

NBER WORKING PAPER SERIES  
ON  
HISTORICAL FACTORS IN LONG RUN GROWTH

CLIOMETRICS AND THE NOBEL

Claudia Goldin

Historical Paper No. 65

NATIONAL BUREAU OF ECONOMIC RESEARCH  
1050 Massachusetts Avenue  
Cambridge, MA 02138  
December 1994

This paper was written while I was a Visiting Fellow at The Brookings Institution, Washington, DC. I thank Dora Costa, Lance Davis, Stanley Engerman, Lawrence Katz, Robert Margo, Donald McCloskey, Joel Mokyr, Larry Neal, Dahlia Remler, Kenneth Sokoloff, Robert Whaples, Gavin Wright, and the editorial office of the Journal of Economic Perspectives for their suggestions. This paper is part of NBER's research program in the Historical Development of the American Economy. Any opinions expressed are those of the author and not those of the National Bureau of Economic Research.

© 1994 by Claudia Goldin. All rights reserved. Short sections of text, not to exceed two paragraphs, may be quoted without explicit permission provided that full credit, including © notice, is given to the source.

CLIOMETRICS AND THE NOBEL

ABSTRACT

In October 1993, the Royal Swedish Academy of Sciences awarded the Nobel Prize in Economics to Robert William Fogel and Douglass Cecil North "for having renewed research in economic history." The Academy noted that "they were pioneers in the branch of economic history that has been called the 'new economic history,' or 'cliometrics'." In this paper I address what this cliometrics is and how these two Nobel Prize winners furthered the discipline of economics.

Claudia Goldin  
Department of Economics  
Harvard University  
Cambridge, MA 02138  
and NBER

In October 1993, the Royal Swedish Academy of Sciences awarded the Nobel Prize in Economics to Robert William Fogel and Douglass Cecil North "for having renewed research in economic history." The Academy noted that "they were pioneers in the branch of economic history that has been called the "new economic history," or "cliometrics". What is this cliometrics, and how have these two Nobel Prize winners furthered the discipline of economics?

Cliometrics is, quite simply, the application of economic theory and quantitative methods to the study of history. The term marries the muse of history -- Clio -- to measurement and was coined by Stanley Reiter, a mathematical economist then at Purdue University and a collaborator of two of the first cliometricians, Lance Davis and Jonathan Hughes.

History serves economics in various ways.<sup>1</sup> Most importantly, history is essential because it is risky to base conclusions on transient phenomena. The past, many economic theorists have discovered, is a giant experiment station for economic ideas. And empiricists have learned that historical data are often better (for example, because of less litigious environments) and provide larger samples (that is, longer time series).<sup>2</sup> The histories of the developed world are backdrops, and often provide advice, for current developing countries. Finally, remnants of the past, which shape the realm of the possible today, are always with us as laws, norms, structures, institutions, and even people. In short, only the oblivious can ignore history in modern economics, and only the unenlightened would choose to do so.

Given the large domain of economic history, it should not be surprising that Robert Fogel and Douglass North are not the first Nobel Prize winners in economics to study and use history. Milton Friedman used the past to understand the role of money; John Hicks studied economic history to understand economic growth; W. Arthur Lewis explored economic history as a backdrop for the problems of development; and Theodore Schultz examined it to learn about human capital. Robert Fogel's mentor Simon Kuznets was an economic historian in all these ways.

Yet Fogel and North do not simply join the list of stellar economists who have used history. They are distinctive, because for them economic history is not a handmaiden of

economics but a distinct field of scholarship. Economic history was a scholarly discipline long before it became cliometrics. Its practitioners were economists and historians studying the histories of economies. Both called themselves economic historians. The new economic history, or cliometrics, formalized economic history in a manner similar to the injection of mathematical models and statistics into the rest of economics.

### The Birth of the New Economic History

The revolution that brought the new economic history occurred in the early 1960s. As in many such revolutions, the young were pitted against the old. It would be fair to say that the more established members of the economic history profession, many of whom were historians, controlled the Economic History Association at least to 1960s. However, Douglass North, a champion of the new economic history, and William Parker became the editors of the Journal of Economic History (the EHA's scholarly journal) in 1960, a post they shared until 1966. The Journal of Economic History remained a journal read by economic historians from both history and economics,<sup>3</sup> whereas Explorations in Entrepreneurial History (later Explorations in Economic History)<sup>4</sup> became and continues to be a major outlet for the new economic history.

The young turks, who included Fogel and North at the very outset, formed their own scholarly meetings at Purdue University (Purdue University had a glorious decade of prominence in cliometrics). They called their field "the new economic history," a term actually coined by Douglass North (Hughes, 1982). The Cliometrics Meetings, as they became known, are still held annually and have retained their open, argumentative, and exhilarating character.

The new economic history was able to blossom in the 1960s because its foundations had recently been laid. A stock of quantitative knowledge produced by economists, many at the National Bureau of Economic Research, gave economic historians a clearer sense of when economies grew and what the sources of growth were. For example, a joint meeting in 1957 of the Economic History Association and the National Bureau of Economic Research (Conference

on Research in Income and Wealth) produced a volume containing various data series which formed the basis for much of the new economic history (Parker, 1960). In that volume are Robert Gallman's estimates of commodity output, Towne and Rasmussen's farm gross product and investment series, Richard Easterlin's regional income estimates, Stanley Lebergott's wage series, Ethel Hoover's price index, Edward Budd's factor shares, and North's estimates of the balance of payments, all for the nineteenth century United States. North (1977) has credited the conference with spawning the new economic history.

No longer did economic historians have to rely on series for particular industrial commodities or those on international trade to proxy the entire economy. The task of measurement was in no way complete, but enough groundwork had been set to enable the flowering of an entire profession.

Formalization caused more of an uproar in economic history than elsewhere in economics.<sup>5</sup> In most of empirical economics, more precise estimation of economic relationships and more precision about what one was estimating were viewed as progress. But in economic history there was considerable resistance. Those who were formalizing the field were viewed as outsiders. They were economists, not historians or economic historians. The insiders claimed the outsiders were theorists with little knowledge of the facts, and with no sense of history.

In large measure the opposition was intense because the modeling and statistical methods were alien to many practitioners. But I believe that it was also because the conclusions ran counter to orthodoxy. When economic history was formalized, there was already a huge fossilized stock of accepted wisdom concerning major projects, figures, and events of the past.<sup>6</sup> Such accumulated wisdom did not exist to the same degree in other fields of empirical economics. The other empirical fields of economics were newer or had been less cumulative. The conclusions of one generation of economists in other fields, therefore, could be overturned without mounting a major challenge to an entire field. If one generation claimed labor supply functions were backward-bending but the next estimated a positive supply elasticity using new

data and methods, their results could be reconciled by merely supposing that in the meanwhile the underlying parameters had changed.

The most important and immediate innovation from the formalization of economic history was the "counterfactual." The most vivid example comes from the work of Robert Fogel and concerns the first of his projects that was singled out by the Swedish Academy for recognition (Fogel, 1964). Historians had for some time claimed that the railroad was the engine of economic growth in nineteenth century America. By stating that the railroads were essential to growth, the historians were claiming that the railroads caused it. But if railroads caused growth, then the growth would have been considerably less in the absence of the railroads. Robert Fogel restated these claims, then, as a "counterfactual." The hypothesis was: had the railroads not been built, America would have grown much more slowly. Fogel (1964), which will be discussed more in the next section, is actually an extended thought-experiment of what the U.S. economy would have looked like if the railroads had never been built.

The notion of a counterfactual was hard for many historians to swallow. It involved the hypothetical removal of the largest enterprise at the time, the first big business in America, one of the most productive sectors, and some of the wealthiest Americans, to mention just a few parts of the mental experiment. But, noted Fogel, those who were making claims about the indispensability of the railroad were implicitly invoking precisely this experiment. He was merely making the claim explicit and subjecting it to hard evidence.

Robert Fogel and Douglass North have moved the discipline of economic history in a similar manner. At the outset of their careers, their methodologies and subject areas were quantitative in the National Bureau of Economic Research tradition.<sup>7</sup> However, they have now emerged as rather different scholars with distinctive research methodologies. Fogel is the premier empiricist, who establishes a fact and then establishes it over and over again, until he is confident he can persuade the most determined skeptic. Douglass North is the grand theorist, arbitrating between economic history and organization theory. Fogel's current subject area investigates the

nexus of nutrition, health, and productivity. North's is the role of institutions and organizations in economic growth, with particular reference to the countries of the former Soviet bloc. Yet in their early works, one can see the fuller agenda they would eventually pursue.

#### Early Work on Transportation

It is not much of a coincidence that Fogel and North both focused on changes in the price of transportation. In the 1950s, a primarily theoretical literature emerged conjecturing that economic growth could be enhanced by decreased transport costs, at least under special circumstances. Even when productivity change is moving at a snail's pace in the goods-producing sectors, a decrease in the price of transportation can increase national income substantially.<sup>8</sup> Developing economies were advised to increase certain capital expenditures if they wanted to grow, especially "infrastructure" and, most especially, transportation. How decreased transport costs affected the economic growth of the United States -- the great success story -- was a natural.<sup>9</sup>

Fogel's Railroads and American Economic Growth was an immediate classic. Derived from his doctoral dissertation at Johns Hopkins University, it is a volume in search of a single number -- the social savings of the American railroads in 1890.<sup>10</sup> By the term "social savings," Fogel meant the increase in social surplus from the decrease in transport costs. The most cited finding of the book is the "interregional" social savings calculation, which pertains to the large trunk lines that linked the food exporting cities of the Midwest to the food importing cities of the East. Fogel calculated that if in 1890 the railroads had not existed and if, in their stead, the four major agricultural goods (wheat, corn, pork, and beef) were transported on existing water routes, gross national product would have declined by less than 0.6 percent. For those who believed the great east-west railroads were indispensable to American economic growth, the 0.6 percent figure was a blow. The preliminary results from the interregional social savings calculation were presented by Fogel to the first Cliometrics Meetings held at Purdue University in December 1960.

Etched in the memory of all who attended was a presentation by this master debater, who would deliver countless more presentations on the road to winning the Nobel.

Anyone who looks at a map of the United States, and thinks hard about the concept of marginal cost, would find the result on the interregional social savings to be less surprising than it seemed in 1960. The United States has a lot of navigable waterways and the cost of water transportation was actually lower than that for railroads, although water transport was slower and less reliable, involved costly linkages, and required some land transport. Other countries were not so fortunate, and for them (for example, Mexico, for which the same calculation has been made<sup>11</sup>), the interregional social savings of the railroads was greater.

In some sense the real controversy, and the more difficult calculation, concerned the social savings of the railroads within regions, termed the "intraregional" social savings. The intraregional calculation involved the thought-experiment of removing all the railroads that transported goods from farms to the markets of the Midwest and computing how much gross national product would have declined. The railroads had more costly alternatives here than they did for the long-haul routes. There were some navigable waterways, to be sure, but there were also considerable distances to move goods over land, a costly venture before the gasoline engine and trucks.

Fogel (1964) made four calculations of the within-region social savings, depending upon various assumptions concerning the alternative mode of transportation and the area cultivated.<sup>12</sup> The alternative modes involved either existing water and land routes, along with a set of canals that would, according to Fogel, probably have been built had the railroads not existed. Fogel also pointed out that with higher costs of transportation, it would not have been cost effective to cultivate some areas of the country. A reasonable calculation, then, takes out from cultivation lands that were beyond the feasible margin but adds back into the social savings the loss in net income from those lands.<sup>13</sup> The intraregional social savings estimated in this manner is about 1 percent of 1890 GNP.



Thus, the total social savings from shipping agricultural commodities both between and inside regions comes to less than 2 percent of GNP in 1890. Agricultural commodities, by ton-miles shipped, were about one-fourth of all goods shipped by rail, but there is no obvious reason to multiply the agricultural social savings figure by a factor of exactly four. Fogel omitted, too, the social savings of the railroads in passenger travel. But on the other side of the balance sheet, the calculation does not include the probability that the internal combustion engine would have been invented and commercialized sooner in the absence of the railroad.

Fogel has noted that his original dissertation proposal called for measuring how large the social savings of the railroads were, and that he was truly startled when he discovered the savings were small. But whether or not one views the social saving as large or small is in the eyes of the beholder. It was small in comparison with the claims of those who came before Fogel. But it may be viewed as large in comparison with the social savings from any other single mechanical device in U.S. history. Whatever the judgment on relative magnitude, Fogel offered a most careful and meticulous estimate of the actual size.

Douglass North's best-known research in transportation concerns ocean shipping from 1600 to 1860. The costs of ocean shipping decreased during much of the period, more so in the nineteenth century than before. A large part of the decrease, argued North (1968), came from an increase in total factor productivity. But the question was whether total factor productivity gains were rooted in technological advances or some other innovation. North found that from 1600 to 1784 productivity advanced at a slow rate, but that virtually all of the gains were due to decreased crew size and less time spent idle in ports. For the period from 1814 to 1860, productivity increased faster, at almost ten times the annual rate in the previous two centuries. Virtually all the gain here was due to an increase in the size of ships and to their greater load factor. For most of the two and a half centuries considered, goods coming from the New World to the Old World were bulky raw materials, whereas those moving in the other direction were compact manufactured goods. In the 1840s and 1850s, however, there was a large increase in

immigration, which meant that ships returned to the New World with cargo, not in ballast. The load factor thereby increased.

The surprising finding is that for both periods, technological change was less responsible for the increase in productivity than were other innovations -- a sharp reduction in piracy and organizational changes that increased round-trips per year by a factor of three.<sup>14</sup> With less piracy, ships needed fewer crew members and could carry more goods and fewer armaments. With less need to arm ships, technologically superior vessels could be used. For example, the Dutch "flute"<sup>15</sup> had been used in the Baltic long before the modified flute made it to the ocean. But the reason these superior vessels were used in the Baltic was that piracy had been significantly reduced there, and the flute generally carried no armament. The important point for economic history and for North's intellectual development is that institutions interact with technology. One without the other does not produce economic growth. North learned the lesson well and shifted his attention for the next 25 years to a study of institutions.

In their work on transportation, both Fogel and North did case studies exploring whether growth occurs because a particular sector takes off or because of a larger set of changes across many sectors. The answer, from Fogel, was that the sector identified with growth -- that of railroad transport -- was not solely or primarily responsible. Rather it was the contributions of many sectors. North's answer was that even if one sector pulled the economy along, the path of development depended crucially on institutions that, in turn, derived from the distribution of income, culture, and politics.

#### On the Economic Impact of Slavery

An area of greater overlap between the works of North and Fogel is the impact of slavery on the growth of the American South. In the midst of a growing industrial nation with a mobile and free labor force sat an agricultural slavocracy. North's volume The Economic Growth of the United States, 1790 to 1860 (1961) and Fogel and Stanley Engerman's Time on the Cross (1974),

as well as Fogel's Without Consent or Contract (1989), all explore differential regional growth.

After the American Civil War the North was economically vibrant; the South was, by national standards, economically backward. But in 1860, per capita income was actually higher in the South than in the Midwest, another agricultural and rural region. Income per capita in the South decreased in real terms from 1860 to 1880 and did not regain its previous level until about 1900. Even as late as the 1920s, southern income per capita was less than 60 percent of the U.S. average. The southern economy apparently collapsed after the Civil War and did not recover for almost a half century. Such economic deterioration could not have been due to the war itself. Rather, it must have had something to do with the institutions existing in the South before the American Civil War.

According to North, the roots of southern stagnation are to be found in the geographic patterns of the antebellum period. The South, using slave labor, grew cotton and exported it to the American North and to Britain. With the receipts from its northern shipments it purchased foodstuffs from the Midwest and industrial goods from the North.<sup>16</sup> With its receipts from European shipments, it purchased luxury items and other industrial wares. Little was ploughed back into the South as internal improvements. Schooling was denied slaves and was poorly provided to southerners in general. Cities, those generators of agglomeration economies, were rare in the South. Innovation was thereby stifled.

The North ran a very different ship. With far more equality of income and wealth, northerners purchased goods produced by local tradesmen and local firms. Its funds were ploughed back into local industry and internal improvements. Its people were the best educated in the world. The North established institutions that served an egalitarian society and that furthered an industrial and growing region. The South had norms that reinforced a caste and race-based society and that inhibited growth at the service of a master class. Such institutions have long lives.

The message, repeated in many of Douglass North's later works, is that when institutions

serve to enrich one group (masters, feudal lords) at the expense of another (slaves, serfs) it does not matter that these institutions also reduce the potential income of the elite. Pareto-improving trades are generally impossible between the two groups, and thus there is no assurance that more efficient institutions will drive out less efficient ones.

Robert Fogel's many volumes on the South and slavery explore why the South was rich before the Civil War, and thus why emancipation greatly reduced income per capita. In 1860, southern income per capita (including slaves) was 57 percent of the per capita income of the urban industrial north, and 116 percent of the more rural and agricultural midwest. If slaves are allotted a mere subsistence standard of living, then per capita income for the rest of the South would rise to 98 percent of northern, and 200 percent of midwestern income. Free southerners, then, were relatively rich in the antebellum period. How did the South achieve its economic position before the Civil War and how did it lose it? Fogel focuses on the first question, for his interests were mainly in the role of slavery in the antebellum economy and the manner in which it influenced the material condition of slaves.

He and co-author Engerman asked whether slaves worked more intensively than did free laborers and whether large plantations were more efficient than smaller cotton farms. The evidence revealed substantial economies of scale, but the economies of scale were reaped only on slave plantations.<sup>17</sup> Plantations with more than 15 slaves produced about 40 percent more output per unit input than did farms with no slaves or farms with fewer than 15 slaves. The key was gang labor on plantations and the more effective use of all slaves around the seasons, as well as the old, the infirm, pregnant women, and children. Southern farms utilized slaves efficiently by meshing the seasons for cotton and corn, the care of livestock and buildings, and the production of manufactured goods, such as shoes and clothing. The South was actually self-sufficient in the production of foodstuffs in the antebellum period.<sup>18</sup> The hypothesized triangular trade among the South, the North, and the West did not exist at the scale most imagined (including Douglass North). Slavery stifled the growth of industrial firms and cities in the South,

but not the way most thought. Slaves were not incompatible with cities and industry. Rather, they had a strong comparative advantage in the production of cotton.

Fogel's research revealed slavery's harshness and cruelty. Yet even though slavery was a brutal labor system, the prosperity of the antebellum South may have benefited North American slaves who lived longer lives, achieved greater physical stature, and had better living conditions than their bound counterparts in the rest of the New World, such as Latin America and the Caribbean.

Although Fogel's conclusions about the South are rather different from North's, their views of the regional differences are compatible. At the heart of Fogel's explanation is a very Northian point that organizational innovations allowed an oppressive institution to flourish. The South may have been a rich farming area in the antebellum period, but its wealth rested on slave labor. In the absence of slavery, production plummeted. The different paths to development taken by the agricultural South and the agricultural midwest point to the persistence of norms, laws, traditions, and organizations that retained inequality in the South and implicitly taxed both rich and poor.

### Recent Writings

The final chapters in the writings of North and Fogel are likely to be considered their finest achievements. North's most recent writings are a continuation of an agenda he began in the early 1970s. Robert Fogel's build on his work since the mid-1970s.

North's current agenda concerns the role of institutions in economic growth. One can see a glimmer in his studies of transportation and antebellum growth. Economists have recently become aware that the rules of economic and social interaction determine economic outcomes more than the stock of resources and the level of technology. Other parts of the world, for example, had even more abundant natural resources than did North America. Yet the United States engineered the most intensive exploitation of its natural resources than did any other nation in the nineteenth century. The reason had to do with its institutions, particularly those

pertaining to property rights. North began his exploration of these ideas in Institutional Change and American Economic Growth (1971), co-written with Lance Davis.

The United States was a great success story in large measure because of its pedigree. It inherited its private property laws from England but because of English domination, it also learned to detest strong central government. Davis and North explore how various unique American institutions served to encourage economic growth and how Madison's effort (through Federalist Paper #10 and the Constitution) to control interest groups was eventually in vain. In two volumes, The Rise of the Western World (1973, with Robert Paul Thomas) and Structure and Change in Economic History (1981), North investigated world history in this light. The principal question in these volumes is why Europe failed to grow in a sustained manner from 900 to 1700, yet succeeded after.

Although economic growth was not sustained for long during the 900 to 1700 period, important institutional changes occurred that eventually led to the breakthroughs of the eighteenth century. Changes in military technology led to increases in the optimal size of the manor. Population increase led to the settlement of the areas between manors, and more settled land brought greater order and even cities. Feudal areas that were initially unconnected and self-sufficient now traded. Markets expanded and regions specialized. With goods and factors entering markets, traditional feudal dues and fealty were abandoned. And with expanded markets there was more need for a larger unit -- the nation-state -- to assume the function of securing order. Nation-states often set down rules governing property rights and laws that gave incentives to innovation. Increased trade within and among the new nation-states was a further fillip to the flowering that was to come in the eighteenth century.

North reminds us that war and rebellion were widespread in fourteenth and fifteenth century England, and that nothing guaranteed the success of England. The rise of Parliament was crucial. Without Parliament there would have been no private property guarantees and without that institutional change, innovation would have been stifled. Why a Parliament rose in

England, but not in Spain or France, cannot be ascribed to one factor but to several that hinge on England's island status. Because foreign invasion was not a serious threat, the power of the monarch was less important in England. Because an export -- wool -- could be taxed with little evasion, a large bureaucracy was not essential. As North (1981, p. 156) notes regarding the rise of Parliament, "Had such a shift not occurred, the economic history of England would have been much different."

The critical elements in North's story, telling of the emergence of the modern, is the interplay between structural change and technological change. Technological change blossomed, not so much because people got smarter, but because they were enabled to reap greater rewards as markets expanded and property rights were better defined and defended. North argues that increases in the conventional factors used to explain economic growth imply that an economy has the capacity to grow. They do not therefore explain why growth is absent in particular countries or at particular times. Saying that countries grow because they increase their stock of capital is, according to North, like saying that people are rich because they have money.

One of my favorite of Douglass North's pieces is "Ideology and the Free Rider," a chapter in Structure and Change. We all live in a Hobbesian world, he argues, and the only way economies can operate near the frontier is to keep nasty behavior in check. Governments are organized to do that. Laws governing behavior are set down, governments are given the authority to police, incentive-compatible contracts are drawn up, and so on. But individuals can still engage in behavior that undermines the very foundations of the system. In the absence of truly Draconian measures, we will have social chaos and economic collapse.

Ideology, says North, has kept such behaviors in check. All civilized societies have cultivated particular ideologies (by which is meant belief systems), such as those making families primary, those bonding individuals to groups (such as families, communities, tribes, clans), and those conferring social opprobrium on individuals who engage in various behaviors. Stealing

alters economic incentives and imposes negative externalities on everyone. Thus the person who steals is a free rider. Ideology and norms are a means of reducing such behavior by imposing extra-legal penalties on the perpetrator and their kin.

According to North, the cliometric revolution helped economic historians make progress in understanding why economies perform favorably, given institutions, but not what the role of institutions is. With an enabling structure, capital can accumulate, innovation can flourish, and economic growth can be sustained. Without it, nothing. North (1990, p. 3) would like to return economic historians to one of their original tasks -- understanding the "humanly devised constraints that shape human interaction," whether they be laws, norms, ideology, government agencies, constitutions, codes of behavior, religion, or conventions. The difficult part is the dynamics of institutional change and whether and how these structures and institutions change for the good of all. That is the task of future work.

For the past 20 years, Robert Fogel has turned his attention to demography and economics. The project is large, far-reaching, and a challenge to summarize. It has involved scholars from economics, history, medicine, physiology, demography, and statistics, and a data collection that is the largest ever in the field of economic history and one of the largest that has been privately amassed in economics.<sup>19</sup> It covers several centuries and continents. The research, like North's, is ongoing. The most massive of the data sets, that on the Civil War pension records, is still being collected.

The project explores the relationship between economic resources and the standard of living. The standard of living includes health, a multidimensional quantity incorporating morbidity and mortality. The central question is when and how the world's people improved their health, and how health in turn enhanced productivity. The first part of the project, pertaining primarily to North America, summarizes much of Robert Fogel's work to the mid-1980s (Fogel, 1986; Fogel et al., 1983). America was rich in resources, with a relatively high standard of living from at least the eighteenth century onward, overtaking France on a per capita basis early in the nineteenth



century and Britain somewhat later. But international comparisons of standards of living are difficult, both now and then. Comparisons of one aspect of the standard of living over time and across countries -- health -- may not be so difficult. The early work on the project was directed to measuring aspects of health -- adult height, the adolescent growth spurt, mortality, and birth weight, to mention a few -- for much of American history and the histories of various European countries as comparisons.

The results have been astonishing. Native-born American men were as tall on the eve of the American Revolution as they were on the eve of the American Civil War, and as tall as they were on the eve of World War II. But the foreign-born men who fought on the American side during the Revolution were almost two inches shorter than the native-born, as were the British they fought. Birth in the American colonies, particularly in the South, endowed men with nutrients and calories to enable them to reach adult heights that were high even by twentieth century standards.

Why the adult height of native-born American men did not rise is puzzling. One possibility (and I note again that the research is ongoing) is that native-born Americans were sometimes nonetheless the sons of foreign-born women. Physiological studies show that stunted adults (here, undernourished European women) give birth, on average, to young who are relatively stunted. Fogel also argues that the Industrial Revolution and the disease environment is another part of the story. Fogel and his colleagues have amassed considerable evidence that heights and life-expectancy (conditional on reaching age 20) actually cycled during much of the nineteenth century. Rising real incomes may not have been experienced by the bulk of the working-class population. Crowding in the nation's burgeoning cities and the large influx of immigrants in the 1840s may have heightened the disease environment; greater work intensity in factories during the 1830s and 1840s may have increased the need for calories and protein. With more of the population removed from food supplies, and refrigeration and improved transportation decades away, it seems plausible that the Industrial Revolution decreased some elements of the standard

of living for a growing subsection of the American population.

The second, and the more ongoing portion, of Fogel's project concerns both long-term trends in Europe and the data on the Civil War veterans (Fogel, 1994). It seeks to uncover the relationship between early nutritional deprivation and later productivity and health outcomes. It rests on evidence from medical and physiological studies underscoring the importance of height and body mass in improving life-expectation, and that chronic conditions at older ages result from early nutritional deprivation, the impact of which may remain concealed for decades.

Before the nineteenth century, most European populations were severely undernourished. Frenchman around 1790, for example, were probably two-thirds their current body weight and 4 inches shorter. Although they were both stunted and wasted, they would have been even more undernourished had they been taller. Fogel emphasizes that height serves as a crucial equilibrating mechanism across generations, adjusting to food supplies, work intensity, and the disease environment. But even with the equilibration of height, those who are stunted still have a greater incidence of chronic disease and lower life expectancy. Given the calories available and their distribution, 20 percent of the French population in 1790 could do little more than beg. A large amount of economic growth, therefore, was due to increased nourishment of the population. Fogel estimates for Britain that one-third of the increase in growth per capita from 1790 to 1980 was due to increased nutrition. How more food got produced is another question.

Almost all able-bodied young men were drafted to serve in the U.S. Union Army, and the pension from the Union Army supported large numbers of men in their old age during the early twentieth century. Fogel's team is linking the Union Army draft records backward in time to the 1850 and 1860 federal population censuses to obtain information on the family of origin. The records are then linked forward to veterans' records and Union Army pensions. Finally the records are linked to the 1900 and 1910 federal population censuses to get information on labor force status in old age. The conclusion is that illness is more likely the shorter the adult and the lower the adult's body mass, both today and in the Union Army sample. Nutritional advances,

not just medical technology, have reduced the incidence of chronic diseases and may also have reduced death and ill health from contagious disease. Increased nutrition was responsible for a large proportion of the increase in life expectation until the mid-twentieth century, when advances in medical technology become instrumental. Better nourished people have less chronic disease, are less susceptible to contagious disease, and are considerably more productive.

Fogel's emphasis on the health risks of low body mass may strike many in our low-cal, thin-is-in, diet-happy times as odd. An optimum weight, given height, exists and a substantial fraction of Americans have gone beyond it. But for most of world history and in much of the developing world today severe stunting and low body mass seriously limit life. How those in the developed world escaped from hunger has been foremost in Fogel's research agenda (Fogel 1992).

The works of Fogel and of North have relevance for both economic policy and economic theory. Fogel's should caution those making health care policy not to rely on short-term series concerning life-expectancy, to pay attention to the nutritional and hidden causes of chronic disease, and to consider the productivity effects of a healthier population. It contains implicit warnings to the governments of poor countries and the agencies of rich countries attempting to assist them. Distributional factors, not the aggregate lack of food, are often to blame for famines; famines have repercussions that often last for generations; even when body mass is optimal for height, stunting has serious consequences later in life and lowers life expectancy; and stunting is caused more by day-to-day nutritional deficiencies than by catastrophic events such as famines. North's work directs the emerging nations of eastern Europe and the former Soviet Union to reconsider their structures and institutions as they embrace other reforms. He also cautions their advisors that Western organizational forms will not function properly without enabling norms and ideologies. His work has considerable relevance in organization theory and game theory. North (1991) provides a menu of institutions and guidance about how they fared.

## Conclusions

The birth of cliometrics brought economic history into the discipline of economics. It subjected its claims to the same standards of proof by which others in economics had to abide. It used the same models and statistical tools, and often better and more critically-examined data. But as in other revolutions, unanticipated repercussions occurred. One is that few departments of history now have economic historians at all; in effect, the new economic historians extinguished the other side. The intent, however, was to proselytize, not obliterate. Why the unintended consequence arose had as much to do with the history profession, as that of economics.

A second consequence is of greater significance to the field of economics. It used to be that economic history was a requirement for the doctorate in the premier departments, but as economic history began to use the same tools as other specialties, many believed the economic history requirement for the doctorate could be abolished without consequence. The young turks had taken a discipline that had a unique place in economics and made it appear familiar to all economists. Familiarity did not breed contempt, but it had almost as harmful an effect. Economic historians were after some time no longer viewed by many economists as a distinct group. One economic historian recently went so far as to argue that cliometricians engineered the "end of economic history."<sup>20</sup>

The work of Fogel and North, however, suggests the opposite. Economic history is not a quaint nor outdated field, but a highly relevant one. Both Fogel and North concentrated their early efforts on transportation and market integration to understand the development of U.S. and European economies. But they also pursued these topics because they were foremost in the minds of policy makers in the 1950s and 1960s. Fogel's work on slavery revealed why the antebellum South was so rich and how slaves contributed to high productivity that would decline with emancipation. But it was written in large measure to expose an important piece of the current American dilemma.

Economic historians today are primarily concerned with economic growth, the persistence

of institutions, and the roots of current economic issues. In the past, it was the focus on institutions that made economic historians appear to be distinctive. Because that knowledge is now subject to the same rigor as some other economics does not mean that it is any less special and certainly does not mean that economic historians possess less of it. Economic historians who came before the cliometric revolution distinguished themselves by mastering a wide array of facts and by their knowledge of institutions. But without the rigor of economics and econometrics, they sometimes built on faulty reasoning. Because theories were not tested properly, important data were often overlooked. By bringing economic history into modern economics, cliometricians have not ended economic history. On the contrary, they have brought it to a higher plane.

Most fields of economics can be viewed a particular segment of a general equilibrium system. Labor economics analyzes the labor market, industrial organization deals with the goods market, public finance studies the government, and so on. Economic historians, however, consider the entire system. To use an analogy from medicine, economic historians are family practitioners, not specialists, and like the family doctor they follow the patient over the long run. Economic history is, like other fields of economics, unified by a common set of questions. But in economic history the questions typically concern how whole economies have developed, why some grew while others did not, and what the consequences of economic growth have been. In this way, economic history is very much related to development economics.

What is it then that makes economic historians, such as Robert Fogel and Douglass North, unique among economists? It is not that they study the past, use historical data, exploit the past for natural experiments, use a particular methodology, are open to the ideas from other disciplines, or find lessons in the past for developing countries. Rather, it is all of these plus one indispensable ingredient. Economic historians study economies over the long-term. The evolution of economies is their particular niche.

## Acknowledgments

I thank Dora Costa, Lance Davis, Stanley Engerman, Lawrence Katz, Robert Margo, Donald McCloskey, Joel Mokyr, Larry Neal, Dahlia Remler, Kenneth Sokoloff, Robert Whaples, Gavin Wright, and the editorial office of the Journal of Economic Perspectives for their suggestions.

## References

Coatsworth, John H. (1981) Growth Against Development: The Economic Impact of the Railroads in Porfirian Mexico. DeKalb, IL: Northern Illinois University Press.

Conrad, Alfred H., and John R. Meyer. (1958) "The Economics of Slavery in the Antebellum South," Journal of Political Economy 66 (April): 94-130.

Davis, Lance. (1968) "'And It Will Never Be Literature': The New Economic History: A Critique," Explorations in Economic History 6 (Fall): 75-92.

\*Davis, Lance E., and Douglass C. North. (1971) Institutional Change and American Economic Growth. New York: Cambridge University Press.

Engerman, Stanley L. (1966) "The Economic Impact of the Civil War," Explorations in Economic History 3: 176-99.

Fishlow, Albert. (1965) American Railroads and the Transformation of the Ante-bellum Economy. Cambridge, MA: Harvard University Press.

\*Fogel, Robert W. (1964) Railroads and American Economic Growth: Essays in Econometric History. Baltimore: The Johns Hopkins University Press.

Fogel, Robert W. (1986) "Nutrition and the Decline in Mortality since 1700: Some Preliminary Findings." In S.L. Engerman and R.E. Gallman, Long-Term Factors in American Economic Growth. Studies in Income and Wealth, vol. 51. Chicago: University of Chicago Press.

\*Fogel, Robert W. (1989) Without Consent or Contract: The Rise and Fall of American Slavery. New York: W.W. Norton and Company.

\*Fogel, Robert W. (1992) "Second Thoughts on the European Escape from Hunger: Famines, Chronic Malnutrition, and Mortality." In S.R. Osmani, ed., Nutrition and Poverty. Oxford: Clarendon Press.

Fogel, Robert W. (1994) "Economic Growth, Population Theory, and Physiology: The Bearing of Long-Term Processes on the Making of Economic Policy," American Economic Review 84 (June): 369-395.

Fogel, Robert W., et al. (1983) "Secular Changes in American and British Stature and Nutrition." Journal of Interdisciplinary History 14 (Autumn): 445-81.

\*Fogel, Robert W. and Stanley L. Engerman. (1974) Time on the Cross: The Economics of American Negro Slavery. vols. 1 and 2. New York: Little Brown and Company.

Fogel, Robert W. and Stanley L. Engerman. (1977) "Explaining the Relative Efficiency of Slave Agriculture in the Antebellum South," American Economic Review 67 (June): 275-96.

Fogel, Robert W. and Stanley L. Engerman. (1980) "Explaining the Relative Efficiency of Slave Agriculture in the Antebellum South: Reply," American Economic Review 70 (September): 672-90.

Gallman, Robert, (1970) "Self-Sufficiency of the Cotton Economy of the Antebellum South." In William Parker, ed., The Structure of the Cotton Economy of the Antebellum South. Washington, D.C.: Agricultural History Society, pp. 5-24.



Goodrich, Carter. (1960) Government Promotion of American Canals and Railroads 1800-1890. New York: Columbia University Press.

Harley, C. Knick. (1988) "Ocean Freight Rates and Productivity, 1740-1913: The Primacy of Mechanical Invention Reaffirmed," Journal of Economic History 48 (December): 851-76.

Hughes, Jonathan R.T. (1982) "Douglass North as a Teacher." In R.L. Ransom, R. Sutch, and G.M. Walton, eds., Explorations in the New Economic History: Essays in Honor of Douglass C. North. New York: Academic Press.

McCloskey, Donald N. (1976) "Does the Past Have Useful Economics?" Journal of Economic Literature 14 (June): 434-461.

Murphy, Kevin M., Andrei Shleifer, and Robert W. Vishny. (1989) "Industrialization and the Big Push," Journal of Political Economy 97 (October): 1003-1026.

\*North, Douglass C. (1961) The Economic Growth of the United States, 1790-1860. New York: Prentice Hall.

\*North, Douglass C. (1968) "Sources of Productivity Change in Ocean Shipping, 1600-1850," Journal of Political Economy 76 (September): 953-970.

North, Douglass C. (1977) "The New Economic History After Twenty Years," American Behavioral Scientist 21 (December).

\*North, Douglass C. (1981) Structure and Change in Economic History. New York: W.W. Norton

and Company.

\*North, Douglass C. (1991) Institutions, Institutional Change and Economic Performance. New York: Cambridge University Press.

\*North, Douglass C. and Robert Paul Thomas. (1973) The Rise of the Western World: A New Economic History. London: Cambridge University Press.

Parker, William N., ed. (1960) Trends in the American Economy in the Nineteenth Century. Studies in Income and Wealth, vol. 24, by the Conference on Research in Income and Wealth. Princeton: Princeton University Press.

Romer, Christina. (1994) "The End of Economic History," Journal of Economic Education 25 (Winter): 49-66.

Rostow, W.W. (1960) The Stages of Economic Growth: A Non-Communist Manifesto. Cambridge: Cambridge University Press.

Temin, Peter. (1969) The Jacksonian Economy. New York: W.W. Norton and Company.

Thomas, Robert Paul. (1965) "A Quantitative Approach to the Study of the Effects of British Imperial Policy on Colonial Welfare: Some Preliminary Findings," Journal of Economic History 25 (September): 615-38.

Whaples, Robert. (1991) "A Quantitative History of the Journal of Economic History and the Cliometric Revolution," Journal of Economic History 51 (June): 289-301.

Wright, Gavin. (1979) "The Efficiency of Slavery: Another Interpretation," American Economic Review 69 (March): 219-226.

\* indicates a publication cited by the Royal Swedish Academy of Sciences.

## NOTES

1. The many roles of historical economics are detailed in McCloskey (1976).
2. Oddly enough historical data are often better than current data. The absence of litigation is one reason. For example, I have uncovered U.S. Department of Labor surveys from 1939 that asked personnel officers of firms "Do you discriminate on the basis of race?" and "List the jobs for which you would never hire a man and those for which you would never hire a woman." Such questions would not be asked today for they provide "smoking-gun" evidence for civil rights suits. Historical data also enable linkages that often cannot be done today because files are closed, sometimes for almost a century. Robert Fogel's study of the Union Army veterans (see below) links veterans' data to information from the U.S. census of population manuscripts. The 1920 census of population manuscripts are the latest to have been released.
3. Robert Whaples (1991) has quantified the cliometric revolution as reflected in the content of the Journal of Economic History. He finds that the surge in cliometric articles in the regular issues of the Journal began in the mid-1960s, but that the "Tasks" issues (published papers from the Economic History Association meetings) lagged behind. Articles based on the cliometric methodology were about 10 percent of the total in the regular issues in the 1956-60 period and 16 percent in the 1961-65 period. But they were 43 percent from 1966-70 and 72 percent from 1971-75. In the "Tasks" issues they were 6 percent from 1956-60, 15 percent from 1961-65, and just 18 percent from 1966-70. They increased to 40 percent during 1971-75. That is, the methodology of the research-oriented economic history community changed before that of the association's leadership who choose the papers for the annual meeting.
4. Explorations in Entrepreneurial History was initially under the editorship of John Meyer who was a major spark to the cliometric revolution through his paper with Alfred Conrad, "The Economics of Slavery in the Antebellum South," which appeared in the Journal of Political Economy (Conrad and Meyer, 1958). This paper was originally presented at the momentous joint EHA/NBER meeting referred to below.
5. There was similar opposition in industrial and labor relations, which also had a long history of non-economist practitioners, when modern labor economics invaded its turf.
6. Among the conclusions of the new (U.S.) economic history in the late 1950s and 1960s that ran counter to orthodoxy are: that the railroads were not indispensable to economic growth (Fogel, 1964), that railroads were not built ahead of demand (Fishlow, 1965), that President Jackson's banking policies did not cause the economic turbulence of the 1830s and 1840s (Temin, 1969), that slavery was not unprofitable (Conrad and Meyer, 1958), that the Civil War was not a major spur to the industrialization of the northern states (Engerman, 1966), and that the navigation acts could not directly have caused the American revolution (Thomas, 1965).
7. Even though North's later work is mainly theoretical and abstract, his early contributions to economic history were empirical, for example his estimates of the balance of payments, ocean freight rates, and import and export price indexes (North, 1961).
8. Such "big push" theories, in which non-convexities dominate, have been given renewed attention recently (Murphy, Shleifer, and Vishny, 1989).

9. Both Fogel and North were influenced by the work of Carter Goodrich (1960) who emphasized the importance of government infrastructure investments to economic growth.

10. Fogel's book also concerned the thesis of W.W. Rostow (1960) that the railroads were a leading sector in American economic growth. Because the railroads were so large, their growth, according to Rostow, pulled along other sectors. Fogel demonstrates that the railroads consumed only a small fraction of the nation's iron, coal, and lumber production and, therefore, that they were not a leading sector in the manner hypothesized by Rostow.

Given the importance of the subject, it is not surprising that Fogel's was not the only doctoral dissertation written on railroads in the early 1960s. Albert Fishlow's (1965) concerned an earlier history of the railroads, and he came to somewhat different conclusions.

11. See Coatsworth (1981).

12. Four calculations are emphasized in the book, although six are actually made. There are three assumptions for the alternative transportation network: (1) no change, (2) build more canals, and (3) resurface roads, of which (1) and (2) are emphasized in the book. There are two assumptions for the amount of land in cultivation: (1) use all existing land in cultivation, and (2) use only that within the feasible margin.

13. If those lands were left in cultivation, then the social savings of the railroad is inflated, because without the railroad goods would be shipped East at a total unit cost greater than their unit price in the market.

14. Harley (1988) offers a strongly dissenting view. Harley disagrees with North's conclusion because he disputes the freight rate series on which North's work rests. According to Harley, transportation rates decreased only trivially before 1850 and then quite rapidly with the adoption of the metal steamship. North's freight rates decline more continuously, claims Harley, because they refer largely to the shipment of cotton and here the tighter packing of the good lowered costs of shipment.

15. The "flute" (fluit in Dutch) was a Dutch sailing vessel with a rounded stern.

16. The view that there was extensive tri-lateral trade among the three regions -- the North, the South, and the Midwest -- in the antebellum period was challenged by several economic historians on the basis of actual trade flow data and the production of foodstuffs on southern farms. All but the very smallest southern farms were actually self-sufficient in agricultural commodities prior to 1860.

17. Fogel and Engerman (1977) revises their original estimates of the relative efficiency of slave agriculture increasing the size of slave plantations subject to economies of scale. Their earlier estimates, presented in Fogel and Engerman (1974), showed productivity declining after 16 slaves, whereas the new estimates, which net out locational rents on farms, have increasing productivity throughout the range. The view that extensive scale economies existed is not shared by all scholars of the antebellum and post-bellum South. See, for example, Gavin Wright (1979). Some of the debate centers on the 1859 cotton-crop yield. See Fogel and Engerman (1980) for a response to Wright's point that cotton yields were abnormally high in 1859 and therefore that larger farms, which produced relatively more cotton, appeared exceptionally efficient in that year.

18. One calculation of the self-sufficiency of southern farms was made by Robert Gallman (1970).

19. Some of Robert Fogel's research has been funded by U.S. government grants, but much has been supported by private foundations and universities.

As in other fields in economics and in the sciences in general, advances in computer technology in the 1960s provided a spur to empirical work in economic history. This factor may explain the growth of the new economic history in the 1960s and 1970s. New computer technology has fostered the collection of large historical samples. For example, Fogel's Union Army sample would not have been possible without the personal computer. The collection of extensive new bodies of historical evidence is a central goal of Fogel's research, as it was during his tenure as Program Director of the Development of the American Economy Program at the National Bureau of Economic Research.

20. This is the title of Christina Romer's 1993 talk on "Recent Developments in Economic History" delivered to the American Economic Association (Romer, 1994). I do not believe that she meant the title as a literal statement about the field.