Economic History, Quantitative: United States

Economic history is a hybrid discipline, concerned with recording and interpreting the economic events of the past. It should not be confused with the ‘history of economic thought’, the study of the intellectual history of economics as a discipline. Although the practice of compiling historical statistics goes back to the nineteenth century, if not earlier, the term ‘quantitative economic history’ refers to a self-conscious movement dating from the 1950s and 1960s, also known as the ‘new economic history’ or ‘cliometrics’, which set out to revolutionize the field by incorporating explicit economic analysis and quantitative methods into the study of past economic performance. In subsequent decades, practitioners have extended and redirected this agenda, by drawing upon diverse branches of economic theory to analyze the historical evolution of market and nonmarket institutions, technology, preferences, and other elements commonly taken as exogenous by mainstream economics. The resulting literature stresses the influence of historical experience on ensuing economic patterns, an intertemporal link-age known as ‘path dependence.’ This article traces the main tendencies within quantitative economic history since the mid-nineteenth century, though it is by no means a comprehensive survey.

1. The Origins of Economic History

Recognition of economic history as a distinct subject is traceable to the consolidation of British neoclassical economics at the turn of the twentieth century, under the towering influence of Alfred Marshall and his Cambridge successor, A. C. Pigou. The analytical core of the dominant school held that economies tended towards ‘long-run equilibria’ that were independent of initial conditions (although Marshall himself was by no means dogmatic about this doctrine in practice). Having lost out in the struggle for the disciplinary identity of economics itself, the ‘historical school of economics’ emerged at that time as a reaction against the neoclassical paradigm and the laissez-faire program with which it was associated. Drawing ideas and inspiration from the ‘German historical school’ of Gustav Schmoller and Friedrich List, early historical economists emphasized the virtues of inductive studies.

Bibliography

Redlich F 1965 ‘New’ and traditional approaches to economic history and their interdependence. The Journal of Economic History 25: 480–95
Snooks G D 1993 Historical Analysis in Economics. Routledge, London

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as contrasted with the deductive or axiomatic approach. Methodological preferences were reinforced by their affinity with ‘neomercantilist’ policies, including promotion of national industries, social reforms, and the regulation of enterprise. The organization of economic history as an academic field in Britain was prompted as much by a search for refuge as by the emergence of a distinctive research agenda. William James Ashley, first president of the Economic History Society at its founding in 1926, lamented: ‘the theoretical economists are ready to keep us quiet by giving us a little undisputed garden plot of our own; and we humble historians are so thankful for a little undisputed territory that we are inclined to leave the economists to their own devices’ (quoted in Koot (1987, p. 7).

Similar tensions persisted in the United States, but the separation between economics and economic history was slower to develop. The inductive approach of the ‘institutional’ school associated with such figures as John R. Commons and Thorstein Veblen was dominant within labor economics and in other parts of the parent discipline, displaced only by the rise of Keynesian economics in the 1930s and 1940s. In the same era, ‘progressive’ historians such as Frederick Jackson Turner and Charles Beard put economic conflict and change at the center of their ‘economic interpretation of history.’ Although neither of these groups would be recognized today as economic historians, they did provide outlets for those dissatisfied with the deductive methodological approach. Thus, the (American) Economic History Association was founded only in 1940, and lacked the ideological identity and fervor of its British counterpart.

Between the 1930s and the 1950s, a few exceptional figures such as Carter Goodrich could have a significant impact on both economics and economic history. But the majority of EHA members were historians, whose works made little use of economics and had little influence on the thinking of economists. The same could be said for entrepreneurial history, which flourished for a time at the Harvard Center for Entrepreneurial History, under the leadership of Arthur H. Cole. In retrospect, many of the detailed descriptive studies from this era have lasting value, perhaps best reflected in monographic series entitled The Economic History of the United States, published between 1945 and 1962. But as economics became increasingly analytical and quantitative, economic history at the time appeared to be something of a stodgy backwater.

2. The Rise of Quantitative Economic History

The two decades after World War II saw a significant expansion of economic history within economics, much of it quantitative in character. This was mainly an American development, and largely (although by no means exclusively) focused on the economic history of the United States. The immediate stimulus was the new postwar interest in economic growth. Following the lead of Simon Kuznets, father of the national income accounts, a new generation of economic historians sought to extend the statistical record of the American economy back to its origins early in the nineteenth century, drawing upon the rich potential of the decennial census and making ingenious use of other diverse archival sources. The major results of these efforts were presented in landmark volumes published by the National Bureau of Economic Research (Parker 1960, Brady 1966). Estimates developed by Robert Gallman suggested that growth in the United States had reached modern rates by the middle of the nineteenth century, and should not therefore be seen as the consequence of political upheavals at the time of the Civil War (as hypothesized by Charles Beard). Adapting Gallman’s estimates into a regional framework, Richard Easterlin showed that the slave economy of the South also shared in the growth acceleration, though per capita income in that region was some 25–35 percent below the national average.

A second and more controversial thrust was the deployment of tightly constructed deductive models to address specific hypotheses about this statistical record. The advent of this ‘climometric’ approach is often dated from the publication in 1958 of The Economics of Slavery in the Ante-Bellum South by Alfred H. Conrad and John R. Meyer (reprinted in Fogel and Engerman 1972). In this article, Conrad and Meyer set out to settle a perennial debate over the ‘profitability of slavery,’ by treating slaves as a form of capital and posing the question as an explicit rate-of-return-on-investment calculation. Their conclusion was that investments in slaves were just as profitable as alternatives such as railroad bonds. Other studies tackled broader questions about the origins of growth and the impact of government policies. Douglass North (1961) interpreted the acceleration after 1815 as a dynamic response to the potential of expanding markets, primarily through interregional specialization and trade. Fogel (1964) and Fishlow (1965) generated comprehensive estimates of the contribution of railroad construction to national economic growth, by posing explicit historical counterfactual circumstances within an analytical framework. Both the methods and the conclusions of these provocative works were the subjects of intense academic debate for many years after publication.

One strand of this discussion represented a reaction by ‘old economic historians’ against attempts to subsume historical complexity into what they regarded as hypothetical and unrealistic abstractions. A second strand, however, came from within the economics discipline, reflecting dissatisfaction with the limitations of deductive models as the working tools for structuring research in economic history. In 1972, two collaborative efforts summarized the major results of
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the New Economic History (Davis et al. 1972, Fogel and Engerman 1972). The overall yield was impressive, an upgrading of the quantitative base of historical knowledge, and a richer appreciation of the presence of market forces in history. Signs of growing unrest were also evident, however, and in retrospect these volumes have the character of closing chapters in a methodological cycle that had largely run its course by that year. This interpretation may be elaborated by a review of two major research areas.

2.1 The Economic Analysis of Technological Change

Economic historians of all stripes had no difficulty agreeing that a central component of economic growth was technological change, broadly defined to include organizational change and the diffusion of existing techniques, in addition to the more famous ‘inventions’ that have long been standard fare in textbooks. But the dominant tradition in economic analysis has long been accustomed to regarding technological change as exogenous, not part of the domain of a discipline specialized in analysis of the implications of such change for the economy. One might reasonably hope therefore that quantitative economic history would be able to say more about the timing, pace, and direction of particular historical technologies, if not to uncover historical laws of motion for technological change in general.

In the context of American economic history, these questions were brought to the fore by a landmark book published in 1962 by the British economic historian H. J. Habakkuk, America and British Technology in the Nineteenth Century. Habakkuk hypothesized that American industry pioneered the development of capital-intensive methods as compared with Great Britain, in response to the scarcity of labor relative to land in the United States. This apparently straightforward thesis subsequently proved exceptionally difficult to capture analytically or to confirm empirically. An extended stream of contributions by Peter Temin, Robert Fogel, Nathan Rosenberg, Paul David, Alexander Field, John James, David Hounshell, and Kenneth Sokoloff, among others, succeeded in elaborating many characteristic features of the technologies emerging as an American national specialty in the nineteenth century. In comparison with the British, American techniques were not only capital intensive, they were also resource using, faster paced, skill saving (at least for traditional craft skills), and adapted for long production runs of standardized final products. As useful as this accumulated descriptive knowledge may be, the question remains: What sort of economic analysis would allow the quantitative economic historian to come to terms with the origins and nature of this list of characteristics?

The long-running debate over the ‘labor scarcity paradox’ brought out most clearly that so long as the analytical framework was defined by standard neoclassical analysis, the subject matter would be transmuted into the language of ‘relative factor abundance’ and substitution, terms derived from the assumption that a ‘production function’ is given by technical factors. Within this constraint, the economic historian was powerfully driven towards the exercise of rationalizing observed historical choices. The impulse was observed most clearly when the choice-of-technique question was transported to the other side of the Atlantic, and cliometricians assessed the popular indictment of British entrepreneurs for their reluctance to adopt American methods. Virtually without exception, the conclusion was that British choices were entirely appropriate responses to prevailing factor prices and market conditions. Although this verdict may be valid, the uniformity of results understandably gave rise to doubts about whether it constituted an authentic inference from historical evidence, or merely an assumption imposed on the evidence by the methodology.

This approach to technology proved unduly constraining for a number of reasons. As subsequent research has demonstrated, the ‘factor endowments’ taken to be fundamental determinants were themselves not really exogenous, being subject to influence not just by policy but by technology as it unfolded through time. For example, the large inflows of unskilled immigrants to the United States are most readily explained by the growth of industrial jobs adapted to that type of labor, a result in other words of an attribute of the new technology. Even the apparent American abundance of mineral resources, coal, iron ore, copper, petroleum, and many more, turned out on closer inspection to have been more the result of technological development and capital investment than its cause (David and Wright 1997). To a significant extent, minerals constituted a ‘knowledge industry’ even in nineteenth-century America. As such, its development was part of the broader evolution of national technology, or learning. Evidently, the development of an analytical interpretation of such phenomena required a new set of tools.

2.2 The Slavery Debate

No topic tested the limits of deductive economic history more fully than slavery. Conrad and Meyer (1958) set out to measure the profitability of slavery, and thereby to test the thesis that slavery would have died out for economic reasons, in the absence of the Civil War. Among others, Yasuba pointed out that because slave imports were ended by legislation in 1807, a more appropriate measure of the private economic viability of slavery was the level of ‘capitalized rent’ embedded in the price of slaves ‘high and rising on the eve of secession, according to Yasuba’s estimates (1961, reprinted in Fogel and Engerman 1972). The ‘profitability’ finding is best understood as
an indication that slave prices were approximately correct as capitalizations of the expected stream of future returns, which may be taken as evidence that 'commercial' motivations were dominant in the operation of the slave system. The achievement of consensus around this broad proposition, however, redirected attention towards more difficult and challenging historical issues, including the political and ideological dimensions of slavery, and the longer-term consequences of slavery as a mode of social organization.

This was the setting for the appearance in 1974 of *Time on the Cross: The Economics of American Negro Slavery*, by Robert W. Fogel and Stanley L. Engerman. Fogel and Engerman (1974) went well beyond the previous consensus, presenting total-factor-productivity calculations implying that slave plantations were as much as 35 percent more efficient than free family farms. Not only was the slave system highly productive, but the book went on to assert that material and social conditions among slaves were far better than historians had recognized. Using such indicators as diet, clothing, housing, life expectancy, and family stability, the authors compared the lives of slaves favorably with those of immigrant workers in the northern states. It is hardly surprising that these incendiary claims generated an explosive reaction.

The full range of the ensuing debate cannot be recounted here. As with the response to Conrad and Meyer, one part of the reaction represented traditional historians objecting to the coldhearted nature of the calculations, and the apparently cavalier treatment of the feelings and behavior of the slaves themselves. Another component, however, came from within the profession. Detailed scrutiny of the statistical evidence ultimately led to significant modifications of the relatively benign picture of slavery, most notably in health conditions and family life. It would be a mistake to characterize the alternative views on these issues along simplified dimensions, such as the economist’s inclination to presume that historical operators are rational and market oriented. For example, subsequent research suggests that slaves were bought and sold much more frequently than Fogel and Engerman believed, often separating not only husbands from wives, but even mothers from their children (Tadman 1989). On this count, *Time on the Cross* if anything actually understated the ruthlessly profit-driven character of American slavery.

Debates over empirical evidence are a normal feature of any social science. The dimension of the slavery debate with more enduring import for quantitative economic history concerned the conceptual underpinnings of the analysis of slavery, specifically the emphasis on calculations of efficiency in production. Because plantations produced multiple outputs with heterogeneous inputs, it emerged that the efficiency results were highly sensitive to relative values assigned to cash crops (such as cotton) vs. food crops (such as corn), and to factors of production (such as farm land of varying quality, or male vs. female slave labor). The debate may be followed in David et al. (1976), and a subsequent exchange in the *American Economic Review*. The deeper issue was whether it was possible, or perhaps whether it was meaningful and historically informative, to separate the calculation of productive efficiency as a technical matter, from the task of locating slavery as a system of property rights in historical time and space. From this perspective, property rights in slaves may be seen to have had a decisive influence on the course of economic development in the southern states, not only on human capital investment, but on geographic patterns of settlement, transportation infrastructure, and urbanization.

In several respects, the course of the slavery debate highlights the new directions in which quantitative economic history has moved since the 1970s: study of the evolution of institutions, incorporation of political, social and ideological dimensions into economic history, and identification of lasting effects of earlier historical phases on later events. These evolutionary tendencies are well illustrated by the careers of two of the founding figures of the New Economic History.

2.3 The Nobel Prizes

In October 1993, the Royal Swedish Academy of Sciences awarded the Nobel Prize in Economics to Robert William Fogel and Douglass North, noting that ‘they were pioneers in the branch of economic history that has been called the ‘‘new economic history’’ or ‘‘cliometrics’’. In essence, the two economic historians were cited for helping to launch the quantitative economic history movement. In what must be a rarity among Nobel laureates, at the time of the award both men had moved some distance from the approach for which they were honored.

North’s early work in American economic history was both quantitative and analytical. He developed new statistical time series on the US balance of payments, and on the long-term decline in transportation costs. North (1961) drew upon concepts from theories of location and comparative advantage to interpret the quantitative record of regional performance. His first venture outside American economic history (North and Thomas 1973) was consistent with this focus on market incentives, emphasizing the role of limited government and secure property rights in explaining the comparative historical performance of nations. By 1981, North’s range of explanatory material had broadened considerably, to include ideology (including norms and belief systems) as a primary element in comprehending the persistence of order in the world, essential for the effective functioning of markets. North (1990) cast the net even more widely, pointing to the critical economic role of
institutions, defined broadly to include all ‘the humanly devised constraints that shape human interaction.’ One part of North’s personal evolution derived from an expansion of his research horizons, generating an awareness that the effectively functioning market society found in the United States is exceptional in a global context. In many ways, however, North’s later work marked a return to themes and interests that had occupied economic historians for generations prior to the cliometric revolution.

Fogel’s intellectual trajectory was rather different. Fogel (1964) and Fogel and Engerman (1974) built sweeping historical interpretations on the results of complex and ambitious quantitative procedures. After 15 years of further research on slavery, Fogel (1989) devoted more than half of his next book to an account of the rise of antislavery opinion in Europe and the United States, emphasizing the force of religious, political and ideological factors. Fogel wrote: ‘I began [this research], like many other cliometricians, not because I was especially interested in the history of American slavery, but because an accident of scholarship made the economics of slavery a major testing ground for the application of cliometric methods. Once drawn into the subject, however, it was the substance of the issues that maintained my interest. Although my principal professional expertise was, and is, in the areas of economics and demography, I found myself led down a road that forced me to grapple with the work of colleagues in cultural, political, and religious history’ (p. 13). To be sure, Fogel’s later work on historical nutrition and physiology remains solidly quantitative in its essential scope and methods, but his interest in subjective and ideological aspects of history has persisted. It seems safe to say that by 1990, cliometrics had outgrown the historical naivete of its youth.

3. New Directions in Quantitative Economic History

In recent decades, quantitative economic history has become steadily more diverse and expansive in both its methods and its subject matter. Some of these tendencies reflect growing diversity in the composition of the cliometric intellectual community, which at the start of the twenty-first century includes many more women and scholars of differing nationality than was true in the 1960s and 1970s. Once almost exclusively an American phenomenon, cliometrics is now also pursued by small but thriving groups in Europe, Latin America, Canada, and elsewhere. Another force for diversification is the expanding range of topics now covered within economics itself, including ecology, law, family, gender, and race, all of which have strong historical dimensions. Since the full range of scholarship cannot be surveyed here, a brief account will be given of two general areas in which historical aspects of economic life seem especially compelling.

3.1 Increasing Returns, Path Dependence, and Technology

In 1984, William N. Parker organized a session at the annual meetings of the American Economic Association, on the role of economic history in graduate economics education, the proceedings of which were published in Parker (1986). Among the many spirited defenses of history by such economists as Kenneth Arrow, Robert Solow, Peter Temin, D. N. McCloskey, and others, one contribution proved to be particularly lasting as an illustration of path dependence: Paul A. David’s account of the rise and persistence of the QWERTY typewriter keyboard. Although many evidently superior layouts were designed and marketed during the typewriter’s post-Civil War diffusion, the standard became ‘locked in’ to QWERTY by the 1890s, illustrating the power of historical accident and ‘network externalities’ to shape the course of technological history. Drawing in part upon theoretical work by W. B. Arthur, David argued that because choices were interdependent ‘since manufacturers, employers and typists all wanted to use the same keyboard that others were using’ the system never shook off the circumstances of its origin, despite the suboptimality of the equilibrium choice. The QWERTY story has emerged as a popular metaphor for the proposition that ‘history matters’ in economic life. The typewriter example and its meaning have been hotly controversial, and its appropriate scope and significance have by no means been settled. But its relevance for quantitative economic history has been to confirm the historical character of the economics of technology. As noted above, the study of technological change had never fit comfortably within the New Economic History. Nathan Rosenberg, a member of the first cliometric generation whose research on technological change diverged from the reigning paradigm, had long been engaged in Exploring the Black Box (1994), i.e., trying to understand technological change as it would be seen by technical people. In The Lever of Riches, Joel Mokyr (1990) elaborates the many context-specific factors that have served to encourage, retard, or channel technological progress. The broad conclusion of this research is not to deny the proposition that technology is responsive to incentives, quite the contrary, but to argue that these responses are sharply conditioned by the historical and institutional setting, including the cognitive structures through which knowledge is codified and transmitted.

3.2 Institutions and Economic History

In the heyday of the New Economic History, ‘institutional’ was used as a term of dismissal if not
contempt, to refer to old-fashioned descriptive work that lacked theoretical foundations. As the field has evolved, ‘institutional’ economic history has again become respectable, although in new and more analytical clothing. Indeed, many argue that the study of institutions is at the heart of the case for historical economics. Whereas the parent discipline specializes in the functioning of markets, the domain of the economic historian is the institutional foundations that allow markets to function as they do. These subject areas have become more pressing in the light of the varied experiences of formerly planned economies in their transition to market systems.

In its first phase, the so-called New Institutional Economics identified ‘institutions’ with the property rights, rules and regulations defined and enforced by the state, interpreting institutional change as responses to exogenous shifts in population, technology, or the scope of markets. Beginning with North and Thomas (1973), numerous historical studies examined the implications of these institutions for economic performance, broadly confirming the general proposition that securely enforced property rights are favorable for economic efficiency and growth. Deviations from this pattern are attributed commonly to the influence of special interest groups, with transactions costs standing as barriers to more efficient systems.

Dissatisfaction with this framework gradually began to build, with the realization that the simple cause-and-effect scenarios took as exogenous much of what was most historically interesting. An essential next step was to broaden the concept of institutions, to include not only explicit and state-enforced rules, but also informal and uncodified constraints on behavior. To say that institutions are ‘constraints’, on individual behavior, however, does not mean that they must be seen as having been ’imposed’ on the society in question. By analogy with market prices, institutions may be viewed as exogenous to the individuals, yet endogenous to the society as a whole. When the underlying conception has been broadened in this way, a natural theoretical framework is provided by game theory, depicting institutions as self-enforcing equilibria arrived at through the interaction of historical players. Avner Greif (1994, 1997) has been a pioneer in the application of game theory to historical institutions, using these tools to analyze the bases for the rise of long-distance trade in late medieval Europe.

Greif argues that appropriate historical uses of game theory must be context specific. In many strategic situations there are multiple equilibria, implying that outcomes are not uniquely predetermined. Constructing a context-specific model that captures the essence of a situation requires microlevel historical study, to provide the specific details of the model, and to facilitate the task of confronting predictions with historical evidence. Thus, the process has a large inductive component, drawing on cultural, political, and social factors and also upon economic motivations. Although this specificity may seem to limit the potential scope for application, Greif (1994) was able to use these tools to extract sweeping implications from the contrasting cultural beliefs of the Maghribi traders (who used collective social instruments to discipline the behavior of their members) and the Genoese (from whose rule-based system the Western legal traditions descend). Because institutional evolution typically entails individual behaviors that are interdependent, such models often exhibit increasing returns and path dependence, similar to patterns observed in technological systems subject to network externalities.

In many ways, modern quantitative economic history has returned to the roots of economic history, in its renewed appreciation of institutions and culture. But there is a major difference. Whereas earlier versions of ‘institutional economics’ tended to be ‘anti-theory’, stressing the sheer weight of historical reality as contrasted with abstract rationalizations, the newer forms of institutional economic history are firmly lodged within the parent discipline, drawing on frontier developments in economic theory as well as quantitative methods. The ability to deploy more eclectic theoretical tools allows cliometricians to extend their reach into new subject areas, that previously were preserves of purely descriptive work. Examples include historical studies of financial markets and financial institutions, which now use theories of information and principle-agent relationships; and the history of labor markets and institutions, where the roles of norms, prejudices and family institutions are too prominent to be ignored.

An illustration of this progression is Claudia Goldin’s book on the economic history of American women (Goldin 1990). The early chapters developed new quantitative evidence on relative wages and labor force participation rates of American women, interpreting two major upward surges (1820–1850 and 1890–1930) in terms of supply and demand forces, driven largely by technology. By the latter half of the book, however, Goldin found that ‘institutional’ aspects of the record were inescapable, from the ‘marriage bars’ of the 1920s and 1930s ‘which forced women to resign from jobs upon marriage’ to patterns of socialization and peer influence, detectable in behavioral shifts from cohort to cohort across the twentieth century. Significantly, these insights were not advanced as a rejection of quantitative economics, but as an enrichment of the analytical and quantitative tools within the core disciplines of economics and history.

Reflecting on her own evolution, Goldin wrote: ‘I began this study more as an economist but have ended with a fuller appreciation of how the distant past affects the present, how norms and expectations impede change, how discrimination can survive even in highly competitive markets, and how slow genuine change can be.’ Much of Goldin’s personal account...
could be applied to economic history as a whole, in its increasingly self-conscious identity, not as a branch of applied economics, but as a distinctive approach to the study of economic life in general.

See also: Economic Growth: Measurement; Historical Demography; Historical Geography; Quantification in History; Quantification in the History of the Social Sciences.

Bibliography


Tadman M 1989 Speculators and Slaves: Masters, Traders and Slaves in the Old South. University of Wisconsin Press, Madison, WI.

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**Economic Panel Data**

1. **Introduction**

A panel (or longitudinal or temporal cross-sectional) data set is one which follows a number of individuals over time, and thus provides multiple observations on each individual in the sample. Prominent examples are the University of Michigan’s Panel Study of Income Dynamics, the National Longitudinal Surveys of Labor Market Experience, and National Longitudinal Survey of Youth in the US and the Social Economic Panel, the Expenditure Index Panel of Intromart, and the Labor Mobility Survey from the Organization of Strategic Labor Market Research in the Netherlands. These labor market data samples contain thousands of individuals and variables followed over a number of years. In addition, panel data are also common in marketing studies, biomedical sciences, and financial market analysis, etc.

The increasing popularity of panel studies is partly a consequence of more cost effective ways of developing and maintaining panels (e.g., Mátys and Sevestre 1996). More importantly, panel data offers many more possibilities for exploring analytical and substantive issues than purely cross-sectional or time series data. However, new data sources also raise new issues. This entry reviews the major advantages and limitations of panel data in the context of specific econometric methodologies. Section 2 gives an overview of the major advantages of the informational content of panel data. Section 3 reviews typical specifications for the linear models. Section 4 discusses issues of non-linear models. Section 5 considers the implication of sample attrition and sample selection. Conclusions are in Sect. 6.