

Human Capital in the United States from 1975 to 2000

Patterns of Growth and Utilization

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1

Introduction

HUMAN CAPITAL: CONCEPT AND MEASUREMENT

A veritable army of statisticians and analysts carefully monitor and document the performance of the U.S. economy. Their reports rely on a standard set of economic indicators, such as Gross Domestic Product (GDP) and its growth, the unemployment rate, new jobless claims, and the rate of productivity growth. Digging a bit deeper, one would find statistics and reports on the capacity utilization rate in the manufacturing sector, the level of employment, or the number of job vacancies that are advertised. These statistics and the reports based on them help shape our views of the state of economy and future economic prospects. Surprisingly, however, these commonly cited measures do not provide a comprehensive description of the magnitude of the nation's productive resources because they do not fully value the potential and the actual inputs of people into the nation's productive processes.

The nation's labor and physical resources are its primary inputs into the production process that is the U.S. economy. While we do an excellent job of measuring and reporting on the level and utilization of the nation's physical capital, national statistics on the available productive contributions of the nation's workers are far less adequate. The contribution of workers and their skills—that is, the contribution of *human capital*—to the economy rests on the number of people that are available to work, the share of the available workers who are employed, and the distribution of the skills and productivity of these workers. However, most national statistics describing the contribution of human capital to the economy are simply counts of people—for example, the number of people in the labor force or the number of people employed. While these statistics accurately summarize the number of people who are working or looking for work (the labor force) and the employment status of these workers, they convey little regarding

the value of the potential or actual contribution of these people to the nation's output.

The goal of this study is to enhance existing measures of the nation's human capital and the extent to which that capital is utilized. We think of the nation's human capital as the value of the labor resources that are embodied in its working-age citizens. These resources—in particular, the hours of labor time that people have available to be used in productive activities—can be allocated in many ways to produce things of value. Indeed, it is the value of this “output” that gives value to these labor resources.

In our analysis, we develop an indicator of the value of the human capital stock held by the nation's working-age population. We call this indicator *earnings capacity* and refer to it as EC throughout the monograph. We use it to study the time trends (from 1975 to 2000) in aggregate human capital in the United States and human capital per worker. We also use our EC measure to evaluate the *utilization* of the nation's human capital stock. We explore these patterns for the entire working-age population, as well as for subgroups distinguished by race, schooling, and age. Thus, our empirical results provide insight into the performance of the U.S. economy over the past three decades, and they serve to supplement other analyses of this performance.

How is EC an indicator of the nation's human capital stock? A comprehensive measure of the value of human capital of the nation's potential workers would be the value as of today of the entire future stream of productive services of the existing working-age population. Thought of in this way, the value of the human capital stock is analogous to value of the nation's physical capital stock. Indeed, in valuing the stock of physical capital (i.e., the nation's factories, machines, and equipment), the analyst calculates today's value of the stream of potential outputs attributable to this physical capital over its lifetime. This “asset value” reflects what this capital stock would fetch on the market if it were sold. In a parallel way, the value of the human capital stock is the discounted present value¹ of the stream of outputs attributed to the potential productive activities of the nation's citizens. If we had an estimate of this value for each working-age person, we could sum these individual values and obtain a measure of the nation's human capital stock.

Our indicator of human capital—EC—is not this full “discounted present value” for the existing population of potential workers. Rather, EC is equal to the annual value of the potential output of the nation’s working-age population. In particular, it is the market value of the annual earnings that the working-age population would generate if it were used to its full potential.² We assert that this value is an accurate indicator of the full human capital stock measure, in much the same way that the annual value of the potential output attributable to the nation’s stock of physical capital would accurately track the value of the stock of physical assets.

Measuring the flow of income from physical or human capital raises a number of issues. First, we must distinguish between the gross flow of income and the net flow. If we measure just the value of the potential income generated by a particular piece of physical capital, we measure the gross value of the annual outputs attributable to that capital. If we subtract the costs of operating and maintaining that capital, we measure the net value. Similar gross and net concepts can be applied to human capital. If we measure just the value of the potential earnings that a worker could generate, we measure the gross value of the services of his or her human capital. If we subtract the costs of “maintaining” that individual—food, clothing, shelter, etc.—we arrive at a net value measure. As we will see, our EC indicator is a gross measure of the potential annual return on human capital.

The second issue involves the distinction between the maximum value of earnings that can be generated from the stock of human capital and the value that is, in fact, generated. Here, we must introduce the notion of “potential,” and again draw a parallel to physical capital. When statisticians and analysts present measures of *Potential* GDP, they describe the value of goods and services that could be produced (hence, the value of income generated) if the nation’s stock of physical capital were used at its capacity. Similarly, our EC measure is a potential measure. It asks what annual earnings in the United States would be if all working-age individuals used their human capital at its capacity. The utilization of that stock is equivalent to the value of the goods and services actually produced by working-age people, that is, their actual earnings.

In order for this concept of potential earnings to serve as the basis for measuring the level of physical or human capital, the full (or capac-

ity) utilization of these resources must be specified. Such a specification is bound to be controversial. Take an industrial plant, for example; what is the capacity level of output of such a facility? One possibility would be the maximum level of output. Alternatively, we could seek to measure the plant's value when it is operating at an "efficient" level, where efficiency has some objective definition.³ In most nations, researchers and national accountants have established an operational norm for measuring the potential operation of factories, machines, and equipment when attempting to measure the value of the nation's physical capital stock.⁴

In developing our indicator of the value of human capital, we specify the potential, or capacity, use of the time and skills of the nation's working-age population in a similar way. In particular, our EC concept rests on a widely accepted (though clearly debatable) standard of potential or capacity use of human capital, namely full-time, full-year (FTFY) work. Although this standard reflects an accepted standard of "capacity" work, it fails to count those productive activities of workers beyond this full-time norm.

Like measures of the nation's physical capital stock, the EC indicator of human capital relies on evidence regarding how the market values the flow of capital services, namely, the market price attached to them. In particular, we use the values of labor services observed in the labor market—wage rates—as our guide in valuing the potential services of human capital. In practical terms, then, EC is equal to the annual gross earnings that would be generated in the United States if all people of working age were to employ their skills, knowledge, and labor services in FTFY market work.⁵ While the standard and regularly reported indicators of labor-market performance measure either the physical quantity of potential and actual labor services (e.g., the labor force, employment, unemployment, and hours worked) or the price of labor services (e.g., wage rates), EC captures in one indicator both the level of potential labor supply and the valuation of these services. For many questions, then, the EC measure is able to provide a richer and more comprehensive description of the actual and potential performance of the labor market than can these more commonly used indicators.

OBJECTIVES OF THE STUDY

We have several objectives in undertaking this study. Most basically, we wish to document the level and growth of human capital in the United States. This “national accounting” purpose rests on the judgement that the stock of productive knowledge and skill that is embodied in the nation’s working-age population is one of its most valuable resources. When human capital services are combined with the flow of inputs from the nation’s natural resources and physical capital, a stream of final goods and services of value to the nation’s citizens is generated. This stream is the nation’s GDP. It follows that the human capital component of the nation’s economic base must be accurately measured and recorded in order to understand the contribution of labor resources to the nation’s output or GDP, as well as their contribution to potential economic growth—growth in GDP.

We present our measure of the nation’s aggregate EC for each year from 1975 through 2000 and display this series in figures and tables. While the level and trend of the nation’s aggregate human capital is of interest in its own right, because we use detailed information on several thousand individuals each year (weighted so as to represent the entire working-age population), we are able to assess the level and growth of EC for several socioeconomic groups, distinguished by gender, race, education, age, and family status. Such breakdowns enable us to compare the levels and trends in human capital among racial, gender, age, and family structure groups, as well as inquire into the source of these differing patterns.

A second objective of our study concerns the term “potential,” mentioned above. The nation’s actual GDP in any year reflects the extent to which the potential services from its physical capital and human capital are realized. Hence, it is important to measure the “utilization” of the nation’s capacity to produce—the utilization of the nation’s physical and human capital. While the utilization of physical capital has been studied extensively (see Chapter 2), far less progress has been made in measuring the utilization of human capital. Following our analysis of the level and growth of the value of potential human capital services, EC, we also study the extent to which this human capital is utilized. We develop an index of human capital utilization—a

capacity utilization rate (CUR)—that is analogous to standard measures of the utilization of the nation’s physical capital stock.

Some of the most interesting questions we pose concern the extent to which particular gender, race, education, age, and family structure groups utilize their human capital, and how these capacity utilization patterns have changed over time. How do racial groups (or age, gender, or educational groups) differ in the extent to which they utilize their human capital? Again, because our analysis is based on information for the entire working-age population for each year, we are able to explore the differences in human capital utilization patterns among various groups of interest.

Having measured and tracked the level and composition of human capital over the last quarter century, and identified the primary patterns in the use of this human capital, we also seek to understand why the nation’s stock of human capital is only partially utilized. In this analysis, we consider the role played by the macroeconomic performance of the economy, the health status of the population, and the extent to which people have voluntarily chosen to substitute other activities (e.g., retirement, even though of working age) for market work.

Finally, we focus attention on a set of particularly vulnerable population groups in the United States. These include both youths and older workers with low levels of schooling, as well as single mothers and other subgroups of specific interest to policymakers. We explore how the stock of human capital of these groups compares to that of the remainder of the population and how the capital stock of these vulnerable groups has grown or failed to grow. Generally, these vulnerable groups show a rather low level of utilization of their capital stock, and we study these level and trend patterns as well.

THE PERFORMANCE OF THE U.S. LABOR MARKET OVER THREE DECADES: A BACKDROP

Our measures of EC and its utilization provide empirical evidence regarding various aspects of labor market performance, in particular the available supply of human capital and the extent to which human capital is employed in the formal labor market. This evidence supple-

ments existing statistical series and research studies in presenting a picture of the overall operation of the nation's labor market.

In this section, we briefly review the performance of the labor market in the United States since about 1970. In particular, we summarize U.S. trends in employment, labor force participation, part-time employment, and hours worked—all physical measures of various aspects of the supply of labor services. We also describe trends in the level and distribution of real wages, describing the payment for work done.⁶ This background provides the context for our discussion of the level and trend of the nation's human capital and its utilization, and it will allow us to nest our findings in the previous literature on the past performance of the labor market. It will also enable us to assess the value of the additional insights into the performance of the nation's workforce that the EC concept provides.

The performance of the labor market during the 1970s and the 1980s differs in many ways from that of the decades that preceded it, and from the expansionary period of the 1990s that followed it. Hence, in some of our discussion, we distinguish the period from the early 1970s to the end of the recession of the early 1990s from the expansion that followed 1992.

Employment Ratio

The U.S. employment–population ratio⁷ has followed a steady upward trend over the post World War II period (Summers 1986). Indeed, total employment increased by 60 percent between 1975 and 2000. This increase is the product of a rapidly increasing female employment rate, which has outweighed a decline in the rate of male employment over the past three decades.

Data from the March Current Population Surveys (CPS) show a fall in the employment–population ratio for males 18–64 years old from over 0.9 in 1967 to 0.82 by the mid 1970s, and it has held nearly steady since then.⁸ Among low-skilled subgroups of the male population, however, the ratio continued to fall into the late 1970s and early 1980s. These declines were most pronounced among blacks, high school dropouts, and both the oldest and the youngest age groups within the working-age population.⁹ All of these groups are heavily

represented in the lower tail of the skill distribution of the nation's potential workforce.¹⁰

Between 1975 and 2000 the employment–population ratio of working-age females (aged 18–64) increased from 49 percent to 69 percent, a jump of over 40 percent. The employment rate increased for nearly all white and black female age and schooling groups except for high school dropouts, aged 20–24 years, which showed little change from its low level (about 0.5) from 1970 to the mid 1990s. The employment rate for young, low-education women has increased since then (see U.S. House of Representatives, Committee on Ways and Means 1993; Blau and Kahn 1997; Holzer and Offner 2001).

Juhn, Murphy, and Topel (1991) and Juhn (1992) conducted two of the more rigorous studies of the decline in male employment rates.¹¹ The studies focus on the early 1970s to the early 1990s, use similar techniques, and concentrate on nonstudent, civilian males with 1–40 (or 1–30) years of potential labor-market experience. The evidence suggests that, from the early 1970s until the early 1990s, the downward shifts of labor demand along stable supply curves accounts for most of the decline in the employment of white men and half of that for blacks.¹² The parallel movement of real wages and employment for low-skill workers over this period supports this view of the important role of demand shifts.¹³ However, the reasons why the demand for such labor has declined are not well identified. Researchers place varying emphasis on factors such as increased openness to imports, skill-biased technological innovation, and/or competition from increases in the immigrant and female labor force.¹⁴

Since the early 1990s, this decreasing trend in the employment rate of low-skilled males seems to have been tempered, if not reversed. Again, however, there is disagreement among researchers as to the dimensions and composition of these trends. For example, while Freeman and Rodgers (2000) indicated that the employment rate of low-education young men, especially young black men, has increased during the 1990s, Lerman, Riegg, and Aron (2000) and Holzer and Offner (2001) suggested trends that more closely resemble those of the 1970s and 1980s.

Labor Force Participation

Juhn, Murphy, and Topel (1991) attributed about one-half of the secular decline in employment of prime-age males between 1967–1969 and 1987–1989 to a decline in labor force participation, the other half to increased unemployment.¹⁵ The fall in participation has been most dramatic among older working-age males; for example, the participation rate for men aged 50–65 fell from 86 percent in 1969 to 77 percent in 1979 and to 72 percent in 1989. The robust economy and strong labor demand of the 1990s seems to have offset this decline.

This downward trend of the 1970s and 1980s has been the subject of a substantial literature. In particular, the contribution of disability-related transfers (in particular, the Social Security Disability Insurance program) to labor-market withdrawal has been extensively studied. While a wide range of estimates exist, the prevailing consensus is that this program has led to a decrease in the labor force participation of older males, but that it has not been the main factor causing that decline (Haveman and Wolfe 2000; Autor and Duggan 2001).

In contrast, female labor force participation has been increasing for all age groups for most of the twentieth century (Smith and Ward 1985; Coleman and Pencavel 1993b). Over the past three decades, the increase has been particularly rapid for young women. From 1969 to 1979, the participation rate of 25–49-year-old females increased from 48 to 63 percent, and it had risen to 74 percent by 1989. The bulk of the increase in female participation between 1950 and 1990 has been attributed to a combination of rising real wages of women and reductions in childbearing related to increased labor-market opportunities. Explanations for the remainder of the trend include higher education levels, greater marital instability, changing societal attitudes, and non-wage induced reductions in childbearing. During the 1990s, the upward trend in female labor force participation continued but at a substantially slower pace than in the prior two decades, in spite of the rapid increase in overall labor demand.¹⁶

Unemployment

Measuring unemployment is difficult given the ambiguity of the “looking for work” condition. This, as well as the discouraged worker

phenomenon (see below),¹⁷ clouds the distinction between unemployment and nonparticipation and provides an argument for focusing on employment as an indicator of labor-market activity (Clark and Summers 1979; Juhn 1992; Flinn and Heckman 1983). Nevertheless, the unemployment rate is informative of the proportion of individuals currently seeking but not in employment.

A number of studies have identified a secular increase in unemployment during the decades of the 1970s and 1980s;¹⁸ most of the increase during this period has been attributed to increased durations of unemployment spells. Indeed, most of the unemployment experienced during this period is attributable to individuals experiencing long spells of not working.¹⁹

Again, the concern with the increasing secular increase in unemployment pertains primarily to the period prior to the prosperity and rising labor demand of the 1990s, when full employment conditions for virtually all worker groups put concerns regarding this pattern on the back burner.²⁰ Unemployment rates fell for virtually all gender, schooling, and age groups during the years after 1992.

Part-Time Work²¹

The proportion of civilian nonagricultural workers in part-time jobs has increased slowly, but steadily, over the past several decades, from 12 percent in 1968 to nearly 20 percent in 1999.²² This increase is primarily due to the rise in females as a proportion of the labor force; about one-quarter of female workers were in part-time employment at the end of the 1990s. Additionally, part-time employment has increased among males; from 5.3 percent of workers in 1968 to 12.6 percent in 1999. Moreover, for both sexes, there has been an increase in the proportion of part-time workers who would prefer full-time employment; by the early 1990s, part-time work was not the desired option for about one-quarter of female and one-half of male part-time workers. The rapid growth in employment demand during the 1990s has likely reduced this involuntary part-time work, although little evidence on recent changes in this pattern exists.²³

Hours Worked by Employees

Data from the 1940–1980 Decennial Censuses and the annual March CPS files indicate little change in median weekly and annual hours of male and female employees aged 16–64 years over the last several decades (Coleman and Percavel 1993a,b). However, this aggregate picture masks changes that have occurred within age, race, and gender groups. For both sexes, the mass at the upper tail of the hours distribution fell for less-educated groups and rose for those with more schooling, particularly for whites. These shifts in the distribution of weekly and annual hours, after controlling for education, are more pronounced for females than males. There have been substantial declines in the weekly hours of young and older male employees, particularly among blacks. The hours of prime-aged white male workers have changed little or increased slightly. This difference across age groups in the hours trends is not evident for females. Coleman and Percavel (1993b) concluded from their analyses that gender differences in work behavior are becoming less important relative to differences by skill groups.²⁴

These findings on work hours are inconsistent with the claim by Schor (1991), from analysis of 1969–1987 CPS data, that mean hours have increased over the past 20 years for workers of many demographic groups. The explanation for the inconsistency appears to be that Schor may have examined trends in the hours worked by FTFY workers only. The evidence cited in the previous section of increases in part-time work, together with the fact that there has been little change in median hours of work, also suggests an increase in hours worked by full-time employees.²⁵

Real Wages

Over the past four decades, there has been a substantial shift in the structure of wages in the U.S. labor market.²⁶ Relative to the 1960s, overall real wages have grown relatively slowly since the mid 1970s.²⁷ However, over this same period, the real wages of all low-skilled worker groups have declined, at least until 1997. These trends were more negative for low-skilled men than for women over this period. As a consequence, overall wage inequality has increased substantially,

while the gender gap in real wages among low-skilled workers has narrowed.²⁸ While some evidence has indicated that increased dispersion of wages is responsible for increased earnings, more recent evidence suggests that an increase in the dispersion of work time has also played an important role (Haveman and Buron 1998).

Labor-market returns on education increased through the 1960s, declined over the 1970s, and increased again since the beginning of the 1980s. Trends in the college premium over the first two of these periods have been attributed to shifts in the supply of differentially skilled labor, with relatively stable demand. Shifts in labor demand have been the dominant factor in explaining the change in the wage structure since the early 1980s and through the 1990s. The changes in technology associated with the recent expansion have resulted in an increase in demand for highly educated/skilled labor that has not been met sufficiently by expanding supply (Katz and Murphy 1992). Additionally, the demand for low-skilled labor has shifted downward, for reasons related to import penetration, changes in production technology, increases in the supply of female and immigrant workers, and the decline in the real minimum wage and unionization (Fortin and Lemieux 1997; Johnson 1997) as discussed above.

Discussion

Examination of trends in a variety of indicators of labor-market activity from 1970 to the mid 1990s leads to what appears to be a robust conclusion; namely, until very recently, labor-market activity and real wages have declined for less-educated labor, especially men. Overall, this decline in activity has been somewhat counterbalanced by the continuing increase in female employment. Existing research suggests the decline in activity of low-skilled labor is due to a shift in the relative demand for this type of labor input. Import penetration and technological innovation appear the most likely reasons, with some contribution from decreases in the real minimum wage and the decline in unionization. The possibility that the increased supply of female labor has crowded out male labor is supported by some research studies but not by others. Other issues arising from these labor-market trends concern their social and economic consequences, such as the implications for family income inequality and poverty. Less consider-

ation has been paid to the impact of these trends on the productive potential of the economy and the utilization of this potential.

Again, it must be emphasized that many of these trends appear to have reversed themselves, at least temporarily, during the period of unprecedented growth in labor demand and employment experienced in the latter half of the 1990s. Our estimates of human capital utilization for various education, age, and gender groups through the end of the 1990s will shed light on the extent of this reversal.

ORGANIZATION OF THE VOLUME

We begin our study by reviewing in Chapter 2 an extensive set of existing statistical series that document the nation's economic potential and its physical and human capital stocks. These measures include series describing the nation's productive capability—potential GDP, the level of its physical and human capital—and indicators of the extent to which the nation's productive capability is utilized. The series that we discuss are all produced by the statistical agencies of the federal government, and some of them are regularly published. Because our estimates of the level and trend of EC and of the utilization of EC are closely tied to economic concepts of physical capital and its utilization, they serve as complements to and extensions of these measures.

In Chapter 3, we confront basic questions regarding the economic concept of human capital and its measurement. As we will see, defining the value of a nation's human capital is not a straightforward matter. Should we measure the value of human capital as a gross or net value? Should this value reflect the individual evaluation by the person who holds the human capital or should it reflect a broader social evaluation? Should we measure its asset value or the annual value of the services that this capital could (or does) yield in a particular period of time?

Chapter 4 reviews a selection of prior contributions to the extensive economics literature on the concept and measurement of human capital. Much of this literature is designed to serve as the basis for understanding the process of human capital formation, including measures of the economic returns on schooling and training. We discuss the

basic analytical contributions to the human capital concept, and we indicate their implications for measuring both the stock of human capital and the annual flow of services from it. We also summarize the literature on empirical measures of the nation's human capital stock.

Chapter 5 presents the nuts and bolts of our EC estimation. We will see that EC is the annual earned income (labor-market payments) that each working-age person would receive if he or she used his or her skills, training, and other productive characteristics to his or her potential. We use workers in each year who do, in fact, work FTFY as the basis for estimating the value of EC for all working-age people.

We provide a rigorous empirical definition of the EC concept that we use in measuring the level of human capital. Then, using this definition, we describe the statistical conventions and procedures that we adopt in our empirical work. We apply these procedures to large representative samples of the U.S. population for the years 1975–2000. We describe this data source and its use in our estimates. We also explain the reasons why we have selected the working-age population as the basis for our estimates and describe the earned income concepts on which our measures rest.

In Chapter 6, we use the concepts, data, and estimation procedures described in Chapters 3–5, and show the results of our estimation of the level and trend of aggregate EC in the United States since 1975. Total EC is allocated to gender, race, age, education, and family-status groups, and the changes in each group's contribution to aggregate EC over time is discussed. For example, because of the well-documented increase in the returns on schooling and in the share of the working-age population with postsecondary education, we would expect to observe rapid growth in the share of human capital attributable to that group.

However, the nation's aggregate EC is made up of both the number of working-age people in the population and the marketable skills and knowledge that they possess. To distinguish the growth of aggregate EC that is caused by a growing working-age population from that caused by increases in productive skills of the members of this population, we also show patterns of EC on a per capita basis.

Given our concept of EC—the annual market rental value of the nation's human capital stock—we adopt a natural way of estimating the extent to which that stock is utilized. For any individual, the ratio of actual earnings to EC is a CUR. It measures the value of the labor-mar-

ket services actually produced by the person relative to the potential value of the services that could be produced if the person's human capital were used to capacity. We then use this CUR concept to measure the overall extent to which human capital is utilized.

Also in Chapter 6, we measure the portion of potential human capital services that are not utilized in market activities. By subtracting the portion of EC that is utilized in market work from the total EC for any person, we obtain a measure of unrealized potential earnings for each year. We estimate this value for each year and present these patterns both in aggregate and per capita terms.

An important question concerns the reasons for unrealized potential earnings for the entire working-age population, and Chapter 6 addresses this question as well. On the basis of what people state as the reason for not working FTFY, we allocate unrealized potential earnings among a set of six categories, each of which indicates a reason for not using potential human capital services in market activities. We are able to distinguish the following reasons for each individual and, hence, for the working-age population: retirement, housework (including at home child care) voluntary part-time work, involuntary unemployment, illness/disability, and other.

We also group these components into "exogenous constraint" (e.g., involuntary unemployment) or "voluntary response" (e.g., retirement) sources of unutilized human capital. By presenting these patterns over time, we are able to explore the extent to which working-age people have altered their utilization of human capital because of voluntary choices or because of involuntary constraints that are imposed on them. Clearly changes in capacity utilization that result from voluntary decisions have quite different economic and social implications than changes that are due to involuntary constraints. We show these patterns over time as well.

In Chapters 7 and 8, we present these patterns of human capital levels and trends, utilization, and the sources of unutilized human capital by subgroups of the population. Again, these patterns are shown in both figures and tables. In Chapter 7, we disaggregate these patterns by gender, race, schooling levels, and age. In Chapter 8 these patterns are explored for particularly vulnerable subgroups of the working-age population, in particular young and older worker groups with low levels of education.

Finally, in Chapter 9, we review the case for our EC indicator of human capital, explore the assumptions on which this measure is based, and present the insights of our estimates for understanding the human capital effects of welfare reform, the progress made in increasing human capital utilization of minority youths, and the recent patterns of utilization for the older working-age population. We also pull together some of the main patterns that our analysis has revealed and draw a few conclusions from these findings for public policy.

Notes

1. The present value of a stream of future returns is calculated using a discount rate to reflect the fact that returns obtained in distant years are valued today at less than returns received currently. This calculation is called “discounting.”
2. As such, EC can be viewed as the annual potential rental value of the human capital stock embodied in the nation’s working-age population.
3. Economists define an efficient level of plant utilization as the output level at which the minimum point on the plant’s short-run average cost curve equals long-run average cost.
4. We will discuss the conventions that have been adopted in Chapter 2.
5. In Chapter 5, we discuss the assumptions on which the EC indicator of human capital rests, as well as the limitations of both the concept and our measure of it.
6. Blank and Shapiro (2001) presented detailed estimates of the contributions of changes in employment and labor force participation, weeks worked, and earnings per week to annual earnings for detailed demographic groups during the decades of the 1980s and the 1990s. These estimates complement our discussion.
7. The employment–population ratio is total civilian employment divided by the civilian noninstitutionalized population over 16 years of age.
8. Juhn (1992) reported a decrease in the employment–population ratio of males aged 18–63 from 0.93 in 1975 to 0.87 in 1987. The figures in the text update her estimates.
9. See U.S. House of Representatives, Committee on Ways and Means (1993). Gottschalk (1997) reported that employment rates for male high school dropouts with more than 10 years of experience declined from 78.5 percent in 1975 to 67.4 percent in 1994, while employment rates for experienced males with some post-secondary schooling increased. At the beginning of the 1990s, more than 30 percent of black high school dropouts, aged 20–35 years had not worked at all in the previous year (U.S. House of Representatives, Committee on Ways and Means, 1993). More recently, Holzer and Offner (2001) showed that, from 1979 to 1999, the employment rate of young, less-educated, out-of-school, black males fell from 63 percent to 50 percent. Between 1992 and 2000, the employment rate of this group improved by only a few percentage points, while their labor force participation rate actually dropped by five points.

10. Juhn (1992) attributed the bulk of this increase in male joblessness to an increase in the duration, rather than the incidence, of nonwork periods.
11. The following discussion draws heavily upon their findings. See also Bound and Johnson (1992) and Johnson (1997).
12. The relative decline in employment among blacks over the latter period is attributed to a relative shift in the labor-supply function of blacks.
13. Several studies have focused on the cyclical changes in employment for various groups, as opposed to longer term trends. These studies convincingly show that the employment and earnings of less-educated workers are more heavily affected by macroeconomic performance than are those of other groups. See Hoynes (2000) and Hines, Hoynes, and Krueger (2002).
14. Early studies that have attempted to disentangle these determinants include Juhn (1992) and Murphy and Welch (1992). Studies by Freeman (1995), Richardson (1995), and Wood (1995) focused on the potential role of increased import penetration and, except for the last, ascribed a relatively minor role to this factor. Berman, Bound, and Griliches (1994) provided evidence that the nature of technological change has been an important determinant of this relative demand effect. Topel (1997), citing a variety of studies, concluded that neither immigration nor the increase in female labor force participation has played a large role in explaining this pattern, although some studies have indicated the opposite. There is some evidence that changes in the minimum wage and the extent of unionism have also contributed to the decline in male employment over this period (see Fortin and Lemieux 1997).
15. Since this result is for males with 1–30 years of labor market experience, which corresponds to an approximate age range of 18–48 years for high school graduates, it will understate the relative importance of the decline in labor force participation for all males.
16. Blank and Shapiro (2001) suggested an end to the increase in female labor force participation, except possibly among low-skilled women.
17. Division of employment trends into changes in labor participation and unemployment is made difficult by the existence of discouraged workers. Examination of cyclical movements reveals little discouraged worker effect amongst prime-aged males (Juhn, Murphy, and Topel 1991), but the participation of females and teenagers is sensitive to cyclical movements in the unemployment rate (Clark and Summers, 1982). There is, however, evidence that the secular increase in unemployment amongst prime-aged males over the past few decades has resulted in a substantial discouraged worker effect within this group (Juhn, Murphy, and Topel 1991).
18. See Clark and Summers (1979); Summers (1986); Poterba and Summers (1986); Murphy and Topel (1997); Juhn, Murphy, and Topel (1991); and Juhn (1992). The discussion in the text relies on their findings. In many respects, 1970–1990 trends in unemployment rates resemble trends in employment ratios. The most dramatic increase in the unemployment rate has been amongst prime-aged males, particularly in the younger age groups (< 25 years), with relatively little increase

- in female unemployment. Unemployment rates are high and increasing most rapidly for the lower education groups. The amount of unemployment due to individuals losing, rather than leaving, jobs has increased over these years.
19. Explaining the secular increase in unemployment during the 1970s and 1980s has proved difficult. For the increase to be consistent with a rise in the natural rate of unemployment, rates of mobility of individuals across occupations and industries should be observed, but data do not support this hypothesis. Search theories have little relevance given the majority of unemployment is attributable to long spells. Classical and neo-Keynesian theories also provide limited insight into secular changes in the unemployment rate, as opposed to transitory changes related to wage or price inflexibilities. The unemployment rate has increased at given levels of other economic activity indicators, suggesting it is not simply an aggregate demand problem. The predominance of job losers rather than quitters among the unemployed, together with the fact that real wages have moved in the opposite direction to unemployment for the most affected groups, casts doubt on the importance of intertemporal substitution theories. The disincentive effect of unemployment insurance is not a strong candidate to explain the trend in that the unemployment rate has fallen among the insured population. Summers (1986) attempted to establish whether the secular increase in the aggregate unemployment rate during the 1970s and 1980s was simply an artifact of changes in demographic composition. Separate standardizations for age/sex, marital status, education, and industry compositions revealed no effects strong enough to explain the aggregate trend. Indeed changes in the education and industry compositions had the largest effects, and these suggest a reduced unemployment rate. This result receives some support from Juhn, Murphy, and Topel (1991) who indirectly standardized the unemployment (and nonparticipation) rate for experience, race, education, and marital status and found no demographic effect. As noted above, Juhn, Murphy, and Topel (1991) and Juhn (1992) placed primary responsibility for the decline in male employment since the early 1970s on a downward shift in relative demand for low-skilled labor. The same argument has some force in explaining the secular increase in unemployment. An alternative argument attributes the problem to segmentation in the labor market, with high-wage and low-wage jobs for given skill levels, with trade unions and other institutions enforcing the segmentation (see Summers 1986). With structural shifts reducing the demand for labor of a given skill in the high-wage sector, displaced workers take longer to take another job in the hope of getting back into the high-wage sector. The two explanations are consistent, providing it is low-skilled workers who have experienced the decline in opportunities in the high-wage sector.
 20. Indeed, Hines, Hoynes, and Krueger (2002) concluded that, over the entire 1970–2000 period, “unemployment rates have been trending downward” (p.11).
 21. Discussion in this section relies on Blank (1990), as updated with more recent estimates.
 22. Data are from the CPS. Part time is defined as working fewer than 35 hours per week.

23. Blank and Shapiro (2001) indicated no increase in weeks worked per employed person during the 1990s, compared to 2 percent growth during the 1980s.
24. The difference by skill in hours trends are unaffected by movements in real wages and are not explained by changes in demographic composition. Hours trends are not explained by the business cycle or changes in cohort sizes.
25. A comprehensive framework for analyzing the utilization of labor—the Labor Utilization Framework—was put forward by Hauser (1974). In his words, this framework represents an “attempt to develop a comprehensive, multi-dimensional measure of underemployment.” In this framework, the labor force (or the “modified” labor force) is allocated to six categories of labor-market activity: discouraged workers, unemployed, involuntary part-time workers, full-time workers with earnings less than 1.25 of the poverty line, mismatched workers (employees with years of schooling one standard deviation above the mean for their occupation), and a residual category of the adequately (or fully) employed. Using this framework and March CPS data, Clogg and Sullivan (1983) examined trends in the proportion of the labor force in these categories over the 1969–1980 period. The proportion of the modified labor force adequately employed declined from 77 percent in 1969 to 67 percent in 1980. The decline was more pronounced for males. Discouraged workers as a proportion of the modified labor force showed no secular trend in the aggregate, but there was an increase among blacks. (Juhn, Murphy, and Topel [1991] reported an increase in discouraged workers among prime-age males. The inconsistency may be explained by the fact that the latter study examined trends up to the late 1980s within gender-, age-, and race-specific cells.) The unemployment category shows a secular increase during this period, both overall and for all subgroups. This is also true of involuntary part-time employment. Both findings are consistent with the secular trends observed in the separate analyses of these indicators reported above. For females and blacks, the proportion of full-time workers with earnings less than 1.25 of the poverty line fell over this period. Clogg and Sullivan found that 30 percent of the overall variability across time in the distribution of the modified labor force across the activity categories is attributable to changes in demographic (gender/age/race) composition. They attributed more than three-quarters of this demographic effect to changes in the age distribution—in particular, the increase in the relative proportion of the labor force in the 20–35 year age group—with the remainder being due to shifts in the gender balance. (Note that this decomposition does not control for changes in the schooling of the labor force.) While updated estimates using this framework do not exist for the period after the recession of the early 1990s, it seems unlikely that the trends observed until that time have persisted in the full employment environment of the mid to late 1990s.
26. The early literature includes Burtless (1990), Moffitt (1990), Bound and Johnson (1992), Murphy and Welch (1992), and Levy and Murnane (1992). The more recent evidence is summarized in Gottschalk (1997), Johnson (1997), and Topel (1997). The discussion in the text relies on these studies.

27. Blank and Shapiro (2001) compared peak-to-peak real wage growth over three expansions since 1961. They found that from 1961 to 1969, real wages grew nearly 28 percent. They grew by less than 9 percent from 1980 to 1990, and grew only about 14 percent even during the expansion of the 1990s.
28. See Blau and Kahn (1997). Holzer and Offner (2001) reported severely declining real wages for young less-educated men and women of all racial groups from 1979 to about 1996 or 1997; since then, however, substantial real wage growth has been experienced by all racial groups, especially for women.