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Introduction

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

Human Capital and American Economic Growth: Introductory Remarks

The United States has one of the highest standards of living in the world, the result of a remarkably steady increase in per capita real income over the past two centuries. By definition, the growth rate of per capita real income is the sum of the growth rates of output per worker and of the labor force participation rate. The chapters in this volume illuminate the role of human capital in increasing both labor productivity and the labor force participation rate, particularly among women, over the course of American history.

Labor productivity increases if technology improves or if capital per worker rises. However, this standard decomposition obscures the complementary role of human capital in the growth process. Given that physical and human capital have been relative complements throughout the twentieth century, the accumulation of physical capital contributes more readily to growth when augmented by an educated workforce. As advanced technologies diffuse through the economy, the allocation of workers of different skills and education to the tasks of production is also altered.

Shifts in the demand and supply of educated, highly skilled workers have transformed the level and composition of human capital embodied in the average worker in the United States, with corresponding effects on growth.

Leah Platt Boustan is associate professor of economics at the University of California, Los Angeles, 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.

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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 slowdown during the 1940s (Goldin and Katz 2008). On the supply side, changes in the distribution of educational attainment in the labor force derive from two sources—workers who obtain an education in the United States, and workers of varying levels of schooling who immigrate to the United States. When growth in demand for educated workers outstrips growth in supply, the earnings gap between workers with different levels of education, such as those 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 formal schooling, will increase. In the United States the earnings of skilled workers relative to less skilled workers followed a U-shaped pattern over the twentieth century, declining during the first half of the century and increasing in the second half (Goldin and Katz 2008).

In addition to enjoying a higher material standard of living, individuals today live longer and healthier lives. Improvements in health and longevity arguably are complementary to increasing educational attainment because individuals have a longer period of time over which to reap the benefits of investments in schooling and related skills. In turn, increases in educational attainment, particularly those in the twentieth century, have played an important causal role in reducing morbidity and increasing life expectancy.

Growth in per capita real income can also be attributed in part to a rising labor force participation rate, particularly among women.[1] The increasing participation of women in the workforce is perhaps the most significant transformation experienced by American labor markets in the last century. Over the longer run, the level of female labor force participation has followed a U-shaped pattern, with participation falling in the nineteenth century and then rising sharply in the twentieth century among married women, albeit with important differences by race. The factors that caused the rise in female labor participation have also encouraged women to upgrade their educational attainment. These include both structural changes in the economy that altered the returns to skill for women employed outside of the household and shifts in a social and political climate that once made gender and racial discrimination ubiquitous but what is now largely (and thankfully) a thing of the past.

Rising female labor force participation and the associated expansion in

1. Goldin (1986) examines the impact of changes in the participation of women in the workforce on per capita income in the United States from 1890 to 1980. Over this period the female labor force participation rate (age 15–64) rose by 40 percentage points (from approximately 20 percent to 60 percent) and the female-to-male earnings ratio rose from 0.46 to 0.60. According to Goldin, the rise in female participation coupled with growth in their relative earnings led to a rise in per capita income that was between 16 to 28 percent higher than the rise in male earnings over the same period.

women's human capital have contributed to changes in household formation and fertility. Throughout the twentieth century in the United States, the increase in the workforce participation of women has been negatively correlated with fertility. This negative relationship reflects the combined impact of changes in the timing of household formation within the life cycle, the type of household formed (married versus cohabitation), fertility decisions within household type, and rates of household dissolution (e.g., divorce). Household formation and fertility, in turn, influence levels of human capital because successive generations of parents have substituted child quality—greater investment in human capital per child—for child quantity. Historically and at present there are pronounced differences in these processes by race, ethnicity, and social class, which ultimately affect the rate of growth of human capital in the aggregate economy.

Volume Summary

This book presents ten chapters addressing topics on the role of human capital in American economic development and the increased participation of women in the workforce, as outlined above. The chapters are revised versions of papers presented at a conference held in Cambridge, MA, in December 2012. The conference was sponsored by the National Bureau of Economic Research and the Spencer Foundation.

Chapter 1 by Lawrence F. Katz and Robert A. 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, modern computers). Throughout the twentieth century, physical capital and skilled or educated labor are relative complements, so that increases in physical capital per worker are associated with shifts in relative demand for 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. Previously, economic historians have argued that capital deepening in nineteenth-century manufacturing reduced the relative demand for skilled labor, a process referred to as "de-skilling." The artisan shop, overseen by a master craftsman, was displaced by the factory, in which production tasks 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 chapter 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. This change in the occupation distribution is better described as "hollowing-out" rather than de-skilling. 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 wide variety of historical evidence to document their points, including establishment-level data from the 1850 to 1880 manuscript censuses of manufacturing and occupation and industry information from various Integrated Public Use Microdata Series (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 preexisting 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.

Goldin and Katz (2008) 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, the supply of skilled workers grew more quickly than demand during the high school movement from 1910 to 1940, but it did not keep pace with growing demand in 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 chapter 2 by Nora Gordon on the role of educational institutions in producing the supply of educated workers.

Drawing on Goldin and Katz's estimates, Gordon documents that, in 1900, less than 10 percent of youths graduated from high school, whereas, by 1970, the high school graduation rate increased to nearly 80 percent. Over the next thirty years (1970–2000), 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.

As Gordon observes, the stagnant high school graduation rate between 1970 and 2000 is a puzzle that only deepens 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 remaining constant. 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 also 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 since 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. 2013), 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.

The relative supply of skilled labor in the United States 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 quantitatively significant portion of the growth in population and the labor force. Consequently, 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. Chapter 3 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 United States, 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, when measured by the earnings score relative to the native born or the ability to speak English, immigrants who arrived during the Great Migration assimilated 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 of 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 nonexistent. 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.

Chapter 4 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 microdata 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 socioeconomic outcomes—good childhood health was not strongly correlated 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 remaining chapters in the book study changes in the female labor force over time, and associated shifts in household formation and fertility. Underlying the analysis in all of these chapters is an awareness of the U-shaped relationship between female labor force participation and economic development in the United States, 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.

Chapter 5 by Claudia Olivetti builds on this logic by looking for the pres-

ence 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 Organisation for Economic Co-operation and Development (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 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-based 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 does not hold in all historical periods and regions of the world but is, instead, a feature of certain economies—including, but not limited to, the American economy—that went through a transition from agriculture to manufacturing in the nineteenth century.

Chapter 6 by Leah Platt Boustan and William J. Collins turns to the evolution of racial differences in women's work within the United States 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 socioeconomic 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.

Boustan and Collins emphasize that, in the antebellum United States, 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 intergenerational transmission of attitudes, skills, and labor market networks from mother to daughter.

The chapter presents two estimates of the intergenerational correlation between mothers' and daughters' 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 5 to 9 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 3 to 4 percentage points more likely to be in the labor force around age thirty, even after controlling for extensive family background controls. According to these estimates, the intergenerational transmission of labor force behavior can explain a sizable 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 socioeconomic status. Chapter 7 by Shelly Lundberg and Robert A. Pollak documents differences in the probability of cohabitation, nonmarital 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 nonmarried mothers, compared to less than one-third of white births. Within each race, the probability of having a nonmarital 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 socioeconomic 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 chapter 5). 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. Couples may choose to marry rather than cohabit because marriage bolsters the intertemporal commitments that facilitate successful child rearing.

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 United States in the late nineteenth century. However, this fertility decline was interrupted when birth 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? Chapter 8 by Martha J. 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 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 nonmarital 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 premarital sex and in the fraction of nonmarital 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 a 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, nonmarital childbearing, and age at first birth evolved similarly for all educational groups. In contrast, the dispersion in the age at first birth and nonmarital 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 births, 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.

Unlike the chapters by Olivetti, and by Boustan and Collins, which place the rise of female labor force participation into the broader context of industrial or technological change, the final two chapters focus on shifting forms of discrimination against women. Sex segregation and gender differences in earnings were pronounced in the early twentieth century. Chapter 9 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 reassessed 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 toward 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 consistent with 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 data set 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. Typist positions were often 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 among 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 chapter 10 by Edward L. Glaeser and Yueran 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 formation of gender-related stereotypes will likely differ from models of discriminatory racial, religious, or ethnic-based beliefs based on hatred of an "out group" because men will not consider women to be innately evil. The authors quickly discard various sources of the formation and dissemination of gender stereotypes, such as politicians, producers of consumer goods, and coworkers. Instead, Glaeser and Ma focus on parental formation of beliefs for female children. In their framework, grandparents often have a stronger desire for their children to reproduce than their own children do, and will therefore try to persuade their daughters to forgo work in the formal labor force. Parents shape their daughters' beliefs about their own ability through their investment in education; in equilibrium parents underprovide education to their daughters, who therefore receive a negative signal about their ability. These beliefs and the lower investment in formal education reduce the returns from participating in the workforce relative to childbearing, and lead to higher fertility.

The mechanism proposed by Glaeser and Ma will be disrupted, however, when young women begin to work outside the home before childbearing, and are therefore able to obtain an independent assessment of their talents. Medical technologies, such as the Pill, that allow women to control the timing of fertility, and the elimination of institutional barriers that kept women away from top occupations likely diminished the ability of false beliefs to persist, and reduced the incentives for parents to underinvest in their daughters' education. These mechanisms may explain why gender stereotypes began to erode with the cohorts born in the 1940s, and may contribute to the transformative changes in female labor force participation

and in household formation experienced by the American economy over the twentieth century.

Concluding Remarks

In bringing together the various chapters into a single volume, our primary goal is for the research presented in this book to advance understanding of the role of human capital in American economic development, and to encourage further related work on the United States as well as on other countries. But the volume is more than the proceedings of a conference; it also honors the scholarly work of Claudia Goldin, whose research has done much to shape knowledge about the issues considered in this volume and many other key topics in American economic history. The motivations for the various chapters arose organically from every phase of Goldin's research, from her earliest published work on black and white women in southern labor markets to her widely cited and very influential work on the changing role of women in economic development, and finally, to her recent interest in how technological change and educational attainment together determine the growth and distribution of income. The volume concludes with a brief, personal essay by Stanley L. Engerman that recounts and assesses Goldin's profound and ongoing impact on the fields of labor economics and economic history.

References

Bleakley, Hoyt. 2007. "Disease and Development: Evidence from Hookworm Eradication in the American South." *Quarterly Journal of Economics* 122:73–117.

Boustan, Leah P., Fernando Ferreira, Hernan Winkler, and Eric Zolt. 2013. "The Effect of Rising Income Inequality on Taxation and Public Expenditures: Evidence from US Municipalities and School Districts, 1970–2000." *Review of Economics and Statistics* 95 (4): 1291–1302.

Corcoran, Sean, and William N. Evans. 2010. "Income Inequality, the Median Voter, and Support for Public Education." NBER Working Paper no. 16097, Cambridge, MA.

Costa, Dora L., and Richard H. Steckel. 1997. "Long-Term Trends in Health, Education, and Economic Growth in the United States." In *Health and Welfare During Industrialization*, edited by R. H. Steckel and R. Floud, 47–89. Chicago: University of Chicago Press.

Goldin, Claudia. 1977. "Female Labor Force Participation: The Origin of Black and White Differences." *Journal of Economic History* 37:87–108.

———. 1986. "The Female Labor Force and American Economic Growth: 1890–1980." In *Long Term Factors in American Economic Growth*, Studies in Income

and Wealth, vol. 51, edited by S. Engerman and R. Gallman, 557–94. Chicago: University of Chicago Press.

———. 1990. *Understanding the Gender Gap: An Economic History of American Women.* New York: Oxford University Press.

———. 1995. "The U-Shaped Female Labor Force Function in Economic Development and Economic History." In *Investment in Women's Human Capital and Economic Development*, edited by T. P. Schultz, 61–90. Chicago: University of Chicago Press.

Goldin, Claudia, and Lawrence F. Katz. 1998. "The Origins of Technology-Skill Complementarity." *Quarterly Journal of Economics* 113:693–792.

———. 2008. *The Race between Education and Technology*. Cambridge, MA: Harvard University Press.

Margo, Robert. 2000. *Wages and Labor Markets in the United States, 1820–1860*. Chicago: University of Chicago Press.