Introduction to "Human Capital in History: The American Record"

Leah P. Boustan, Carola Frydman, and Robert A. Margo

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Leah Boustan is Associate Professor of Economics at UCLA and a Research Associate of the National Bureau of Economic Research. Carola Frydman is Assistant Professor of Economics at Boston University and a Faculty Research Fellow of the National Bureau of Economic Research. Robert A. Margo is Professor of Economics at Boston University and a Research Associate of the National Bureau of Economic Research. This paper is the introductory chapter to the forthcoming NBER conference volume, *Human Capital in History: The American Record.* We are grateful to Stanley Engerman and Claudia Goldin for comments on an earlier draft of this introduction.

Introduction

The United States is one of the richest nations in the world, but the high standard of living of its population did not happen overnight. Instead, American economic leadership is the result of a remarkable steady increase in the productivity of the average worker over the past two centuries, if not before.

By definition, workers are more productive when labor has more units of capital to work with, or when labor is more efficiently combined with the given level of capital. But understanding the process of economic progress as a simple decomposition of labor productivity growth into these two components – capital deepening and technological change – can obscure a crucial feature of long-term development. The design and successful implementation of new technology is not independent of the knowledge and skills – human capital – of workers. In fact, studies of the determinants of modern economic growth reveal that changes in the stock of human capital account for a significant fraction of measured increases in productivity in the American economy (Goldin and Katz 2008). Human capital, in other words, is now central to the wealth of nations. Few better historical examples can be found of the importance of human capital than the ascendancy of the United States to economic supremacy over the last two centuries.

Individuals can accumulate human capital in different ways, for example by attending school or by acquiring skills on the job. Shifts in the demand and supply of educated, high-skilled workers have transformed the level and composition of human capital embodied in the average worker over the course of American history. There is strong evidence, for example, that the demand for highly educated workers relative to less educated workers has increased steadily

throughout the twentieth century, except for a brief and explicable slowdown during the 1940s (Goldin and Katz 2008). This growth in the relative demand for skills reflects the indirect role of capital deepening and the direct effects of technology upgrading. The accumulation of physical capital boosts the demand for educated, skilled labor because physical capital and human capital have been relative complements throughout the twentieth century. Moreover, educated inventors and entrepreneurs develop modern technologies, the implementation of which requires skilled workers. As advanced technologies diffuse through the economy, the allocation of workers of different skills and education to the tasks of production is also altered. Thus, the relationship between educational attainment, worker skills, and the tasks that individuals perform in their jobs is not constant, but rather changes with the process of economic growth.

On the supply side, changes in the level of educational attainment and skills of the average worker primarily reflect decisions made by individuals in the context of economic organizations, such as schools and firms that facilitate the production of human capital. Parents make decisions, such as where to live, that influence the quantity and quality of formal education of their children, as well as their acquisition of productive skills, such as languages, within the home. Individuals continue to invest in their human capital after they leave the parental home – for example, through obtaining additional formal schooling, or migrating to a country or area that offers better economic opportunities. The returns that individuals experience on their education and skills are also profoundly influenced by another component of human capital, namely, their health. Better health allows individuals to reap the profits of their labor over a longer period, creating complementarities between investments in health and in formal education. Thus, improvements in the health of the average worker – as reflected, for example, in increased

longevity and lower morbidity – have been intertwined with the steady increase in the level of education over the twentieth century.

Individuals' decisions to invest in various forms of human capital – formal education, skills valuable in the labor market, better health – are also influenced by the legal environment and by social norms. The shifts in the demand for and the supply of skills over the course of American history are a consequence of the interplay between changes in institutions and a structural transformation of the production and organization of economic activity.

The level of human capital of the average worker has also been affected by some major changes in the composition of the labor force over the last two centuries. The long-term decline in child labor, a process that began in the nineteenth century, has been an important manifestation of this process. In the twentieth century, the most important transformation in labor markets involves the role of women, which entered the workforce in various evolutionary and revolutionary stages (Goldin 2006). Women upgraded their education in response to structural changes in the economy that altered the returns to their skills when employed outside of the household. Importantly, their investments in education and other marketable skills were also a response to changes in a social and political climate that once made gender and racial discrimination ubiquitous but which is now largely (and thankfully) a thing of the past. The increased economic opportunities have also influenced women's fertility and marriage decisions. These decisions, in turn, alter the value of accumulating human capital, and therefore have feedback effects on female labor force participation decisions.

The interaction between the demand for and the supply of labor with different levels of education and skills leaves its imprint on the wage structure. When the growth in the demand for educated workers outstrips the pace of the increase in the supply of skilled labor, the earnings

gap between workers with a college degree versus those with a high school degree, or between workers in occupations that demand high skills versus workers in occupations requiring less in the way of formal schooling, will increase. But neither the occupational wage structure nor the economic returns to schooling have been a constant over the twentieth century. Rather, the earnings of skilled, educated workers relative to less skilled workers have followed a more-or-less "U-shaped" pattern, declining during the first half of the twentieth century, especially in the 1940s; remaining fairly steady during the "golden age" of productivity growth from 1950 to 1970; and increasing from the 1970s to the present (Goldin and Margo 1992; Goldin and Katz 2008). Thus, economic growth is not always shared equally. When educational progress, however, manages to keep pace with the increasing demand for skills, increases in productivity may entail economic well-being for the majority of the population.

This book presents the proceeds of a conference devoted to issues in the long-term role of human capital in American economic development. The conference, which was held in December 2013 in Cambridge, Massachusetts, honors the scholarly work of Claudia Goldin, whose research has done much to advance our understanding of the role of human capital in the long-term evolution of the American economy, the changing economic role of women, and many other key topics in American economic history. The book includes revised versions of the conference papers as well a brief essay that assesses Goldin's impact on the profession. Although the palette of the book is wide, the role of human capital in American development is too complex and myriad to be fully explored in any single volume. For the benefit of those whose appetite is whetted by the chapters, our concluding remarks mention the most important issues not addressed herein.

Chapter Summaries

At a most basic level, the role played by human capital in economic development is determined by the demand for and supply of skilled labor. The volume begins, therefore, with four chapters that address various features of labor demand and supply.

The chapter by Lawrence Katz and Robert Margo focuses on the evolution of the demand for skilled labor over two centuries of American economic history. Katz and Margo begin with the well-known observation that technical change is often embodied in physical capital (for example, machines such as modern computers). Throughout the twentieth century, physical capital and skilled or educated labor appear to be relative complements, so that increases in physical capital per worker are associated with shifts in demand in favor of skilled workers. Goldin and Katz (2008) show that the relative demand for skilled labor has increased in every decade of the twentieth century, with the exception of the 1940s.

Conventional wisdom about the relationship between physical capital and skilled labor in the nineteenth century, however, is quite different. In the nineteenth century, capital deepening was even more pervasive than in the twentieth century. Economic historians have argued that this process reduced the relative demand for skilled labor or that technical change was "de-skilling." In manufacturing, the artisan shop, overseen by a master craftsman, is said to have been displaced by the factory system. In the factory, the tasks of production were divided up such that each could be performed by a relatively unskilled worker. According to this argument, the shift to modern capital-skill complementarity arises with the diffusion of electricity, which dramatically reduced the need for unskilled workers on the shop floor (Goldin and Katz 1998).

Katz and Margo instead argue that the complementarity between physical capital and skilled labor has been a central feature of the US economy from the dawn of industrialization to the present. Their paper makes three points. First, while the share of artisans in the manufacturing sector declined over time throughout the nineteenth century, the shares of both unskilled labor and white collar workers increased. A more complete description of this change in the distribution of occupations is not "deskilling," but rather "hollowing out." Second, in the economy as a whole, rather than simply in the manufacturing sector, the aggregate shares of low skilled jobs decreased, middle skill jobs were roughly constant, and high skill jobs expanded during the second half of the nineteenth century. Lastly, Katz and Margo show that, over the course of the nineteenth century, the relative wage of white collar workers – the best available proxy for educated labor – increased, also suggesting that the origins of the long term trend in the relative demand for educated labor began quite early in American economic development.

Katz and Margo use a variety of historical evidence to document their points, including establishment level data from the 1850 to 1880 manuscript censuses of manufacturing along with occupation and industry information from various IPUMS samples. In addition, Katz and Margo use archival evidence to construct new wage series for artisans, common labor, and white collar workers over the 1860s and 1870s. Taken together with previous series constructed by Margo (2000), the new series document relative wages by occupation for most of the nineteenth century.

Katz and Margo appeal to recent "task-based" models put forth by Autor, Acemoglu, and others to develop a consistent explanation for the impact of technical change on the relative demand for skilled labor. In this framework, the labor market assigns workers with pre-existing skills, such as education, to perform various tasks (for example, accounting). New technology

alters the worker-task assignment matrix, which then affects the demand for educated workers. The task-based approach illustrates that technical change is not always uniformly skill-biased one way or the other, but instead can complement skills in certain tasks while substituting for skills in other tasks.

From Goldin and Katz's (2008) work, it is now well-known that the relative demand for educated labor grew continuously and steadily throughout the twentieth century, with the exception of the 1940s. However, Goldin and Katz also document that the rate of return to schooling declined sharply during the first half of the twentieth century, and then rose just as sharply after 1970. If the supply of educated workers adjusted quickly to changes in demand, we would expect the rate of return to a year of schooling to remain roughly constant over time. The V-shaped pattern in the return to schooling implies that, to the contrary, there have been long periods of time during which the supply of skilled workers either grew more quickly than demand (the "high school movement") or did not keep pace with growing demand (the last several decades).

In recent decades, this imbalance between supply and demand has manifested itself quite starkly in a stagnant rate of high school graduation. This observation is the starting point of Nora Gordon's chapter on the role of educational institutions in producing a supply of educated workers. Drawing on Goldin and Katz's estimates, Gordon documents that, in 1900, less than 10 percent of youth graduated from high school, whereas, by 1970, the high school graduation rate increased to nearly 80 percent. Over the next thirty years however, the high school graduation rate remained constant despite the sharply rising relative demand for college graduates and the fact that a high school degree is a prerequisite for college attendance; since 2000, the rate has been increasing.

It is puzzling that workers have not responded to the higher price of skilled labor by increasing their own investments in human capital. The puzzle deepens, as Gordon observes, when we consider that real per pupil spending at the elementary and secondary levels has increased dramatically since 1950, and that much of that has been mandated by state and federal programs intended to help groups of students at the highest risk of dropping out. In theory (if not always in practice) spending on education should be complementary to time spent in school, so, given the increase in funding, we would expect that high school graduation rates should have increased, rather than stagnating. Gordon finds that in the absence of state school finance equalization reforms, the (counterfactual) high school graduation rates may have declined more than they actually did. For economic historians and others who are unfamiliar with the recent education literature, Gordon's chapter provides an excellent overview of the relevant legislation.

The second key point of Gordon's chapter concerns the effect of income inequality on high school graduation rates, with inequality's impact on spending acting as a potential intermediate mechanism. On the one hand, the rising income inequality of the 1980s increased the return to a college degree, and increases in inequality at the top of the distribution lowered the tax price of spending for the median voter; yet, on the other hand, a widening income distribution—or any increase in fractionalization—can weaken the electorate's willingness to spend on public education as it involves subsidizing the children of other groups. In their analysis of state-level differences in high school graduation rates in the early twentieth century, Goldin and Katz (2008) note that high levels of inequality were associated with lower rates of graduation. If this pattern were still present today, it might account for some of the stagnation in high school graduation rates. Using state-level panel data, Gordon investigates the relationship between income inequality and graduation rates; she finds little support for the hypothesis that

graduation rates are lower in states with high levels of inequality. Instead, and consistent with recent work on the latter part of the twentieth century (Corcoran and Evans 2010; Boustan et al. forthcoming) she finds some evidence that increases in inequality are associated with *increases* in graduation rates and with higher levels of school spending. In short, the rise in income inequality after 1970 does not appear to be a major cause of the stagnation in high school graduation rates, leaving open the question of "what is" as a pressing topic for future research.

The relative supply of skilled labor in the US is determined not only by the production of educated workers in local schools but also by "importing" workers of various skills from abroad. Throughout American history, immigration has accounted for a large portion of the growth in population and the labor force. Therefore, the skill composition of the US labor force is fundamentally shaped by the initial selection of who chooses to immigrate to the United States and by the extent to which immigrants "assimilate" into the labor market once they arrive.

Convergence between immigrants and the native born can occur over a single lifetime, as an immigrant develops his labor market network, or it can take place across generations, as children surpass their immigrant parents and move up the occupational ladder. Traditionally, economists have assumed that parents can influence the assimilation rates of their children through human capital investments and neighborhood choice. The chapter by Ilyana Kuziemko and Joseph Ferrie proposes the novel hypothesis that children, in turn, can exert a profound influence on the assimilation of their parents. Children may enhance the human capital of the adults if, for example, they teach the local language to their parents. When parents "learn" from their children, immigrants with young children in the household will assimilate faster. Alternatively, parents may rely on their children to navigate economic life in the destination, and substitute for their own human capital with that of their children. In this case, parents will "lean"

on their children to conduct transactions and will delay their own language acquisition, thereby assimilating more slowly.

Kuziemko and Ferrie analyze the role of children in helping or hindering the language assimilation of immigrants for two waves of immigrant arrivals to the US, one arriving during the Great Migration of the late nineteenth and early twentieth centuries and the other arriving after 1970. These two arrival cohorts differ in fundamental ways. In the past, immigrants were less likely to arrive with children, whereas today immigrants are more likely to arrive in family groups. Furthermore, immigrants who arrived during the Great Migration assimilated (either in earnings score relative to the native born, or in their ability to speak English) more rapidly than immigrants from recent cohorts. This pattern holds even after controlling for declining cohort quality within each migration wave. Finally, Kuziemko and Ferrie show that, in the past, immigrants with children at home assimilated more quickly than did immigrants in childless households (regardless of the gender of the head of household and of the children), whereas today the opposite is true. Thus, immigrants of the Great Migration "learned" from their children, but more recent immigrants "lean" on them.

Despite potentially high returns to human capital, poor health levels in the population may have curtailed investments in formal schooling or job training at points in American history. Over the past three decades, economic historians have made major advances in understanding the evolution of early health and nutritional status, using data on birth weight and adult height as proxies. Scholars have shown that adult height fluctuated over the nineteenth century; periods of improvement were followed by periods during which average height declined, signaling a worsening of nutritional status and possibly health more generally (Costa and Steckel 1997). Improvements in early childhood health may have been a precondition for the expansion of

schooling. In particular, children who were in poor health would likely attend school less frequently, especially prior to the early twentieth century when compulsory attendance laws were weakly enforced or non-existent. Although there is some evidence that historical shocks to health did affect investment in schooling (see, for example, Bleakley 2007), systematic analysis has been limited thus far.

The chapter by Hoyt Bleakley, Dora Costa, and Adriana Lleras-Muney seeks to fill this lacuna. The chapter summarizes existing evidence and presents new data on long-term trends in early health, including birth weights and mothers' health. The authors then use micro-data from the nineteenth and twentieth century to investigate changes in the relationships between health, human capital and productivity over time. Although adult height increases educational attainment and income throughout the twentieth century – suggesting that early child health, which is a determinant of adult height, matters for socio-economic outcomes – good childhood health was not complementary with time spent in school in the nineteenth century. Bleakley, Costa, and Lleras-Muney speculate that shifts in economic structure – in particular, an increase over time in the relative return to cognitive skills – may be responsible for this pattern. Given that health is an input into both physical strength and cognitive skill, and that the relative return to physical strength was higher in the past than it is today, some healthier individuals chose to specialize in manual labor in the nineteenth century. Therefore, poor health alone is not a sufficient explanation for low levels of educational attainment in the nineteenth century; rather, this supply-side explanation must be combined with low labor demand for skilled work (and hence low returns to education).

The steady rise in the demand for skill, coupled by periodic expansions in the supply of educated workers, had a profound influence on the economy as a whole, but also had specific

effects on the role of women in the economy. The remaining six chapters of the volume address changes in women's economic activities over the past two centuries. Underlying these contributions is an awareness of the U-shaped relationship between female labor force participation and economic development in the US, first documented in Goldin (1990, 1995). Goldin argues that, in the early- to mid-nineteenth century, women worked on family farms, often combining childcare and home production with market-oriented work. As the manufacturing sector grew in the late nineteenth and early twentieth centuries, employment increasingly took place in dirty, unpleasant factories, leading married women to retreat from paid employment. The return of women to the labor force in the mid- to late-twentieth century coincided with, and was in part caused by, a second economic transition from manufacturing into services and the attendant expansion of education in the workforce.

Building on this logic, the chapter by Claudia Olivetti looks for the presence of the U-shaped relationship between economic development and female employment in a long panel of sixteen developed countries (1890-2005) and a shorter panel of nearly 200 countries (1950-2005). She finds evidence of a U-shaped relationship in both samples, even after focusing on variation in economic development within a country over time. However, after excluding the early OECD countries, the U-shape relationship is considerably attenuated.. Olivetti interprets the attenuation as evidence that the *timing* of a country's transformation from agriculture to manufacturing determines whether female labor force participation experiences the first, downward portion of the U-shaped relationship. Manufacturing industries of the late nineteenth century required heavy manual labor and took place in dark, dirty settings considered unfit for women. The cleaner, more precision manufacturing of today may be less likely to trigger norms against women's work. Olivetti concludes that the U-shaped association between economic

development and female labor force participation is not an "iron law" that holds in all historical periods and regions of the world but is, instead, a feature of certain economies – including, but not limited to, the US – that went through a transition from agriculture to manufacturing in the nineteenth century.

The chapter by Leah P. Boustan and William J. Collins turns to the evolution of racial differences in women's work within the US over time. In the decades after slavery's end, black women were more likely than white women to work outside of the home, even after controlling for the (limited) set of socio-economic characteristics available in the Census. The racial gap in market work narrowed significantly between 1920 and 1950 as white women began graduating from high school in large numbers and entering the growing number of "clean" office jobs. Black women, in contrast, remained heavily concentrated in agriculture and domestic service until the last third of the twentieth century. Only by 1990 did the racial gap in female labor force participation disappear entirely.

In Olivetti's parsimonious framework, agriculture is treated as a single sector with high (albeit informal) female participation. Boustan and Collins emphasize that, in the antebellum US, white and black women participated in very different types of agriculture; white women often lived on small family farms and engaged in limited work outside of the home, while black women were mostly enslaved, living on farms that operated with little gender differentiation in work activity. Following Goldin (1977), Boustan and Collins argue that these initial differences by race in work behavior, a legacy of slavery, had persistent effects on female labor force participation over time through the inter-generational transmission of attitudes, skills and labor market networks from mother to daughter.

The chapter presents two estimates of the inter-generational correlation between mother's and daughter's work behavior. The first approach focuses on daughters born immediately after Emancipation. Boustan and Collins find that black daughters whose mothers were born into slavery in the South were themselves five to nine percentage points more likely to be in the labor force in the 1900 Census, even after controlling for region of residence. Their second approach analyzes a cohort of young women born in the mid-twentieth century who were followed over time by the National Longitudinal Survey (NLS). Daughters whose mothers' worked outside of the home were three to four percentage points more likely to be in the labor force around age 30, even after controlling for extensive family background controls. According to these estimates, the inter-generational transmission of labor force behavior can explain a sizeable but declining share of the racial gap in female participation, as the work behavior of black and white mothers converged over time.

Labor supply is only one of the many economic choices that women make that differ by race and socio-economic status. The chapter by Shelly Lundberg and Robert Pollak documents differences in the probability of cohabitation, non-marital fertility and divorce by race and educational attainment, and the widening of these gaps over time. By 2010, over two-thirds of black births occurred to non-married mothers, compared to less than one-third of white births. Within each race, the probability of having a non-marital birth falls with education level, although the gradient is steeper for whites.

Since 1970, the economic value of marriage has declined for couples across the socio-economic spectrum, as the value of women's time in market work rose (due, in part, to the transition from manufacturing to services emphasized by Olivetti in her chapter). Yet marriage rates have remained relatively high for whites, particularly for white college graduates, a pattern

that Lundberg and Pollak attribute to the interest of this group in raising "middle class" children, an outcome that is more readily achieved in a two-parent household.

Until recently, women had to choose between marrying or remaining single. Today, the option of cohabiting outside of marriage is also available. Lundberg and Pollak point out that the existing economic theories of marriage emphasize the returns to joint household production through specialization and division of labor, benefits that are also available to couples who cohabit without entering into a formal marriage contract. Lundberg and Pollak argue that couples choose to marry rather than cohabit because marriage bolsters the inter-temporal commitments that facilitate successful childrearing.

The recent changes in fertility and marriage markets documented by Lundberg and Pollak are part of a longer-run transformation in demographic outcomes that began with a decline in childbearing in the US in the late nineteenth century. However, this fertility decline has not have been uninterrupted; in particular, fertility rates increased by roughly 60 percent during the baby boom from 1940 to 1960 but declined sharply thereafter. Are the changes in childbearing in the post-1960 period merely a return to this long-run trend, or are they instead the response to forces fundamentally different from those driving the declines in fertility a century ago? The chapter by Martha Bailey, Melanie Guldi, and Brad J. Hershbein tackles this question by contrasting the sharp decline in childbearing after 1960 with the earlier fertility transition.

From 1900 to 1930, fertility rates and average completed childbearing declined as rapidly as they did during the post-1960 period, even after controlling for compositional changes in the US population. Yet the authors find that many other characteristics of marriage and childbearing decisions differ across these two transitions. The variance in childbearing was much lower in the recent transition, with more women having exactly two children and a smaller fraction remaining

childless. Cohorts reaching childbearing age in the post-1960 period formed households roughly at the same age as did the early twentieth century cohorts, but more recent cohorts were more likely to do so through non-marital cohabitation. Thus, women in the later cohorts exhibited a higher age at first marriage, delayed motherhood and, conditional on getting married before having children, waited longer from first marriage to giving birth. These delays occurred even as women became sexually active at a younger age. The second fertility transition was also accompanied by an increase in pre-marital sex and in the fraction of non-marital births, particularly for the youngest cohorts. Thus, the post-1960 fertility decline has been characterized by a decoupling of sex, marriage, and childbearing that was not present in the first fertility transition.

Bailey, Guldi, and Hershbein also find that the association between fertility outcomes and mother's education has changed over time. For each birth cohort, they compare the outcomes for women with high educational attainment relative to those for women in the lower quantiles of the education distribution. During the early fertility transition, trends in children ever born, childlessness, marriage rates, non-marital childbearing, and age at first birth evolved similarly for all educational groups. In contrast, the dispersion in the age at first birth and non-marital childbearing increased steadily across the educational distribution since the 1960s.

The varying features of the two fertility transitions may help to shed light on the applicability of various models of fertility decline, and suggest that different factors may have influenced fertility decisions in each period. For example, the decline in the variance in the number of birth, and the decoupling of sex, marriage, and childbearing are indicative of the large role that the availability of modern contraceptive technology has played in reducing the cost of exerting control over one's fertility in the later twentieth century fertility transition.

The last two chapters continue our discussion of women's changing roles in the economy. Unlike the previous chapters which place the rise of female labor force participation into the broader context of industrial or technological change, these chapters focus explicitly on shifting forms of discrimination against women. Sex segregation and gender differences in earnings were pronounced in the early twentieth century. The chapter by Claudia Goldin proposes that some of these differences are due to gender-based discrimination that can be explained by men's desire to protect the status or prestige of traditionally male occupational groups.

Goldin presents a theoretical framework in which society confers prestige on a given occupation based on the minimum perceived level of a productivity-related characteristic required to perform the job. When a woman attempts to break into an occupation that is traditionally male the prestige of the occupation is re-assessed and assumed to be equal to the female average, because the skills of specific female entrants are unknown by society. Given the lack of information on the characteristics of new entrants, society may infer that a technological shock has downgraded the required level of productivity when women are hired in male occupations. In this way, even the entry of highly qualified women may "pollute" the occupation, leading men to be hostile towards female coworkers, or to try to bar women from entering the occupation. Which occupations are integrated by gender depends on the characteristic distributions for men and women, and on the minimum required level of productivity. Sex segregation will be greater for occupations requiring a level of the characteristic above the female median. Occupations will also be more segregated at the tails of the female characteristic distribution. New occupations, in contrast, are more likely to be integrated.

The long-run evolution of sex segregation is supportive of the pollution model proposed by Goldin. In the early 1900s, manufacturing work required considerable strength, a trait much more prevalent among men than among women. The limited overlap in the strength distribution may explain why segregated occupations in manufacturing were found at the upper tail of the female earnings distribution. With the rise of clerical jobs, and the increasing importance of brains relative to brawn, the characteristic distributions began to have greater overlap starting in the 1930s.

Using an extensive dataset on the characteristics of clerical and office workers and on firms' personnel policies in 1940, Goldin finds that hiring restrictions were particularly prevalent in the higher-paying occupations. Accounting jobs, for example, were generally restricted to men. Typists were often listed as restricted to women. But many middling occupations, including clerks and correspondents, were not restricted by gender. As the model predicts, occupations with annual earnings above the female median were amongst the most restricted, whereas hiring was not restricted for those occupations below or around the female median.

Occupations at the upper end of the education scale remained restricted to women until the 1970s, even though the fraction of college-educated women had increased rapidly for several decades. The pollution theory suggests that increased public information on the qualifications of women would remove entry barriers. Thus, the increased credentials associated with occupations that emerged in the 1970s and 1980s may have contributed to the decline in sex segregation and in wage discrimination for the most educated women in the late twentieth century.

Beliefs about women's ability to work outside the home may also explain why female labor force participation rates were low in the early twentieth century, especially for married women, and why they have increased steadily since then. Goldin's model suggests that women

may be kept out of certain occupations, and perhaps out of the workforce altogether, if society perceives their average ability to perform on the job to be too low. As men (and women) change their beliefs about women's ability to perform tasks outside of the home, women will start entering the labor market. But why would beliefs about women's ability to work change over time? And how would these discriminatory beliefs form in the first place? These questions are the basis of the chapter by Glaeser and Ma.

While Goldin's framework emphasizes that beliefs about average ability reflect reality, Glaeser and Ma allow for the possibility that beliefs are formed by perception and are systematically different from women's innate ability. The authors propose various mechanisms that could have generated, and helped to perpetuate, gender stereotypes. One possibility is that sellers of household goods promoted gender stereotypes to increase the amount of time that women spend at home, with the hope of increasing the demand for their products. Alternatively, male coworkers may have spread stories of female incompetence, or established a glass ceiling, to shun competition in the workplace. For a variety of reasons, however, Glaeser and Ma find such models wanting, and thus propose a class of explanations focusing on stereotype generation within the family. For example, parents may try to generate beliefs that lead to more childbearing – for example, by underproviding education to their daughters – because they value having grandchildren. This mechanism may be disrupted, however, when women begin to work outside the home before child-bearing; the authors suggest this may explain why gender stereotypes began to erode with the cohorts born in the 1940s.

Concluding Remarks

The chapters in this volume have been inspired by the extensive body of work produced by Claudia Goldin over the course of her career. The motivations for these chapters arose from every phase of Goldin's research, from her earliest published work on black and white women in southern labor markets to her most recent interest in how technological change and educational attainment together determine the growth and distribution of income. A large section of the volume is dedicated to Goldin's most highly cited and perhaps most influential work on the changing role of women in the economy.

In addition to honoring Goldin's many contributions to the fields of economic history and labor economics, this volume has aimed to generate new facts and theories to add to our understanding of the role of human capital in the US growth experience. Together, the chapters have uncovered a set of intriguing new facts, including: a new series of wages by occupation that suggests the presence of a rising demand for skilled labor as early as the mid-nineteenth century; consistent estimates demonstrating that the observed association between height (as a proxy for childhood health) and wages emerged only recently; a systematic comparison between the fertility declines of the early and late twentieth centuries hinting that the latter decline was driven by contraceptive technology that allowed women greater control over the variance and timing of births; and an extensive exploration of the U-shaped relationship between economic development and female labor force participation throughout the twentieth century and in a large sample of countries.

In addition, the volume puts forward a set of new theories about the sources of gender discrimination and about the decision to marry when cohabitation is a well-accepted alternative.

Goldin's "pollution theory" emphasizes that male co-workers have restricted women's entry into certain occupations in order to maintain their high level of social prestige. Lundberg and Pollak propose that the continued high rates of marriage among educated couples alongside the declining rates of marriage for other groups is driven by the preference for producing "middle class" children.

Although the chapters in this volume have examined many of the central topics regarding the role of human capital in American economic development, it is inevitable that other key issues have been left out. Several of the chapters, for example, address the economic behavior of women – including their labor force participation and their fertility and marriage decisions – in light of shifting social norms about the "proper" place of women in the economy. However, relatively little attention is paid to gender *differences* in human capital, which are themselves of great interest. In particular, a notable historical feature of American education has been its gender neutrality, present long before the rise in female labor force participation in the twentieth century (Goldin and Katz 2008). Further, an important proximate cause for why the supply of educated labor, particularly at the college level, has not kept pace with demand for skill has been the failure of male enrollment rates, not female enrollment rates, to keep pace.

More generally, our book leaves out a discussion of the frictions that have handicapped the race between technology and education in American history. These frictions include discriminatory barriers against African-American schooling in the South through the mid-twentieth century; and rising tuition costs, coupled with the inability to borrow against future human capital, which may prevent some children from poor backgrounds from achieving the optimal level of schooling for their ability and the current economic needs. We know that these frictions have been and continue to be important, as clearly suggested by the long swings in the

returns to schooling documented by Katz and Margo in this book, and by Goldin and Katz (2008).. By contrast, no such "long swings" of remotely the same magnitude are present in historical time series of interest rates or other measures of the returns to physical capital. Finance, in other words, has not experienced the same types of frictions, even if every so often, a financial crisis temporarily impedes economic growth. In our view, further studies of the frictions involved in the production of human capital, both past and present, will not only shed much-needed additional light on key features of American economic growth but may also lead to more effective public policy.

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