Labor Markets

Robert A. Margo

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Abstract

This chapter presents a brief historical overview of labor and labor markets, using the United States as a case study. Topics include the concepts of the labor force and the labor market; sources of information for historical study; basic features of change over time in the size and composition of the labor force, hours worked, occupations, and skills; changes in real wages over time and in the structure of wages; the emergence of a national market for labor; and the evolution of racial differences.

R. A. Margo (✉)
Boston University and National Bureau of Economic Research, Boston, MA, USA
e-mail: margora@bu.edu

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Introduction

This chapter presents an overview of issues in the economic history of labor and labor markets, using the United States as a case study. My overview is highly selective in method and topics. In terms of method, I focus on research in the "cliometric" tradition. Cliometricians are economic historians who use the tools of modern academic economics – formal theoretical models of economic behavior and econometric models used to test and refine the theory – to study long-term economic development. In their use of the theoretical and statistical tools of modern economics, cliometricians are generally like other economists, and their work is judged by the same standards. However, cliometricians differ from other economists in two key respects.

First, a critical component of the cliometric research agenda is the documenting of long-term change. This requires the collection and analysis of primary historical economic data, often from archives and related sources. Second, when cliometricians use the tools of modern economics, it is primarily to contribute to scholarly understanding of an important issue in economic history, not to validate (or disprove) a particular economic theory (although this can also be a goal of the research). To do both properly – that is, the collection of primary historical data and their analysis – requires deep immersion in the historical context. Good cliometrics, in other words, requires good history, not just good economics.

Cliometricians have made fundamental and lasting contributions to scholarly understanding of the evolution of labor and labor markets. My chapter touches on many of these contributions, although it is far from a complete review. Broadly speaking, I focus on topics involving the measurement of aggregate economic quantities – for example, the unemployment rate – and the demand and supply of labor. The chapter begins by first discussing what economic historians mean by the "labor force" and by a "labor market." I then turn my attention to sources of information for historical study and to the basic features of historical change in the labor force – size, composition, the "intensive margin" (e.g., hours worked), occupations, and skills.

I follow the discussion of the labor force with a discussion of the price of labor – namely, the wage. I present terms, sources, and summarize change over time in real wages and in the "structure" of wages – for example, differences by education level. I also discuss how wages differed across regions in the United States historically and that changes in these differences over time speak to the emergence of an integrated, national market for labor. The chapter concludes with a brief road map of suggestions for further research.

Definition of the Labor Force

An organizing principle in modern economics is the aggregate production function:

$$Y = F(L, K, T) \quad (1)$$

In this equation, Y refers to some measure of aggregate output, L is the aggregate labor input, K is the capital, and T is natural resources ("land"). F is the production function or "technology" linking the use of productive factors (L, K, and T) to output. Output is a "flow" variable – that is, measured over some period of time – and the inputs are also flows over the same period.

Changes in Y between two time periods of production reflect changes in the use of inputs or in the technology (or both). Letting d(ln X)/dt represent the rate of change in a variable over time, we can summarize this point quantitatively in the following equation:

$$d(\ln Y)/dt = dA/dt + \alpha_L d(\ln L)/dT + \alpha_K d(\ln K)/dt + \alpha_T d(\ln T)/dt \quad (2)$$

The "α's" in the above equation are output elasticities – the percentage change in Y for a given percentage change in the relevant factor of production, holding other factors constant. For quantitative purposes, it is generally assumed that the sum of the output elasticities (all of which are positive by definition) is one and that, for computational purposes, each elasticity can be identified with its respective factor share.[1]

In terms of the above equation, L represents the total amount of labor supplied in the economy. Here "amount" has two components – the number of people supplying labor (the extensive margin) and how much time is spent working (the intensive margin).

To measure the first of these components, economists define the "labor force" to consist of individuals who are actively contributing their time and skills to the production of national income. If national income is defined broadly to include production in the home, the majority of the adult population would be in the labor force and the concept would not have much analytic usefulness.[2] But if we take a narrower view, that of market production, there have been significant changes over time in the size and composition of the labor force – that is, how many are working and who they are.

The fundamental source for long-run information on the labor force for the United States is the federal census. Historically the census provides the basis for two different definitions of the labor force. The first definition, used prior to 1940, relies on the "gainful worker" concept as a bright line – if a person reports a "gainful

[1]The assumption that the factor shares sum to one is equivalent to assuming that the aggregate production function is constant returns to scale. However, a strong case can be made for increasing returns in the aggregate – so-called endogenous growth; see PM Romer (1986). The output elasticities will equal their respective factor shares if the factor markets are competitive, so that each factor is paid the value of its marginal product.

[2]The distinction is important historically in the case of the United States because historically much production took place within households. Household production, however, declined as transportation costs fell and more economic activity took place within markets.

occupation" to the census, the individual was part of the labor force. Examples of gainful occupations include farmer, carpenter, domestic servant, and clerk.[3]

According to the second definition, in use today, a person is in the labor force depending on their activities during the census week – that is, a particular window of time. If the person has a job at which he/she is working or would be working except for a temporary hiatus (e.g., a vacation) or works for himself/herself (self-employed), the person is in the labor force. If he/she is without such work but is actively looking for it, he/she is unemployed and still considered part of the labor force. Although modern survey methods are sufficiently refined to measure job-seeking activity, the concept is still fuzzy in practice and especially so during economic downturns in which people turn into discouraged workers, convinced that there is no point looking for work because there is no work to be had.

What Is a Labor Market?

In an idealized market, the goods that are exchanged between buyers and sellers are assumed to be homogenous in quality, and one unit is equivalent as another as far as buyers are concerned – that is, the units are perfect substitutes. For better or worse, this off-the-shelf model is often applied to labor markets – that is, a market in which the good in question being exchanged is the quantity of labor services. Holding the supply curve fixed, an increase in demand will drive up the equilibrium wage and quantity of labor services. Conversely, holding constant the demand curve, an increase in the supply of labor will drive down the equilibrium wage (and increase the equilibrium quantity).

Most markets exist in geographic space, and this is certainly true of most (if not all) labor markets. In a typical labor market, buyers and sellers of labor services are located in physical proximity to each other, and the buyer commutes to her place of employment. This notion of commuting to the workplace gives rise to a fundamental geographic construct in the modern United States – the standard metropolitan statistical area, or SMSA. An SMSA is defined as a collection of counties such that the substantial majority of individuals living in the SMSA also work within its boundaries.

Given a set of labor markets that are geographically delineated, it is natural to ask if they operate distinctly from one another or else are linked together. Imagine that there are two such labor markets, A and B, and suppose that, at the moment, the equilibrium wage in A exceeds that in B. If the cost of migrating between A and B exceeds the difference in wages, there will be no tendency for the situation to change. However, in the long run, if the difference in wages is expected to persist, the net benefit of labor to migrate from B to A may be positive. If this occurs, the

[3]It is possible to adjust the figures to make the pre- and post-1940 figures comparable because information was collected at the time using both questions allowing adjustment factors to be computed; see Durand (1948).

supply of labor will increase relative to demand in A, causing the wage there to fall. Economists speak of this process as the integration of geographically separated labor markets and the narrowing of the wage gap as convergence in wages between A and B. Market integration of this sort occurs if the costs of transporting people between A and B were to fall due to technological change.[4] Alternatively, even if people are not free to migrate between A and B for some reason, the wage difference may narrow if the goods produced in both regions are traded between them; this is called "factor price convergence."

The view that a national market for labor eventually emerged in the United States as the knitting together of geographically distinct labor markets is one that is embraced by many economic historians (see, e.g., Rosenbloom 2002). Later in the chapter, I argue that this view has merit, but it must be supplemented by the consideration of the gradual extension of the frontier – in other words, labor markets expanded outward as the country was settled from east to west.

As noted above, the analogy between goods and labor markets is highly useful but presumes that each unit of labor services is a perfect substitute to one another. A more sophisticated approach to labor market equilibrium invokes the notion of hedonic prices (Rosen 1974). In this model, individuals arrive at the labor market with a set of characteristics which are valued by employers – for example, education or skill – and each employer also comes with a distinct set of characteristics. In this setting, there is not a single equilibrium wage but rather an equilibrium wage function that is comprised of a set of equilibrium prices for worker and employer characteristics. This model is highly useful, for example, in describing how wages vary with education or skill or employer characteristics such as plant safety or the likelihood of job termination or layoff.

Labor markets do not exist in a theoretical vacuum but rather in a specific historical and institutional context. Generally, modern economists have in mind a so-called "free" labor market in which individuals are presumed to have the right to sell their labor services to the highest bidder.[5] However, the model per se does not rest upon a particular set of property rights invested in individuals – the right to trade labor services could be allocated to a third party. Such was the case with indentured servitude and slavery.

In the case of indentured servitude, former individuals were willing to give up their freedom for a period of time in exchange for transit across the Atlantic. Indentured servitude made economic sense because transportation costs from Europe to the New World were very large relative to the productivity (in Europe) of potential servants, and there was no means by which servants could finance the

[4]It can also occur if information flows between A and B improve so that workers have more accurate knowledge of labor market conditions.

[5]That said, labor markets exist in a continuum between truly free labor and slave labor. Historically much labor was restricted in ways that limited labor mobility and even today labor markets are not truly free in the economic sense. For example, many workers in the United States today sign so-called "noncompete" clauses which prohibit them from working for a competitor for some period of time if they terminate their employment with their current employer.

journey themselves. Ship captains were middlemen in this market, arranging for transportation in Europe and then selling servant contracts in the New World. The length of indenture varied with the expected productivity of the servant – shorter, if productivity was higher, longer otherwise – and also with location characteristics. Servants who went to the Caribbean had shorter periods of indenture arguably because health conditions were very poor (Galenson 1984; Grubb 1985).

Chattel slavery, such as was practiced in the United States before the Civil War among other New World economies (e.g., Brazil), was very different from indentured servitude. Slaves did not willingly enter into a contract – they were forcibly abducted or were spoils of war and sold on an international market. The New World, including the United States, was an eager recipient of slave labor from Africa. In the case of the United States, the international slave trade was vigorously active until banned by the act of Congress in 1808. Within the United States, however, slaves were traded more or less freely, until the peculiar institution ended with the defeat of the Confederacy in the American Civil War. These were rental and asset markets – that is, markets in which individuals could transact for the use of slave labor for a specified period of time (rental) or for trading slaves as capital goods (asset). Because of this, there is substantial historical information on both asset and rental prices of slaves, which enables historians to quantitatively assess various key features of the workings of the slave economy (Fogel and Engerman 1974; Fogel 1989).[6]

Documenting the American Labor Force

The historical documentation of the American labor force rests fundamentally on the federal census of population. A census of population was mandated by the United States constitution to be taken every 10 years for the purpose of determining representation in Congress, with the first such census occurring in 1790.

The censuses taken during the first half of the nineteenth century contain relatively limited economic information (the 1840 census is an exception), but there are sufficient data such that, with judicious assumptions, reasonable accurate estimates of the labor force can be made. Starting in 1850, additional information was collected, most importantly on occupation. As the economy shifted out of agriculture and experienced occasional bouts of distress – "panics" in nineteenth-century parlance or business cycles today – "unemployed" workers made their appearance, and it became evident that this, too, became an economic outcome worth documenting, beginning with the 1880 census. States also got into the act of collecting information on the labor force. Starting with Massachusetts, state governments created divisions which monitored and, eventually, regulated various features of labor markets, such as maximum hours that children were permitted to work, or

[6]For example, because both asset and rental prices are known, it is possible to estimate the internal rate of return to owning a slave; see Fogel and Engerman (1974).

plant safety. Established in the late nineteenth century, the US Bureau of Labor Statistics (BLS) also monitored and surveyed the labor market, often at the request of Congress. Many of the documents prepared by the US BLS and its state counterparts in the late nineteenth and early twentieth centuries contain vast quantities of information on individual workers or establishment-level data. The technology to process the data did not exist much less the economic theory to interpret any findings, but the agencies still published the information anyway – perhaps with the belief that, in the not-too-distant future, both the theory and technology (i.e., computers) would be available.

Although the collection of economic data on labor increased steadily after 1900, it became obvious in the early years of the Great Depression that the information was neither comprehensive nor especially timely enough to be of use to policymakers. From the labor statistics point of view, the 1940 census marks a watershed moment – the census was the first to collect comprehensive national data on wages, week works, and educational attainment, all mainstays of modern labor market analysis. But this information was still taken too infrequently to be of use for short- or even medium-term policy.

Economic historians have used the available historical data to construct long-run statistics on the size and composition of the American labor force. The pioneering estimates were undertaken by Lebergott (1964). Lebergott's estimates for the nineteenth century have been revised and updated by Weiss (1992, 1999).

Although the census is indispensable for establishing long-run trends, it provides no evidence on short-run movements. To be useful, such information must be timely – quarterly, say – but the costs of taking a full census every 3 months are obviously prohibitive. Enter the Current Population Survey or CPS for short. The CPS was first taken in 1940 and again in 1944; in the late 1940s, it became a monthly survey. Today, government, business, and academic economists rely heavily on the CPS to give current information about earnings, employment, and unemployment. From time to time, the CPS includes additional questions in its survey, and these have proven invaluable in shedding light on specific topics of current interest.

Since the establishment of the CPS, there have been innumerable specialized surveys by government and private agencies aimed at eliciting labor market information. Of these surveys, arguably the most useful – and certainly the most frequently used – are the Panel Study of Income Dynamics (PSID) and the National Longitudinal Surveys (NLS). These surveys track individuals over time for many years and, indeed, across generations.

Most of the data described above is readily available to the general public via the Internet, such as the websites of the United States Census Bureau (2014) and BLS (United States Department of Labor and Labor Statistics 2014a). Some of the most useful data, such as the CPS or the more recent American Community Surveys (ACS), are samples of individual and household level information. A very convenient source for these samples is the IPUMS (Integrated Public Use Microdata Series) project at the University of Minnesota (Minnesota Population Data Center, University of Minnesota (2014)). The IPUMS site is regularly updated when new

samples become available; among the most interesting in recent years are those in which individuals are linked across census years forming a panel (such as 1880–1910).

The literature on methods for analyzing labor force data is vast and far too complex to discuss here. Excellent background information on survey methods, both historical and contemporary, can be found in the BLS *Handbook of Methods* (United States Department of Labor and Labor Statistics 2014b) (http://www.bls.gov/opub/hom/). The publishing firm Elsevier produces an economics handbook series in which distinguished authors survey the literature on topics of interest at a level useful for professional economists and graduate students; currently there are four volumes in their *Handbook of Labor Economics* series (Ashenfelter and Layard 1986a, b; Ashenfelter and Card 1999a, b, c; Ashenfelter and Card 2011a, b). For tables giving long-term time series on a wide array of labor statistics (e.g., the size of the labor force, unemployment, and so on), a very convenient source is the most recent edition of *Historical Statistics of the United States* (Carter et al. 2006).

Size and Composition of the American Labor Force

Table 1, taken from Margo (2015), displays the aggregate labor force and the labor force per capita (labor force divided by population) from 1800 to 2010. In 1800 there were 1.7 million workers in the labor force, or 320 per 1,000 persons – an aggregate labor force participation rate of 32%. By 1900 the labor force had grown by a factor of 17, and the aggregate labor force participation rate was 38%, 6 percentage points higher than in 1800. The labor force continued to grow in the twentieth century. In 2010, the latest year for which census data are available, there were 154 million workers in the American labor force, and the aggregate participation rate was 50%, 18 percentage points higher than in 1800. As the aggregate labor force participation rate increases in the long run, so does per capita income – implying that rising labor force participation has contributed to rising living standards over the past two centuries of American economic growth.

Changes in the aggregate size of the labor force and in per capita terms reflect complex shifts in population composition, as well as fundamental economic and social change driven by technology, economic growth and development, cultural norms, and government regulation. Children were much more likely to be in the labor force in the nineteenth century than in the twentieth century. The decline in child labor reflects a secular rise in the relative demand for educated workers coupled with the fact that investment in education is sensibly "front-loaded" – that is, undertaken by the young – in the life cycle. It also reflects, to a lesser extent, the passage of laws requiring that individuals remain in school until a certain age – compulsory schooling laws – or which restrict the employment of children – child labor laws (Margo and Finegan 1996). Another long-run trend of enormous importance is the rise of "retirement." Retirement refers to the phenomenon of individuals leaving the labor force at older ages, usually permanently. Retirement was uncommon in the nineteenth century but begins to be observed in the late nineteenth century and accelerates in the twentieth century with the advent of private pensions,

Table 1 The labor force in the United States, 1800–2010

	Labor force (in 1000s)	Per 1,000 population, all ages
1800	1,713	323
1810	2,337	323
1820	3,163	328
1830	4,272	332
1840	5,778	338
1850	8,193	353
1860	11,293	359
1870	13,752	345
1880	18,089	361
1890	23,701	376
1900	29,483	387
1910	37,873	411
1920	42,345	399
1930	49,343	401
1940	56,168	425
1950	62,208	411
1960	69,628	388
1970	82,771	405 [604]
1980	106,940	472 [638]
1990	125,840	506 [665]
2000	140,863	501 [671]
2010	153,889	497 [647]
Average annual rate of growth, 1800–2010	2.11%	0.21%
Average annual rate of growth, 1800–1900	2.88%	0.18%
Average annual rate of growth, 1900–2010	1.50%	0.24%

[] Per 1,000 people, civilian noninstitutionalized population, ages 16 and over (Source: see Margo (2015))

Social Security, and Medicare (Ransom and Sutch 1986; Costa 1998). For detailed discussions of these issues, see Margo (2000a) and Goldin (2000).

The shifts in child labor and labor force participation among the elderly tended to reduce the labor force per capita, and yet the ratio of workers to population rose substantially while these trends were occurring. Some of the upward trend can be attributed to immigration; historically, the foreign-born tend to have higher labor force participation than native-born Americans. But the primary trend offsetting decreases in child labor and older workers is the long term, very substantial rise in the labor force participation rate of married women. The long-term increase in participation among married women reflects shifts in the structure of the economy toward sectors in which women were closer substitutes for men; growth in the relative demand for educated labor, coupled with a largely gender-neutral education system; shifts in cultural norms that enabled women to enter occupations that were formerly closed to them, along with associated anti-discrimination legislation; and

improvements in contraceptive technology, which enabled younger women to more readily invest in schooling and other skills that paid off later in the life cycle (Goldin 1990).

The Intensive Margin

The number of people in the labor force is a very imprecise measure of the labor input into the aggregate production. Among the reasons for this imprecision are changes over time in hours worked. This refers to changes in hours among employed persons as well as, potentially, changes in the incidence and duration of unemployment.

It is frequently assumed that each hour worked by an employed worker is a perfect substitute for the other, so that hours in the aggregate is simply the sum across workers. However, this ignores much evidence that reducing hours per day but keeping days of work per week constant may have a different effect on output than holding hours per day constant but reducing days per week. My discussion below ignores such subtleties (see Atack et al. 2003; Sundstrom 2006).

For the nineteenth-century United States, most of what is known about hours worked pertains to the manufacturing sector. In the early 1830s, the average workweek in manufacturing was about 69 h; this declined to about 62 h on the eve of the Civil War. Weekly hours continued to trend downward for the remainder of the century but slowly – in 1900, the typical workweek was 59 h. This decrease occurred not because of fewer days of work per week but rather fewer hours per day, perhaps a fall of about 90 min per day from the early 1830s–1880s. The 1880 census provides detailed information on variation in hours worked; these data reveal substantial differences across industries and geography, as well as substantial seasonality (Atack and Bateman 1992).

It seems likely that the decrease in weekly hours was offset by an increase in annual weeks worked. Over time, an increasing share of manufacturing establishments operated on a full-year rather than part-year basis. The increase in full-year operation has a multitude of causes – improvements in indoor heating and lighting, enabling firms to operate continuously in colder climates; improvements in transportation networks, which lessened the frequency and severity of supply chain interruptions; and a greater use of fixed capital (machinery), which created incentives for more continuous production (for further discussion, see Atack and Bateman 1992 and Atack et al. 2002).

The decline in weekly hours continued after the turn of the twentieth century, falling from around 60 h per week in 1900 to about 50 h per week in 1920. Further decreases continued in the 1920s and, especially in the 1930s, when employers turned to so-called work sharing as an alternative to layoffs. Not surprisingly, weekly hours rose temporarily during World War Two, but resumed a modest decline after, settling eventually on the norm today, just shy of 40 h per week.[7]

[7]For additional analyses of historical data on the length of the work data, see Whaples (1990), Costa (2000), and Vandenbroucke (2009).

The long-run decline in hours is often interpreted using a simple labor-leisure choice model. In this model, individuals choose between time not spent working – leisure – and goods, which are purchased using the income from work. The outcome of this choice is a labor supply curve relating hours of work supplied to the real wage. If leisure is a normal good, that is, if the income elasticity of the demand for leisure is positive, it is possible for the labor supply curve to be "backward bending," that is, hours of labor supplied will be a negative function of the real wage. For workers who are highly attached to the labor force, it is generally believed that the wage elasticity of labor supply is close to zero; in this case, for a given increase in real wages, the income effect on leisure demand(fewer hours supplied) is just offset by the substitution effect – the worker substitutes away from leisure when its price relative to consumption goods increases. Although the model is useful, it abstracts from changes over time in preferences for leisure which may have been important (see Hunnicutt 1980; Maoz 2010).

As noted earlier, today's concept of the labor force includes individuals who are not currently employed but who are seeking work – the unemployed. In the early nineteenth century in which the majority of the labor force was engaged in self-employed agricultural production, the modern notion does not have much meaning. However, as development progressed in the nineteenth century, labor shifted out of agriculture, and workers increasingly became the employees of someone else.

An important feature of the evolution of labor markets has been the development of laws to deal with contractual relationships between employers and employees. Broadly speaking, in the United States, this evolution produced the notion of "employment at will." With few exceptions, employees are free to leave their job with little or no notice to the employer – that is, the employee is free to quit her job – and the employer has no legal recourse to prevent this from occurring. The flip side is that, again subject to restrictions (more on the employer in today's labor market than on the employee), employers can "divorce" their employees by terminating their jobs. The termination can be with the expectation of being recalled, a separation, or it can be permanent with no expectation of recall – a divorce. It is this two-sided freedom that accounts for two of the three ways in which an individual can enter the status of unemployment.

As noted earlier, unemployment was first recorded in the 1880 census but the data are poor in quality. Much better quality data was collected in 1900 and 1910; the individual level responses have been analyzed by Margo (1990) and reveal significant differences from patterns prevailing in the late twentieth century. Specifically, in the early twentieth century, the odds that a worker would enter into unemployment appear much higher than today (here I am speaking in comparison to similar points in the business cycle), but the length of unemployment was shorter. The labor market, in other words, of the early twentieth century seems closer to the proverbial spot market with more churning than was typical in the late twentieth century.

The time series characteristics of aggregate unemployment have been of central importance to macroeconomics because these are thought to reveal crucial features of the impact of policy. A tenet of post-World War Two macroeconomics for a long time was that policy was effective in taming the business cycle. This was allegedly

revealed by changes in the dynamics of aggregate unemployment – in particular, unemployment was supposedly less volatile once activist policy was adopted.

This tenet was challenged in a celebrated debate originating in Romer (1986a). Pre-1940 unemployment rates were constructed in an entirely different manner from postwar rates. In particular, the pre-1940 rates were inferred as residuals from estimates of the labor force and employment. Romer argued that the assumptions in this method tended to overstate true volatility relative to a time series in which unemployment was collected directly (as is the case after 1940 using the survey week method described earlier). When this bias is corrected, there is no clear evidence that unemployment after WW2 was less volatile than before. Since the publication of the original article, Romer (1999) modified her criticism somewhat, allowing for some dampening of volatility in the 1990s. However, the recent financial crisis may have changed this interpretation of the long run – the jury is still out.

While the debate continues over the second moment of the unemployment series (its variance), there has been little debate – again, excepting the recent period of financial crisis – that in the very long run the unemployment rate has shown little tendency to drift upward or downward. This belies, however, some stubborn cross-sectional differences. The most notable of these is a persistent racial gap in unemployment; this gap, along with associated differences in labor force participation overall, is addressed later in the chapter.

Occupations and Skills

The American labor force changed in the long run not just in terms of numbers or the amount of time spent laboring. There have also been vast changes in the type of work performed. A useful, if imperfect way, to capture these changes is to examine the structure of occupations.

In Table 2, I present estimates of the occupation distribution at 50-year intervals between 1850 and 2000. The distributions are derived initially from the IPUMS samples and subsequently adjusted to be as comprehensive as possible. The broad contours of change are adequately revealed by using so-called "one digit" categories as shown in the table. Details on the construction of the estimates can be found in appendix B of Katz and Margo (2013).

In the top half (Panel A) of Table 2, I show the percentages of the labor force in the various occupation categories. In terms of change, the most substantial are the secular decrease in the share in agriculture and the secular increase in the share in white collar. According to Weiss (1999), about three-quarters of the labor force was engaged in agriculture in 1800, so the long-term shift away from farming began quite early in American history.

The shift of labor out of agriculture can be readily explained by a standard two-sector general equilibrium model with specific factors, although for quantitative purposes more complex versions of the model would be required (Lewis 1979). In the standard two-sector model, agricultural output is a function of labor and land, and

Table 2 Occupation and skill distributions, the United States, 1850–2000

Panel A: by occupation				
	1850	1900	1950	2000
White collar	**6.9**%	**17.1**%	**37.5**%	**61.8**%
Professional-technical	2.3	4.3	8.9	23.4
Manager	3.1	5.7	9.0	14.2
Clerical/sales	1.5	7.2	19.6	24.2
Skilled blue collar	**11.6**	**11.0**	**14.0**	**9.8**
Operative/unskilled/service	**28.7**	**36.4**	**36.8**	**27.1**
Agriculture	**52.7**	**35.3**	**11.7**	**1.2**
Operator	23.9	20.0	7.7	0.6
Farm laborer	28.8	15.5	4.1	0.6
Panel B: by skill group				
	1850	1900	1950	2000
High skill (prof/tech/man)	5.4%	10.0%	17.9%	37.6%
Middle skill 2 (clerical/sales/farm operator/craft)	37.1	38.3	41.3	34.6
% Low skill (oper/unsk/serv/farm lab)	57.5	51.1	40.8	27.7

Source: Computed from Tables 4 and 6 of Katz and Margo (2013). See Katz and Margo (2013, Appendix B) for details on the construction of the figures in this table

nonagricultural output, a function of capital and labor. Labor is allocated between the two sectors so as to equate the value of its marginal product. If the demand for agricultural output is price and income inelastic, an increase in total-factor productivity in agriculture would "push" workers off the farm into the city (i.e., nonfarm occupations), whereas an increase in total-factor productivity in nonagriculture would "pull" workers into the nonfarm sector. It is clear that total-factor productivity increased in both agriculture and nonagriculture, so the effect of technical progress was to shift labor away from farming.

An interesting feature of the estimates is that the share of skilled blue-collar labor remained more or less constant over the nineteenth century, while the shares of white collar and of operative/unskilled/service workers increased. The rough stability in the blue-collar share is the outcome of competing forces. On the one hand, the economy experienced its own industrial revolution, leading to the emergence of a growing and highly productive manufacturing sector. A key feature of manufacturing development in the nineteenth-century United States is the growth of the factory system and the concomitant displacement of the artisan shop. Labor historians refer to this process as one of "de-skilling," in which the share of artisans in manufacturing decreased, while the shares of operatives/unskilled and white-collar workers increased – or as Katz and Margo (2013) put it, the occupation distribution in manufacturing "hollowed out." But manufacturing was more intensive in the use of artisans than the economy overall, and, in addition, demand for artisan labor increased because the construction sector expanded. De-skilling in manufacturing, therefore, reduced the demand for artisans, while manufacturing and construction growth overall increased the demand, leaving the overall share more or less constant (see also Chandler 2006).

During the first half of the twentieth century, there was a steady and substantial move out of agriculture, an equally steady and substantial increase in the share of white collar, stability in the unskilled/operative/service share, and a modest rise in the share of blue collar. Since World War Two, the rise in the white-collar share has been inexorable, while the other groups have declined. In the year 2000, slightly more than 1% of the American labor force was engaged in agriculture, a vast decline over the previous two centuries.

A somewhat different take on the same evidence is provided in Panel B, which classifies occupations by broad skill categories – high, middle, and low. Low-skill jobs require relatively little or no training or education; high-skill jobs require substantial (for the time period) human capital investment; middle-skill jobs are in between. The most salient changes in Panel B are the long-term rise in the share of high-skill jobs and corresponding decrease in low-skill jobs. Middle-skill jobs expanded their share from the late nineteenth century through the first half of the twentieth century but have decreased since 1950.

To make sense of these shifts, they need to be combined with shifts in the relative wages by job category. Based on the available wage data, Katz and Margo (2013) argue that the relative demand for high-skill jobs appears to have increased more or less continuously throughout American history. Here the basic idea is the complementarity between new technologies and skills: as technology advances, much of which is embodied in new capital goods, the demand for high-skilled workers increases relative to the other groups. The increase in relative demand can be met, or not, by shifts in relative supply, or what Goldin and Katz (2008) refer to as the "race" between technology and skills. In the nineteenth century, the relative wage data suggest that the demand for high-skill workers grew slightly faster than supply because the relative wage of high-skilled workers was slightly higher at the end of the century than ca. 1820. In the twentieth century, the relative wages of high-skill workers declined over the first half of the twentieth century but rose over the second half. Goldin and Katz (2008) show that these twentieth-century shifts are explained by shifts in relative supply – the relative supply of highly skilled (educated) workers increased faster than demand over the first half of the twentieth century, but the reverse was true over the second half. The rise in the relative wages of highly skilled workers in recent decades is an important component of increasing income inequality in the United States (see Goldin and Katz 2008).

Wages: The Price of Labor

The wage is the price of labor – a payment per some unit (e.g., per hour) for the rental of a person's labor services. This payment could be in money or "in kind" – for example, housing or food.

Economists distinguish between nominal and real wages. Nominal wages are expressed in terms of current monetary values, whereas real wages are adjusted to reflect changes in purchasing power over time. A real wage, in other words, needs to be deflated (divided) by an index of prices. The price index could be an index of producer prices, in which case the real wage is called the "product wage" and is

isomorphic (or dual) to an index of labor productivity. The price deflator could be an index of consumer prices, in which case the real wage measures the extent to which workers over time can command more goods and services for a given quantity of labor services provided to the market.

Real wages increase over time for two primary reasons. First, individuals may have more complementary inputs to work with – more capital per worker, say. Increases in complementary inputs per worker will raise labor productivity and therefore real wages as well. Second, the economy will experience technical progress, which will raise labor productivity even if there are no corresponding increases in complementary inputs per worker. Historically, both factors have been in play more or less continuously over the course of American economic history.

Sources of Information About Wages in American Economic History

At the start of the nineteenth century, the vast majority of workers were self-employed in agriculture and not working for wages. Information on wages for the colonial and early national period, therefore, tends to come from occasional transactions recorded in account books of farmers or craftsmen. As the nineteenth century progressed, more persons worked for wages and more information is available. For the census years 1850–1870, for example, the Federal Census of Social Statistics recorded average daily wages (with and without board) for common labor and carpenters, the weekly wages of female domestics, and the average monthly wages (with board) of farm labor. Extensive wage data survive for the construction and maintenance of the Erie Canal; company records provide evidence in certain industries, such as textiles. For a more extensive discussion of available sources, see Margo (2000b).

By far the most extensive (and comparable) data pertain to civilian employees of the US Army, who were hired by quartermasters at the various army posts throughout the nineteenth century in a wide array of unskilled, artisanal, and white-collar jobs. Margo (2000b) provides a comprehensive analysis of the extant data for the antebellum period for this source, which yields regional and aggregate time series for unskilled labor, artisans, and white-collar workers. After the Civil War, the available information increases sharply as governments at all levels began collecting wage information on a regular basis. In the late nineteenth century, the US Bureau of Labor Statistics became the primary federal source of routine information on wages, which continues to the present day, supplemented since 1940 by wage information collected by the US population censuses and the CPS. Generally speaking, the BLS data is collected from employers, whereas the census (and CPS) data derive from self-reports by individuals.

Long-Run Growth in Real Wages

Standard long-run series of nominal and real wages can be found in Margo (2006). A useful approximation is that, in the aggregate, real wages have increased at a long-

run rate of about 1.5% per year, implying a fourfold rise every century. There has been acceleration in real wage growth comparing the twentieth to the nineteenth century, and volatility – the standard deviation of the real wage – is also lower in the twentieth century.

The growth in the aggregate real wage, however, masks important and sometimes dramatic shifts in the structure of wages. Economists refer to wage structure as the measures of the distribution – for example, its variance or the difference between wages at the 10th and the 90th percentiles – or closely associated differences by level of skill, such as the difference in wages between white-collar and unskilled workers or the difference in wages between high school and college graduates.

Economic historians have worked hard to measure shifts in wage structure over the course of American history, with a fair degree of success at documentation. In the nineteenth century, these shifts appear to be relatively modest, tending to show that over the century the relative wages of white-collar workers increased compared with unskilled labor or artisans. In conjunction with the evidence on occupations discussed earlier, this suggests that the relative demand for white-collar skills grew more quickly in the nineteenth century than did relative supply, although any difference between two trends was fairly modest (Margo 2000b; Katz and Margo 2013).

In the twentieth century, measures of wage structure follow a U-shaped pattern (Goldin and Katz 2008). Specifically, the relative wage of skilled or educated workers appears to have decreased during the first half of the twentieth century but increased during the second half, leaving the level of the skill or education premium approximately the same. The U-shaped pattern was not due to shifts in the relative demand for skills – these appear to have been more or less constant across decades, with the exception of the 1940s (Goldin and Margo 1992). Rather, the shifts in wage structure are due to supply. During the first half of the twentieth century, the supply of skilled, or educated, workers increased relative to demand, whereas in the second half of the century, supply lagged significantly behind demand (Goldin and Katz 2008).

Regional Differences: The Emergence of a National Labor Market in the Nineteenth Century

A major theme in American economic history is the emergence of national markets in goods and mobile factors of production. This process began in the nineteenth century and occurred in conjunction with the settlement of the country from east to west (Rosenbloom 2002). The process was greatly facilitated by the so-called transportation revolution – canals, inland waterways, and, most importantly, railroads (Taylor 1951; Slaughter 1995; Atack et al. 2010).

The evolution of a national market in labor begins with a consideration of a paradox. In 1840, per capita income was highest in the Northeast and lower, on average, in the South than in the North. Within the North, per capita income was much higher in the Northeast than in the Midwest. The direction of population

movement within the North, however, was from east to west – that is, from the region where per capita income was highest to where it was lowest (Easterlin 1960).

A variety of explanations have been offered to explain east-west migration given the regional income gradient. One prominent hypothesis views the west as a "safety valve" for disaffected eastern labor. The idea here is that migration to the western frontier may have been selective – those who left the East were low-wage workers whose wages were in fact higher in the West than they were in the East but, on average, were still lower than average wages in the East. This would happen if migrants to the west were "negatively selected," but the extent of negative selection cannot fully resolve the paradox (Ferrie 1997).

A complementary explanation focuses on the possibility of capital gains to land (Galenson and Pope 1992). Migrants to the frontier could not immediately begin farming – the land had to undergo extensive improvement. Moreover, the value of the land was heavily dependent on its proximity to transportation, which itself was a function of settlement (Craig et al. 1998; Coffman and Gregson 1998; Atack and Margo 2011). Capital gains, nonetheless, did occur, and it is also worth noting that per capita incomes in the Midwest rose substantially relative to the Northeast between 1860 and 1880. The key point is that migration was expected to be permanent rather than transitory, implying that the present discounted value of migration is the relevant gross benefit of moving, not the current difference in income.

Another argument is that, for a variety of reasons, the per capita income estimates do not capture the actual geographic pattern of differences in the marginal product of labor. That is, the marginal product of labor may have been higher in the West than in the East, and yet measured per capita income was actually lower. The simplest models of labor market integration posit that labor should move from A to B if the value of the marginal product of labor is higher in B than in A, allowing for the costs of migration.

If the value of the marginal product of labor was higher on the frontier, this should be evident in real wages. Margo (2000b) provides annual time series of nominal and real wages for the United States from 1820 to 1860 for three occupations, common labor, skilled artisans, and clerks (i.e., white-collar workers), for four census regions – the Northeast, Midwest, South Atlantic, and South Central regions. In addition, he also provides regional estimates of the number of workers in three occupations over the same period.

Margo uses these data to study shifts in relative wages and employment before the Civil War. The first pattern that emerges is that, for all three occupations, real wages within the North and within the South were higher on the frontier – the Midwest in the case of the North and the South Central in the South – than in the settled region, the Northeast and the South Atlantic.

Second, within the North, there was a general tendency for the regional wage gap to decline over time. For example, in the case of common labor, Margo estimates that real wages were about 32% higher in the Midwest than in the Northeast in the 1820s, but the gap had fallen to 17% in the 1850s. Over the same period, the share of common labor in the North residing in the Midwest rose substantially – that is,

relative (Midwest-Northeast) wages moved inversely with relative employment. This suggests a process of market integration in which labor moved from east to west, increasing the relative supply of labor in the west and causing the relative wage to fall.

An analogous process of convergence also occurred for skilled artisans and white-collar workers in the North. Interestingly, the initial gap was much larger for skilled artisans and white-collar workers than for common labor, indicating a skill "shortage" and therefore a relatively high initial skill premium on the frontier. Again, skilled blue- and white-collar labor responded by moving from east to west, causing the wage gap to narrow over time.

Within the South, there is less evidence of regional convergence in wages, regardless of occupation. However, it is also the case that, in absolute terms, the regional gaps were generally smaller than in the North, suggesting the possibility that the southern labor markets before the Civil War may have been more efficient in terms of regional allocation than the northern labor market.

In addition to regional gaps, Margo (2000b) also provides evidence on wage convergence using data from the 1850 and 1860 censuses of social statistics. These censuses recorded the average daily wages of common labor and other occupations, with and without board, at the level of minor civil divisions, a geographic aggregate smaller than a county. It is possible to use these data to construct a proxy for real wages and, therefore, estimate a regression of the change in real wages between 1850 and 1860 on the initial level. Margo finds that the coefficient on the initial level is significantly negative, consistent with a market integration process in which labor migrated generally from low to high real wage areas.

If state dummy variables are added to Margo's regressions, these show that the extent of wage convergence was less complete across states rather than within. This is not surprising because the average distance within states between counties (the unit of observation in the regressions) is shorter than the average distance across states. We expect that distance will matter – less accurate information about job opportunities and wage differences and higher costs of migration.

Both because the shortest distance between two points is a straight line and because much human capital in agriculture in the nineteenth century was latitude-specific, the settlement process in nineteenth-century America was generally due West and, importantly, mostly incremental (Steckel 1983). Occasionally, however, vast amounts of intermediate settlement were sidetracked in favor of direct movement to a very distant location. This occurred because of very large "shocks" to labor demand in the distant locations, invariably in response to the discovery of natural resources.

By far the most famous example of such a discovery in the nineteenth century was the California Gold Rush. Close study of the Gold Rush reveals much of interest to the student of historical labor markets.

The Gold Rush commenced with the discovery of gold in California in January 1848 and was for all practical purposes complete by the middle of the 1850s. Although obviously part of the land mass of North America, it would be incorrect to call California part of the American economy in the early nineteenth

century – if anything, it was part of the Mexican economy. But American fur traders had arrived at the start of the nineteenth century, and Russia also had its eyes of California, establishing a fort in 1812 in the northern part of the region. Slowly, Americans began arriving, agreeing to become Mexican citizens in exchange for land grants. Conflicts between the settlers and the Mexican government escalated into war in 1846 which ended with California (and other lands) being ceded to the United States by treaty in 1848. Ironically, the 1848 treaty was signed shortly after gold was discovered. When the news of the discovery reached the east coast, it set off a frenzy of activity as "49ers" made their way arduously to the gold camps.

Margo (2000b) provides a model to assess the impact of the Gold Rush on the labor market in California at the time. The model is inspired by similar frameworks used to assess "Dutch disease" – so-called in reference to the effects of the discovery of oil on the Netherlands in the 1970s. In the model, there are two sectors, one of which is gold mining. The discovery dramatically increases the demand for labor in gold mining. Some labor responds by shifting out of the other sector, but this is not nearly enough to prevent wages in gold mining from rising. The increase in wages draws in migrants from the rest of the country, prompting wages to decline. If the Rush is fully temporary – that is, over when all the gold is mined – both labor supply and wages should return to their pre-gold equilibrium.

Based on archival wage data, Margo provides estimates of nominal and real wages for artisans, white-collar workers, and common laborers in California from 1847 to 1860. He finds, as the model predicts, a sharp rise in wages after gold is discovered, but the rise is abated and to some extent reversed as in-migration occurs. However, he also finds that real wages in California settle at a level that is significantly higher than before the Rush. Since not all of the labor returned, this suggests that what the discovery really did was speed up the exploration (and exploitation) of the Pacific coast. In fact, California entered the union as a state long before many of the other territories in the West, and to this day it remains far more settled than much of the land between it and the Midwest.

Diversity in the Labor Market: Racial Differences

Race is central to the economic history of the United States – one cannot truly understand American economic development without understanding the role of slavery, nor can one understand the post-Civil War history of the country without appreciation for the role of race. Race, too, plays a key role in the evolution of American labor markets and in the income distribution.

Comprehensive data on income by race for the nation as a whole are not available until after World War Two. For the years after the Civil War but prior to World War Two, race-specific information on earnings (income from wages) is available in the 1940 census. Prior to 1940 there are scattered surveys of wages by race and other information on income sufficient to allow economic historians to piece together a plausible timeline on racial income differences.

The earliest black-white income estimate in the aftermath of the Civil War is that by Robert Higgs (1977) for approximately 1870. The underlying data is more extensive and reliable for agriculture than for nonagriculture, but this is a good thing, because just after the Civil War, the vast majority of African-Americans were in the South, engaged in agriculture. Higgs' estimate of the black-white per capita income ratio in 1870 is 0.25 – for every dollar of income accruing to a white person, blacks received 25 cents. Higgs has also made an estimate for 1900, and here the ratio is 0.35. The implication is that racial convergence occurred in the three decades after the Civil War – the black-to-white income ratio increased.

There are several reasons to believe that the direction of change is plausible even if one quibbles about the magnitudes. In the aftermath of the Civil War, schools were set up for African-Americans in the South, and, for the vast majority, these were the first schools any had ever attended. As a consequence, the racial gap in literacy – a chasm in 1870 – had narrowed substantially by 1900. Literacy had an economic payoff in the postbellum south, and thus the narrowing literacy gap promoted convergence in incomes (Collins and Margo 2006).

A second reason to believe that convergence plausibly occurred is that there is evidence of convergence in wealth. The evidence comes in two forms. The first form refers to assessed wealth for tax purposes, which was reported by a number of southern states. These data show a narrowing of black-white differences in per capita wealth from after the Civil War to about World War I (Higgs 1982; Margo 1984). Unless the wealth to income ratio increased quite significantly for blacks relative to whites over the same period, the narrowing black-white wealth gap would imply a narrowing black-white income gap. Race-specific estimates of homeownership recently compiled by Collins and Margo (2011) also show a narrowing gap between 1870 and 1910, consistent with the wealth data and also with racial income convergence.

What about the twentieth century? Here the pattern is mixed – periods of stability and, on occasion, retrogression interspersed with periods of significant convergence.

Smith (1984; see also Smith and Welch 1989) is a well-known article that provides estimates of black-white income ratios for adult males from 1890 to 1980. Over this period, the income ratio increased from 0.44 to 0.62. Little change occurred, however, between 1890 and 1940; all of the long-run increase happened after World War Two. According to Smith's estimates, the increase between 1940 and 1980 was split evenly between 1940 and 1960, and 1960 and 1980. Smith argues that the primary factors behind the convergence were racial narrowing in educational attainment and African-American migration from the South. Margo (1986, 1990), however, argues that the census data on educational attainment, properly interpreted, do not support Smith's argument and that racial divergence in incomes likely took place in the South before World War Two, impeding convergence at the national level.

Schooling and migration are supply-side factors in racial convergence. Further research suggests that racial convergence took place in two distinct episodes, both of which reflected significant increases in the demand for black labor relative to whites. The first episode was the 1940s. In the 1940s, blacks gained relative to whites

because of shifts in demand that favored less-educated workers, the only such period in the twentieth century, and also because large number of blacks left the rural south in response to wartime shifts in production (Goldin and Margo 1992; Margo 1995; Goldin and Katz 2008). In the second period, shifts in demand associated with the Civil Rights Movement were critical, particularly in the South (Donahue and Heckman 1991).

Since 1980 there has been limited racial convergence in incomes (Neal and Rick 2014). The absence of convergence reflects many factors. On the supply side, black-white differences in skills and education have not narrowed significantly in recent years, and this lack of narrowing is an important reason why labor market differences by race remain large (Neal 2006). The growth of incarceration, which has disproportionately affected African-Americans, may play a role; employers are reluctant to hire ex-convicts (Neal and Rick 2014). Since 1980 there has been a substantial increase in income inequality in the United States, a portion of which can be attributed to rising relative demand for better-educated workers. Because African-Americans continue to lag behind whites in educational attainment, these shifts in demand have impeded racial convergence (Juhn et al. 1991). African-American incomes have also been harmed by globalization trends that reduce the demand for manufacturing labor in the United States and also by the growing share of foreign-born workers, who are closer substitutes for African-American workers than for white workers (Borjas et al. 2010).

Directions for Future Research

This chapter has presented an overview of issues in the economic history of labor and labor markets, using the United States as a case study. The overview is both brief and highly selective in topics and method. I have concentrated on topics associated with the measurement of aggregate quantities and those involving the demand and supply of labor, rather than the institutions of the labor market (slavery is an exception). Aside from being selective in topic, my review is also selective in method – I have focused largely on research in the cliometric tradition.

Although cliometricians have made important contributions to our understanding of the long-term evolution of the American labor force, there is still much to be learned, even about the "bread-and-butter" topics surveyed in my chapter. In keeping with the supply-and-demand architecture of the chapter, I group my suggestions for further research into those pertaining to the quantities (e.g., unemployment or hours worked) versus those pertaining to wages and labor compensation.

Cliometricians such as Stanley Lebergott (1964) and Thomas Weiss (1992, 1999) have developed excellent estimates of the labor force and its components going back well into American history. Broadly speaking, these estimates are on a very solid footing for the census years beginning in 1850 but are less secure for earlier years. Further research on this topic, perhaps using archival records such as diaries documenting labor force activity for specific population groups (children, young women), would be helpful. Even more valuable would be improvements in the

reliability of annual estimates of employment and unemployment prior to World War Two, which would greatly enhance our understanding of economic behavior over the business cycle.

As in other advanced industrialized economies, the shift of labor out of agriculture was the defining feature of long-term economic development in the United States. New investments in human capital across generations figure prominently in this shift. Successive generations of children growing up on the farm realized – or rather, their parents did – that their future was not in agriculture, and to secure this future required learning new skills and, typically, going to school for more years. How this process played out across space and time in the nineteenth-century United States, when the frontier was still expanding westward, is very poorly understood. Census micro-data linked across generations (such samples are available from the IPUMS project at the University of Minnesota mentioned earlier in the chapter) might provide essential insights into this topic.

Although cliometricians have done much in recent years to map out the history of wages in the United States (see Margo 2000; Goldin and Katz 2008), there is still much to learn. In particular, more needs to be done to understand the relationship between wages and human capital, especially the "returns to schooling" – the change in wages associated with an additional year of formal schooling. For the twentieth century, estimates of the returns to schooling can be made at a national level for period after 1940 and for one state, Iowa, in 1915 (see Goldin and Katz 2008). However, for the nineteenth century, all that is known at present is how wages differed by occupation – for example, the difference in wages between carpenters and common laborers. While it may prove impossible to find suitable direct micro-data on schooling and wages for the nineteenth century, further documentation of the differences in schooling across occupations could still be useful in understanding shifts in the demand for labor relative to supply for different skill levels (see Katz and Margo 2013).

References

Ashenfelter O, Card D (1999a) Handbook of labor economics, vol 3a. North-Holland, Amsterdam
Ashenfelter O, Card D (1999b) Handbook of labor economics, vol 3b. North-Holland, Amsterdam
Ashenfelter O, Card D (1999c) Handbook of labor economics, vol 4c. North-Holland, Amsterdam
Ashenfelter O, Card D (2011a) Handbook of labor economics, vol 4a. North-Holland, Amsterdam
Ashenfelter O, Card D (2011b) Handbook of labor economics, vol 4b. North-Holland, Amsterdam
Ashenfelter O, Layard R (1986a) Handbook of labor economics, vol 1. North-Holland, Amsterdam
Ashenfelter O, Layard R (1986b) Handbook of labor economics, vol 2. North-Holland, Amsterdam
Atack J, Bateman F (1992) How long was the workday in 1880? J Econ Hist 52:129–160
Atack J, Margo RA (2011) The impact of access to rail on agricultural improvement: the midwest as a test case. J Trans Land Use 4:5–18
Atack J, Bateman F, Margo RA (2002) Part-year operation in nineteenth century american manufacturing: evidence from the 1870 and 1880 censuses. J Econ Hist 62:792–809
Atack J, Bateman F, Margo RA (2003) Productivity in manufacturing and the length of the working day: evidence from the 1880 census of manufactures. Exp Econ Hist 40:170–194

Atack J, Bateman F, Haines M, Margo RA (2010) Did railroads induce or follow economic growth? Urbanization and population growth in the American midwest, 1840–1860. Soc Sci Hist 34:171–197
Borjas GJ, Grogger J, Hanson GH (2010) Immigration and the economic status of African-American men. Economica 77:255–282
Carter SB et al (2006) Historical statistics of the United States, earliest times to the present, millennial edition vol 2/Part B, work and welfare. Cambridge University Press, New York
Chandler A (2006) How high technology industries transformed work and life worldwide from the 1880s to the 1990s. Capital Soc 1:1–55
Coffman C, Gregson ME (1998) Railroad development and land values. J Real Est Fin Econ 16:191–204
Collins WJ, Margo RA (2006) Historical perspectives on racial differences in schooling in the United States. In: Hanushek E, Welch F (eds) Handbook on the economics of education, vol 1. North-Holland, Amsterdam, pp 107–154
Collins WJ, Margo RA (2011) Race and home ownership from the end of the civil war to the present. Am Econ Rev Pap Pro 2011:355–359
Costa D (1998) The evolution of retirement: an American economic history, 1880–1990. University of Chicago Press, Chicago
Costa D (2000) The wage and the length of the work day: from the 1890s to 1991. J Lab Econ 18:156–81
Craig LA, Palmquist RB, Weiss T (1998) Internal improvements and land values in the antebellum United States. J Real Est Fin Econ 16:173–189
Donahue J, Heckman JJ (1991) Continuous versus episodic change: the impact of civil rights policy on the economic status of blacks. J Econom Lit 29:1603–1643
Durand J (1948) The labor force in the United States, 1890–1960. SSRC, New York
Easterlin R (1960) Interregional differences in per capita income, population, and total income, 1840–1950. In: Committee on research on income and wealth (ed) Trends in the American economy in the nineteenth century. Princeton University Press, Princeton, pp 73–140
Ferrie J (1997) Migration to the frontier in mid-nineteenth century America: a re-examination of turner's safety valve hypothesis. Department of Economics, Northwestern University, Unpublished Working Paper
Fogel RW (1989) Without consent or contract: the rise and fall of American slavery. Norton, New York
Fogel RW, Engerman SL (1974) Time on the cross: the economics of American negro slavery. Little Brown, New York
Galenson DW (1984) White servitude in colonial British America: an economic analysis. Cambridge University Press, New York
Galenson DW, Pope C (1992) Precedence and wealth: evidence from nineteenth century Utah. In: Goldin C, Rockoff H (eds) Strategic factors in nineteenth century American economic history: a volume to honor Robert W. Fogel. University of Chicago Press, Chicago, pp 225–241
Goldin C (1990) Understanding the gender gap: an economic history of American women. Oxford University Press, New York
Goldin C (2000) Labor markets in the twentieth century. In: Engerman S, Galllman R (eds) Cambridge economic history of the United States, vol 3. Cambridge University Press, New York, pp 549–624
Goldin C, Katz LF (2008) The race between education and technology. Harvard University Press, Cambridge
Goldin C, Margo RA (1992) The great compression: the wage structure in the United States at mid-century. Q J Econ 107:1–34
Grubb F (1985) The market for indentured immigrants: evidence on the efficiency of forward-looking contracting in Philadelphia, 1745–1773. J Econom Hist 45:855–868
Higgs R (1977) Competition and coercion: blacks in the American economy, 1865–1914. Cambridge University Press, New York

Higgs R (1982) Accumulation of property by southern blacks before world war one. Am Econ Rev 72:725–737
Hunnicutt B (1980) Historical attitudes toward the increase of free time in the twentieth century: time for work, for leisure, or as unemployment. Soc Leis 3:195–218
Juhn C, Murphy KM, Pierce B (1991) Accounting for the slowdown in black-white wage convergence. In: Kosters MH (ed) Workers and their wages: changing patterns in the United States. Am Enter Inst, Washington, pp 107–143
Katz LF, Margo RA (2013) Technical change and the relative demand for skilled labor: the United States in historical perspective. Working paper 18752, NBER, Cambridge
Lebergott S (1964) Manpower in economic growth: the American record since 1800. McGraw-Hill, New York
Lewis FD (1979) Explaining the shift of labor from agriculture to industry in the United States: 1869 to 1899. J Econom Hist 39:681–698
Maoz YD (2010) Labor hours in the United States and Europe: the role of different leisure preferences. Macro Dyn 14:231–41
Margo RA (1984) Accumulation of property by Southern blacks before world war one: comment and further evidence. Am Econ Rev 74:768–776
Margo RA (1986) Race and human capital: comment. Am Econ Rev 76:1221–1224
Margo RA (1990) Race and schooling in the South, 1880–1950: an economic history. University of Chicago Press, Chicago
Margo RA (1995) Explaining black-white wage convergence, 1940–1950. Ind Labor Relat Rev 48:470–481
Margo RA (2000a) The labor force in the nineteenth century. In: Engerman S, Gallman R (eds) Cambridge economic history of the United States, vol 2. Cambridge University Press, New York, pp 207–243
Margo RA (2000b) Wages and labor markets in the United States, 1820 to 1860. University of Chicago Press, Chicago
Margo RA (2006) Wages and wage inequality. In: Carter S (ed) Historical statistics of the United States, millennial edition, Part B: work and welfare. Cambridge University Press, New York, pp 40–46
Margo RA (2015) The American labor force in historical perspective. In: Cain L, Fishback F, Rhode P (eds) Oxford handbook of American economic history. Oxford University Press, New York
Margo RA, Finegan TA (1996) Compulsory schooling legislation and school attendance in turn-of-the-century America: a 'natural experiments' approach. Econom Lett 53:103–110
Minnesota Population Data Center, University of Minnesota (2014) Integrated public use microdata series. www.ipums.umn.edu. Accessed 2 Sept 2014
Neal D (2006) Why has black-white skill convergence stopped? In: Hanushek E, Welch F (eds) Handbook of the economics of education, vol 1. North-Holland, Amsterdam, pp 512–576
Neal D, Rick A (2014) The prison boom and the lack of black progress after Smith and Welch. Working paper 20283, NBER, Cambridge
Ransom R, Sutch R (1986) The labor of older Americans: retirement on and off the Job, 1870–1937. J Econom Hist 46:1–30
Romer C (1986a) Spurious volatility in historical unemployment data. J Pol Econ 94:1–37
Romer PM (1986) Increasing returns and long run growth. J Pol Econ 94:1002–1037
Romer C (1999) Changes in business cycles: evidence and explanations. J Econ Persp 13:24–44
Rosen S (1974) Hedonic prices and implicit markets: product differentiation in pure competition. J Pol Econ 82:34–55
Rosenbloom J (2002) Looking for work, search for workers: American labor markets during industrialization. Camb University Press, New York
Slaughter M (1995) The antebellum transportation revolution and factor price convergence. Working paper 5303, NBER, Cambridge
Smith J (1984) Race and human capital. Am Econ Rev 74:685–698
Smith J, Welch F (1989) Black economic progress after Myrdal. J Econ Lit 27:519–564

Steckel R (1983) The economic foundations of East–West migration during the nineteenth century. Exp Econ Hist 20:14–36
Sundstrom W (2006) Hours and working conditions. In: Carte S (ed) Historical statistics of the United States millennial edition, 2nd edn. Cambridge University Press, Cambridge, pp 46–54, 301–330
Taylor GR (1951) The transportation revolution, 1815–1860. Rinehart, New York
United States Census Bureau (2014) www.census.gov. Accessed 2 Sept 2014
United States Department of Labor, Bureau of Labor Statistics (2014a) www.bls.gov. Accessed Sept 2, 2014
United States Department of Labor, Bureau of Labor Statistics (2014b) BLS handbook of methods. http://www.bls.gov/opub/hom/. Accessed 2 Sept 2014
Vandenbroucke G (2009) Trends in hours: the U.S. from 1900 to 1950. J Econ Dyn Cont 33:237–49
Weiss T (1992) US labor force estimates and economic growth. In: Gallman R, Engerman S (eds) American economic growth and standards of living before the civil war. University of Chicago Press, Chicago
Weiss T (1999) Estimates of white and nonwhite gainful workers in the United States by age group, race, and sex: decennial census years, 1800–1900. Hist Meth 32:21–35
Whaples R (1990) Winning the eight-hour day, 1909–1919. J Econ Hist 50:393–406