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ECONOMIC GROWTH AND STRUCTURAL CHANGE IN THE LONG NINETEENTH CENTURY

ROBERT E. GALLMAN

INTRODUCTION

This chapter is concerned with quantitative features of the development of the American economy in the period between the late eighteenth century and World War I – the long nineteenth century. A reasonable place to begin is with measurements of the size of the economy. Since a central feature of any economy is production, size is appropriately measured by aggregate output. Other indicators, such as population and geographic extent, are considered below.

The conventional measures of aggregate output are the national product – that is, output produced by factors of production owned by Americans – and the domestic product – output produced by factors of production domiciled in the United States. The proper index to select depends upon whether one thinks of the United States as the sum of all Americans or as a geographic entity. We are interested in the history of the people of the United States, and therefore the national product is the more appropriate concept. It underlies most of the measurements treated in this chapter; in practice the choice matters little, however, since in the years under examination the national product and the domestic product were virtually identical. A more important question is the extent to which these conventional measures properly describe levels of output and changes in output over time, a question set aside for the moment but treated later in this essay.

SIZE AND GROWTH OF THE AMERICAN ECONOMY

Size

The American gross national product probably ran around \$144 million just before the Revolution (Table 1.3). (A wide margin for error must be allowed.) By modern standards, that is a small value, considerably less than half as great as Helene Curtis's sales in the quarter ending August 31, 1995. If we allow for price changes, gross national product in 1774, expressed in prices of 1995, would run roughly \$2.8 billion. That is less than four-tenths of the current annual output of the state with the smallest total output, Wyoming, and less than one-third greater than A&P's sales in the twelve weeks ending September 9, 1995.

By the standards of the world of 1774, however, the American economy was not small. It yielded a gross national product that was probably more than one-third that of Great Britain (excluding Ireland) (see Table 1.1). Great Britain was then undergoing an agricultural revolution and was in the early stages of the Industrial Revolution; it was one of the most powerful nations in the world, economically and politically. The American economy was smaller than the British – and, no doubt, smaller than the Spanish or French, in Europe, and the Chinese or Indian, in Asia – but it was by no means tiny. It may very well have been as large as the well-developed Dutch and Belgian economies, taken together.

Growth

Between 1774 and 1909 the American real gross national product increased about 175-fold, or at an average rate of 3.9 percent per year (Table 1.3). Higher rates have been recorded in recent times, but only for much shorter periods. In the nineteenth century, the frontier economies of Australia and Canada grew about as fast as the American, and the Argentine economy, considerably faster. (See Table 1.2.) Again, the periods these records cover are substantially shorter than the 135 years encompassed by the American record. Although it is possible that higher rates of growth were recorded by one or more of these three economies over the extended period 1774–1909, the rates would be computed on very small bases: for example, in 1774 the entire population of Australia consisted of a small number of aborigines – Captain Cook had arrived only four years before –

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Table 1.1. *Aggregate product in various countries, compared with aggregate American product, various dates*

	Current prices		1990 Geary-Khamis dollars			
	1774	1840	1850	1870	1890	1913
1. <i>Western Europe</i>						
a. United Kingdom	2.7	1.3–1.5	1.42	0.97	0.67	0.41
b. France		1.7	1.43	0.73	0.44	0.28
c. Germany			0.69	0.45	0.33	0.28
d. Belgium			0.19	0.14	0.10	0.06
e. Netherlands			0.14	0.10	0.07	0.05
f. Ireland			N.A.	0.07	0.03	0.02
g. Denmark			0.06	0.04	0.03	0.02
h. Norway			0.04	0.02	0.02	0.01
i. Sweden			0.11	0.07	0.05	0.03
j. Finland			N.A.	0.02	0.01	0.01
k. Italy			N.A.	0.42	0.24	0.18
l. Switzerland			N.A.	0.06	N.A.	0.03
m. Portugal			0.10	0.05	0.04	0.02
n. Spain			0.40	0.23	0.15	0.09
o. Czechoslovakia			0.22	0.12	0.08	0.05
p. Hungary			N.A.	0.07	N.A.	0.03
q. Austria			0.15	0.09	0.06	0.05
r. Totals (excl. Switzerland and Hungary)			N.A.	3.52	2.32	1.56
2. <i>Eastern Europe</i>						
a. USSR			N.A.	0.85	0.47	0.45
3. <i>Australia, New Zealand, and the Americas</i>						
a. Australia			0.03	0.06	0.07	0.05
b. New Zealand			N.A.	0.02	0.01	0.01
c. Canada			0.07	0.06	0.05	0.06
d. Argentina			N.A.	0.02	0.03	0.06
e. Brazil			0.12	0.07	0.05	0.04
f. Mexico			0.12	0.07	0.05	0.04
g. Chile			N.A.	N.A.	N.A.	0.02
h. Colombia			N.A.	N.A.	N.A.	0.01
i. Peru			N.A.	N.A.	N.A.	0.01
j. Venezuela			N.A.	N.A.	N.A.	0.01
k. Totals (excl. Chile, Colombia, Peru, Venezuela)				0.30	0.26	0.26

Table 1.1 (cont.)

	Current prices		1990 Geary-Khamis dollars			
	1774	1840	1850	1870	1890	1913
4. <i>Asia</i>						
a. China			N.A.	1.90	1.09	0.58
b. India			2.42	1.20	0.66	0.32
c. Indonesia			0.36	0.19	0.12	0.09
d. Thailand			N.A.	0.04	0.02	0.01
e. Japan			N.A.	0.26	0.18	0.13
f. Totals				3.59	2.07	1.13
<i>Grand Totals</i> (Σ of 1r, 2a, 3k, 4f)				8.26	5.12	3.40

Note: The table should be read in the following way: in 1774 the aggregate product of Great Britain (excl. Ireland) was roughly 2.7 times as large as the aggregate product of the Thirteen Colonies, when both aggregate products are expressed in prices of 1774; in 1913, aggregate product in the United Kingdom was roughly 41 percent as large as the aggregate product of the United States, when both aggregate products are expressed in Geary-Khamis dollars of 1990. Aggregate products refer to GNP, in 1774 and 1840, and to GDP, in 1850–1913.

Source: 1774: The estimate is based on Alice Hanson Jones, *Wealth of a Nation To Be* (New York, 1980), 39, 68. The American per capita income level is the higher of Jones's two estimates, on the authority of Weiss. Thomas Weiss, "U.S. Labor Force Estimates and Economic Growth, 1800–1860," in Robert E. Gallman and John Joseph Wallis (eds.), *American Economic Growth and Standards of Living before the Civil War* (Chicago, 1992), 32. See also, Lance E. Davis, Richard A. Easterlin, William N. Parker, et al., *American Economic Growth, An Economist's History of the United States* (New York, 1972), 24; 1840: Derived from Gallman, "Gross National Product in the United States 1834–1909," in Dorothy S. Brady (ed.), *Output, Employment, and Productivity in the United States After 1800*, Studies in Income and Wealth, Volume 30 (New York, 1966), 5, 26; 1850–1913: Angus Maddison, *Monitoring the World Economy, 1820–1992* (Paris, 1995), 180, 182, 184, 186, 188, 190. The Geary-Khamis procedure yields multilateral comparisons. See Maddison, 162–63.

and the total European population of Argentina in the same year was probably no more than 160,000. Canada was larger, but not much larger. The U.S. economy remained much bigger than the other three, down to World War I: American real Gross Domestic Product in 1913 was almost six times as large as the sum of the real GDPs of Argentina, Australia, and Canada (Table 1.1).

These four countries shared several characteristics. They were colonized by Europeans (and Africans, in the case of the United States), their native

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Table 1.2. *Average annual rates of change of real GDP (1990 Geary-Khamis dollars), nineteen countries, 1820–1913*

Argentina	[6.0%]
U.S.A.	4.1
Canada	(3.8)
Australia	[3.5]
Netherlands	2.4
Germany	2.4
Denmark	2.3
Belgium	2.1
Finland	2.1
Brazil	2.0
U.K.	2.0
Austria	1.9
Norway	1.9
Sweden	1.9
Italy	1.6
Mexico	1.6
Spain	1.4
Japan	1.2
Ireland	0.6

Note: () = 1850–1913; [] = 1870–1913

Source: Derived from Maddison, *Monitoring the World Economy*, 180, 182, 184, 188.

populations were small and easy to brush aside, and having done so, the colonizers were left with abundant, rich natural resources. All four countries then experienced rapid population and economic growth. Rapid growth simply began earliest in the colonies that ultimately became the United States.

No European economy grew so fast for so long as did that of the United States before World War I. For example, the British growth rate ran only about 2.2 percent per year from circa 1770 to 1913. The difference between Britain and the United States with respect to the pace of growth had important consequences. In 1774 the British current price GNP was almost three times the American; in 1840 it was only about one and a half times as great, while in 1913, the entire United Kingdom had a real GDP only about 41 percent as large as the American real GDP. As time passed, the relative standing of the two economies had reversed.

By the beginning of World War I the United States was by far the largest producer of goods and services in the world. Aggregate annual output was greater in the United States than in the three main World War I belligerents – the United Kingdom, Germany, and France – combined. In fact, at that time it was roughly two-thirds as large as the total GDP of *all* of the leading Western European economies (Table 1.1).

The Price Level

Most of the preceding remarks refer to measures of real output. Over the long term, U.S. real and nominal output grew at approximately the same rates (Table 1.3). That is, prices seem to have been at roughly the same level just before the Revolution as just before World War I. This statement is subject to well-known qualifications, arising from the changing composition of aggregate output as time passed. Many items produced in large amounts before the Revolution (e.g., oil lamps) were either not produced at all in the early twentieth century, or in very small quantities. Similarly, important products of the years just before World War I (e.g., electric lamps) were completely unknown in 1774. Price indices that cover many years thus pose serious problems of construction and interpretation. Nonetheless, there can be little doubt that American experience with the long-term drift of the price level was very different in the long nineteenth century from what it has been since. In the first period there was little trend (prices rose about 0.05 percent per year); in the second, the trend has been strongly upward, the index rising at a rate of about 3.4 percent per year. In 1991 the price level was about 13.5 times as high as it had been on the eve of World War I.

Although the trend in nineteenth-century prices was approximately zero, there were periods of marked inflation and periods of marked deflation. Table 1.3 is not ideally suited to deal with this issue. Nonetheless, the inflations associated with the French-British wars, the boom following the War of 1812, and the inflation of the Civil War all make their imprints on the record in the table. So do the periods of price decline after the collapse of the 1819 boom and after the Civil War. The reflation of the world economy after the gold discoveries of the 1890s also appears. (See Rockoff, Chap. 14, this volume for a more comprehensive treatment of this subject.)

Table 1.3. *U.S. gross national product, current prices and prices of 1860, 1774–1909, and rates of change*

Panel A: GNP (Mil. \$)			
Years	Current prices	Price index (1860 = 100)	1860 prices
1774	144	(97)	149
1793	(317)	(119)	266
1800	(544)	(151)	360
1807	(680)	(139)	489
1810	(765)	(148)	517
1820	(1,079)	(141)	765
1830	(1,229)	(111)	1,107
1834/43	(1,803)	(112)	1,610
1839/48	1,951	97.4	2,003
1844/53	2,649	100.8	2,628
1849/58	3,474	102.3	3,397
1859			4,226
1869			5,547
1869/78	8,009	120.7	6,633
1874/83	9,736	111.8	8,711
1879/88	11,467	104.4	10,987
1884/93	12,536	97.1	12,915
1889/98	13,464	91.9	14,655
1894/03	16,335	93.1	17,546
1899/08	22,588	103.1	21,903
1909			25,968

Panel B: Average annual short-term rates of change, GNP in prices of 1860	
1774–1793	3.1%
1793–1800	4.4
1800–1807	4.5
1807–1810	1.9
1810–1820	4.0
1820–1830	3.8
1830–1834/43	4.2
1834/43–1839/48	4.5
1839/48–1844/53	5.6
1844/53–1849/58	5.3
1849/58–1859	4.1
1859–1869	2.9
1869–1869/78	4.1
1869/78–1874/83	5.6
1874/83–1879/88	4.8
1879/88–1884/93	3.3

Table 1.3. (cont.)

Panel B: Average annual short-term rates of change, GNP in prices of 1860	
1884/93–1889/98	2.6
1889/98–1894/1903	3.7
1894/03–1899/1908	4.5
1899/08–1909	3.1
Panel C: Average annual long-term rates of change, GNP in prices of 1860	
1774–1800	3.5%
1800–1834/43	3.9
1834/43–1869	4.2
1869–1909	3.9
1774–1909	3.9

Note: The estimates for the later years are more reliable than those for the earlier years. See the bibliographic essay. Bracketed price index numbers refer to the cost of living, not to the GNP deflator; parenthetical GNP figures were derived by use of a cost of living index, rather than by the more appropriate GNP deflator.

Source: GNP, 1834/43–1909, 1860 prices, and 1839/48–1909, current prices: Taken from Robert E. Gallman, “Gross National Product in the United States, 1834–1909,” in Dorothy S. Brady (ed.), *Output, Employment, and Productivity in the United States After 1800*, Studies in Income and Wealth, Vol. 30 (New York, 1966) 26 (and underlying worksheets), adjusted to incorporate inventory changes, the latter computed from Robert E. Gallman, “The United States Capital Stock in the Nineteenth Century,” in Stanley L. Engerman and Robert E. Gallman (eds.), *Long-Term Factors in American Economic Growth*, Studies in Income and Wealth, vol. 51 (Chicago, 1986), 204 and Robert E. Gallman, “American Economic Growth Before the Civil War: The Testimony of the Capital Stock Estimates,” in Robert E. Gallman and John Joseph Wallis (eds.), *American Economic Growth and Standards of Living Before the Civil War* (Chicago, 1992), 94 (and underlying worksheets). The years 1834/43 through 1859 are census years. For example, the year 1859 refers to the 12 months from June 1, 1859, to May 31, 1860. The current price figures for 1839/48, 1844/53, and 1849/58 are actually 3-year averages, rather than decade averages: 1839, 1844, 1849; 1844, 1849, 1854; 1849, 1854, 1859. *Price Index, 1839/48–1909:* Computed by dividing current price GNP by GNP in prices of 1860. *GNP, 1774–1830, prices of 1860:* The figure for 1834/43 was extrapolated to the earlier years on real GDP estimates (1840 prices) drawn from Thomas Weiss, “U.S. Labor Force Estimates and Economic Growth, 1800–1860,” in Gallman and Wallis (eds.), *American Economic Growth*, 27, 31, 32. The resulting estimates are treated as calendar year estimates. *Price Index, 1774–1834/43:* David and Solar cost of living index, base 1860 (Paul A. David and Peter Solar, “A Bicentenary Contribution to the History of the Cost of Living in America,” *Research in Economic History*, 2 (1977)). *Current Price GNP, 1793–1834/43:* GNP in 1860 prices multiplied by the price index. *Current Price GNP, 1774:* See source note to Table 1.1.

Variations in the Rate of Growth

Although there was virtually no trend in the rate of change of aggregate output between the Revolution and World War I (Panel C of Table 1.3), there were important short-term changes, many of an episodic character (Panel B of Table 1.3). The data in Table 1.3 are not well devised to show short-term movements in the economy – for example, the estimates for the years before 1834 (except for those for 1793 and 1807) make no allowance for variations in the level of employment of inputs, nor do they take into account differences in the level of crop production from one year to the next occasioned by variations in weather, the ravages of insects, crop diseases, etc. The estimates were devised for the study of long-term trends, not for short-term changes. Nonetheless, some of the short-term variations exhibited by this series for the early period probably do reflect real phenomena. For example, the rate of growth shown for the period 1774 to 1793 is relatively low, no doubt due to the effects of the Revolutionary War and the troubles of the Confederation years. It is a little surprising that it is not lower. The years of prosperity for American merchants, shippers, and shipbuilders during the hostilities between France and England show up clearly in the table (1793–1800 and 1800–1807) as a time during which the growth rate was high. The rate drops off sharply in the period 1807–1810, likely a consequence of events leading up to the War of 1812.

More reliance can be placed on the series beginning in 1834. The data show clearly the surge of growth during the 20 to 30 years before the Civil War, a surge usually associated with the beginning of industrialization, the westward movement, and the first great nineteenth-century inflow of European migrants. The impact of the Civil War is registered in the low rate of growth for the interval 1859–1869, 2.9 percent per year (a rate that would undoubtedly have been lower still, if the period had been limited to the war years), and the Great Depression of the 1890s made its mark in an even lower rate for the period 1884/93 through 1889/98, 2.6 percent per year. The so-called Great Depression of 1873–1879 does not show up in the aggregate statistics, partly because the decade averages in Table 1.3 are not well designed to catch its effects, but partly also because the quantitative record for the 1870s does indeed suggest that there was a strong upward movement of output in that period. The seeming conflict between the evidence on vigorous output growth and persistent, deep unemployment has received much scholarly attention, without being resolved.

Several of the fluctuations in output described above are the economic consequences of political or military events. Others are due to economic processes that can be regarded as systematic. Every market economy experiences undulations in economic activity. Some – seasonal variations – do not influence annual data; others – business cycles – are difficult to trace in annual data, and even more so in decade-average data of the type contained in Table 1.3, since nineteenth-century business cycles were typically short – three to five years, peak to peak or trough to trough. Important collapses, such as the Great Depression of the 1890s, affect annual series, and even decade-average series, but less cataclysmic events are difficult to date and to measure.

There is a third form of economic fluctuation – the long swing, or Kuznets cycle, of an amplitude of fifteen to twenty-five years, peak to peak or trough to trough – that occurred during this period. It is observable in annual data and in decade averages of the sort figuring in Table 1.3. It has been subject to analysis by Simon Kuznets, Moses Abramovitz, Richard Easterlin, Brinley Thomas, and Douglass North, among many others. All five see these fluctuations as central to the story of American nineteenth-century economic growth.

North's account relates exclusively to the period before the Civil War. To North, the impetus to American antebellum growth from 1815 onward was British demand for American cotton, a demand that arose out of the Industrial Revolution. In the two decades immediately preceding the Civil War, cotton accounted for almost one-half of the value of American exports. The cycling of the Southern economy was a consequence of the process by which planters responded to the British demands. The expansion of the British economy gradually raised the price of raw cotton and eventually encouraged planters to move westward onto new, fertile land, to clear the land, and to begin to produce. There were also investments in social overhead capital, such as railroads, that went along with the westward expansion. When such investments matured, cotton hit the market in unusually large amounts, prices fell, and investment by planters ceased, not to begin again until the expansion of British demand caught up with the ability of Americans to produce, and cotton prices again began to rise.

According to North, the cycle influenced the rest of the American economy through Southern expenditure of cotton earnings. Planters bought manufactures from the Northeast and food supplies from the Northwest. During the expansion phase of the cycle, these demands