# Labor
## for *Historical Statistics of the United States, Millennial Edition*

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> The annual labour of every nation is the fund which originally supplies it with all the necessaries and conveniences of life,… (whose quantity) must in every nation be regulated by two different circumstances; first, by the skill, dexterity, and judgment with which its labour is generally applied; and, secondly, by the proportion between the number of those who are employed in useful labour, and that of those who are not so employed. Whatever be the soil, climate, or extent of territory of any particular nation, the abundance or scantiness of its annual supply must, in that particular situation, depend upon those two circumstances. [Adam Smith. *The Wealth of Nations* 1776, p. 1.]

Writing in the American revolutionary war year, 1776, Adam Smith identified labor as the key for understanding international differences in the standard of living and quality of life. For earlier thinkers the "wealth of nations" was their stock of gold and other precious metals. With these they could purchase implements of military power and pay the salary of a standing army. Such resources not only secured the nation's own stock of wealth, but could be used to plunder the wealth of others.

Smith's insight was to recognize that the true "wealth of nations" is the productive capacity of the population. While Smith based his analysis on a close reading of the historical development of European nations, perhaps the best illustration of his principles was about to unfold with the development of the American economy.

In this broad sense, then, Labor is the subject of nearly every chapter of *Historical Statistics of the United States*. It also commands an enormous literature of its own. For recent overviews, written from the point of view of quantitatively-oriented economic historians, see Galenson (1996) for the Colonial era, Margo (2000a) for the nineteenth century, and Goldin (2000) for the twentieth century.

The paragraphs that follow are meant to direct readers to material in other chapters of *Historical Statistics* that are relevant to understanding the development of Labor in the American economy. I use the structure outlined by Smith as an organizational device.

## A. Proportion Employed in Useful Labor

For narrative purposes let us begin with Smith's second "circumstance," the proportion of the population employed in "useful labour." As Smith argues, this proportion is an important determinant of economic well-being. Other things equal, high employment rates mean high levels of income per capita. Nations in which there are few dependents have higher levels of income *per capita* than nations which support large numbers of young, old, or idle. In addition, because labor productivity tends to be higher in the market than in the nonmarket sector, the transfer of labor out of the household and into the market increases total output. This would be true even if official labor force statistics were to include the output of the household sector, which typically they do not. If output in the household sector is ignored, the effect of a shift of labor to the market sector is especially important (See Folbre and Wagman, 1993; Wagman and Folbre, 1996; and <labor.force.essay>).

One measure of the proportion of the population employed in useful labour is the labor force to population ratio. This is not a perfect measure of Smith's concept since it excludes non-market labor and includes work that

some might not deem "useful." Moreover, it makes no adjustment for changes in hours. For a discussion of change in hours of work per worker over time see <Sundstrom.essay>.[1]

The statistical record reveals a high and growing labor force to population ratio in America for most of the last two centuries (see, for example, tables <SBC.A.2A>, <SBC.A.11>, and <SBC.W.1> to <SBC.W.6>). These estimates put the employment ratio at over 35 percent in 1800; by the year 2000 it had grown to approximately 51 percent. Both of these levels are high by international standards, especially considering that -- except in the case of slaves -- relatively few young children were or are engaged in labor in America. The labor force to population ratio fell only during the period 1929 through 1966. The decline was the result of markedly reduced immigration resulting from restrictive legislation, the onset of the Great Depression, and the post-World War II Baby Boom.

Part of the explanation for the high and growing labor force to population ratio that characterized much of American history is demographic. While American fertility was extremely high during the eighteenth century, it began to fall during the early years of the nineteenth. This more or less continuous fall, interrupted only by the post-World War II Baby Boom, reduced the dependency ratio, that is, it reduced the fraction of the population that is either too young or too old to work. Measured as the number of persons "young" (0 to 14 years) and "old" (65 years of age and older) divided by the number of persons in the middle working ages (15 to 64 years) and multiplied by 100, the U.S. dependency ratio was only 37.1 in 1850 when it is first reliably possible to make this calculation; by 1990 it had fallen to 28.6 (<Vital Statistics>). By contrast, many developing countries at the turn of the twenty-first century experience dependency ratios in excess of 75; with some as high as 100 (U.S. Census Bureau, 2003).

The effects of the early fertility decline were reinforced by a heavy influx of immigrants throughout much of the last two centuries. Immigrants tend to arrive during their young working ages. This means that immigration increases the population in the 15 to 64 year age group relative to those who are young and old (compare <bcs.d.2> with <mrh.a.12a>). Moreover, because a major reason for immigrating in the first place is to obtain employment, immigrants also tend to have high labor force participation rates relative to the native-born population of the same age and gender (see <bcs.b.14>).

The long-term secular increase in women's labor force participation reinforced the positive demographic forces. Women's participation rates are given in tables <SBC.W.4>, <SBC.A.7> and <SBC.A.8>. They show a more than three-fold increase in the proportion of the prime age adult female population engaged in the labor force since1800. Women's labor force participation evolved from a relatively brief interlude between school-leaving and marriage into a relatively permanent career attachment across the lifecycle, including, increasingly, mothers of young children. This important development is discussed more fully in the labor force participation section below.

[1] Abramovitz and David estimate that hours worked *per capita* rose over the period 1800 to 1890, fell from 1890 through 1966, and then rose over the period 1966 through 1989 (Abramovitz and David 2000, Table 1.3, p. 14).

The increasing labor force participation of women more than offset three other developments that exerted downward pressure on the economy-wide labor force participation rate. These were the reduction in the labor of black workers following emancipation, as their participation rates adjusted to the standards of free rather than slave labor; the reduction in labor force participation among young males as schooling levels advanced; and the marked reduction in the labor force participation of older males as voluntary retirement became the American norm. These participation rates are shown in tables <sbc.a.5> and <sbc.a.6> and discussed in greater detail in the labor force participation section below.

## B. "Skill, Dexterity, and Judgment"

Even more important than the labor force to population ratio, in Smith's view, was the "skill, dexterity, and judgment" possessed by those who work. To such factors Smith credited the "greatest improvements in the productive powers of Labour." Skill, dexterity and judgment are developed through three interrelated but distinct processes: division of labor; investments in physical and human capital; and invention, innovation, and diffusion of new technologies and organizational structures.

### *B.1 Division of Labor*

The division of labor refers to specialization in production and the exchange of goods and services. Specialization and exchange can take place at a variety of levels. Largely self-sufficient agriculturalists may produce extra farm products for exchange for manufactured items or for services produced on neighboring farms, in a nearby town, or in a distant land. An example is the Samuel Swayne household of Chester County, Pennsylvania in the latter part of the eighteenth century described by Marc Egnal (1996, pp. 7-8). The Swaynes operated a 91-acre farm they received at their marriage in 1756 and which they supplemented with an additional 35 acres purchased16 years later. Most of the labor of the Swayne household was reserved for the production of the goods and services for its own consumption but some was directed toward producing goods for exchange. Swayne made saddletrees (leather frames that served as foundations for saddles) and his wife churned butter and made cheese for sale in the local market. They produced wheat, flax, Indian corn, flaxseed, beef, rye, and pork for sale outside the community. The Swaynes used the proceeds from these sales to purchase goods such as books, fabric, sugar, tea, and wine.

Another form of specialization and division of labor involves localities or regions. One well-known example is the "triangular trade" that developed in the eighteenth century in which New England produced rum for export to Africa, Africa produced slave for export to the Caribbean, and the Caribbean exported sugar to New England, where much of it was made into rum. (For statistics regarding the number and tonnage of vessels clearing Boston by origin and destination see <jjm.21a>.) Another example is the rapid expansion of regional specialization and interregional trade after 1815 with the "West" (what we would today call the Midwest) specializing in grains, the South cotton and tobacco, and the Northeast manufactured products (Atack and Passell, 1994, pp. 160-164).

Yet a third form of the division of labor involves the specialization among and within occupations, industries, and firms. One example that will be familiar to many is the evolution of the one-room rural school house in which a single teacher taught all grades and subjects into graded classrooms with specialized teachers for individual grades and subjects. A related development was the creation of separate institutions for the elementary, middle, secondary, and post-secondary educational levels.

The division of labor stimulates labor productivity and wages in a number of ways. By specializing in each its area of comparative advantage labor concentrates in the activity in which its relative productivity is highest. Repetition develops workers' skills so they become more proficient. Focus on a single activity eliminates lost time in moving from one to another. Close familiarity with a specific task generates new ideas for enhancing productivity; specialization provides an incentive to invest in skills, tools, machinery and structures to make the work more accurate, faster, and less physically demanding.

Given its abundant advantages, why don't all societies adopt the division of labor? The answer is contained in Smith's oft-quoted remark, "The division of labor is limited by the extent of the market." In other words, in order for specialization to be profitable, one needs trading partners. Had Robinson Caruso specialized, he would not have survived his stay on his deserted island. Caruso was isolated from the large populations with their high level of wealth that would have made specialization both possible and attractive. If, instead, Caruso had washed ashore in the newly-formed United States of America in 1776 he would have found an extensive market and one which was uniquely well-positioned to grow larger still.

Because of its high fertility, low mortality, and extensive immigration, the U.S. had a large and growing population. By 1820 U.S. population was almost half the size of that of the United Kingdom (U.K.); by 1870 U.S. population had overtaken that of the U.K.; and by the year 2000 the U.S. was the third most populace country in the world after only China and India (Maddison, 1995, p. 106 and U.S. Census Bureau, 2003).

This large and growing population was also becoming wealthier. Robert Gallman estimates that the U.S. economy in 1774 was already approximately a third the size of Great Britain's, despite the fact that the U.S. population was proportionately smaller and that the economy had not yet embarked upon the industrial revolution. Between 1774 and 1909 the U.S. economy grew about 175-fold, or at an average annual rate of 3.9 percent <gdp chapter>. This compares with an estimated average annual growth rate for the British economy over the same period of about 2.2 percent. Thus by 1909, the U.S. economy was almost two-and-a-half times the size of Great Britain's (Gallman, 2000, pp. 2-5).

Low barriers to trade facilitate interactions among labor market participants, thereby further promoting the division of labor. In this light, the Constitutional prohibition on tariffs and other impediments that might restrict interstate commerce was an important stimulus to the division of labor. This stimulus was reinforced by early governmental efforts at the federal, state, and local levels to actively promote internal trade by surveying the land, dredging rivers and streams, building turnpikes and canals, and offering inducements to private companies to

undertake transportation improvements. For all these reasons, the United States was in the forefront of a worldwide "Transportation Revolution" which occurred in the early nineteenth century and which measurably increased the speed and reduced the cost of moving goods and people from place to place. (For details see <transportation.essay> and <gw.a.7>).

Overall, then, by virtue of its rapidly growing population and wealth and its falling barriers to internal trade, the United States domestic market grew to become the world's largest and wealthiest by the end of the nineteenth century and it maintained that position through the twentieth century. Other countries have taken advantage of the division of labor by responding to international markets, and indeed the United States has pursued this strategy as well. But because of the common language and culture, nations with large internal markets have a particular advantage in capturing this "Smithian" source of economic growth.

The developing division of labor is perhaps most easily visible in the occupation and industry statistics presented in section <sbc.o> and discussed in <sobek.essay>. Since these statistics refer to the nation as a whole, however, they necessarily omit labor specialization at the regional and local level.

Like most other economies of the time, eighteenth-century America was largely agricultural and, unlike England, it had not yet commenced its industrial revolution. Nonetheless, as early as 1800 more than a quarter of the labor force was employed outside this primary sector, with the two largest categories of non-agricultural employment at the time being ocean transportation and domestic service. See <sbc.s.1>. Over the nineteenth and twentieth centuries the agricultural share of the labor force declined further as labor moved into more productive occupations. By 1890 the agricultural share of the labor force was less than 50 percent of the total; by 1990 it was just a little more than 1.5 percent (see <sbc.o.1>). Only during the Great Depression of the 1930s when agriculture provided employment for those who could not find work in other sectors, did agricultural employment experience a respite from the relenting downward trend in its share of employment.

The occupations that outpaced agriculture were enormously diverse and constantly changing. During the nineteenth century manufacturing employment grew most spectacularly in both absolute and relative terms. In 1810, manufacturing accounted for only 3.2 percent of the labor force; by 1870 it claimed between 19 to 24 percent of the labor force and, at its peak in 1950 it claimed 34 percent of the total (<sbc.s.1> and <sbc.o.1>).

Clerical, sales, and service occupations outside of domestic work grew rapidly in the late-nineteenth and early twentieth centuries. In 1870, the first year in which the census of occupations included the entire labor force, clerical and sales and service occupations (excluding domestic work) accounted for only 3.4 and 1.4 percent of the labor force, respectively. By 1920 their respective shares were 13.1 and 4.4 percent; and by 1990 these had advanced to 25.6 and 12.8 (<sbc.o.1>). These important shifts in the occupational distribution of the labor force were the source of both improvements in income per capita and also the cause and consequence of the entry of women into the labor force. See <sobek.essay> for more detail on the occupational and industrial distribution and its change over time. See <sundstrom.essay> for the changing character of the size of firms in which workers were employed.

The <wright_productivity.essay> describes the pace and pattern of labor productivity change over time while the <margo.essay> describes the pattern of wages.

*B.2 Physical Capital*

Output per worker may advance as a result of the development of the division of labor alone. Indeed, Sokoloff (1986) ascribes productivity advances in early-nineteenth-century American textile manufacturing almost entirely to this source. At the same time, expansion of the physical capital stock – machinery, factories, livestock, and land – can enhance labor productivity regardless of the division of labor. A farmer with a horse-drawn plow can cultivate more acres in a day than one who pushes the plow by hand.

Given the obvious advantages of employing physical capital in the production process, why don't all societies make use of it? The explanation has to do with relative prices and the legal status of labor. If labor is plentiful, inexpensive, and "free", then it pays to organize production using hand techniques even if machinery is readily available; only if labor is scarce, expensive, and "free" does it pay to invest in machinery. "Free" labor in this context means that the worker retains legal control over the disposition of his or her own labor and that they cannot be compelled to complete a labor agreement by threat of punishment. Since the beginning of the nineteenth century, and with the important exception of the American South that is discussed in detail below, American labor is and has been scarce, expensive, and "free"; it is for these reasons that capital-intensive techniques have been and continue to be a prominent feature of the American economy.[2]

The origins of labor scarcity date to the earliest European settlements in North America. The arrival of Europeans decimated the indigenous population through disease and through calculated political and military strategies, leaving the continent sparsely populated (<See Snipp.essay>). European settlers and their offspring then enjoyed a relative abundance of land, game, fish, timber, and minerals. Since the objective of the colonists in British North America was settlement, they adopted a legal environment that encouraged small land holdings; democratic institutions that encouraged broad-based input into local, state, and national decision-making; and a political system of checks and balances designed to limit the exercise of power by any single group.

As a result of these institutions, independent family-based enterprise became the norm. The easy availability of self- or family-employment meant that hired laborers could be had only at high wages. Thus those who sought to expand output beyond what could be produced by the family looked for strategies that might mitigate the impact of high wages on their profitability. To this end, they actively recruited foreign workers; encouraged immigration; and pioneered ways to substitute capital, raw materials, and land for labor. Gallman (2000) and Abramovitz and David (2000) have made estimates of average annual growth rates of capital relative to the population and to the labor force for specified sub-periods during the nineteenth and twentieth centuries. Growth in capital per worker was a particularly important source of economic growth in the nineteenth century. Abramovitz and

[2] For a fuller discussion of "free" labor see the section on labor market institutions below.

David (2000, Table 1.6, p. 23) estimate that this so-called capital deepening accounted for almost half (49 percent) of the total growth in output per worker growth during the period 1800-1855 and 65 percent of a much more rapid rate of output per worker growth during the period 1855-1890.

The high and growing capital-labor ratios were effected through a variety of technological and organizational responses, three of which are particularly worthy of mention. These appeared first in America and were progenitors of developments that would later be emulated world-wide.

First was the "American System of Manufactures," perhaps best exemplified by rifle production in the Enfield Armory in Connecticut. Prior to the adoption of the American System, rifles were hand-crafted to the specifications of individual customers by an artisan who worked with general-purpose tools such as files, hammers and tongs. With to the American System, a large volume of standardized rifles were manufactured by a large number of highly specialized workers operating highly specialized single-purpose machines and making heavy use of capital and raw materials. Early characterizations of the American System emphasize the importance of interchangeable parts, although more recent research suggests that interchangeable parts were more the exception than the rule before 1870. Before then, quality was not high enough to make such interchangeability a practical reality in most industries (Hounshell, 1984). The American System as developed in small arms production was soon adopted in the production of other manufactured goods. Thus the modern factory production techniques that today are employed world-wide had their origin in the high-wage environment of nineteenth-century America. See <manufactures.essay>.

Second organizational response was the early development of the machine-tool industry, that is, an industry specialized in the manufacture of machines for use in other industrial processes. The viability of such an industry depended crucially upon an extensive domestic market of final manufactured goods and on the capital-intensive nature of a wide range of industrial enterprises throughout the economy. The search for mineral inputs for this industry, such as iron and coal, prompted mineral exploration efforts that had far-reaching consequences for the economy. Thus the mineral-rich products that fueled America's international ascendancy and, by extension, the mineral discoveries that revolutionized economies around the world, also had their origin in the high wage environment of nineteenth-century America (Rosenberg, 1963 and <Wright.natural resources essay>.

The third factor of significance was the early growth of large-scale corporations. These made their appearance in the American railroad and telegraph industries during the mid-nineteenth centuries. The railroad and telegraph companies expanded rapidly over the nineteenth century in response to an unprecedented increase in the demand for transportation and communication services. This demand for transportation services, in turn, was stimulated by the vast geographic extent of the nation, its large domestic market, and the strong regional variation of its resource base. Technological breakthroughs in the 1820s and 1830s gave an edge to railroads over water and road transportation systems in much of the country and the railroad industry expanded rapidly. Annual statistics on the miles of railroad track laid between 1830 and 1925 are shown in <lpc.30>. What these statistics don't show is the

growing size of the corporations that owned these rail systems. The railroad industry was characterized by returns to scale, that is, large companies were more profitable than small ones; as a consequence, the industry became highly concentrated in the hands of a small number of rail service providers. The large size of these rail companies presented unprecedented challenges to labor management. As business historian Alfred D. Chandler, Jr., emphasized:

> They were the first to require a large number of full-time managers to coordinate, control, and evaluate the activities of a number of widely scattered operating units. For this reason, they provided the most relevant administrative models for enterprises in the production and distribution of goods and services when such enterprises began to build, on the basis of the new transportation and communication network, their own geographically extended, multiunit business empires (Chandler, 1977, p. 79).

Thus the unprecedented economic and geographic expansion of the American product market laid the basis for the innovation of labor management systems and internal labor markets. This innovation revolutionized labor systems in the United States and throughout the world during the twentieth century (Jacoby, 1985). For statistics on manufacturing employees by size of employing unit see (<sbc.d.30>).

*B.3 Human Capital*

"Human capital" refers to those productive human skills that are developed through investments in education, apprenticeship, and other formal and informal on-the-job training. Human capital can advance productivity directly, as it does when it leads to faster or more accurate completion of some given task. Human capital can also advance productivity indirectly as it does when it enables workers to identify and seize new opportunities such as adopting a new type of seed or a different method of cultivation, or to switch to a more advantageous venue for example, abandoning the thin and rocky soils of New England for the fertile lands of the Midwest, or quitting agriculture altogether to take up more profitable employment in industry. Human capital also stimulates invention. In the nineteenth century it was human capital in the form of the work experience of thousands of individual farmers, mechanics, and craftsmen that generated the stream of inventions that transformed American agriculture and industry. In the early twentieth century the locus of American invention and innovation shifted to industrial research laboratories and research universities. In this case the connection between human capital in the form of formal schooling and invention is especially clear (<science&technology.essay>).

In the American context formal schooling is the form of human capital that has received the greatest attention. One reason is that from as early as the mid-nineteenth century until recently, America led the world in formal educational attainment. Claudia Goldin describes this American ascendancy in terms of three transformations <goldin.essay>. The first of these was achieved about 1850 when the majority of free American youth completed the eighth grade. The second was achieved about 1940 when the majority of youth completed high school. The third is still ongoing at the beginning of the twenty-first century as a growing fraction of youth complete four years of college.

Historical statistics on the educational attainment of the population by sex and race since 1940 are shown in <cg.c.1>. Labor force participation rates by educational attainment are shown in <sbc.a.17>.

Not only did America lead the world in terms of educational attainment for much of the nineteenth and twentieth centuries, but the rest of the world gradually adopted the American educational model – what Goldin terms the "American template." This template reflected the American political philosophy which Goldin characterizes as "egalitarianism" and which consisted of several elements: "public funding, openness, gender neutrality, local (and also state) control, separation of church and state, and an *academic curriculum*"(Goldin, 2001, p. 265, emphasis added). Americans insisted upon an academic rather than a vocational curriculum because the academic but not the vocational curriculum provided *general* skills. General skills are those that are useful in a variety of circumstances. General skills "…survive transport across firms, industries, occupations, and geography …" (Goldin, 2001, p. 275). Americans insisted upon these general, portable skills because of the dynamism of the American economy; in America, the locus of opportunity shifted rapidly across industries, occupations, technologies, and locales.

If human capital development in the form of formal schooling is so attractive, why didn't all societies embraced it? Part of the answer has to do with demand-side factors. In a stagnant economy experiencing little change in its technology, industrial organization, composition of its output, and in the geographic location of its production, there is no payoff to training that goes beyond the acquisition of the current stock of skills; only dynamic economies reward those who can craft solutions to new problems and seize new opportunities. Thus the principle demand side factor explaining the growth of formal schooling in America was and is the dynamic economic environment. Some milestones in this dynamic development with special implications for labor include the development of the American System of Manufactures which reduced the demand for skilled artisans, growth of the machine tool industry which stimulated demand for engineering skills, development of large-scale industries such as the railroad and the telegraph which stimulated demand for managerial and organizational skills to run these large-scale organizations, and the advent of "knowledge-based progress" in the twentieth century.

Some evidence pointing to the power of these demand-side factors are the estimated rates of return to formal schooling. These appear to have been higher than returns to other forms of human capital investment perhaps as early as the 1820s. It also seems probable that rates of return to formal schooling in America were higher than in other parts of the world at that early date. Robert Margo (2000b and <margo.essay>) reports that while wages of artisans fell relative to those of unskilled labor during the early period of industrialization, those of educated labor rose. Rates of return to formal education have fallen during only two periods of American history. One was the period of the 1930s, 1940s, and 1950s -- the era that Goldin and Margo (1992) describe as the "Great Compression" when the Great Depression, then World War II, and finally the rapid expansion of manufacturing in response to a dramatic growth in world demand for American products in the immediate post-World War II period favored less educated workers. The second period of decline in the relative wage advantage of highly-educated workers was during the 1970s when a downturn in the economy coincided with the labor force entry of the large,

highly-educated Baby Boom generation. (On the business cycle see <business_cycle.essay>. On the characteristics of the Baby Boom cohort as compared with those of other cohorts see <cohorts.essay>. For evidence on relative earnings by skill category over time see <sbc.b.6>, <sbc.b.9>, <sbc.b.19>, <sbc.fig.07>; for income at different times according to years of education see <cg.f.1> and <cg.f.2>.

The other reason formal schooling developed as rapidly and extensively as it did in America has to do with supply-side factors. Human capital development requires wealth. There is the cost of instruction itself – the wages of teachers and administrators, the physical plant, and books and supplies. Even more expensive in general, is the implicit cost of the student's time in school. Those engaged in on-the-job training reduce their production. Those engaged in formal schooling may have to suspend production and forgo the associated income altogether. In order for human capital accumulation to take place, a society or individual must be wealthy enough to absorb these expenses. We have already documented the high and growing wealth in the American economy.

A related issue is the relationship between adults and youth. Human capital is most beneficial to the individual and to society when it is acquired at young ages. This is because young people have more years in which to reap the benefits in terms of higher productivity and wages. But young people generally find it difficult or impossible to finance their own human capital investments since their earnings capabilities are typically low and they have not had time to accumulate assets. For these reasons, youth are generally dependent for their human capital development upon the decisions and resources of their elders. Not all elders are willing to provide schooling for youth even if they are able. Schooling expands youths' opportunities; youth may take up these opportunities to distance themselves from their parents. In the past throughout the world and in many parts of the world even today, parents rely on their grown children to provide economic security for their old age. Where they do so, they are reluctant to educate their children, especially their daughters.

Americans largely abandoned their reliance on grown children for old-age security early in the nineteenth century. After this transition, planned, self-financed retirement became the norm. Once accumulated savings secured old age, children became precious. They were sent to school and little work was expected of them. Daughters as well as sons enjoyed these benefits (Fishlow, 1966; Lindert, 1978; Kaestle and Vinovskis, 1980; Tyack and Hansot, 1990; and Carter, Ransom, and Sutch, 2003). School enrollment rates were high and boys and girls attended in relatively equal proportions. See <cg.a.15> and <cg.a.11>. An unintended consequence of educating daughters as well as sons was the creation of a large pool of inexpensive female teachers. The schools' willingness to hire female teachers and female teachers' willingness to teach for low wages were important ingredients in facilitating the on-going expansion of the American educational system (Carter, 1986; Perlman and Margo, 2001).

A third supply-side factor was the system of local control. This allowed communities to adjust school structure, curriculum, and financing in response to local conditions. Local control meant that schools reflected local needs and therefore garnered public support. See <goldin.essay>.

*B.4 Improvements in Technology and Industrial Organization*

Technological improvements permit more output from a given set of inputs. Almost always they boost labor productivity. A familiar example is Eli Whitney's cotton gin (1793) which replaced hand methods of removing cotton seeds from the bolls. Contemporary observers testified that the gin would "separate more by one hand in a day than formerly in the space of months" (Green, 1956, p. 49). Organizational changes can improve output in the same way. A famous early organizational innovation is the hog-slaughtering "disassembly" lines established first in Cincinnati and then in Chicago in the early 1870s. Live hogs were herded into the upper floor of slaughter houses and moved by gravity and overhead conveyer devices through a sequence of consecutive steps involving slaughtering, butchering, and dressing. The meat for wholesale and retail distribution emerged at the far end of the slaughter house without once retracing its steps (Giedion, 1948). Such sequential ordering of production was not possible in early factories that relied on water or steam power for their energy. Instead, the power-intensive elements of production were located near the power source and other intervening operations performed elsewhere in the building. Because consecutive steps in the production process were performed at different places around the plant, a large number of workers had to be employed in simply moving partially finished goods from one part of the factory to another. The introduction of electrical power into factories in the 1890s and its widespread adoption in the 1920s allowed for the rationalization of the workflow. Because electricity could be distributed as easily to one as to another point in the factory, production was reorganized to manage the flow of production in a logical fashion and reduce the need to move semi-finished products back and forth around the plant. These changes afforded considerable savings in labor, plant size, and in working capital (David, 1990). To the extent to which such technological and organizational changes raise labor productivity, they also prompt a rise in wages.

Scholars have argued that as early as the first half of the nineteenth century American technological innovation in America was faster than elsewhere. In an influential book, H. J. Habakkuk reports commentary by contemporary observers to this effect and asks, "Why should mechanisation, standardization and mass-production have appeared before 1850 and to an extent which surprised reasonably dispassionate English observers" (Habakkuk 1962, p. 5). At the same time there is abundant evidence that America was a heavy borrower of industrial technologies from other countries. To briefly summarize a large and complicated literature, it seems that in certain industries such firearms, steamboats, farm machinery, sewing machines, and other machine tools, the United States was the primary source of new and distinctive technological inventions and innovations. In other industries, especially cotton textiles, most of the technology employed in America was borrowed from abroad (Habakkuk, 1962; Rosenberg, 1976; and Hounshell, 1984). The longest-running quantitative measure of this technological activity is the series on patents (<SLE.A.3.4>). The U.S. surpassed Great Britain in patents per capita by 1810 (Khan and Sokoloff, 2001, p. 239).

The characterization of American industrial and organizational inventions, innovations, and practice over the last two hundred years is the subject of a large literature. See <science&technology essay>, Engerman and Sokoloff

(2000), and Mowery and Rosenberg (2000) for recent surveys. See <productivity essay> for an assessment of the role of improvements in technology and industrial organization as a source of American productivity growth.

Technological and organizational improvements rarely affect all inputs equally. Those that do are said to be "neutral." Generally speaking, however, changes in technology affect the demand for capital and for labor differently and may have different effects on skilled verses unskilled labor as well. See <margo.essay> for a discussion of the impact of technological and organizational changes on various types of labor over time.

C. Laws, Institutions and the Operation of the American Labor Market

The American labor market operates within a complex, idiosyncratic, and changing set of laws and institutions. These laws and institutions influence a wide range of labor market outcomes. We have already referred to the impact of educational institutions on labor skills; immigration policy on the size and character of the labor force; and Indian policy on "land abundance" for European settlers. These are but a few examples.

The basic law of employment specifies the ownership and control over human labor itself. Three major categories of such ownership and control have been practiced historically: slavery and serfdom, "contract labor" such as indentured servitude, and free labor. A slave is the property of a master who exercises complete legal and physical control. Slaves pass their enslaved status on to their offspring. Contract laborers are born free and their children are born free, but when they voluntarily enter into a labor contract they are bound for the specified period of time to perform their agreed upon duties or face punishment. Free laborers enter labor relations voluntarily and are free to quit at any time. Unlike contract laborers, they are not bound to remain until the task or term of work is completed. If they do depart before the work is complete they loose compensation for the uncompleted work, but they do not face punishment.

Orthogonal to these three labor systems are laws controlling married women's right to make contracts and to control their own their property, earnings, and activities. Until the nineteenth century throughout most of the world and in some parts of the world even today, wives were forbidden to "…make contracts, buy and sell property, sue or be sued, or draft wills. Her husband owned any wages she earned, and he controlled any property she brought to the marriage. A husband also could control his wife's economic activities outside the home, such as limiting a particular shopkeeper from selling to his wife" (Geddes and Lueck 2002, p. 1079). Other legal restrictions society-wide often limited the labor of married women.

At their founding, the American colonies recognized slavery and indentured servitude, but over time abolished both of these forms of coercive labor. The abolition of slavery began in the North in 1777 and was complete in the "Free" States by 1803. Slavery continued in the South, however, until a Civil War and the Thirteenth Amendment to the Constitution outlawed this practice. Indentured servitude vanished by the 1820s. In 1864 Congress legalized contract labor for immigrants, but in 1885 reversed itself and banned the practice. According to Robert Steinfeld (1991), America was the first nation to embrace the institution of free labor on a wide scale.

American labor institutions originated out of the English labor practice and law at the time of initial colonization during the early-seventeenth century. As Steinfeld demonstrates, English law at that time sanctioned both slave and consensual labor contracts. The distinction between the two is that slaves had no say in the disposition of their labor while free persons did. Free persons could sign labor contracts in exchange for wages, training, and/or transatlantic transportation. Steinfeld also demonstrates that the consensual labor contracts offered at the time subjected workers to what we would describe today as "unfree labor" (Steinfeld, 1991, p. 3). While workers entered into these labor agreements voluntarily, they faced stiff penalties if they failed to fulfill their promises. Thus, if an individual agreed to work for some specified period of time, produce some product, or provide some service, he or she would risk not only the loss of compensation for failing to deliver, but would also face fines, imprisonment, whippings, disfigurement, or other punishments. Under such circumstances, hired labor in the seventeenth and eighteenth centuries was closer in nature to indentured servitude than it was to the free labor we know today. Today employees have the right to quit at anytime without fear of coercive retribution.

The motivation for adopting these systems of "unfree" labor was the relative ease of attaining self-employment in the American environment. The abundance of land, game, fish, timber, and minerals and their consequent low price for the right to exploit these resources meant that even those who started with few assets of their own could soon purchase access by accumulating savings over a few years of wage work. Those seeking to expand employment in their enterprise beyond the family labor force found it necessary to resort to some form of unfree labor. The insight is due to Evsey Domar (1970) who demonstrated that free land, free laborers, and rent-earning landlords can not exist simultaneously. Free land means high wages for free laborers and these high wages exhaust landowners' rents. In a land-rich environment property owners can profit from labor only by placing restrictions on laborers' rights.

*C.1. Indentured Servitude and Other Forms of Contractual Labor*

Indentured servitude was the first form of unfree labor to enjoy wide-spread adoption in the American colonies. According to this system Europeans voluntarily signed contracts, called "indentures", in which they pledged to work for a specific period of time in return for food, shelter, and clothing and often passage to America, training, and "freedom dues" upon the completion of their service. The length of the required service varied with the reimbursements; those who could afford to pay their own passage could negotiate for a shorter period of service. The length of required service also varied with the characteristics of the servant. Young, healthy men in possession of craft skills were offered shorter periods of service because of their higher productivity than those without such characteristics. The length of service also varied with supply and demand. A decrease in the supply of servants or an increase in demand for labor caused the period of service to fall, effectively raising the price of the servant for the master.

By about 1630, after the initial establishment of the colonies had been completed, indentured servants constituted the majority of new arrivals from Europe. With the end to religious persecutions in Europe, the rise in wages, and the fall in transportation costs, the number of persons willing to enter servitude fell and colonists were forced to offer shorter terms of service in order to attract them. Increases in the value of colonial export products also led to reductions in the length of service as planters searched for ways to entice more potential workers. These forces eventually drove the price of indentured servants above the price of black slaves imported from Africa or the Caribbean. Colonists who wished to use bound labor relied increasingly on slave labor. By the time of the American Revolution slaves had largely replaced indentured servants in the South although they continued as an important source of labor in Pennsylvania and the Chesapeake. After 1820 the institution of indentured servitude disappeared entirely (Steinfeld 1991, Galensen 1996).

In addition to indentured servants, restrictive contracts formed the basis of the employment relation for apprentices, domestic servants, as well as for laborers. Peter Way (1993) shows that early American canals were built with a labor force comprised of slaves and white laborers who signed contracts committing them to remain with the project until the work was complete. Coercive labor contracts were also ubiquitous in the market for Northern agricultural labor through the first half of the nineteenth century. While most Northern farms made do with family labor, those that employed hired hands bound them to honor either specific periods of service or the completion of specific tasks (Rothenberg 1992; Steinfeld, 1991, Ch. 2).

*C.2. Slave Labor*

Slave labor was a powerful and quantitatively important institution in colonial America. Slavery was legal throughout British North America and it was practiced in all of the colonies that would ultimately become the United States. In 1770, blacks (almost all of whom are presumed to have been slaves) accounted for an estimated 21.7 percent of the total population. They were heavily concentrated in the South. In Virginia, North Carolina, South Carolina, and Georgia they accounted for 42.0, 35.3, 60.5, and 45.5 percent of the population, respectively. At the same time slaves were present in the Northern colonies as well, in particular in Rhode Island, New York and New Jersey where they accounted for 6.5, 11.7, and 7.0 percent of the 1770 population (<jjm.1>).

In 1800 slaves accounted for over thirty percent of the workforce nationally and slightly over 50 percent of the workforce in the South. Almost all slave labor was engaged in agriculture, especially in the cultivation of tobacco. Enslaved women and children were just as likely as enslaved men to work in the fields. See <sbc.w.7> through <sbc.w.12>.

Vermont was the first to abolish slavery in 1777; by 1804 all of the Northern states had outlawed this practice. Slavery continued to be practiced throughout the South until 1865 at the conclusion of the Civil War and the passage of the Thirteenth Amendment to the Constitution. The <slavery.essay> describes the origins of slavery in the American colonies, its development, and subsequent abolition. <mccusker.essay> discusses the role of slavery

in the colonial economy. The <confederate.states of America.essay> focuses on the Conferderate States of America and the Civil War.

The institution of slave labor produced a distinctive economic dynamic in the South. Gavin Wright argues that the distinctiveness of the Southern labor market even today had its origins in behaviors motivated by slaveholding in the early nineteenth century.

> As compared to the American North, the incentives of slave property tended to disperse population across the land, reduce investments in transportation and in cities, and limit the exploration of southern natural resources. Above all, slave owners had no incentives to open up labor market links with outside areas, and the resulting inelasticity of the labor supply squeezed out labor-intensive manufacturing activity, such as the pre-[Civil]war textile industry which grew during the 1840s but stagnated during the cotton boom of the 1850s (Wright, 1984, p. 11).

With the abolition of slavery, Southerners ceased to engage in these distinctive practices. Wright calls particular attention to the "reallocation of land from corn to cotton, new enthusiasm for railroads and local development, and the rise of new manufacturing and mining sectors (p. 11)." He also shows that after the abolition of slavery the Southern labor market began to function much like the labor market in the rest of the country. Despite the evils of debt peonage, sharecropping, and racism, Southern labor turnover was high and laborers migrated from lower- to higher-wage areas. At the same time, the absence of formal linkages with the rest of the nation (in the slave era the South had stronger trade connections with Europe than it did with the Northern states), the absence of appropriate industrial technologies (the American System of Manufactures was not well suited to the low-wage labor-abundant South), and a reluctance to invest heavily in education for fear of enabling the out-migration of youth, kept the Southern labor market separate from that of the rest of the nation. Until World War I the Southern labor market operated in isolation from that in the rest of the country. Southern migration took place only within the South, despite the availability of higher wages, better working conditions, and more political freedom for blacks in other regions of the country. Since the vast majority of blacks lived in the South, an important implication of this Southern labor market isolation is that it perpetuated the poverty, low educational attainment, and agricultural employment of the black population. In Wright's phrase, blacks were the "poorest group in the country's poorest region" (Wright, 1987). See also Rosenbloom (2001) on the isolation of the Southern labor market. William Collins (1997) demonstrates that this isolation of the Southern labor market was caused by mass European immigration coupled with racist hiring practices of Northern employers who favored white immigrants over Southern blacks.

Labor shortages during World War I and the restrictive immigration legislation of the 1920s sparked the "Great Migration" which ended the isolation of the Southern labor market. The "Great Migration" refers to the wholesale migration of black Southerners into Northeastern and Midwestern cities. It began in the last decade of the nineteenth century, accelerated substantially during World War I and then again during the 1920s, subsided somewhat during the Great Depression of the 1930s, but then accelerated once again during the World War II years. While Southerners of all races migrated to the North, black Southerners participated to a disproportionate degree

(<ferrie.essay> and Collins 1997). The Great Migration is credited with substantial gains for blacks on a wide range of fronts including improvements in educational attainment (<cg.a.15>), increased occupational integration (<sbc.o.29>), and greater equality in black-white earnings (<sbc.b.35> and <sbc.b.36>).

While the exodus of blacks sparked some improvements for the black workers who remained in the South, Wright (1987) demonstrates that it was not until the enactment of New Deal labor policies during the 1930s that the Southern labor market really began to resemble the labor market in the rest of the nation. The National Recovery Act (NRA) raised the wage in many Southern industries, Works Progress Administration (WPA) employment opportunities were offered at wages that were much higher than those prevailing in the South. Other influential New Deal policies were those that encouraged unionization and established a relatively high minimum wage.

*C.3. Free Labor*

"Free labor" in this context refers to a labor system in which employees have the right to quit. As Steinfeld (1991) demonstrates, free labor was not an institution that America inherited from the English, it was a unique American development. While free labor first appeared in America in the early eighteenth century, it wasn't until the early years of the nineteenth century that it emerged as the dominate mode. Steinfeld explains the appearance and spread of free labor to two consequences of the American Revolution, a heightened resolve to abolish black slavery and a broad-based demand to extend the suffrage. He argues that following the Revolution, "…Americans began to think about indentured servitude quite differently, as a form of involuntary rather than voluntary servitude and as essentially indistinguishable from slavery" (p. 7). Their post-Revolutionary agitation for broadened suffrage pushed in the same direction. "one of the principal new tests for the suffrage that states began to adopt was the test of legal self-government. Did an individual have the legal right to control and dispose of his or her own person, or did that right lie in another? If individuals enjoyed the legal right to control and dispose of themselves, they would be qualified to exercise the suffrage…" (p. 185). Thus, under this interpretation, suffrage required the abolition of unfree labor. Way (1993) suggests an economic motive may have played a role as well. Free laborers are cheaper than unfree when the supply of labor is great and where demand fluctuates the way it did in the building of canals in the late eighteenth and early nineteenth centuries. During good times inexpensive free labor could be recruited in Scotland and Ireland, during bad times free labor could be dismissed, sparing the company the cost of their room and board, forcing laborers to finance their own unemployment. By the early nineteenth century the two labor systems were chattel slavery and free labor, where free labor not only entered into the employment relation voluntarily but had secured the right to depart at will.

Free labor became an increasingly important institution in America over the nineteenth century and for most of the twentieth century as well. While the free share of the Southern labor force remained roughly constant over the nineteenth century up until the abolition of slavery, it rose as a share of the national labor force. This was because of the substantial immigration of free laborers to the North but not to the South, especially after 1840. Thus, while free

workers accounted for 69.5 percent of the labor force in 1800, on the eve of the Civil War in 1860 the free share was 78.3 percent (calculated from <sbc.w.1> and <sbc.w.4>).

There is an additional sense in which free labor was growing in importance over time. It is when we distinguish self-employed and unpaid family workers from hired workers. As late as 1900, Lebergott estimates that hired labor accounted for only a little more than half (55.4 percent) of the labor force (calculated from <sbc.s.9.1>, <sbc.s.9.9> and <sbc.a.2.1>). The continuing importance of owner-operated farms and small retail and service establishments limited the extent of hired labor economy-wide. By 1960 wage and salary workers comprised 84 percent of the labor force according to Lebergott and 86 percent according to the BLS (<sbc.a.21.12>). In 2000 wage and salary workers are estimated to account for 93 percent of the labor force. The decline in self-employment and rise in (free) wage and salary workers has been a largely uninterrupted development except for a mild reversal of the trend toward wage and salary work in the late 1970s and early 1980s (<sbc.a.21.12>). One confounding development has been the growing use of S-Corporations as a legal form for small individual and family enterprises. To reduce risk and taxation, an increasing number of small enterprises have adopted this legal form. When they do so, the formerly self-employed individual is reclassified as an employee of the new corporation. See <nlr.a.4>. The number of S-corporations has risen rapidly over time, especially since the mid-1980s. This trend may be masking a substantial amount of what we would otherwise classify as self-employment.

*C. 4. The Rights of Married Women*

America law adopted the English practice of "coverture", which refers to the constricted status of married women under common law. In the oft-quoted words of the prominent English jurist, Sir William Blackstone marriage creates under coverture a "unity of person between the husband and wife; it being held that they are one person in law, so that the very being and existence of the woman is suspended during the coverture, or entirely merged and incorporated in that of the husband" (Blackstone 1897). In other words, under coveture husbands exercised legal control over their wives' activities and owned their wives' output; the absence of coverture is self-ownership.

Coverture has been shown to limit married women's commercial and patenting activities in nineteenth-century America (Khan 1996). It is also probable that coverture reduced investments in women's education and job-related skills (Schultz 1968).

American laws regarding coverture were written at the state level and it is therefore possible to observe regional differences in the decline of this institution over time. Geddes and Lueck (2002) develop a chronology of women's property rights by state over time (see <sbc.c.6>) and use the data to explore the causes of this important legal change. In their view, the principle causes of the decline in coverture, at least in the American environment, were increases in wealth, the market wage, the rate of return to education, and the complexity of market work. According to available estimates, women's self-ownership became law throughout the country by the late 1890s (<sbc.c.6>)..

Nonetheless twentieth century depression and wartime exigencies produced a series of labor laws that severely limited married women's employment opportunities between the 1920s and the 1950s. These were the so-called "Marriage Bars" that prohibited employers from hiring married women and required them to fire experienced, formerly single female employees upon their marriage. Goldin (1991) documents the rise of such practices beginning in the 1920s, just as women were beginning to extend the number of years they devoted to the labor force. The institution of such regulations posed few costs to employers, in Goldin's view, since they were imposed at a time when most married women considered their jobs to be temporary. Nonetheless, they must surely have inhibited investments in human capital by women who would have preferred longer employment careers. Marriage Bars were suddenly abandoned in the 1950s under pressure from the markedly growing labor supply of married women.

*C. 5. Labor Market Structure*

In addition to the basic law of employment there are countless other laws, institutions, and practices that affect labor market operation. Nickell and Layard (1999) classify these under five headings: labor taxation, especially payroll taxes, income taxes, and consumption sales taxes; employment protection legislation regulating of hours of work, employee compensation, and job security; trade union activity and minimum wages; support for the unemployed and active labor market policy aimed at reducing unemployment; and education and skill formation. Quantitative evidence on the historical development of these labor market institutions are displayed in various chapters of *Historical Statistics of the United States*. The <wallis.essay> discusses the development of the federal income tax, its level, its incidence, and change over time. The <sundstrom.essay> discusses the development of hours of work, worker safety, and job security legislation. The <rosenbloom.essay> discusses trade unions and their growth and evolution over time. Table <sbc.b.29> displays time series data regarding the federal minimum wage. The <ziliack-hannon.essay> and <fishback-thomasson.essay> describe private and social income support for the unemployed and for those who are out of the labor force. The <businesscycle.essay> discusses the evolution of active labor market policy. Educational institutions are described in <goldin.essay> and in the paragraphs above.

The constellation of institutions that affect labor market operation are sometimes referred to collectively by the term "labor market structure." For some purposes labor market structure can be usefully viewed as lying along a single dimension. At one end of the spectrum lie "unfettered" labor markets that mimic textbook examples of perfect competition. At the other end are highly "structured" labor markets with substantial legal, political, and social institutions that modify the forces of market competition. A popular way of viewing the development of the American labor market is to see it as moving along this continuum from less to more structure over time. Tomlins (2000) provides an overview and analysis of the major legal developments. Fishback (1998) offers a comprehensive description of the operation of the relatively "unfettered" labor markets at the turn of the twentieth century. He also provides an assessment of their operation and the political economy of the emergence of additional labor market structure over the course of the twentieth century. In Fishback's view, the relatively unfettered labor markets at about

1900 “functioned well enough that workers typically had multiple opportunities and were able to move to take advantage of them to improve their situation” (p. 759). At the same time, laborers clearly expressed their dissatisfaction with many of the labor practices of the day and there were a considerable number of issues that were viewed as problems by workers and employers both. Fishback concludes that many of the progressive-era labor regulations, especially worker compensation laws, unemployment insurance, and minimum wages were beneficial not only to workers but to a “significant subset of employers” (p. 761). For this reason they are likely to remain a part of the American landscape, at least until the underlying conditions change.

Labor markets can also be compared according to these structures. An active area of labor market research in the closing years of the twentieth century is the identification of connections between different labor market structures and their associated labor market outcomes (See Blau and Kahn 1999 and Nickell and Layard, 1999 for overviews).

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