ROUTLEDGE HANDBOOK OF MODERN ECONOMIC HISTORY

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property rights, central banking, housing markets, and demographic changes – do not receive chapter-length coverage. Unfortunately, we were not able to convince well-known scholars working in these areas to contribute chapters. The dissemination of knowledge has a high opportunity cost for academics, whose professional incentives are to publish more specialized, technical work in refereed journals.

PART I

The methods of modern economic history

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ECONOMIC HISTORY AND CLIOMETRICS

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As this *Handbook* demonstrates, economic history is an active field that investigates a wide range of topics. The dominant method used by economic historians over the past half-century is cliometrics. The name "cliometrics" comes from joining "Clio" (the Greek Muse of history) with "metrics" (measurement), but cliometrics goes an important step beyond merely measuring historical events. It structures its measurements with economic theory, especially (but by no means exclusively) the neoclassical theory that has dominated economics for several generations. It often develops explicit models of how economic agents (such as households and firms), as well as entire economies, have behaved and interacted historically. Thus, in addition to measuring economic outcomes, cliometrics seeks to understand their causes. This chapter outlines the development of cliometrics and helps put the other chapters in this *Handbook* into context by examining how cliometrics is practiced.

The cliometric revolution

In the first half of the twentieth century, economic historians rarely appealed to explicit economic theory, but relied more on an accumulation of facts and anecdotes in describing and attempting to explain the past. Economists, on the other hand, were often accused of relying too much on theory and not enough on facts. Testing economic theories using historical facts was difficult because data were scarce. Important economic statistics, including series on prices and wages, production, and employment (thus unemployment), were few and far between, partly because the costs of retrieving them were prohibitive in that pre-computer age.

To begin bridging this gap, the National Bureau of Economic Research (NBER) was founded in 1920 to produce research firmly based on economic facts – quantitative if possible, scientific and impartial, and neutral with respect to ideology and policy. Edwin Gay (who later became the first president of the Economic History Association) argued that collecting these data would allow a "relatively dependable causeway" to be "thrown over the morasses of earlier economic history" (Gay 1930: 2–3). Gay's confidence was warranted, because during the interwar period the NBER added substantially to the statistical infrastructure for examining American economic development. Among the most important steps forward was a series of studies on income, savings, and expenditures in the United States by Simon Kuznets. Kuznets, one of three economic historians to win the Nobel Prize in Economics (Robert Fogel and

Douglass North are the others), had a great influence in developing the preliminary version of U.S. national income and product accounts, and in producing, or encouraging others to produce, long runs of historical national accounting data for the United States and elsewhere.

After the Second World War, economists increasingly focused their research on economic growth and development in hopes of preventing a return to Depression-era conditions in developed countries and of improving the lot of less developed countries. Because understanding growth requires understanding history, a new generation of scholars trained in economics departments turned their attention to economic history. When they began to read the works of older economic historians, many complained that important economic issues had been misinterpreted because of a failure to conjoin economic theory and historical data, and they pushed their colleagues to employ economic theory along with measurement.

The value of the new approach was convincingly displayed in "The economics of slavery in the ante-bellum South", one of the most influential and seminal works of cliometrics, which was then called "the new economic history." Rather than examine the mindset and motives of slaveholders, authors Alfred H. Conrad and John R. Meyer (1958) approached the subject as an investment problem. Was slavery profitable? This question had been debated without resolution for over a century. Conrad and Meyer modeled slave owners as investors with a capital asset subject to depreciation and maintenance costs. They examined historical data on cotton yields, slaves' average life spans, and prices of inputs and outputs – and calculated that owning slaves was more profitable than many other potential investments. Their finding (and extensions of it) helped create a new, lasting consensus concerning the profitability of slavery.

Only six years later, Douglass North noted:

> A revolution is taking place in economic history in the United States. It is being initiated by a new generation of economic historians who are both skeptical of traditional interpretations of U.S. economic history and convinced that a new economic history must be firmly grounded in sound statistical data. Even a cursory examination of accepted "truths" of U.S. economic history suggests that many of them are inconsistent with elementary economic analysis and have never been subjected to – and would not survive – testing with statistical data. (North 1963: 128–9)

North could point to Conrad and Meyer's work on the profitability of slavery, Robert Fogel's (1964) work finding that railroads were not indispensable to nineteenth-century American economic growth, research on the unimportance of the Civil War for accelerating U.S. industrialization (Gallman 1960), and several other projects to support the existence of a revolution.

In those years, the cliometric approach quickly resolved several ongoing debates in American economic history. For example, using a simple trade model, estimates of demand and supply elasticities, and colonial prices, the per capita burden of Britain's Navigation Acts as a per cent of colonial income was estimated to be much smaller than many supposed. Hence it was an unlikely spark for the American Revolution (Thomas 1965; McClelland 1969). Likewise, Peter Temin's (1968) analysis of sources of changes in the money supply demonstrated that the inflation and financial crisis of the 1830s had their origin in international events largely beyond President Andrew Jackson's control. Those crises would have taken place whether or not he had acted as he did regarding the Second Bank of the United States – thus fundamentally reinterpreting another important episode in American economic history.

The cliometric approach aimed to replace imprecise qualitative statements – such as "It is difficult to exaggerate the importance of this" – with precise and accurate estimates of economic magnitudes and economic relationships. As cliometricians harnessed computers, which allowed them to quickly calculate totals and averages, they also tried to estimate underlying economic relationships and marginal effects using voluminous (but previously silent and unusable) bodies of archival data. As some debates were settled, however, the new approach opened even more research questions to analysis and scrutiny.

One way to gauge the progress of cliometrics is to examine the pages of the leading economic history journal. In the early 1950s, less than 2 per cent of the pages in the *Journal of Economic History* were in cliometric articles – those which used measurement (seen in a growing number of tables) and explicit economic theory. This figure subsequently climbed to 10 per cent in the late 1950s, 18 per cent in the early 1960s, 44 per cent in the late 1960s, and 78 per cent in the early 1970s (Whaples 1991). In the late 1950s, cliometrics was seen by some as a passing fad, but by the 1970s it was the standard operating procedure for American economic historians. In the following decades, cliometrics was increasingly adopted by scholars from outside the U.S. as well. Many of the achievements of this first generation of cliometric research were surveyed in Fogel and Engerman (1971), McCloskey (1976), Lee and Passell (1979), and more recently (and retrospectively) Lyons *et al.* (2008) – all of which (sometimes breathlessly) emphasized both the novelty and important breakthroughs from the approach as it gained dominance within the United States.

Criticisms of cliometrics

The cliometric approach has had a natural appeal to historically minded researchers trained in departments of economics. In one sense, it is simply the application of standard economic tools – initially developed to understand the present – to the past. However, cliometrics has been more controversial among scholars trained in history departments.

One of the strongest early criticisms of the new method came from Fritz Redlich. In published work he expanded on a point he made most succinctly in responding to a question at an academic conference. The young questioner asked the old professor, "What is your model?" Redlich responded, "Model? I deal with the truth." One of Redlich's most telling arguments was that cliometricians focused too much on purely economic considerations and ignored the impact of institutions. He was even more strident in his attack on the use of explicit counterfactuals, which played a prominent role in the early history of cliometrics, especially in the case of Robert Fogel's influential analysis of the impact of railroads. To fully assess this impact, Fogel modeled a counterfactual world in which railroads never existed. Among other things, this required him to project the expansion of navigable waterways that would have been built had there been no railroads, and to project the consequences of that expansion, such as shifts in population. Redlich attacked such counterfactuals by calling them "figments." "Hypotheses are based on assumptions which are held to have a counterpart in reality, while figments are assumptions having no such counterparts or at least known to be irrealistic" (Redlich 1965: 484). Due to their basis in reality, hypotheses can be verified or falsified; figments can only be justified. Figments lead to economic models, and "a model is never a piece of history" (Redlich 1965: 490).

Proponents of the cliometric approach rebutted this criticism by arguing that *every* historian has a model. Without mental models to simplify the bewildering array of sensory facts, a person wouldn't be able to make it through the day. Without models to simplify the bewildering array of historical facts, no scholar could make sense of the past. Cliometricians, such as Lance Davis (1966), argued that their breakthrough was to make explicit the models that had once been implicit. For example, those who argue for the indispensability of railroads in nineteenth-century American economic growth implicitly have a model that suggests the demand for transportation was massive, that railroads offered immense advantages over other modes of transportation, and

that no suitable substitute for railroads was likely to have performed as well. Fogel (1964) subjected this model to empirical tests and found it wanting. He then formalized an alternative set of assumptions about transportation demand and the shift in supply brought about by the railroads. Cliometricians celebrated this conceptual breakthrough, but debated whether or not the theoretical assumptions in Fogel's model accurately reflected the structure of the economy and whether the numbers used in it were accurate. The conclusion of the profession – especially those trained in economics – was that Fogel's modeling and measurement were convincing. In a 1995 survey, Whaples (1995: 143) found that 89 per cent of economic historians in economics departments rejected the idea that "without the building of the railroads, the American economy would have grown very little during the nineteenth century." Economic historians housed in history departments (a dwindling breed) were less convinced: 66 per cent of them rejected the idea.

Redlich was not alone in his criticism. Cliometricians were mostly economists, and their papers had to conform to economists' standards. Their method and style, and assertions of the virtues of cliometrics, alienated older economic historians in particular, and historians in general. American Historical Association President Carl Bridenbaugh lamented that some colleagues had succumbed "to the dehumanizing methods of social sciences," and warned against worshipping "at the shrine of that Bitch-goddess, QUANTIFICATION" (Bridenbaugh 1963: 326). To many contemporary American economic historians, these arguments are a quaint episode. Cliometrics is their orthodoxy; as they see it, cliometricians "won the West," imposing a "Pax Cliometrica" (McCloskey 1987: 77).

A more lasting criticism has been that the default model of cliometrics is an artifact of modern, Western thinking. Boldizzoni (2011) argues that cliometrics hasn't improved our understanding of the past but has distorted it, because its default assumption is that there are essentially universal laws of human behavior that have held at all times and in all places. Economists, he argues, have projected their belief that people are "rational maximizers" from the modern West – where the assumption may fit fairly well – to other times and places when and where it doesn't fit. The chief villain in his critique is Douglass North, a pioneer of cliometrics, who has also been an insistent critic. North has complained that cliometrics needs to focus more on institutions and their evolution. In a series of works designed to get to the fundamental forces behind long-term economic trends – including both pre-modern economic stagnation and modern growth – North and his co-authors (North 1981, 1990, 2005; North *et al.* 2009) pushed their analysis further and further back, but they never abandoned their key assumption that individuals acted out of self-interest and were constantly cognizant of costs versus benefits in making decisions.

At heart, Boldizzoni attacks cliometrics for relying on ill-considered deductions rather than wading deeply into the details of historical life and using induction to understand the logic of earlier societies and their economies. Cliometricians would rebut this by arguing that their method relies on *both* deduction and induction. Accordingly, the next section of this chapter looks at the practice of modern cliometrics and the debates among cliometricians about how to make conclusions regarding historical cause and effect.

Cliometrics in practice: multivariate regression

Perhaps the most common practice in cliometrics is to use multivariate regression analysis, which produces an estimate of the marginal impact of a variable of historical interest while holding other important factors constant. A typical example is Buffum and Whaples (1995) who seek to test the magnitude of employee-based discrimination in the labor market of the late 1800s using data on

furniture workers collected by the Michigan Bureau of Labor Statistics. Their study begins with a simple economic model that assumes this market was competitive so that wages reflected workers' productivity, but that workers were also compensated for any negative workplace conditions. Using wages as the dependent variable and holding constant measurable worker characteristics (such as occupation, education, and experience) likely to influence productivity (and therefore wages), this study examines the marginal impact of variation in the ethnicity of co-workers. It finds that a one percentage point increase in the share of the work force who were not from a worker's own ethnic group increased his wage about 0.1 per cent. This is interpreted as evidence that employers had to pay their employees more when they were in close contact with co-workers they liked less (or disliked more) than members of their own group. The study also finds that workers from Protestant ethnic groups were generally paid more when working with Catholics, but concludes that the additional labor costs generated by this employee-based discrimination were probably offset by several benefits that rendered complete segregation unnecessary.

This study is typical of cliometric work that applies a widely used economic model to historical data. The regression coefficients allow the economic historian to go an important step beyond contemporary and historical accounts that agreed workers in these groups often didn't get along and disliked each other. Regression coefficients quantify how much workers disliked each other by estimating how much more they had to be paid to work with one another – or how much pay they were willing to sacrifice to work with members of their own group. The study reaches the cliometric goal by illuminating the past and also breaking ground in testing a theoretical implication – that if employees discriminate against each other they must be paid more to work with each other – that can't be tested well using modern data but can be tested with a rich historical data set.

Panel data

A more difficult task is to examine a historical change, an episode or a public policy, and convincingly determine its causes or consequences. Data sets on workers' wages often include thousands of observations, and it is clear that some explanatory variables are exogenous (that is, caused by factors outside the system). Wage regressions can be fairly straightforward to interpret because it is clear that some variables cannot influence others, making conclusions about causation more convincing. When wages are higher for middle-aged workers than for younger workers, it's fairly clear that age is driving wage and not the other way around – that getting older pushes up one's wage since earning more can't cause one to become older. However, examining the causes and consequences of events and policies is harder because it's more difficult to find plausibly exogenous determinants, and because events can be so complex that an unmeasured, omitted variable might be at work.

Panel data can help solve this problem. A panel generally consists of two dimensions – a spatial dimension that consists of cross-sectional observations (e.g. nations, states, cities, industries, firms, groups of people, or individuals) and a temporal dimension that consists of time-series observations (periodic measures of characteristics of what is being observed).

Consider this question: Did the riots in American cities in the 1960s *cause* long-term economic harm to those cities? Conventional economic theory suggests this is plausible, because a property's value is believed to reflect the discounted value of the expected net flow of utility associated with its ownership – including not only the physical quality of the structure, but also such things as security, proximity to work, family, friends and shopping, the quality of municipal services, and the taxes needed to support such services. In theory, if a riot causes a sustained decline in the perceived amenities in one location relative to others, it would register as a

relative decline in property values. In line with this theory, examining data shows that – holding constant other factors like region, population, crime rate, segregation, and the trend in property values – property values fell more in cities hit by more severe riots (Collins and Margo 2007).

But what if the riots themselves were more severe in cities that were economically weaker, and this economic weakness accounts for *both* the lagging property values and the riots? In cases like this, economic historians look for "natural experiments" – changes or differences that plausibly arise outside the economic system, which allow one to compare situations or places that received one "treatment" with those that received another "treatment." Collins and Margo report contemporary observations that rainy weather made rioting less severe, and then estimate the impact of city-specific weather in the period following Martin Luther King's assassination – showing that (holding other factors constant) more rain in April 1968 led to less rioting. In this case, rain is used as an "instrumental variable," an exogenous variable that does not itself belong in the explanatory equation but which is correlated with the endogenous explanatory variables. Putting these pieces together (using a two-stage regression estimation framework), Collins and Margo convincingly confirm that more severe rioting had an independent, large, negative impact on urban property values. They estimate that riots decreased black-owned home values in these cities by about 10 per cent.

Among the panel data sets that are widely used in economic history are the Panel Study of Income Dynamics (PSID), the National Longitudinal Survey of Youth (NLSY), and the Union Army data of the Center for Population Economics. The PSID is a panel of U.S. families that began in 1968 and continues today. Economic, social, and health factors have been measured over individuals' lives and across generations. The NLSY is one of several panels collected by the Bureau of Labor Statistics. The most widely used of these is the National Longitudinal Survey of Youth 1979, which surveys young men and women born in the years 1957–64. The Union Army Data Set (and the U.S. Colored Troops Data Set) consists of white (and black) males mustered into the Union Army during the Civil War. Military, socio-economic, and medical information from several sources throughout their lifetimes have been collected and are part of ongoing research efforts.

Many economic historians have constructed their own panels. An important example is the panel of city-, county- and state-level New Deal spending, economic activity, and demographic data constructed by Price Fishback and his co-authors. For example, Fishback *et al.* (2007) examine the impact of New Deal spending on infant mortality, non-infant mortality, and general fertility rates in major U.S. cities between 1929 and 1940. They include controls for city characteristics, city and year fixed effects, and make use of instrumental variables (voting patterns in years prior to the Great Depression, and Congressional committee assignments, for example) that helped determine the allocation of New Deal spending. They conclude that about $2 million (measured in year 2000 dollars) in additional relief spending was associated with a reduction of one infant death, half a homicide, one suicide, 2.4 deaths from infectious disease, and one death from diarrhea in each large urban area.

Finding a convincing instrumental variable can be very challenging. The researcher needs to find a factor that helped drive the economic events but did not arise simultaneously from within the economic system. When it comes to policy analysis, this can be almost impossible because political decisions are so intricately intertwined with economic forces.

Time series

Because of the focus on economic growth, many problems in economic history involve statistical work with time-series data. Into the 1970s, statistical research on time series was largely limited to isolating trends from cycles. The procedures developed by Clive Granger, D.A. Dickey and W.A. Fuller, and others changed that. The appearance of new techniques in time-series econometrics afforded tests for characteristics in data such as Granger causality, non-stationarity in levels, structural change (unit root tests), and cointegration. These techniques quickly found their way into the research of economic historians. Even the old question of cycles or trends received a statistical update.

The typical regression only says something about correlation, but Granger won the Nobel Prize in Economics for arguing that, under certain conditions, the regression can also say something about causation. In brief, a time series of one variable is said to Granger-cause a time series of another variable if it can be shown that the first variable's values provide statistically significant information about the future values of the second variable – thus, if one time series can be used to forecast another, then one can argue that it helps cause it to vary, at least in a statistical sense. The first mention of such a test in the economic history literature appears in Michael Edelstein's (1980) discussion of a paper by Michael Bordo and Anna Schwartz at the annual Economic History Association meetings. Edelstein suggests the use of the test, but in the published paper Bordo and Schwartz (1981) argue that, while the Granger test could be used to test causality between money and the price level, or the price level and the terms of trade, they believe there is an omitted common influence affecting both the terms of trade and the price level, and this means the test is inappropriate. However, these tests are a main focus of Schwartz (1981) and her contribution toward revisiting the Great Depression contained in Brunner (1981). Her long-run results strongly suggest money Granger-caused income and not the reverse: the supply of money was not endogenously driven by the business cycle.

Stationarity is an attribute of a time series in which the mean and standard deviation are constant over time. It is important since standard econometric tools assume finite variances for the variables of the estimated model. Stationarity provides this finite variance. Thus, the first step in analyzing time-series data is to test if one's data are stationary or not. Its first appearance among economic historians is David Pope's (1984) analysis of Kondratieff cycles in Australia. The most common way to test for (non-)stationarity is to apply a Dickey-Fuller test that checks whether a unit root is present in an autoregressive model. In his examination of open market operations in the 1920s, Mark Toma (1989: 116) used this test to argue that, in a regression of the level of Federal Reserve security holdings against its lagged value and a constant, "standard test procedures reject the non-stationarity hypothesis that the lagged coefficient equals one." Within two years, such tests were common in the economic history journals.

Two (or more) time series are said to be cointegrated if they move together, if they statistically share a common stochastic drift. Alternatively, two time series are cointegrated if they are non-stationary but a linear combination of the two series is stationary. Gary Libecap (1989) examines interstate cartel production coordination in the petroleum market. If residual production by Texas was for the purpose of maintaining nominal crude oil prices, there would have to be a long-term relationship between output in Texas and market demand in the U.S. – that is, the two time series would be cointegrated. Libecap finds no statistically significant evidence that this was true.

One of the major issues confronted by time-series analysis has been to identify the timing and potential causes of the British Industrial Revolution. Many scholars have contributed to this literature, and among the major contributors are David Greasley and Les Oxley (2010). Extending the "best guess" estimates of British Industrial Production generated by Nick Crafts and Knick Harley (1992) and using an augmented Dickey-Fuller test, Greasley and Oxley (2010) divide almost 300 years of British history into five epochs: 1700–80; 1781–1851; 1852–1913; 1922–73 and 1974–92. Their times-series tests characterize the period between 1700 and

1913 as alternating between trend stationary, difference stationary, and trend stationary, so they make a case for dating the British Industrial Revolution to the second epoch, 1781–1851. As to the causes of British industrialization, their tests indicate that cotton and iron were the leading industries, and coal was a follower. Cotton had wider linkages than iron, "statistically causing paper and shipbuilding production," but they do not regard it as more important in the 1815–60 period "as bidirectional causality between iron goods and cotton output lies at the heart of the cotton, mining and metals sector" (Greasley and Oxley 2010: 1009–10). (This paper also contains an extensive overview of time-series methods used by economic historians.)

It can be argued that many of these techniques help us to understand the statistical process that generated the data, but that the *statistical* process is not necessarily the *economic* process and Granger-causality is not *economic* causality. Macroeconomists have generated competing models of the same economic process: there is no single "correct" understanding. It is safe to say that there is much work still to be done to understand and dynamically model the economy.

These examples are only a small sample of the empirical inquiries to which time-series econometrics has been employed by economic historians. Given the importance of time series to economic history and the time-series data economic historians have produced, it seems inevitable that new statistical techniques for analyzing time series, as they become available, will be adopted quickly.

Computable general equilibrium models

As historical questions have become more complicated, the models used to answer them have become more complex in accounting for feedback mechanisms and impacts that spread throughout the economy over time. For example, the economic effects of immigration ripple throughout an economy, so a comprehensive model that can capture this complexity is needed. A naïve, theory-free approach may suggest that one can isolate the impact of historical immigration on wages by simply comparing wages in cities and states where immigrants have settled with those in places they haven't. Unfortunately, this conveys virtually nothing for two reasons. First, immigrants don't usually choose their destinations randomly; given their mobility, they often select areas that have the best job-market opportunities. They are attracted to the highest-wage cities and states, so finding that wages are higher in places with a lot of immigrants could confuse cause and effect. Second, suppose that immigrants flood into a city – increasing its labor supply relative to its labor demand – pushing wages in the city down. The native-born population is not likely to react passively to this, but will begin to leave this market, entering other markets and pushing down wages in places where immigrants haven't gone. If these native-born workers are mobile enough, just enough of them will leave to make the wages in all cities approximately equal for similar jobs. The impact of immigration will be diffused across the entire economy, so looking for its impact by comparing where immigrants are and aren't located can be erroneous.

To capture the impact of immigration and other broad economic changes like trade and technological change, economic historians have turned to models of the economy that can capture the feedbacks. One influential immigration study is Hatton and Williamson (1998), which includes a computable general equilibrium model (developed in O'Rourke *et al.* 1994) of the interactions between the U.S. and UK economies during the late 1800s and early 1900s. In the U.S. model, output and factor prices are endogenously determined – that is, they arise within the system. Consumers are constrained by endowments and maximize a utility function; their income and expenditures are endogenous. There are four production activities that obey standard production functions – food, agricultural intermediates, manufacturing, and services; three primary factors of production – land, labor (divided into agricultural and non-agricultural),

and capital; two imported goods; and foreign exchange. The model assumes that firms minimize costs (to maximize profits); competition is perfect; capital is perfectly mobile across sectors; non-agricultural labor is perfectly mobile between manufacturing and services; and rural–urban migration is determined endogenously by wage gaps. The model also includes an explicit consumer utility function. Equilibrium occurs when for every sector price equals costs; for every commodity, demand equals supply; and the consumers' incomes equal the rents on all endowments. The thirteen prices are endogenously determined, as are the nine activity levels. The UK model is similar but somewhat simpler. The model allows its users to examine the impact that labor flows from Britain to the U.S. had *throughout* the economy – on wages and other factor price levels, on prices of goods, on the allocation of resources, and more.

While a model such as Hatton and Williamson's can be an advance over a simpler partial-equilibrium model, it is open to many criticisms. Rosenbloom (1998) finds Hatton and Williamson's conclusion that trans-Atlantic migration (along with trade) was an important factor in explaining the narrowing of international wage gaps during this period is plausible; yet he cautions that it is difficult to adequately assess these conclusions in part because of the very complexity of the general equilibrium models on which they rest. Are the key assumptions of the model – the elasticities, interactions, and functional forms embedded in it, the calibrations of key parameters – a good reflection of reality? The very complexity of the economy necessitates the use of such complicated models, but also undermines their usefulness – and these complex models are simplifications that leave out much that may be important (e.g. immigration's impact on technological progress, culture, and institutions). Some important events in economic history – like immigration – have such complex and far-reaching impacts that even the most advanced cliometric techniques can't adequately assess them. But the bottom line is that models by their very design and nature are abstractions from the complexity of life. The job of the economic historian is to push refutable hypotheses as far as the theory and data will allow, and to confirm or reject these hypotheses based on the credible evidence that can be marshaled. Perhaps there will never be the tools to adequately address the most important and complex historical economic questions. Researchers probably will not innovate enough to create adequate methods to completely address these important questions. But it is essential to press the available technology as hard and as fully as we are able.

Conclusions

Cliometrics aspires to enhance the study of the economic past by applying the rigor of economic theory and quantitative analysis, while simultaneously using the historical record to evaluate and stimulate economic theory and to improve comprehension of long-run economic processes (Greif 1997). It is the dominant paradigm of modern economic history. At its best, this method has deepened our understanding of American and world economic history in many important ways. It is especially useful when data from the past are abundant and when scholars can agree on how the economy has functioned – and therefore how to model it. However, like any other scientific investigative technique, cliometrics cannot answer every question. Understanding the economic past is crucial to understanding the present, but it is hindered by lack of information on what occurred, individuals' motivations, and the sheer complexity of their interactions.

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2

THE NEW INSTITUTIONAL ECONOMICS AND ECONOMIC HISTORY

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Two claims that are central to the research agenda of the New Institutional Economics (NIE) are that institutions affect economic performance and that both the causes and effects of institutions can be analyzed using economic concepts (North 1990). According to North (1990: 3), "institutions are the rules of the game in a society or, more formally, the humanly devised constraints that shape human interaction." Ostrom (2005: 3) describes institutions as "the prescriptions that humans use to organize all forms of repetitive and structured interactions, including those within families, neighborhoods, markets, firms, sports leagues, churches, private associations, and governments at all scales." Formal rules, which "say what individuals must, must not, may, can, and cannot do," and that are enforced by an "authoritative agency" are institutions (Commons [1924] 1995: 138). But so are informal norms based on custom and tradition, which can also shape economic behavior. This chapter provides an overview of several levels of institutional analysis, ranging from informal norms to specific rules, discusses the concepts of institutional efficiency and change, and concludes with some questions for future research.

The NIE draws on several research traditions in economics, including Neoclassical Economics (Eggertsson 1990), Old Institutional Economics (Rutherford 1994), and Austrian Economics (Langlois 1986). Economic historians have played a central role in generating both the theory and the empirical work of the NIE. (See Alston *et al.* (1996) for a theoretical overview and examples of these contributions.) While the NIE is in part the application of neoclassical theory to the study of institutions, it expands on neoclassical theory by introducing new conceptual tools, such as transaction costs and property rights. The scope of the NIE's analysis is very broad, and it draws from and influences other disciplines, such as political science, history, psychology, sociology, and anthropology. The NIE uses many methods to understand institutions, including mathematical and literary theory (De Alessi 1990), econometric analysis (Klein 2008), and case studies (Alston 2008a).

The NIE draws a distinction between institutions and organizations. Institutions are the "rules of the game," and organizations consist of individuals who interact repeatedly in linked situations. Organizations operate within an institutional environment and have their own institutions that govern their members' behavior. The United Nations, a central government, a stock exchange, a local pizza shop, and a college club are all organizations, and they are all objects of analysis of the NIE. According to North *et al.* (2009: 15), "Organizations consist of

specific groups of individuals pursuing a mix of common and individual goals through partially coordinated behavior." Ostrom (2005: 57, 32) models organizations as being "composed of one or more (usually more) action situations," which occur when "two or more individuals are faced with a set of potential actions that jointly produce outcomes."

Williamson (2000) provides a four-level framework for categorizing social phenomena, which is used to organize the material in the rest of this chapter. He admits that additional levels could be added, suggesting a fifth level, Level 0: "Mechanisms of the mind", which captures the process by which our minds evolve. Evolutionary psychologists believe that psychological adaptions evolved in a similar way to physiological adaptations "because they solved problems related to survival and reproduction" (Confer *et al.* 2010). Level 1: "Embeddedness" includes the informal norms, customs, and traditions that are part of the cultural heritage of a society and take hundreds or even thousands of years to change. Level 2: The "institutional environment" includes basic human rights, constitutions, and rules concerning the allocation and enforcement of property rights. The rules at this level reflect the Level 1 institutions, but change more quickly. Level 3: The "governance" of contractual relations determines the choice and structure of the organization within which interactions take place. Level 3 rules are influenced by Level 2 rules, and can change within 1 to 10 years. Level 4: "Resource allocation and employment" decisions made continuously by market participants are made at the margin and determine the proper input and output levels. Since Level 4 decisions are the key unit of analysis in Neoclassical Economics, this chapter does not address them explicitly. In practice, when studying a particular institution or organization, a partial analysis must be done with other institutional arrangements held constant. The NIE has focused mainly on Level 2 and Level 3 analysis, and the bulk of this chapter is devoted to those two levels.

Other authors offer alternative frameworks for understanding institutions. Similar to Williamson, Ostrom (2005) describes four levels of analysis and outcomes: metaconstitutional situations; constitutional situations; collective-choice situations; and operational situations. Alston (2008b) maps how formal and informal institutions jointly determine property rights, which in turn affect transaction costs, production costs, and, ultimately, economic performance. Eggertsson (1990) uses three levels of analysis to organize the study of institutions: the structure of property rights, the organization of exchange, and the social and political rules. In Williamson's (2000) framework, norms affect formal rules, which affect governance structures, which affect resource allocation decisions, but there are feedback loops between all of these levels that lead to significant endogeneity. While the first two levels, the mechanisms of the mind and embeddedness, are generally spontaneous in nature, organizations are central to the analysis of the institutional environment, governance, and resource allocation and employment.

Mechanisms of the mind

A basic model of behavior in Neoclassical Economics assumes that individuals' mechanisms of the mind are those of rational egoists. They possess complete information, have "complete and consistent" valuations of outcomes that are monotonic transformations of external payoffs, and choose actions that "maximize material net benefits" given the actions of others (Ostrom 2005: 101). Modeling humans as rational egoists makes sense when examining markets that are close to being perfectly competitive; however, it is not appropriate to model humans as rational egoists in all settings (Arrow 1986; North 2005; Ostrom 2005). For instance, in situations where information costs are high, models based on bounded rationality, in which actors are assumed to be "intendedly rational but limitedly so," are more appropriate (Simon 1957: xxiv). A long tradition in Old Institutional and Austrian Economics posits that decision makers use habits and routines to

compensate for their difficulties in processing information (Clark 1918; Hayek 1960), and the NIE draws from these traditions. Another assumption of human behavior is that some humans do not solely maximize material net benefits, but value "trust, reciprocity, and equity very highly" (Ostrom 2005: 131). These "conditional cooperators" can be modeled as receiving non-material benefits from cooperating that are not functions of external payoffs. Achieving a cooperative outcome, however, requires that other players also value cooperation and that the institutional environment encourages cooperation. Without the proper institutions in place, even those actors with a preference for cooperation will act egotistically (Ostrom 2005).

Embeddedness

The embedded culture of a society affects how people learn and process information as well as what kinds of formal institutions and organizations are feasible. North (2005: 71) argues that "Humans start out with genetic features which provide the initial architecture of the mind; the mind interacts with the cultural heritage and the experiences of individuals to shape learning." Greif (1994: 915) defines cultural beliefs as "the ideas and thoughts common to several individuals that govern interaction … and differ from knowledge in that they are not empirically discovered or analytically proved." Ostrom (2005: 106) states, "When we indicate that people share a culture, it is a shorthand way of indicating that the wide diversity of mental models that individuals have invented has been reduced to a smaller set within those sharing the culture." The interpretation of culture as limiting the menu of available mental models is developed in Denzau and North (1994) and North (2005).

If culture limits the set of mental models with which people interpret their world, then culture will affect the range of possible legal and contractual outcomes. This is the argument made by Greif (1994, 2006) in his comparison of the eleventh-century Maghribi and Genoese traders. Because of their collectivist cultural beliefs, the Maghribi adopted "horizontal economic interactions" and group sanctions and enforcement, while the individualist culture of Genoa led to a "vertical social structure" with legal and political sanctions and enforcement (Greif 1994: 942). Alston *et al.* (2009) argue that shared cultural norms between hacendados and workers in Yucatán, Mexico, led to unique contractual practices that cannot be understood outside of the specific political and cultural context. On a broader scale, statistical cross-country analyses of culture often rely on measures such as the World Values Survey. Guiso *et al.* (2003) show that religion affects economic attitudes such as trust, thriftiness, and preferences for redistribution, and Knack and Keefer (1997) show that differences in the culture of trust across countries affect economic performance.

The institutional environment

The institutional environment defines the formal rules of society, such as constitutions, statutory law, and common law. While neoclassical theory traditionally ignores legal rules or assumes that they are structured in a way that allows costless transacting, laws and their enforcement are important because they create incentives for organizing economic activity (North 1990). Coase (1960) provides the NIE with the concepts needed to understand the conditions under which the legal rule affects economic efficiency. Using what has become a universal example in law and economics classes, he asks whether it matters if the state assigns property rights to farmers who are planting crops, or to neighboring ranchers whose cattle tend to wander and trample those crops. He argues that, in a frictionless market, farmers and ranchers would "agree themselves around" the property rights rule to achieve an efficient and invariant outcome. For instance, if farmers

have the legal right to be free from wandering cattle, but total wealth is highest if farmers build a fence to exclude cattle, then a "Coasian" bargain would be struck in which ranchers pay farmers to build a fence. From an efficiency perspective, it would not matter how property rights were defined, as long as all of the assumptions required for achieving a frictionless market were met. The most important reason why markets are not frictionless is because of transaction costs, the costs of searching for trading partners, bargaining to an agreement, and policing and enforcing that bargain. Coase's insight has been labeled "the Coase Theorem," and, due to the ubiquity of transaction costs, the Coase Theorem has an important corollary: in the presence of transaction costs, institutional and organizational choices affect economic outcomes.

The insights of the Coase Theorem have been used to understand the formation and importance of property rights (Demsetz 1967; Barzel 1989; Libecap 1989). Property rights are the rights to use, derive income, exclude others, and transfer property. Rules concerning property are central to the institutional environment, and the state or some other organization must define, interpret, and enforce these rules. Since frictionless markets and well-defined property rights lead to the efficient allocation of society's resources, a policy prescription drawn from Coase's work is that the state should reduce transaction costs and have clear rules regarding the assignment of property rights in order to increase social wealth.

Examples of the importance of property rights abound in the economic history literature. In their seminal article on England's Glorious Revolution of 1688, North and Weingast (1989) argue that the balance of power between parliament and the monarchy enhanced property rights and generated subsequent economic growth. In their study of property rights in the Brazilian Amazon, Alston *et al.* (1999) find that having clearly defined property rights induces farmers to make greater investments in land, and that having better access to markets induces farmers to seek clearly defined rights. They also find that unclear property rights combined with poorly designed government policies increase the amount of squatting and the use of violence to settle competing claims to property. Libecap (1989) and Higgs (1982) provide examples of how poorly designed regulations allocate property rights to oil fields and salmon fisheries in a way that leads to inefficient modes of production. Property rights need not be defined and enforced by the state. As shown by Umbeck (1977) for the early years of the California gold rush and Ellickson (1989) for the whaling industry in the eighteenth and nineteenth centuries, property rights can arise out of informal norms and in the absence of formal enforcement mechanisms.

The institutions of governance

The institutions of governance operate at a level below the institutional environment and are the specific rules governing how economic activity is organized. The central question that Coase (1937: 388) asks is, "if production is regulated by price movements … why is there any organization?" As noted earlier, Coase's answer is that search, bargaining, and enforcement costs introduce friction into the price mechanism. Entrepreneurs will choose the organizational form that minimizes the sum of production and transacting costs. While economic activity can be categorized as taking place either within the hierarchy of a firm or within a pure market setting, in practice, most activity takes place within a hybrid setting that incorporates elements of both.

The NIE replaces the assumptions that humans can process unlimited amounts of information and that the distribution of possible future outcomes is knowable with Simon's (1957) assumption that humans are boundedly rational and Knight's (1921) assumption that we live in a world of uncertainty. In this framework, the future is murky and complex contracts are "invariably incomplete" (Williamson 1985: 178). Klein *et al.* (1978) and Williamson (1971, 1985) build on

Coase's work to develop a theory of the firm that focuses on the enforcement costs of contracting and is founded on the concepts of bounded rationality, uncertainty, ex post opportunism, and specific assets. This theory analyzes the conditions under which stages of production are internalized versus outsourced: the classic "make or buy" decision. Williamson (1985) posits that interactions between market participants vary in their frequency and in the specificity of assets involved in the transaction. While a large number of market participants may interact during the initial stages of contracting, a "fundamental transformation" occurs after a significant amount has been invested in specific assets, causing the relationship between market participants to become bilateral. Once this transformation in the relationship takes place, a party that has devoted significant resources investing in assets specific to the relationship is vulnerable to opportunistic behavior. The greater the investment in a specific asset, the greater the opportunity to appropriate quasi rents, and the greater the cost of pure market transactions. Market transacting will occur when asset specificity is low, but, as asset specificity rises, alternative governance structures are needed, such as bilateral, trilateral, and unified contracting. Joskow (1987) tests the importance of relationship-specific investments in the U.S. coal market, using access to transportation and differences in regional variation in coal quality as measures of specificity. He finds that parties are more likely to rely on long-term contracting when investments are more specific, thereby reducing their exposure to opportunism and hold up.

While theories of transaction costs associated with asset specificity provide important insights into organizational choice, the institutions of governance are shaped by many other transaction costs. (See Garrouste and Saussier [2008] and Ménard [2008] for overviews and comparisons of alternative theories of the firm.) Alston and Higgs (1982) show that transaction costs associated with monitoring assets and worker effort explain the choice of a wage, sharecropping, or tenant contract on cotton plantations in the post-bellum South. Staten and Umbeck (1982) show that changes in the rules governing medical treatment encouraged higher levels of shirking among air traffic controllers in the 1970s. Olmstead and Rhode (2004) describe how asymmetric information in the early twentieth-century cattle market led some firms to organize trade in a way that accelerated the spread of bovine tuberculosis. They argue that this market failure could only be resolved through regulation of cattle markets at the national level. These three examples show the endogeneity of rules, incentives, and transaction costs. While Alston and Higgs (1982) show that the institutions of governance minimize the sum of production and transaction costs, Staten and Umbeck (1982) show that changes in rules can increase transaction costs and incentivize workers to shirk. Finally, Olmstead and Rhode (2004) show that transaction costs can be so high that restructuring the institutional environment is necessary.

Institutional efficiency and change

The phrases "inefficient institutions" and "efficient institutions" are often used in the NIE in the attempt to prescribe how to move from the former to the latter. One commonly used definition of efficiency is Pareto optimality. An allocation of resources is said to be Pareto optimal if there is no way to make one person better off without making someone else worse off. Pareto-improving trades happen constantly in the marketplace, but Pareto-improving institutional change is harder to achieve because institutional change creates winners and losers. In the presence of transaction costs, the winners may have a difficult time paying off the losers. A more general definition of efficient institutions is that they maximize economic growth and aggregate welfare. North and Thomas (1973), Alchian and Demsetz (1973), and Posner (1977) view institutions as either being efficient or on a path towards efficiency, but this view has been critiqued by Field (1981: 184) as being too functionalist in its assumption that market forces will cause the optimal set of rules to be

chosen from a "book of organization blueprints." The introduction of transaction costs makes evaluating the efficiency of any institutional arrangement very difficult. Commenting on property rights research, Ostrom (1990: 216) argues that it is common for institutions to be "rejected as inefficient, without examining how these institutions may help them acquire information, reduce monitoring costs, and equitably allocate appropriation rights and provision duties."

North (2005) abandons his earlier views on the progression of institutional change towards efficient institutions and instead argues that the institutional structure of society is largely non-ergodic: it shifts over time in unpredictable ways in response to human action. David (1985) and Arthur (1988) develop a theory of path dependency that initially was applied to technological change, the most famous example of which is the persistence of the QWERTY keyboard layout. (See Liebowitz and Margolis (1995) for a critique of David's QWERTY story and an alternative framework for categorizing path dependence.) David (1985: 332) defines a sequence of events as being path dependent when "influences upon the eventual outcome can be exerted by temporally remote events, including happenings dominated by chance elements rather than systematic forces." North (1990) combines the path-dependence literature with a Coasian transaction cost analysis to argue that institutional lock-in can occur on many paths, including those that lead to "consistently poor performance." As an example of this type of analysis, Engerman and Sokoloff (2000) argue that path dependence and lock-in can explain differences in the performance of economies across the Americas. In their framework, initial factor endowments during the colonial period influenced the distribution of political and economic power, differences in power affected whether rules, such as those governing land policy and voting rights, were designed to maintain the power of the elite or encourage growth, and lock-in caused these remote differences to persist and affect economic outcomes to the present day.

Alston (2008b) provides a framework for analyzing change and persistence in the formal legal rules of society, distinguishing between the demand for and the supply of legal institutions. The demand for rules comes from the citizenry in general and from special interests. Formal rules are supplied by the government. A wide array of rules governs political organizations and therefore affects the path of institutional change. The structure of the organizations and the preferences of the individuals demanding and supplying change determines what types of rules will be passed and how they will be applied and enforced. Voters have little incentive to become aware of most issues facing government because the effects of their votes are small, as are the impacts of policies on individual voters (Downs 1957; Tullock 1967). Instead, special interests are more likely to influence the political process (Olson 1965). Many variables influence the supply side of government and the types of institutional change that occurs. These variables include whether the government is presidential or parliamentary (Carey 2008), federalist or unitary (Weingast 2008), and bicameral or unicameral (Cutrone and McCarty 2006); what rules govern the bureaucracy (McCubbins et al. 1987), the committee structure of the legislature (Shepsle and Weingast 1987), and the membership of the legislature (Alston et al. 2006); and how political parties are organized (Cox and McCubbins 1993). In times of crisis, the supply and demand for formal institutional change can increase, leading to an increase in the scale and scope of government. While the size of government generally falls after the crisis has passed, it does not fall back to its pre-crisis growth path, leading to what Higgs (1987) describes as a ratchet effect.

Recent work in the NIE continues to examine the causes and consequences of changes to the institutional environment, particularly the transition to democracy. North et al. (2009) provide a framework for understanding the move from a natural state to an open access order. Natural states limit access to valuable resources and activities to a select group of elite members, both to enrich that elite and to control violence. An open access order controls violence

through a consolidated military and allows organizations to be formed impersonally, without any direct link to an elite coalition. The key question posed by North *et al.* is how natural states evolve into open access orders. Their answer involves satisfying three "doorstep conditions." First, elites must develop a rule of law among themselves that shares rights equally among elites. Second, public and private organizations must exist that persist beyond the life span of individual elites. Finally, the political system must control the military and the use of violence. Acemoglu and Robinson (2006) offer a formal model of the transition from authoritarian rule to democracy in which two groups, the elite and citizens, contend for political and economic power. The elite desire to extract resources from citizens, but fear that the continuation of elite rule may lead to violent revolution. In order to placate citizens, the elite grant them additional concessions and commit to continuing those concessions by switching to a democratic institutional environment. One question concerning this model is under what conditions the transition to democracy creates institutional lock-in and whether elites can regain *de facto* political and economic power in the future even after a transition to democracy.

Concluding remarks

While the idea that "institutions matter" has been accepted by many economists, there are still unanswered questions and much unexplored territory at all levels of Williamson's social analysis. The study of the causes and effects of informal institutions such as culture, norms, and beliefs is still in its early phase. The demand and supply of the formal institutional environment have been studied by economists and political scientists, but the process by which political institutions change and persist still requires much research. While the NIE includes many theories concerning the institutions of governance, these are often partial explanations and require additional integration. Finally, the NIE must refine its assumptions of human behavior and study the conditions under which those assumptions are most appropriate. These questions are only a few of the ones that will continue to make the NIE an exciting and important field of research in the future.

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3

MEASURING ECONOMIC GROWTH AND THE STANDARD OF LIVING

Lee A. Craig

Defining the "standard of living"

Gross domestic product (GDP), the value of final goods and services produced within a country during a period of time, is the measure economists typically use to gauge aggregate economic activity in a modern nation state. It is essentially the sum of the product of prices and (final) quantities of goods and services destined for exchange in the market. The prices in this measure can be influenced by inflation (or deflation) – that is, a general increase (or decrease) in the price level unrelated to "real" economic activity. To control for these effects, economists hold prices constant for some "base year."[1] This adjustment yields real GDP, which is purged of any inflationary (or deflationary) effect. Real GDP, then, is a key economic indicator, and its growth represents "economic growth."

However, since real GDP captures aggregate economic activity, large countries will tend to have relatively large GDPs; conversely, small countries will have relatively small GDPs. For example, measured in U.S. dollars, in 2010 the real GDP of Indonesia is nearly four times larger than that of Norway (ADFAT 2011). However, per capita real GDP – that is, real GDP divided by population – is much higher in Norway than it is in Indonesia: $52,239 versus $4,380, again in 2010 U.S. dollars. Therefore, real GDP per capita, rather than GDP, is the standard economic indicator of "the living standard" within a modern nation state, and the growth of this measure is typically labeled an improvement in the standard of living.

Three intellectual milestones mark the history of measuring GDP, economic growth, and the standard of living. The first of these is the identification of the political or geographical unit that is to be measured. Exactly what constitutes an "economy"? More specifically, what are its political or geographical boundaries? The second addresses the conceptual issue of what represents economic activity within that unit, and how is that activity related to the standard of living. In other words, what economic activity or indicators are to be measured? Finally, there remains the practical question of how that economic activity is measured, and how its growth is characterized. What economic variables represent aggregate economic activity? Which of these measures the standard of living? And what does a higher standard of living mean? Since even the simplest notions of the economy, economic activity, and the standard of living involve many factors and variables, they necessarily have to be constrained in the actual measurement process for the concept of growth to be meaningful.