood investments—just one that is based on different considerations.

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