INCOME INEQUALITY IN THE UNITED STATES, 1913–1998*

THOMAS PIKETTY AND EMMANUEL SAEZ

This paper presents new homogeneous series on top shares of income and wages from 1913 to 1998 in the United States using individual tax returns data. Top income and wages shares display a U-shaped pattern over the century. Our series suggest that the large shocks that capital owners experienced during the Great Depression and World War II have had a permanent effect on top capital incomes. We argue that steep progressive income and estate taxation may have prevented large fortunes from fully recovering from these shocks. Top wage shares were flat before World War II, dropped precipitously during the war, and did not start to recover before the late 1960s but are now higher than before World War II. As a result, the working rich have replaced the rentiers at the top of the income distribution.

I. INTRODUCTION

According to Kuznets' influential hypothesis, income inequality should follow an inverse-U shape along the development process, first rising with industrialization and then declining, as more and more workers join the high-productivity sectors of the economy [Kuznets 1955]. Today, the Kuznets curve is widely held to have doubled back on itself, especially in the United States, with the period of falling inequality observed during the first half

of the twentieth century being succeeded by a very sharp reversal of the trend since the 1970s. This does not, however, imply that Kuznets' hypothesis is no longer of interest. One could indeed argue that what has been happening since the 1970s is just a remake of the previous inverse-U curve: a new industrial revolution has taken place, thereby leading to increasing inequality, and inequality will decline again at some point, as more and more workers benefit from the innovations.

To cast light on this central issue, we build new homogeneous series on top shares of pretax income and wages in the United States covering the 1913 to 1998 period. These new series are based primarily on tax returns data published annually by the Internal Revenue Service (IRS) since the income tax was instituted in 1913, as well as on the large micro-files of tax returns released by the IRS since 1960.

First, we have constructed annual series of shares of total income accruing to various upper income groups fractiles within the top decile of the income distribution. For each of these fractiles we also present the shares of each source of income such as wages, business income, and capital income. Kuznets [1953] did produce a number of top income shares series covering the 1913 to 1948 period, but tended to underestimate top income shares, and the highest group analyzed by Kuznets is the top percentile.[1] Most importantly, nobody has attempted to estimate, as we do here, homogeneous series covering the entire century.[2] Second, we have constructed annual 1927 to 1998 series of top shares of salaries for the top fractiles of the wage income distribution, based on tax returns tabulations by size of salaries compiled by the IRS since 1927. To our knowledge, this is the first time that a homogeneous annual series of top wage shares starting before the 1950s for the United States has been produced.[3] Finally, in order to complete our analysis of top capital income earners, we have also used estate tax returns tabulations to construct quasi-annual series (1916 to 1997) of top estates.

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1. Analyzing smaller groups within the top percentile is critical because capital income is extremely concentrated.
2. Feenberg and Poterba [1993, 2000] have constructed top income share series covering the 1951–1995 period, but their series are not homogeneous with those of Kuznets. Moreover, they provide income shares series only for the top 0.5 percent, and not for other fractiles.
3. Previous studies on wage inequality before 1945 in the United States rely mostly on occupational pay ratios [Williamson and Lindert 1980; Goldin and Margo 1992; Goldin and Katz 1999].

Our estimated top shares series display a U-shape over the century and suggest that a pure Kuznets mechanism cannot fully account for the facts. We find that top capital incomes were severely hit by major shocks in the first part of the century. The post-World War I depression and the Great Depression destroyed many businesses and thus significantly reduced top capital incomes. The wars generated large fiscal shocks, especially in the corporate sector that mechanically reduced distributions to stockholders. We argue that top capital incomes were never able to fully recover from these shocks, probably because of the dynamic effects of progressive taxation on capital accumulation and wealth inequality. We also show that top wage shares were flat from the 1920s until 1940 and dropped precipitously during the war. Top wage shares have started to recover from the World War II shock in the late 1960s, and they are now higher than before World War II. Thus, the increase in top income shares in the last three decades is the direct consequence of the surge in top wages. As a result, the composition of income in the top income groups has shifted dramatically over the century: the working rich have now replaced the coupon-clipping rentiers. We argue that both the downturn and the upturn of top wage shares seem too sudden to be accounted for by technical change alone. Our series suggest that other factors, such as changes in labor market institutions, fiscal policy, or more generally social norms regarding pay inequality may have played important roles in the determination of the wage structure. Although our proposed interpretation for the observed trends seems plausible to us, we stress that we cannot prove that progressive taxation and social norms have indeed played the role we attribute to them. In our view, the primary contribution of this paper is to provide new series on income and wage inequality.

One additional motivation for constructing long series is to be able to separate the trends in inequality that are the consequence of real economic change from those that are due to fiscal manipulation. The issue of fiscal manipulation has recently received much attention. Studies analyzing the effects of the Tax Reform Act of 1986 (TRA86) have emphasized that a large part of the response observable in tax returns was due to income shifting between the corporate sector and the individual sector [Slemrod 1996; Gordon and Slemrod 2000]. We do not deny that fiscal manipulation can have substantial short-run effects, but we argue that most long-run inequality trends are the consequence of

real economic change, and that a short-run perspective might lead to attribute improperly some of these trends to fiscal manipulation.

The paper is organized as follows. Section II describes our data sources and outlines our estimation methods. In Section III we present and analyze the trends in top income shares, with particular attention to the issue of top capital incomes. Section IV focuses on trends in top wages shares. Section V offers concluding comments and compares our U. S. findings with comparable series recently constructed for France by Piketty [2001a, 2001b] and for the United Kingdom by Atkinson [2001]. All series and complete technical details about our methodology are gathered in appendices of the working paper version of the paper [Piketty and Saez 2001].

II. DATA AND METHODOLOGY

Our estimations rely on tax returns statistics compiled annually by the Internal Revenue Service since the beginning of the modern U. S. income tax in 1913. Before 1944, because of large exemptions levels, only a small fraction of individuals had to file tax returns and therefore, by necessity, we must restrict our analysis to the top decile of the income distribution.[4] Because our data are based on tax returns, they do not provide information on the distribution of individual incomes within a tax unit. As a result, all our series are for tax units and not individuals.[5] A tax unit is defined as a married couple living together (with dependents) or a single adult (with dependents), as in the current tax law. The average number of individuals per tax unit decreased over the century but this decrease was roughly uniform across income groups. Therefore, if income were evenly allocated to individuals within tax units,[6] the time series pattern of top shares based on individuals should be very similar to that based on tax units.

4. From 1913 to 1916, because of higher exemption levels, we can provide estimates only within the top percentile.
5. Kuznets [1953] nevertheless decided to estimate series based on individuals not tax units. We explain in Piketty and Saez [2001] why his method produced a downward bias in the levels (though not in the pattern) of top shares.
6. Obviously, income is not earned evenly across individuals within tax units, and, because of increasing female labor force participation, the share of income earned by the primary earner has certainly declined over the century. Therefore, inequality series based on income earned at the individual level would be different. Our tax returns statistics are mute on this issue. We come back to that point when we present our wage estimates.

TABLE I
THRESHOLDS AND AVERAGE INCOMES IN TOP GROUPS WITHIN THE
TOP DECILE IN 1998

Thresholds (1)	Income level (2)	Fractiles (3)	Number of tax units (4)	Average income (5)
		Full Population	130,945,000	$38,740
P90	$81,700	P90–95	6,550,000	$94,000
P95	$107,400	P95–99	5,240,000	$143,000
P99	$230,200	P99–99.5	655,000	$267,000
P99.5	$316,100	P99.5–99.9	524,000	$494,000
P99.9	$790,400	P99.9–99.99	117,900	$1,490,000
P99.99	$3,620,500	P99.99–100	13,100	$9,970,000

Computations are based on income tax returns statistics (see Piketty and Saez [2001], Appendix A). Income is defined as gross income excluding capital gains and before individual taxes. Amounts are expressed in 1998 dollars.
Source: Table A0 and Table A4, row 1998 in Piketty and Saez [2001].

Tax units within the top decile form a very heterogeneous group, from the high middle class families deriving most of their income from wages to the super-rich living off large fortunes. More precisely, we will see that the composition of income varies substantially by income level within the top decile. Therefore, it is critical to divide the top decile into smaller fractiles. Following Piketty [2001a, 2001b], in addition to the top decile (denoted by P90–100), we have constructed series for a number of higher fractiles within the top decile: the top 5 percent (P95–100), the top 1 percent (P99–100), the top 0.5 percent (P99.5–100), the top 0.1 percent (P99.9–100), and the top 0.01 percent (P99.99–100). This also allows us to analyze the five intermediate fractiles within the top decile: P90–95, P95–99, P99–99.5, P99.5–99.9, P99.9–99.99. Each fractile is defined relative to the total number of potential tax units in the entire U. S. population. This number is computed using population and family census statistics [U. S. Department of Commerce, Bureau of Census 1975; Bureau of Census 1999] and should not be confused with the actual number of tax returns filed. In order to get a more concrete sense of size of income by fractiles, Table I displays the thresholds, the average income level in each fractile, along with the number of tax units in each fractile all for 1998.

We use a gross income definition including all income items reported on tax returns and before all deductions: salaries and wages, small business and farm income, partnership and fidu-

ciary income, dividends, interest, rents, royalties, and other small items reported as other income. Realized capital gains are not an annual flow of income (in general, capital gains are realized by individuals in a lumpy way) and form a very volatile component of income with large aggregate variations from year to year depending on stock price variations. Therefore, we focus mainly on series that exclude capital gains.[7] Income, according to our definition, is computed before individual income taxes and individual payroll taxes but after employers' payroll taxes and corporate income taxes.[8]

The sources from which we obtained our data consist of tables displaying the number of tax returns, the amounts reported, and the income composition, for a large number of income brackets [U. S. Treasury Department, Internal Revenue Service, 1916–1998]. As the top tail of the income distribution is very well approximated by a Pareto distribution, we use simple parametric interpolation methods to estimate the thresholds and average income levels for each of our fractiles. We then estimate shares of income by dividing the income amounts accruing to each fractile by total personal income computed from National Income Accounts [Kuznets 1941, 1945; U. S. Department of Commerce 2000].[9] Using the published information on composition of income by brackets and a simple linear interpolation method, we decompose the amount of income for each fractile into five components: salaries and wages, dividends, interest income, rents and royalties, and business income.

We use the same methodology to compute top wage shares using published tables classifying tax returns by size of salaries and wages. In this case, fractiles are defined relative to the total number of tax units with positive wages and salaries estimated as the number of part-time and full workers from National Income Accounts [U. S. Department of Commerce 2000] less the number

7. In order to assess the sensitivity of our results to the treatment of capital gains, we present additional series including capital gains (see below). Details on the methodology and complete series are presented in the appendix to Piketty and Saez [2001].
8. Computing series after individual income taxes is beyond the scope of the present paper but is a necessary step to analyze the redistributive power of the income tax over time, as well as behavioral responses to individual income taxation.
9. This methodology using tax returns to compute the level of top incomes, and using national accounts to compute the total income denominator is standard in historical studies of income inequality. Kuznets [1953], for instance, adopted this method.

of wives who are employees (estimated from U. S. Department of Commerce, Bureau of Census [1975] and Bureau of Census [1999]). The sum of total wages in the economy used to compute shares is also obtained from National Income Accounts [U. S. Department of Commerce 2000].

The published IRS data vary from year to year, and there are numerous changes in tax law between 1913 and 1998.[10] To construct homogeneous series, we make a number of adjustments and corrections. Individual tax returns micro-files are available since 1960.[11] They allow us to do exact computations of all our statistics for that period and to check the validity of our adjustments. Kuznets [1953] was not able to use micro-files to assess possible biases in his estimates due to his methodological assumptions.[12]

Our method differs from the recent important studies by Feenberg and Poterba [1993, 2000] who derive series of the income share of the top 0.5 percent[13] for 1951 to 1995. They use total income reported on tax returns as their denominator and the total adult population as their base to obtain the number of tax units corresponding to the top fractiles.[14] Their method is simpler than ours but cannot be used for years before 1945 when a small fraction of the population filed tax returns.

III. Top Income Shares and Composition

III. A. Trends in Top Income Shares

The basic series of top income shares are presented in Table II. Figure I shows that the income share of the top decile of tax units from 1917 to 1998 is U-shaped. The share of the top decile fluctuated around 40 to 45 percent during the interwar period. It declined substantially to about 30 percent during World War II and then remained stable at 31 to 32 percent until the 1970s when it increased again. By the mid-1990s the share had crossed the 40 percent level and is now at a level close to the prewar level,

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10. The most important example is the treatment of capital gains and the percentage of these gains that are included in the statistics tables.
11. These data are known as the Individual Tax Model files. They contain about 100,000 returns per year and largely oversample high incomes, providing a very precise picture of top reported incomes.
12. In particular, Kuznet's treatment of capital gains produces a downward bias in the level of his top shares.
13. They also present incomplete series for the top 1 percent.
14. This method is not fully satisfying for a long-run study as the average number of adults per tax unit has decreased significantly since World War II.

TABLE II
TOP INCOME SHARES, 1913–1998

Year	Inflation CPI (p(1998)/p(n))	# tax units (thousands)	Average income (1998 $)	Top income shares (excluding capital gains)							Capital gains included	
				P90–100	P90–95	P95–99	P99–100	P99.5–100	P99.9–100	P99.99–100	Share only P99–100	Rank and share P99–100
	(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1913	16.4776	37,701	12,076				17.96	14.73	8.62	2.76	17.96	17.96
1914	16.2662	38,513	11,804				18.16	15.08	8.60	2.73	18.16	18.16
1915	16.1051	39,154	11,918				17.58	14.58	9.22	4.36	17.58	17.58
1916	14.9676	39,790	12,961				18.57	15.60	9.87	4.40	18.92	19.34
1917	12.7492	40,387	13,204	40.29	9.95	12.74	17.60	14.23	8.36	3.33	17.73	17.75
1918	10.8596	40,451	12,502	39.90	10.61	13.41	15.88	12.39	6.74	2.45	16.00	15.97
1919	9.4514	41,052	12,240	39.48	10.17	13.44	15.87	12.23	6.45	2.22	16.19	16.44
1920	8.1618	41,909	10,918	38.10	10.63	13.01	14.46	10.95	5.37	1.67	14.71	14.86
1921	9.1398	42,835	9,636	42.86	12.40	14.98	15.47	11.60	5.60	1.69	15.63	15.65
1922	9.7543	43,543	10,875	42.95	11.90	14.76	16.29	12.38	6.17	2.01	16.68	17.09
1923	9.5818	44,409	12,096	40.59	11.64	13.96	14.99	11.32	5.50	1.75	15.32	15.68
1924	9.5627	45,384	11,951	43.26	12.34	14.61	16.32	12.42	6.14	2.01	16.85	17.47
1925	9.3295	46,190	12,073	44.17	11.70	14.86	17.60	13.41	6.75	2.35	18.72	20.36
1926	9.2371	46,940	12,199	44.07	11.32	14.74	18.01	13.75	7.07	2.54	18.78	20.00
1927	9.4160	47,723	12,291	44.67	11.23	14.75	18.68	14.33	7.47	2.76	19.60	21.14
1928	9.5400	48,445	12,542	46.09	11.32	15.17	19.60	15.17	8.19	3.23	21.27	24.14
1929	9.5400	49,085	13,076	43.76	10.71	14.63	18.42	14.21	7.62	3.01	19.90	22.51
1930	9.7846	49,750	11,848	43.07	11.89	14.76	16.42	12.42	6.40	2.39	16.76	17.27
1931	10.7288	50,462	10,750	44.40	13.39	15.74	15.27	11.32	5.68	2.07	15.41	15.52
1932	11.9607	51,117	9,041	46.30	13.71	17.11	15.48	11.55	5.90	1.93	15.57	15.56
1933	12.6035	51,757	8,805	45.03	12.54	16.72	15.77	11.78	6.05	2.04	16.12	16.49
1934	12.1891	52,430	9,671	45.16	12.16	17.13	15.87	11.80	5.82	1.92	16.02	16.41
1935	11.8918	53,147	10,472	43.39	12.40	15.36	15.63	11.67	5.80	1.95	16.00	16.71
1936	11.7740	53,844	11,493	44.77	12.12	15.02	17.64	13.37	6.69	2.23	18.23	19.36
1937	11.3649	54,539	12,053	43.35	11.97	14.93	16.45	12.42	6.16	2.02	16.69	17.17
1938	11.5850	55,342	11,086	43.00	12.82	15.45	14.73	10.82	5.16	1.67	15.05	15.78

Year												
1939	16.20	15.66	1.74	5.45	11.37	15.39	15.89	13.28	44.57	11,812	56,181	11.7495
1940	16.50	15.97	1.77	5.57	11.66	15.73	15.55	13.14	44.43	12,367	57,115	11.6332
1941	15.81	15.25	1.63	5.29	11.15	15.01	14.01	12.00	41.02	14,455	57,392	11.0792
1942	13.44	13.07	1.32	4.48	9.60	12.91	12.20	10.39	35.49	16,794	57,736	10.0083
1943	12.33	11.80	0.97	3.78	8.43	11.48	11.54	9.65	32.67	19,420	58,250	9.4329
1944	11.30	10.82	0.92	3.33	7.60	10.54	11.22	9.79	31.55	20,568	58,656	9.2752
1945	12.58	11.67	0.84	3.32	7.87	11.07	11.83	9.74	32.64	20,102	58,997	9.0667
1946	13.41	12.36	0.92	3.43	8.28	11.76	12.90	9.96	34.62	19,025	59,297	8.3564
1947	12.05	11.34	0.90	3.24	7.71	10.95	12.35	9.72	33.02	18,257	60,118	7.3045
1948	12.31	11.64	0.95	3.44	8.03	11.27	12.43	10.02	33.72	18,579	60,825	6.7760
1949	11.78	11.24	0.95	3.34	7.77	10.95	12.52	10.30	33.76	18,353	61,537	6.8445
1950	12.89	11.98	0.83	3.53	8.14	11.36	12.51	10.00	33.87	19,809	62,446	6.7767
1951	11.86	11.05	0.87	3.12	7.41	10.52	12.15	10.15	32.82	20,410	63,060	6.2805
1952	10.85	10.19	0.75	2.76	6.81	9.76	12.09	10.23	32.07	21,059	63,684	6.1453
1953	9.94	9.41	0.67	2.51	6.26	9.08	11.93	10.37	31.38	21,987	64,273	6.0966
1954	10.83	9.97	0.71	2.57	6.47	9.39	12.17	10.56	32.12	21,720	64,928	6.0662
1955	11.11	9.97	0.72	2.49	6.28	9.18	12.20	10.39	31.77	23,219	65,589	6.0906
1956	10.74	9.75	0.68	2.38	6.14	9.09	12.26	10.46	31.81	24,425	66,257	6.0006
1957	10.21	9.47	0.66	2.36	6.08	8.98	12.19	10.52	31.69	24,528	66,947	5.7921
1958	10.28	9.42	0.64	2.29	5.94	8.83	12.43	10.85	32.11	23,783	67,546	5.6398
1959	10.74	9.58	0.62	2.19	5.90	8.75	12.28	11.01	32.03	25,186	68,144	5.5950
1960	10.10	9.07	0.60	2.10	5.52	8.36	12.15	11.15	31.66	25,500	68,681	5.5069
1961	10.73	9.32	0.59	2.05	5.41	8.34	12.57	10.99	31.90	25,802	69,997	5.4524
1962	10.02	8.98	0.56	1.98	5.40	8.27	12.67	11.10	32.04	26,679	71,254	5.3931
1963	9.99	8.93	0.57	1.96	5.33	8.16	12.73	11.11	32.01	27,369	72,464	5.3291
1964	10.53	9.15	0.53	1.97	5.33	8.02	12.60	11.02	31.64	28,680	73,660	5.2607
1965	10.95	9.35	0.54	2.04	5.42	8.07	12.63	10.82	31.52	29,828	74,772	5.1728
1966	10.28	9.52	0.60	2.15	5.59	8.37	12.62	10.99	31.98	31,136	75,831	5.0270
1967	10.85	9.94	0.60	2.16	5.63	8.43	12.65	10.97	32.05	31,954	76,856	4.8853
1968	11.36	10.20	0.58	2.15	5.58	8.35	12.62	11.01	31.98	33,002	77,826	4.6884
1969	10.46	9.50	0.55	2.00	5.30	8.02	12.66	11.14	31.82	33,506	78,793	4.4482
1970	9.09	8.50	0.53	1.94	5.16	7.80	12.58	11.13	31.51	33,637	79,924	4.2004
1971	9.48	8.73	0.52	1.91	5.12	7.79	12.71	11.26	31.75	33,543	81,849	4.0234
1972	9.73	8.78	0.52	1.92	5.10	7.75	12.62	11.25	31.62	34,941	83,670	3.8986
1973	9.27	8.44	0.50	1.89	5.07	7.74	12.83	11.28	31.85	35,679	85,442	3.6710
1974	9.21	8.61	0.56	2.11	5.41	8.12	12.91	11.32	32.36	34,623	87,228	3.3072
1975	8.97	8.45	0.56	2.04	5.31	8.01	13.02	11.60	32.62	32,807	89,127	3.0314

TABLE II *Continued*

Year	Inflation CPI (p(1998)/p(n))	# tax units (thousands)	Average income (1998 $)	Top income shares (excluding capital gains)							Capital gains included	
				P90–100	P90–95	P95–99	P99–100	P99.5–100	P99.9–100	P99.99–100	Share only P99–100	Rank and share P99–100
	(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1976	2.8652	91,048	33,587	32.42	11.57	12.96	7.89	5.23	2.02	0.56	8.43	8.97
1977	2.6903	93,076	33,924	32.43	11.60	12.93	7.90	5.25	2.04	0.57	8.46	9.12
1978	2.5003	95,213	34,560	32.44	11.58	12.91	7.95	5.30	2.08	0.58	8.47	9.06
1979	2.2464	97,457	34,018	32.35	11.52	12.80	8.03	5.38	2.16	0.62	9.11	10.08
1980	1.9792	99,625	32,428	32.87	11.70	12.99	8.18	5.51	2.23	0.65	9.27	10.15
1981	1.7944	101,432	31,763	32.72	11.75	12.94	8.03	5.42	2.23	0.66	9.03	10.12
1982	1.6897	103,250	31,310	33.22	11.82	13.01	8.39	5.73	2.45	0.77	9.85	10.89
1983	1.6373	105,067	31,318	33.69	11.91	13.19	8.59	5.94	2.61	0.87	10.42	11.71
1984	1.5698	106,871	32,401	33.95	11.85	13.21	8.89	6.22	2.83	0.98	10.76	12.14
1985	1.5152	108,736	32,938	34.25	11.87	13.28	9.09	6.39	2.91	0.97	11.24	12.84
1986	1.4870	110,684	33,362	34.57	11.98	13.46	9.13	6.38	2.87	1.00	13.40	16.22
1987	1.4353	112,640	34,328	36.48	11.99	13.74	10.75	7.76	3.73	1.30	11.84	12.76
1988	1.3788	114,656	35,862	38.63	11.68	13.78	13.17	9.96	5.21	1.99	14.73	15.58
1989	1.3156	116,759	35,607	38.47	11.81	14.05	12.61	9.37	4.74	1.74	13.90	14.58
1990	1.2482	119,055	35,174	38.84	11.78	14.07	12.98	9.71	4.90	1.83	13.88	14.40
1991	1.1979	120,453	34,137	38.38	11.95	14.26	12.17	8.90	4.36	1.61	12.76	13.40
1992	1.1630	121,944	34,345	39.82	11.94	14.40	13.48	10.11	5.21	2.02	14.30	14.74
1993	1.1291	123,378	33,633	39.48	12.07	14.59	12.82	9.45	4.72	1.74	13.77	14.33
1994	1.1005	124,716	34,107	39.60	12.09	14.65	12.85	9.45	4.70	1.73	13.72	14.31
1995	1.0705	126,023	34,971	40.19	12.08	14.77	13.33	9.87	4.94	1.80	14.43	15.06
1996	1.0394	127,625	35,682	40.95	11.98	15.11	13.85	10.18	5.31	2.10	15.01	16.57
1997	1.0160	129,301	37,046	41.25	11.97	14.96	14.32	10.79	5.73	2.34	15.80	17.87
1998	1.0000	130,945	38,739	41.44	12.02	14.83	14.58	11.14	6.04	2.57	16.37	18.91

Full details are in Appendix A of Piketty and Saez [2001]. Number of tax units is estimated. Total income is estimated from National Income Accounts. Top shares are obtained from income tax returns statistics and Pareto interpolation.

Top shares in columns (3) to (9) are based on individual gross income before individual taxes and excluding capital gains.

Column (10) displays top percentile (based on income excluding capital gains) share where capital gains are added back into the share computation.

Column (11) displays top percentile (based on income including capital gains) share where capital gains are added back into the share computation.

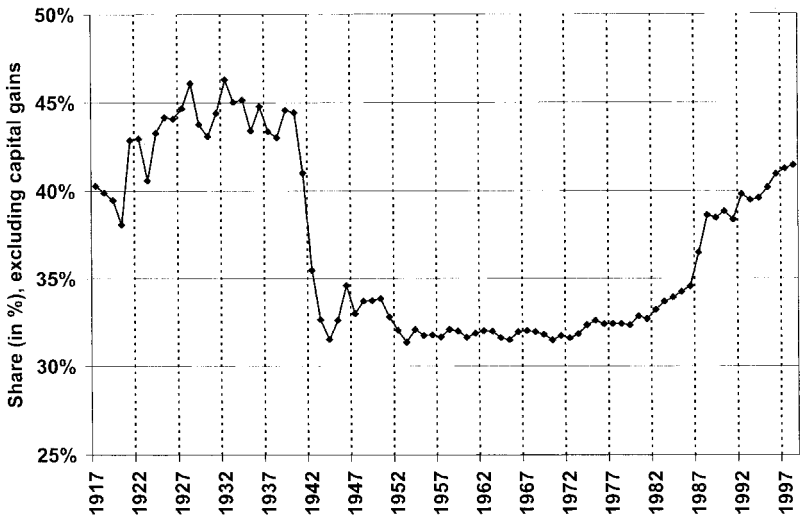*Source:* Tables A0 and A1 in Piketty and Saez [2001].

FIGURE I
The Top Decile Income Share, 1917–1998
Source: Table II, column P90–100.

although a bit lower. Therefore, the evidence suggests that the twentieth century decline in inequality took place in a very specific and brief time interval. Such an abrupt decline cannot easily be reconciled with a Kuznets-type process. The smooth increase in inequality in the last three decades is more consistent with slow underlying changes in the demand and supply of factors, even though it should be noted that a significant part of the gain is concentrated in 1987 and 1988 just after the Tax Reform Act of 1986 which sharply cut the top marginal income tax rates (we will return to this issue).

Looking at the bottom fractiles within the top decile (P90–95 and P95–99) in Figure II reveals new evidence. These fractiles account for a relatively small fraction of the total fluctuation of the top decile income share. The drop in the shares of fractiles P90–95 and P95–99 during World War II is less extreme than that for the top decile as a whole, and they start recovering from the World War II shock directly after the war. These shares do not increase much during the 1980s and 1990s (the P90–95 share was fairly stable, and the P95–99 share increased by about 2 percentage points while the top decile share increased by about 10 percentage points).
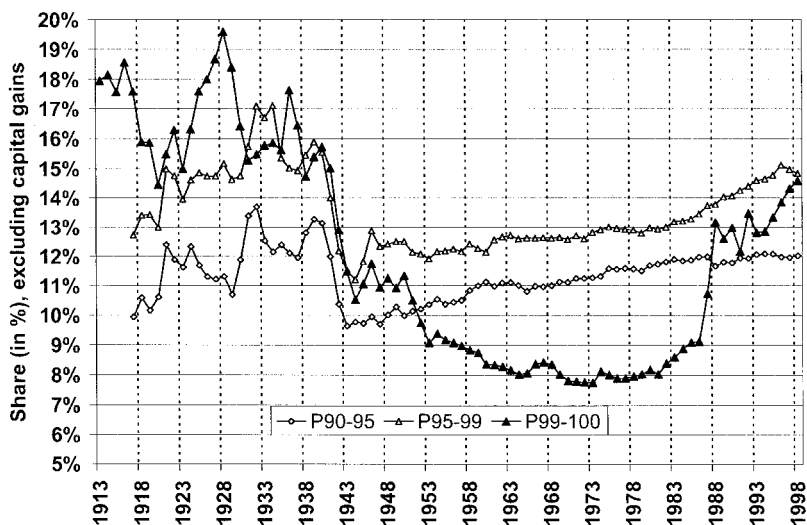
FIGURE II
The Income Shares of P90–95, P95–99, and P99–100, 1913–1998
Source: Table II, columns P90–95, P95–99, and P99–100.

In contrast to P90–95 and P95–99, the top percentile (P99–100 in Figure II) underwent enormous fluctuations over the twentieth century. The share of total income received by the top 1 percent was about 18 percent before World War I, but only about 8 percent from the late 1950s to the 1970s. The top percentile share declined during World War I and the postwar depression (1916 to 1920), recovered during the 1920s boom, and declined again during the Great Depression (1929 to 1932, and 1936 to 1938) and World War II. This highly specific timing for the pattern of top incomes, composed primarily of capital income (see below), strongly suggests that shocks to capital owners between 1914 and 1945 (depression and wars) played a key role. The depressions of the interwar period were far more profound in their effects than the post-World War II recessions. As a result, it is not surprising that the fluctuations in top shares were far wider during the interwar period than in the decades after the war.[15]

15. The fact that top shares are very smooth after 1945 and bumpy before is therefore not an artifact of an increase in the accuracy of the data (in fact, the data are more detailed before World War II than after), but reflects real changes in the economic conditions.

Figure II shows that the fluctuation of shares for P90–95 and P95–99 is exactly opposite to the fluctuation for P99–100 over the business cycle from 1917 to 1939. As shown below, the P90–95 and P95–99 incomes are mostly composed of wage income, while the P99–100 incomes are mostly composed of capital income. During the large downturns of the interwar period, capital income sharply fell while wages (especially for those near the top), which are generally rigid nominally, improved in relative terms. On the other hand, during the booms (1923–1929) and the recovery (1933–1936), capital income increased quickly, but as prices rose, top wages lost in relative terms.[16]

The negative effect of the wars on top incomes is due in part to the large tax increases enacted to finance them. During both wars, the corporate income tax (as well as the individual income tax) was drastically increased and this mechanically reduced the distributions to stockholders.[17] National Income Accounts show that during World War II, corporate profits surged, but dividend distributions stagnated mostly because of the increase in the corporate tax (that increased from less than 20 percent to over 50 percent) but also because retained earnings increased sharply.[18]

The decline in top incomes during the first part of the century is even more pronounced for higher fractiles within the top percentile, groups that could be expected to rely more heavily on capital income. As depicted in Figure III, the income share of the top 0.01 percent underwent huge fluctuations during the century. In 1915 the top 0.01 percent earned 400 times more than the average; in 1970 the average top 0.01 percent income was "only" 50 times the average; in 1998 they earned about 250 times the average income.

Our long-term series place the TRA86 episode in a longer term perspective. Feenberg and Poterba [1993, 2000], looking at the top 0.5 percent income shares series ending in 1992 (respectively, 1995), argued that the surge after TRA86 appeared permanent. However, completing the series up to 1998 shows that the significant increase in the top marginal tax rate, from 31 to

16. Piketty [2001a, 2001b] shows that exactly the same phenomenon is taking place in France during the same period.
17. During World War I, top income tax rates reached "modern" levels above 60 percent in less than two years. As was forcefully argued at that time by Mellon [1924], it is conceivable that large incomes found temporary ways to avoid taxation at a time when the administration of the Internal Revenue Service was still in its infancy.
18. Computing top shares for incomes before corporate taxes by imputing corporate profits corresponding to dividends received is an important task left for future research (see Goldsmith et al. [1954] and Cartter [1954] for such an attempt around the World War II period).
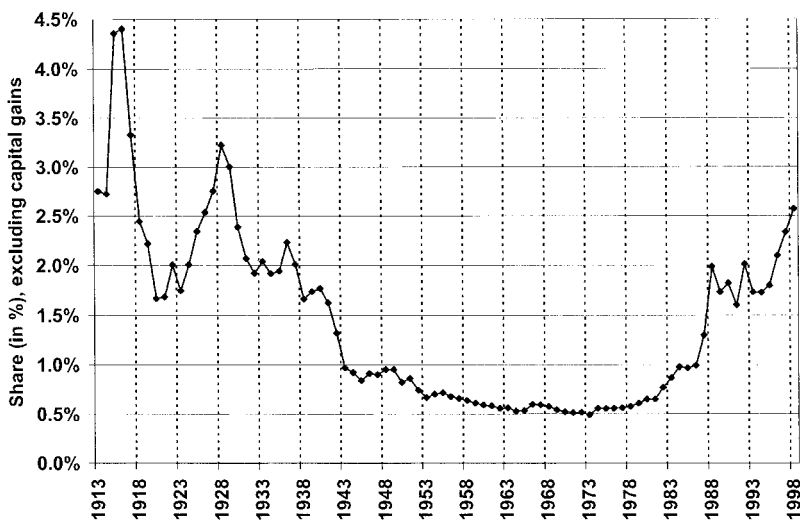
FIGURE III
The Top 0.01 Percent Income Share, 1913–1998
Source: Table II, column P99.99–100.

39.6 percent, enacted in 1993 on did not prevent top shares from increasing sharply.[19] From that perspective, looking at Figures II and III, the average increase in top shares from 1985 to 1994 is not significantly higher than the increase from 1994 to 1998 or from 1978 to 1984. As a result, it is possible to argue that TRA86 produced no permanent surge in top income shares, but only a transitory blip. The analysis of top wage shares in Section IV will reinforce this interpretation. In any case, the pattern of top income shares cannot be explained fully by the pattern of top income tax rates.

III. B. The Secular Decline of Top Capital Incomes

To demonstrate more conclusively that shocks to capital income were responsible for the large decline of top shares in the first part of the century, we look at the composition of income within the top fractiles. Table III reports the composition of income in top groups for various years from 1916 and 1998. Figure IV displays the composition of income for each fractile in

19. Slemrod and Bakija [2000] pointed out that top incomes have surged in recent years. They note that tax payments by taxpayers with AGI above $200,000 increased significantly from 1995 to 1997.

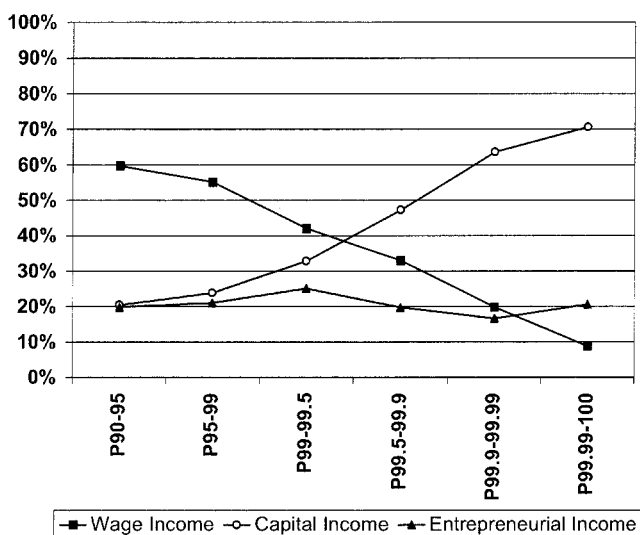TABLE III
INCOME COMPOSITION BY SIZE OF TOTAL INCOME, 1916–1998

	P90–95				P95–99				P99–99.5				P99.5–99.9				P99.9–99.99				P99.99–100			
	Wage	Entrep.	K inc.	K gains	Wage	Entrep.	K inc.	K gains	Wage	Entrep.	K inc.	K gains	Wage	Entrep.	K inc.	K gains	Wage	Entrep.	K inc.	K gains	Wage	Entrep.	K inc.	K gains
1916									35.0	38.4	26.6	1.1	26.9	37.4	35.7	2.8	13.8	31.4	54.7	4.2	5.6	24.3	70.1	4.0
1919	71.2	18.2	10.6	1.6	52.1	31.5	16.4	3.4	37.7	36.4	25.9	4.7	33.7	30.2	36.1	4.1	23.7	30.1	46.2	3.3	10.0	31.8	58.2	2.0
1924	58.1	23.5	18.4	2.3	48.5	29.2	22.3	2.7	43.6	27.9	28.4	4.9	34.6	23.7	41.7	5.5	23.6	18.9	57.5	6.3	12.4	13.5	74.1	7.0
1929	59.7	19.8	20.5	2.5	55.1	21.1	23.8	3.1	42.0	25.1	32.8	7.1	33.0	19.7	47.2	9.8	19.8	16.6	63.5	17.0	8.8	20.6	70.6	22.7
1934	74.5	15.0	10.6	0.3	65.9	16.5	17.6	0.9	60.9	18.0	21.1	1.2	46.2	19.8	34.0	1.9	31.2	15.8	53.1	2.5	15.6	9.2	75.1	1.6
1939	76.0	13.2	10.9	1.0	71.3	15.8	12.8	1.4	52.1	25.0	22.9	2.5	42.9	24.0	33.1	2.9	31.3	18.6	50.1	3.3	16.3	8.1	75.6	3.2
1944	87.9	9.1	3.0	0.8	65.6	26.0	8.4	2.1	37.7	46.6	15.7	3.0	32.7	47.8	19.5	3.3	25.7	47.9	26.4	4.4	12.5	39.6	47.9	6.8
1949	85.3	10.8	3.9	1.2	66.3	24.3	9.4	2.4	45.2	37.5	17.3	2.9	39.2	36.7	24.1	3.3	32.2	29.1	38.7	5.1	17.0	13.6	69.5	8.1
1954	84.5	11.4	4.1	0.6	72.7	19.2	8.1	3.7	46.0	36.8	17.2	5.1	40.7	36.5	22.8	5.7	33.5	26.6	39.9	12.4	18.2	11.5	70.3	17.2
1959	89.5	7.4	3.1	0.3	69.4	20.6	10.0	5.3	48.2	38.2	13.6	4.8	40.9	34.6	24.5	10.0	33.1	24.0	42.9	19.7	17.8	8.6	73.5	23.6
1964	86.2	8.6	5.2	2.7	71.6	19.1	9.3	4.9	52.6	31.4	16.1	12.1	42.4	31.8	25.8	12.0	34.2	23.0	42.8	19.9	12.6	3.2	84.2	32.6
1969	88.6	6.8	4.6	2.1	75.3	16.1	8.6	4.9	51.3	33.7	15.0	9.7	44.3	34.3	21.4	16.2	36.3	25.8	37.9	27.8	18.4	8.3	73.3	39.9
1974	86.9	6.6	6.5	1.4	74.3	15.5	10.3	2.6	56.7	27.3	16.0	5.1	51.2	27.4	21.4	7.0	40.8	24.0	35.2	10.2	22.9	18.3	58.8	14.2
1979	89.1	5.2	5.7	2.3	78.4	11.5	10.1	4.5	64.4	19.6	16.0	8.4	62.5	16.7	20.9	12.0	52.3	14.4	33.3	20.3	31.3	13.7	55.0	34.7
1984	88.9	3.2	6.8	3.0	81.8	6.3	11.9	4.5	71.9	9.6	18.5	11.6	71.2	8.4	20.4	18.7	64.1	4.4	31.5	29.9	32.6	28.2	39.2	33.3
1989	88.6	4.9	6.5	2.3	79.3	10.3	10.3	4.0	67.4	18.2	14.4	8.3	62.0	19.1	18.8	10.8	50.1	25.1	24.8	15.0	30.8	35.3	33.9	20.7
1994	91.1	5.0	3.9	1.9	82.9	10.8	6.3	3.0	71.1	20.0	8.8	5.4	64.3	23.1	12.6	8.3	50.7	31.9	17.4	11.5	32.7	43.6	23.7	13.5
1998	89.6	5.3	5.1	1.9	79.8	12.3	7.9	6.3	69.0	20.0	11.0	12.3	62.7	23.9	13.3	15.5	57.8	26.1	16.1	22.1	44.8	33.3	22.0	20.9

Fractiles are defined by size of total income (excluding capital gains). For each fractile, the first three columns (summing to 100 percent) give the percentage of wage income (wages and salaries), entrepreneurial income (self-employment income, partnership income, and small business income), and capital income (dividends, interest, and rents) in total income (excluding capital gains).

The fourth column displays the percentage of income (defined including capital gains) obtained by each of these fractiles (defined again by total income excluding capital gains) from capital gains. Details on methodology are presented in Appendix A of Piketty and Saez [2001].

Source: Computations are based on Individual Income Statistics and are reported in Tables A7 and A8, various rows, in Piketty and Saez [2001].
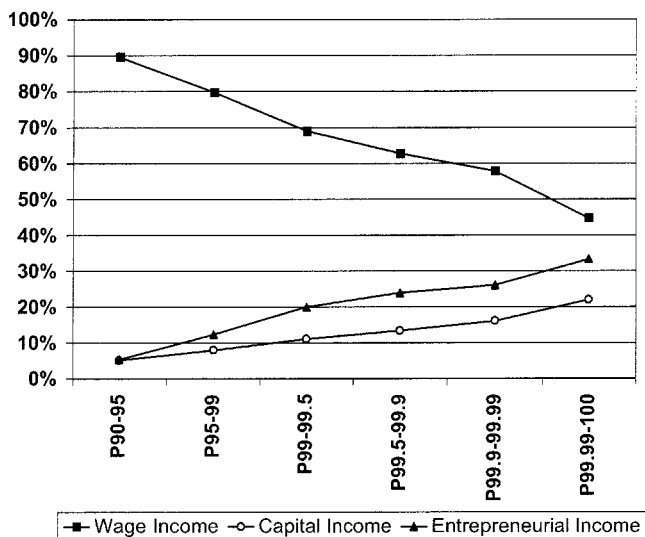
Panel A: 1929

Panel B: 1998

FIGURE IV

Income Composition of Top Groups within the Top Decile in 1929 and 1998

Capital income does not include capital gains.

Source: Table III, rows 1929 and 1998.

1929 (Panel A) and 1998 (Panel B). As expected, Panel A shows that the share of wage income is a declining function of income and that the share of capital income (dividends, interest, rents, and royalties) is an increasing function of income. The share of entrepreneurial income (self-employment, small businesses, and partnerships) is fairly flat. Thus, individuals in fractiles P90–95 and P95–99 rely mostly on labor income (capital income is less than 25 percent for these groups), while individuals in the top percentile derive most of their income in the form of capital income. Complete series in Piketty and Saez [2001] show that the sharply increasing pattern of capital income is entirely due to dividends. This evidence confirms that the very large decrease of top incomes observed during the 1914 to 1945 period was to a large extent a capital income phenomenon.

One might also be tempted to interpret the large upturn in top income shares observed since the 1970s as a revival of very high capital incomes, but this is not the case. As shown in Panel B, the income composition pattern has changed drastically between 1929 and 1998. In 1998 the share of wage income has increased significantly for all top groups. Even at the very top, wage income and entrepreneurial income form the vast majority of income. The share of capital income remains small (less than 25 percent) even for the highest incomes. Therefore, the composition of high incomes at the end of the century is very different from those earlier in the century. Before World War II, the richest Americans were overwhelmingly rentiers deriving most of their income from wealth holdings (mainly in the form of dividends). Occupation data by income bracket were published by the IRS in 1916. These data show that, at the very top, the vast majority of taxpayers reported themselves as "Capitalists: Investors and Speculators," while a small fraction reported themselves as salaried workers (see Piketty and Saez [2001], Table 3 for details). In contrast, in 1998 more than half of the very top taxpayers derive the major part of their income in the form of wages and salaries. Thus, today, the "working rich" celebrated by Forbes magazine have overtaken the "coupon-clipping rentiers."

The dramatic evolution of the composition of top incomes appears robust and independent from the erratic evolution of capital gains excluded in Figures I to IV. The last two columns of Table II display the top 1 percent share including realized capital gains. In column (10), in order to get around the lumpiness of realizations, individuals are ranked by income *excluding* capital
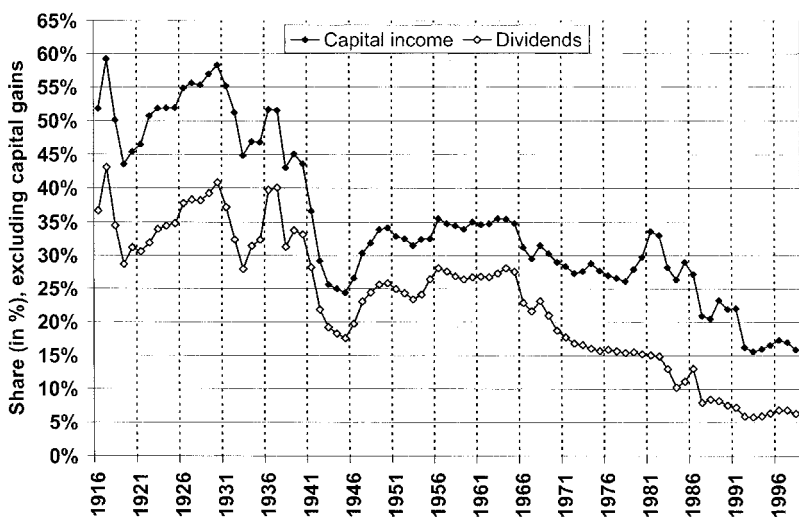
FIGURE V

The Capital Income Share in the Top 0.5 Percent, 1916–1998

Series display the share of capital income (excluding capital gains) and dividends in total income (excluding capital gains) for the top 0.5 percent income quantile.

Source: Authors' computations are based on income tax returns statistics (series reported in Piketty and Saez [2001], Table A7, column P99.5–100).

gains, but capital gains are added back into income to compute shares. In column (11) individuals are ranked by income including capital gains, and capital gains are added back into income to compute shares. These additional series show that including capital gains does not modify our main conclusion that very top income shares dropped enormously during the 1914–1945 period before increasing steadily in the last three decades.[20]

The decline of the capital income share is a very long-term phenomenon and is not limited to a few years and a few thousand tax units. Figure V shows a gradual secular decline of the share of capital income (again excluding capital gains realizations) and dividends in the top 0.5 percent fractile from the 1920s to the 1990s: capital income was about 55 percent of total income in the 1920s, 35 percent in the 1950s–1960s, and 15 percent in the

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20. It is interesting, however, to note that during the 1960s, when dividends were strongly tax disadvantaged relative to capital gains, capital gains do seem to represent a larger share in top incomes than during other periods such as the 1920s or late 1990s that also witnessed large increases in stock prices.

1990s. Sharp declines occurred during World War I, the Great Depression, and World War II. Capital income recovered only partially from these shocks in the late 1940s and started a steady decline in the mid-1960s. This secular decline is entirely due to dividends: the share of interest, rent, and royalties has been roughly flat while the dividend share has dropped from about 40 percent in the 1920s, to about 25 percent in the 1950s and 1960s, to less than 10 percent in the 1990s.[21]

Most importantly, the secular decline of top capital incomes is due to a decreased concentration of capital income rather than a decline in the share of capital income in the economy as a whole. As displayed in Figure VI, the National Income Accounts series show that the aggregate capital income share has not declined over the century. As is well-known, factor shares in the corporate sector have been fairly flat in the long run with the labor share around 70–75 percent, and the capital share around 25–30 percent (Panel A). The share of capital income in aggregate personal income is about 20 percent both in the 1920s and in the 1990s (Panel B). Similarly, the share of dividends was around 5 percent in the late 1990s and only slightly higher (about 6–7 percent) before the Great Depression. This secular decline is very small compared with the enormous fall of top capital incomes.[22] Contrary to a widely held view, dividends as a whole are still alive and well.[23]

It should be noted, however, that the ratio of total dividends reported on individual tax returns to personal dividends in National Accounts has declined continuously over the period 1927 to 1995, starting from a level close to 90 percent in 1927, declining slowly to 60 percent in 1988, and dropping precipitously to less than 40 percent in 1995. This decline is due mostly to the growth of funded pension plans and retirement saving accounts through which individuals receive dividends that are never reported as dividends on income tax returns. For the highest income earners,

21. Tax statistics by size of dividends analyzed in Piketty and Saez [2001] confirm a drastic decline of top dividend incomes over the century. In 1998 dollars, top 0.1 percent dividends earners reported on average about $500,000 of dividends in 1927 but less than $240,000 in 1995.
22. The share of dividends in personal income starts declining in 1940 because the corporate income tax increases sharply and permanently, mechanically reducing profits that can be distributed to stockholders.
23. As documented by Fama and French [2000], a growing fraction of firms never pay dividends (especially in the new technology industries, where firms often make no profit at all), but the point is that total dividend payments continue to grow at the same rate as aggregate corporate profits.

A. Factor shares in the corporate sector
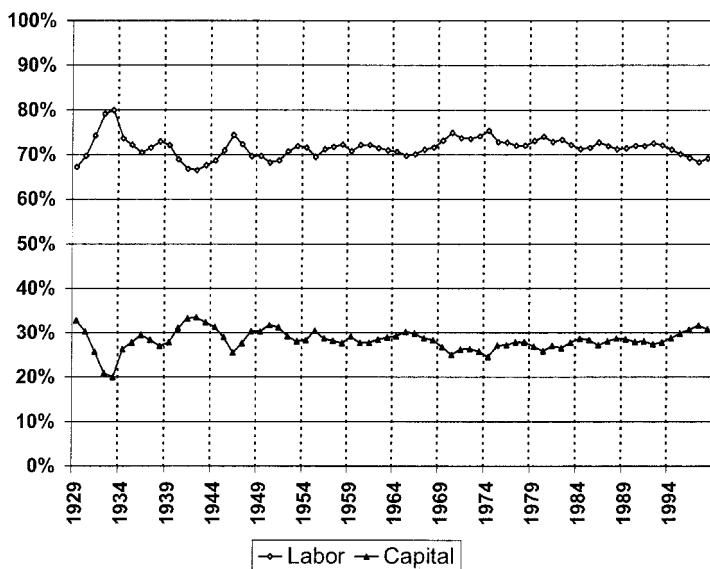
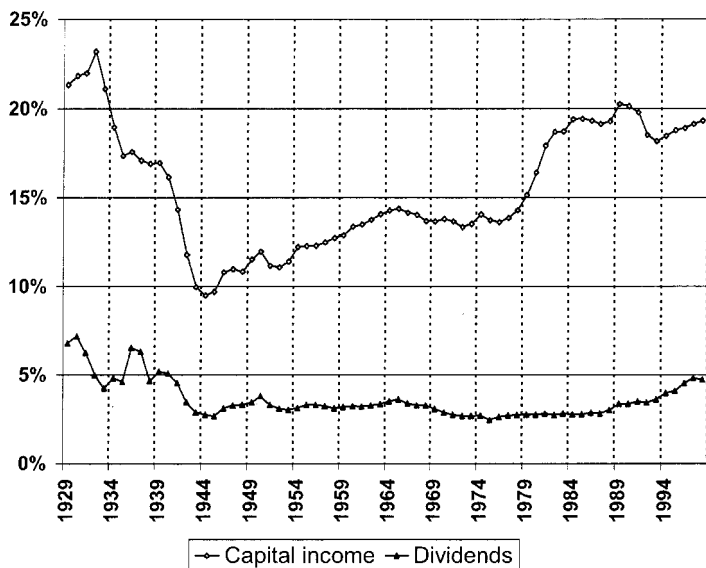## B. The capital income share in the personal income sector

FIGURE VI
Capital Income in the Corporate and Personal Sector, 1929–1998
Source: Authors' computations are based on National Income and Product Accounts.
Panel A from NIPA Table 1.16; consumption of fixed capital and net interest have been included in the capital share.
Panel B from NIPA Table 2.1; capital income includes dividends, interest, and rents.

this additional source of dividends is likely to be very small relative to dividends directly reported on tax returns.

Estate tax returns statistics (available since the beginning of the estate tax in 1916) are an alternative important source of data to analyze the evolution of large fortunes.[24] Lampman [1962] used these data to construct top 1 percent wealth shares for a few years between 1922 and 1956 using the estate multiplier method. We have constructed quasi-annual series of average levels (in 1998 dollars) of gross estates for various fractiles of decedents aged 25 and above (ranked by size of gross estate). Panel A in Figure VII displays the average level of gross estates for the top 0.01 percent of decedents from 1916 to 1997 (these are the largest 225 estates in 1997). Strikingly, the real value of the top estates in 1916 is about the same as in 1997, namely around $80 million, even though the GDP per capita grew by a factor of 3.5 during this period. Therefore, the biggest fortunes have in fact substantially declined in relative terms.[25] To emphasize this point, Panel B displays the evolution of average estates in lower fractiles. The average estate in P98–99 has grown by a factor 3 between 1916 and 1997, and the average estate in P99–99.5 has been multiplied by about 2.5. This evidence is consistent with our previous results on the decline in top capital incomes over the century. Popular accounts suggest that estate tax evasion is very important [Cooper 1979], but academics disagree about the extent of tax evasion [Poterba 2000]. Furthermore, our results would be invalidated only if the level of tax evasion had increased over time much more for the largest estates (top 0.01 percent) than for large estates.

III. C. Proposed Interpretation: The Role of Progressive Taxation

How can we explain the steep secular decline in capital income concentration? It is easy to understand how the macro-economic shocks of the Great Depression and the fiscal shocks of World War I and World War II have had a negative impact on capital concentration. The difficult question to answer is why large fortunes did not recover from these shocks. The most nat-

24. In particular, capital gains not realized before death are never reported on income tax returns, but are included in the value of assessed estates.
25. It is important to keep in mind that estate data reflect the wealth distribution of decedents and thus probably introduce a long lag relative to the current wealth distribution.

A. Average estate of top 0.01% decedents
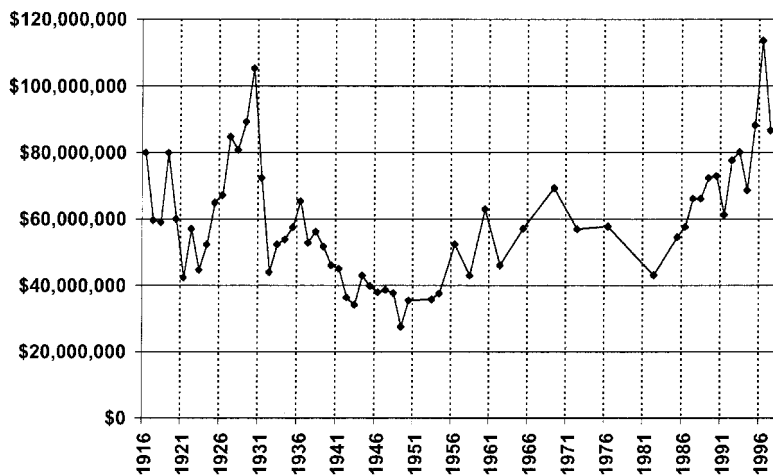
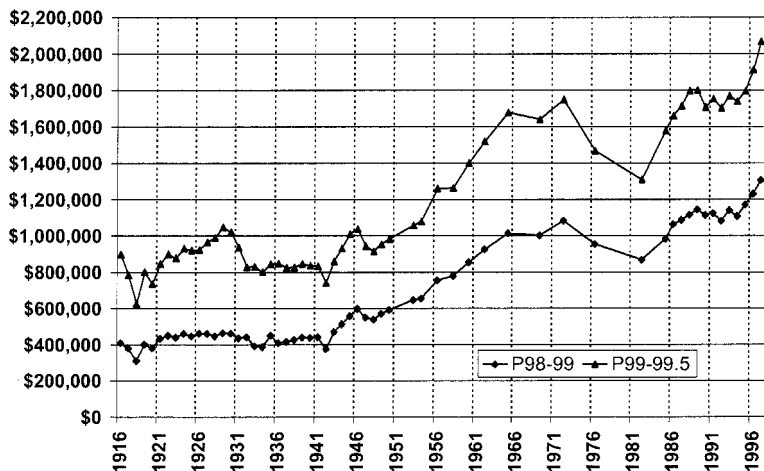**B. Average estate of P98-99 and P99-99.5 decedents**

FIGURE VII
Evolution of Estates (in real 1998 dollars), 1916–1997
Source: Authors' computations are based on estate tax returns statistics [Piketty and Saez 2001, Appendix C, Table C3].
Series report real value of gross estates before deductions (in 1998 dollars) for fractiles P99.99–100 (Panel A) and P98–99, P99–99.5 (Panel B) of decedents aged 25 and above.

ural and realistic candidate for an explanation seems to be the creation and the development of the progressive income tax (and of the progressive estate tax and corporate income tax). The very large fortunes that generated the top 0.01 percent incomes observed at the beginning of the century were accumulated during the nineteenth century, at a time where progressive taxes hardly existed and capitalists could dispose of almost all their income to consume and to accumulate.[26] The fiscal situation faced by capitalists in the twentieth century to recover from the shocks incurred during the 1914 to 1945 period has been substantially different. Top tax rates were very high from the end of World War I to the early 1920s, and then continuously from 1932 to the mid-1980s. Moreover, the United States has imposed a sharply progressive estate tax since 1916, and a substantial corporate income tax ever since World War II.[27] These very high marginal rates applied to only a very small fraction of taxpayers, but created a substantial burden on the very top income groups (such as the top 0.1 percent and 0.01 percent) composed primarily of capital income. In contrast to progressive labor income taxation, which simply produces a level effect on earnings through labor supply responses, progressive taxation of capital income has cumulative or dynamic effects because it reduces the net return on wealth which generates tomorrow's wealth.

It is difficult to prove in a rigorous way that the dynamic effects of progressive taxation on capital accumulation and pretax income inequality have the right quantitative magnitude and account for the observed facts. One would need to know more about the savings rates of capitalists—how their accumulation strategies have changed since 1945. The orders of magnitude do not seem unrealistic, especially if one assumes that the owners of large fortunes, whose pretax incomes were already severely hit by the prewar shocks, were not willing to reduce their consumption to very low levels. Piketty [2001a, 2001b] provides simple numerical simulations showing that for a fixed saving rate, introducing substantial capital income taxation has a tremendous effect on the time needed to reconstitute large wealth holdings after negative shocks. Moreover, reduced savings in response to a reduction in the after-tax rate of return on wealth would accelerate the

26. During the nineteenth century, the only progressive tax was the property tax, but its level was low (see Brownlee [2000] for a detailed description).
27. From 1909 (first year the corporate tax was imposed) to the beginning of World War II, the corporate tax rate was low, except during World War I.

decrease in wealth inequality. Piketty [2001b] shows that in the classic dynastic model with infinite horizon, any positive capital income tax rate above a given high threshold of wealth will eventually eliminate all large wealth holdings without, however, affecting the total capital stock in the economy.

We are not the first to propose progressive taxation as an explanation for the decrease in top shares of income and wealth. Lampman [1962] did as well, and Kuznets [1955] explicitly mentioned this mechanism as well as the shocks incurred by capital owners during the 1913 to 1948 period, before presenting his inverted U-shaped curve theory based on technological change. Explanations pointing out that periods of technological revolutions such as the last part of the nineteenth century (industrial revolutions) or the end of the twentieth century (computer revolution) are more favorable to the making of fortunes than other periods might also be relevant.[28] Our results suggest that the decline in income tax progressivity since the 1980s and the projected repeal of the estate tax might again produce in a few decades levels of wealth concentration similar to those at the beginning of the century.

IV. TOP WAGE SHARES

Table IV displays top wage shares from 1927 to 1998 constructed using IRS tabulations by size of wages. There are three caveats to note about these long-term wage inequality series. First, self-employment income is not included in wages, and therefore our series focus only on wage income inequality. As self-employment income has been a decreasing share of labor income over the century, it is conceivable that the pool of wage and salary earners has substantially evolved over time, and that total labor income inequality series would differ from our wage inequality series. Second and related, large changes in the wage force due to the business cycle and wars might affect our series through compositional effects because we define the top fractiles relative to the total number of tax units with *positive* wage income. As can be seen in column (1) of Table II, the number of tax units with wages declined during the Great Depression due to

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28. De Long [1998] also points out the potential role of antitrust law. According to De Long, antitrust law was enforced more loosely before 1929 and since 1980 than between 1929 and 1980.

high levels of unemployment, increased sharply during World War II because of the increase in military personnel, and decreased just after the war. We show in Piketty and Saez [2001, Appendix B3] that these entry effects do not affect top shares when the average wage of the new entrants is equal to about 50 percent of the average wage. This condition is approximately satisfied for military personnel in World War II, and thus top wage shares including or excluding military personnel during World War II are almost identical. Third, our wage income series are based on the tax unit and not the individual. As a result, an increase in the correlation of earnings across spouses, as documented in Karoly [1993], with no change in individual wage inequality, would generate an increase in tax unit wage inequality.[29]

Figure VIII displays the wage share of the top decile, and Figure IX displays the wage shares of the P90–95, P95–99, and P99–100 groups from 1927 to 1998. As for overall income, the pattern of top decile wage share over the century is also U-shaped. There are, however, important differences that we describe below. It is useful to divide the period from 1927 to 1998 into three subperiods: the pre-World War II period (1927 to 1940), the war and postwar period (1941 to 1969), and the last three decades (1970 to 1998). We analyze each of these periods in turn.

IV. A. Wage Inequality Stability before World War II

Top wage shares show a striking stability from 1927 to 1940. This is especially true for the top percentile. In contrast to capital income, the Great Depression did not produce a reduction in top wage shares. On the contrary, the high middle class fractiles benefited in relative terms from the Great Depression. Even though the IRS has not published tables on wage income over the period 1913 to 1926, we can use an indirect source of evidence to document trends in top wage shares. Corporation tax returns require each corporation to report separately the sum of salaries paid to its officers. This statistic, compensation of officers, is reported quasi-annually by the IRS starting in 1917. We report in Figure X the total compensation of officers reported on corporate tax returns divided by the total wage bill in the economy from

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29. This point can be analyzed using the Current Population Surveys available since 1962 which allow the estimation of wage inequality series both at the individual and tax unit level.

TABLE IV
TOP WAGE INCOME SHARES, 1927–1998

	# tax units with wages (thousands)	Average wage income (1998 $)	Top wage income shares					
			P90–100	P90–95	P95–99	P99–100	P99.5–100	P99.9–100
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1927	33,953	12,225	27.89	9.04	10.20	8.65	6.08	2.53
1928	34,197	12,506	29.11	9.33	10.91	8.87	6.20	2.59
1929	35,425	12,769	29.24	9.49	11.09	8.67	6.08	2.56
1930	33,266	12,705	28.63	9.40	10.69	8.54	5.99	2.56
1931	30,386	12,838	29.34	9.65	11.22	8.47	5.81	2.45
1932	27,117	12,395	30.28	10.61	11.39	8.29	5.66	2.37
1933	28,491	11,824	30.08	10.27	11.50	8.31	5.77	2.45
1934	31,565	12,010	29.77	9.83	11.64	8.31	5.76	2.37
1935	32,790	12,274	30.31	10.19	11.72	8.40	5.85	2.40
1936	35,608	12,797	29.70	9.75	11.35	8.60	6.02	2.45
1937	36,654	13,208	30.06	10.01	11.64	8.41	5.89	2.41
1938	35,205	13,003	29.83	10.18	11.53	8.13	5.74	2.36
1939	36,413	13,633	30.65	10.59	11.86	8.20	5.70	2.32
1940	38,087	13,998	30.85	10.78	11.70	8.37	5.84	2.39
1941	41,889	15,024	29.33	10.29	10.94	8.11	5.75	2.39
1942	45,891	16,362	27.08	9.63	10.24	7.21	5.12	2.18
1943	51,108	17,821	25.88	9.62	9.83	6.42	4.51	1.86
1944	51,928	18,924	24.61	9.48	9.56	5.56	3.84	1.56
1945	50,210	19,178	24.05	9.05	9.27	5.73	3.96	1.57
1946	44,370	18,854	25.10	8.92	9.79	6.40	4.33	1.68
1947	44,582	18,006	24.97	8.90	9.80	6.27	4.23	1.60
1948	45,275	17,891	25.03	8.90	9.92	6.21	4.20	1.58
1949	44,088	18,310	25.00	8.95	9.93	6.12	4.11	1.54
1950	45,592	19,033	25.18	9.06	9.89	6.24	4.21	1.57
1951	48,858	19,103	24.71	9.08	9.66	5.97	4.00	1.48
1952	49,963	19,769	24.43	9.01	9.67	5.74	3.78	1.39
1954	49,144	20,850	24.13	8.88	9.65	5.61	3.65	1.32
1956	51,632	22,584	24.53	8.96	10.02	5.56	3.57	1.26
1958	50,153	22,741	24.67	9.07	10.20	5.40	3.43	1.20
1960	52,554	23,970	25.23	9.51	10.46	5.26	3.31	1.14
1961	51,946	24,321	25.21	9.58	10.44	5.20	3.26	1.11
1962	53,338	24,999	25.22	9.60	10.47	5.16	3.24	1.09
1964	55,216	26,411	25.15	9.72	10.31	5.12	3.24	1.07
1966	60,358	27,370	25.34	9.87	10.31	5.16	3.27	1.11
1967	61,571	27,777	25.77	9.97	10.47	5.34	3.38	1.14
1968	62,836	28,511	25.60	9.95	10.42	5.24	3.32	1.12
1969	64,371	28,871	25.71	10.03	10.49	5.19	3.27	1.10
1970	63,778	29,046	25.67	10.03	10.51	5.13	3.21	1.06
1971	63,194	29,558	25.67	10.00	10.49	5.18	3.25	1.08
1972	64,750	30,520	25.81	10.02	10.47	5.32	3.38	1.14
1973	67,614	30,532	26.14	10.09	10.63	5.42	3.43	1.14
1974	68,518	29,497	26.61	10.14	10.81	5.66	3.63	1.26
1975	66,671	29,039	26.46	10.15	10.68	5.64	3.63	1.26
1976	68,459	29,490	26.66	10.16	10.76	5.74	3.70	1.30

TABLE IV (CONTINUED)
TOP WAGE INCOME SHARES, 1927–1998

	# tax units with wages (thousands)	Average wage income (1998 $)	Top wage income shares					
			P90–100	P90–95	P95–99	P99–100	P99.5–100	P99.9–100
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1977	70,898	29,574	26.94	10.24	10.84	5.86	3.79	1.35
1978	74,503	29,571	27.43	10.36	11.02	6.06	3.93	1.40
1979	77,038	28,774	27.63	10.39	11.03	6.22	4.06	1.47
1980	76,913	27,712	28.06	10.47	11.17	6.43	4.23	1.57
1981	77,439	27,436	28.14	10.49	11.23	6.43	4.24	1.59
1982	75,771	27,539	28.55	10.53	11.35	6.67	4.42	1.67
1983	76,260	27,988	29.09	10.59	11.54	6.96	4.66	1.80
1984	80,008	28,235	29.61	10.66	11.68	7.27	4.93	1.99
1985	81,936	28,573	29.74	10.70	11.77	7.28	4.92	1.98
1986	83,340	29,183	29.94	10.76	11.86	7.33	4.96	2.02
1987	85,618	29,423	30.59	10.61	11.83	8.15	5.68	2.43
1988	88,121	29,691	31.95	10.58	11.99	9.39	6.79	3.16
1989	90,145	29,293	31.53	10.70	12.13	8.69	6.12	2.69
1990	91,348	29,107	31.79	10.66	12.14	8.99	6.41	2.87
1991	89,813	29,008	31.43	10.66	12.21	8.56	5.97	2.57
1992	89,883	29,463	32.45	10.60	12.22	9.63	6.97	3.33
1993	91,279	29,387	31.85	10.56	12.23	9.05	6.41	2.90
1994	93,270	29,427	31.54	10.59	12.22	8.72	6.07	2.63
1995	95,388	29,558	32.43	10.70	12.48	9.25	6.52	2.91
1996	97,338	29,707	32.98	10.51	12.78	9.73	6.90	3.21
1997	100,161	30,343	33.65	10.46	12.87	10.37	7.45	3.66
1998	103,053	31,422	34.19	10.58	12.80	10.88	7.95	4.13

Number of tax units with positive wages (full-time and part-time employees less married women employees) are estimated from Census data and National Income Accounts.

Total wage income is from National Income Accounts (employment income less employers' contributions).

Top shares are obtained from tax returns tabulations (individual income tax statistics) by size of wages and Pareto interpolation. Complete details on methodology are in Appendix B of Piketty and Saez [2001], and complete series are reported in Tables B1 and B2.

1917 to 1960 along with the shares of the P99.5–100 and P99–99.9 wage groups which are close in level to the share of officer compensation. From 1927 to 1960, officer compensation share and these fractiles shares track each other relatively closely. Therefore, the share of officer compensation from 1917 to 1927 should be a good proxy as well for these top wage shares. This indirect evidence suggests that the top share of wages was also roughly constant, or even slightly increasing from 1917 to 1926.

Previous studies have suggested that wage inequality has been gradually decreasing during the first half of the twentieth century (and in particular during the interwar period) using
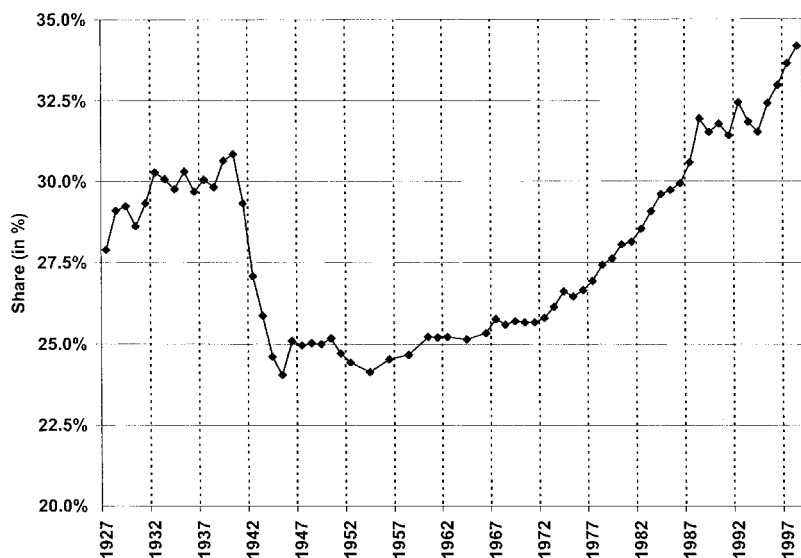
FIGURE VIII
The Top Decile Wage Income Share, 1927–1998
Source: Table IV, column P90–100.

series of wage ratios between skilled and unskilled occupations
(see, e.g., Keat [1960] and Williamson and Lindert [1980]). How-
ever, it is important to recognize that a decrease in the ratio of
skilled over unskilled wages does not necessarily imply an overall
compression of wage income inequality, let alone a reduction in
the top wage shares. Given the continuous rise in the numerical
importance of white-collar jobs, it is natural to expect that the
ratios of high-skill wages to low-skill wages would decline over
time, even if wage inequality measured in terms of shares of top
fractiles of the complete wage distribution does not change.[30]
Goldin and Katz [1999] have recently presented new series of
white-collar to blue-collar earnings ratios from the beginning of
the twentieth century to 1960, and they find that the decrease in
pay ratio is concentrated only in the short periods of the two
world wars. Whether or not the compression of wages that oc-

30. For instance, Piketty [2001a] reports a long-run compression (both from
1900 to 1950 and from 1950 to 1998) of the ratio of the average wage of managers
over the average wage of production workers in France, even though wage in-
equality (measured both in terms of top fractiles wage shares and in terms of
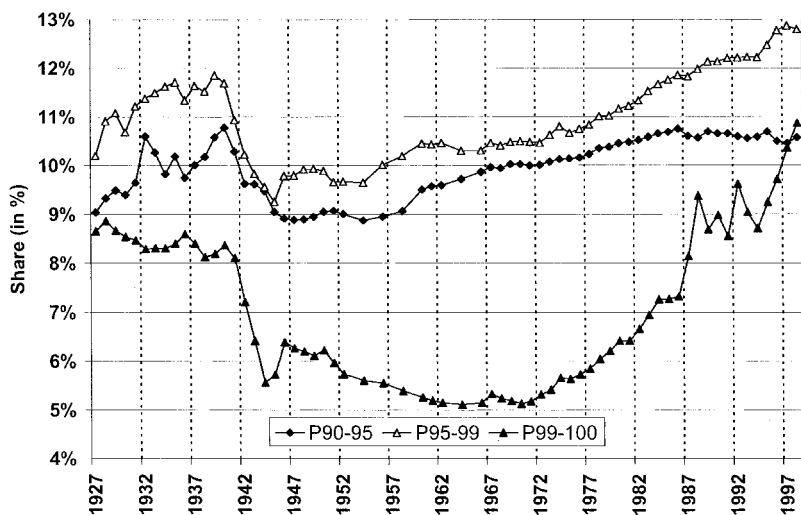P90/P10-type ratios) was constant in the long run.

FIGURE IX

Wage Income Shares for P90–95, P95–99, and P99–100, 1927–1998
Source: Table IV, columns P90–95, P95–99, and P99–100.

curred during World War I was fully reversed during the 1920s in the United States is still an open question.[31]

IV. B. *Sharp Drop in Inequality during World War II with No Recovery*

In all of our wage shares series, there is a sharp drop during World War I from 1941 to 1945.[32] The higher the fractile, the greater is the decrease. The share of P90–95 declines by 16 percent between 1940 and 1945, but the share of the top 1 percent declines by more than 30 percent, and the top 0.1 percent by almost 35 percent during the same period (Table IV). This sharp compression of high wages can fairly easily be explained by the wage controls of the war economy. The National War Labor

31. Tax return data available for France make it possible to compute wage inequality series starting in 1913 (as opposed to 1927 in the United States). By using these data, Piketty [2001a, 2001b] found that wage inequality in France (measured both in terms of top wage shares and in terms of P90/P10 ratios) declined during World War I but fully recovered during the 1920s, so that overall wage inequality in 1930 or 1940 was the same as in 1913. Another advantage of the French wage data is that they are always based upon individual wages (as opposed to total tax unit wages in the United States).

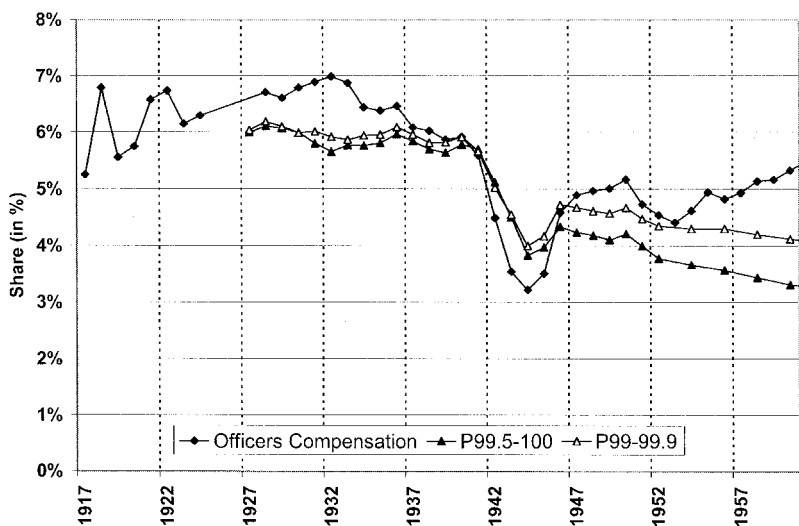32. Note that for fractiles below the top percentile, the drop starts from 1940 to 1941.

FIGURE X

Shares of Officers' Compensation and Wages Shares P99.5–100 and P99–99.9,
1917–1960

Source: Officers' compensation from authors' computations are based on corporate income tax returns (Table B1, column Officers' compensation in Piketty and Saez [2001]), and Table IV, columns P99.5–100, and P99–99.5 + P99.5–99.9.

Board, established in January 1942 and dissolved in 1945, was responsible for approving all wage changes and made any wage increase illegal without its approval. Exceptions to controls were more frequently granted to employees receiving low wages.[33] Lewellen [1968] has studied the evolution of executive compensation from 1940 to 1963, and his results show strikingly that executive salaries were frozen in nominal terms from 1941 to 1945 consistent with the sharp drop in top wage shares that we find.

The surprising fact, however, is that top wage shares did not recover after the war. A partial and short-lived recovery can be seen for all groups, except the very top. But the shares never recover more than one-third of the loss incurred during World War II. Moreover, after a short period of stability in the late 1940s, a second phase of compression takes place in the top percentile. This compression phase is longer and most pronounced the higher the fractile. While the fractiles P90–95 and P95–99 hardly suffer from a second compression phase and start

33. See Goldin and Margo [1992] for a more detailed description.

recovering just after the war, the top group's shares experience a substantial loss from 1950 to the mid-1960s. The top 0.1 percent share for example declines from 1.6 percent in 1950 to 1.1 percent in 1964 (Table IV).

The overall drop in top wage shares, although important, is significantly lower than the overall drop in top income shares. The top 1 percent income share dropped from about 18–19 percent before World War I and in the late 1920s to about 8 percent in the late 1950s (Figure II), while the top 1 percent wage share dropped from about 8.5 percent in the 1920s to about 5 percent in the late 1950s (Figure IX). This confirms that capital income played a key role in the decline of top income shares during the first half of the century.

IV. C. *The Increase in Top Shares since the 1970s*

Many studies have documented the increase in inequality in the United States since the 1970s (see, e.g., Katz and Murphy [1992]). Our evidence on top shares is consistent with this evidence. After the World War II compression, the fractiles P90–95 and P95–99 recovered slowly and continuously from the 1950s to the 1990s, and reached the pre–World War II level in the beginning of the 1980s. As described above, the recovery process for groups within the top percentile did not begin until the 1970s and was much faster. In accordance with results obtained from the March Current Population Surveys [Katz and Murphy 1992; Katz and Autor 1999], we find that wage inequality, measured by top fractile wage shares, starts to increase in the early 1970s. This is in contrast to results from the May Current Population Surveys [DiNardo, Fortin, and Lemieux 1996] suggesting that the surge in wage inequality is limited to the 1980s.

From 1970 to 1984 the top 1 percent share increased steadily from 5 percent to 7.5 percent (Figure IX). From 1986 to 1988 the top shares of wage earners increased sharply, especially at the very top (for example, the top 1 percent share jumps from 7.5 percent to 9.5 percent). This sharp increase was documented by Feenberg and Poterba [1993] and is certainly attributable at least in part to fiscal manipulation following the large top marginal tax rate cuts of the Tax Reform Act of 1986 (see the discussion in Section III above). However, from 1988 to 1994, top wage shares

stay on average constant,[34] but increase very sharply from 1994 to 1998 (the top 1 percent wage share increases from 9 percent to 11 percent). While everybody acknowledges that tax reforms can have large short-term effects on reported incomes due to retiming, there is a controversial debate on whether changing tax rates can have permanent effects on the level of reported incomes. Looking at long-time series up to 1998 casts doubts on the supply-side interpretation that tax cuts can have lasting effects on reported wages.

Part of the recent increase in top wages is due to the development of stock options that are reported as wages and salaries on tax returns when they are exercised. Stock options are compensation for labor services, but the fact that they are exercised in a lumpy way may introduce some upward bias in our annual shares at the very top (top 0.1 percent and above). To cast additional light on this issue and on the timing of the top wage surge, we look at CEO compensation from 1970 to 1999 using the annual surveys published by Forbes magazine since 1971. These data provide the levels and composition of compensation for CEOs in the 800 largest publicly traded U. S. corporations. Figure XI displays the average real compensation level (including stock option exercised) for the top 100 CEOs from the Forbes list, along with the compensation of the CEO ranked 100 in the list, and the salary plus bonus level of the CEO ranked 10 (in terms of the size of salary plus bonus). As a comparison, we also report the average wage of a full-time worker in the economy from National Income Accounts. Consistent with the evolution of top wage shares, average CEO compensation has increased much faster than average wage since the early 1970s. Therefore, the increase in pay gap between top executives and the average worker cannot be attributed solely to the tax episodes of the 1980s.

Thus, by the end of the century, top wage shares are much higher than in the interwar period. These results confirm that the rise in top income shares and the dramatic shift of income composition at the top documented in Section IV are mainly driven by the surge in top wages during the last three decades.

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34. One can note the surge in high wages in 1992 and the dip in 1993 and 1994 due to retiming of labor compensation in order to escape the higher rates enacted in 1993 (see Goolsbee [2000]).
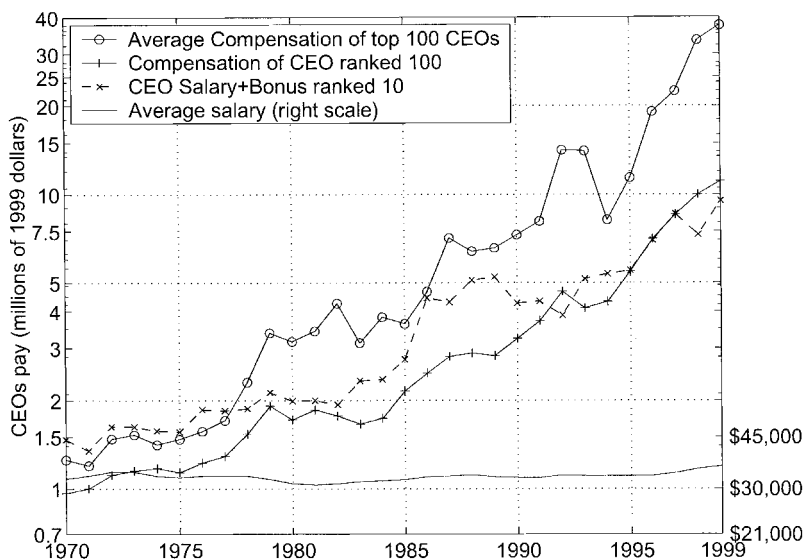
FIGURE XI

CEOs' Pay versus Average Wages, 1970–1999

Source: Forbes Annual Compensation surveys of CEOs in top 800 companies; Average wages of full-time employees are from National Income Accounts.

IV. D. Proposed Interpretation

The pattern of top shares over the century is striking: most of the decline from 1927 to 1960 took place during the four years of World War II. The extent of that decline is large, especially for very high wages. More surprisingly, there is no recovery after the war. We are of course not the first ones to document compression of wages during the 1940s. The Social Security Administration [U. S. Bureau of Old-Age 1952] showed that a Lorenz curve of wages for 1949 displays much more equality than one for 1938. In a widely cited paper Goldin and Margo [1992], using Census micro-data for 1940 and 1950, have also noted that the ratios P90/P10 and P50/P10 declined sharply during that decade. Our annual series allow us to conclude that most of the decline in top wage shares took place during the key years of the war with no previous decline in inequality before and no recovery afterwards.

The compression of wages during the war can be explained by the wage controls of the war economy, but how can we explain the fact that high wage earners did not recover after the wage controls were removed? This evidence cannot be immediately recon-

ciled with explanations of the reduction of inequality based solely on technical change as in the famous Kuznets process. We think that this pattern of evolution of inequality is additional indirect evidence that nonmarket mechanisms such as labor market institutions and social norms regarding inequality may play a role in the setting of compensation at the top. The Great Depression and World War II have without doubt had a profound effect on labor market institutions and more generally on social norms regarding inequality. During this period, the income tax acquired its modern form, and its top marginal tax rates were set very high, in excess of 80 percent. It is conceivable that such large income tax rates discouraged corporations from increasing top salaries. During that period, large redistributive programs, such as Social Security and Aid for Families with Dependent Children, were initiated. These strongly redistributive policy reforms show that American society's views on income inequality and redistribution greatly shifted from 1930 to 1945. It is also important to note that unionization increased substantially from 1929 to 1950 and that unions have been traditionally in favor of wage compression. In that context, it is perhaps not surprising that the high wages earners who were the most severely hit by the war wage controls were simply not able, because of social, fiscal, and union pressure, to increase their salaries back to the prewar levels in relative terms.[35]

Similarly, the huge increase in top wage shares since the 1970s cannot be the sole consequence of technical change. First, the increase is very large and concentrated among the highest income earners. The fractiles P90–95 and P95–99 experienced a much smaller increase than the very top shares since the 1970s. Second, such a large change in top wage shares has not taken place in most European countries which experienced the same technical change as the United States. For example, Piketty [2001a, 2001b] documents no change in top wage shares in the last decades in France. DiNardo, Fortin, and Lemieux [1996] argue that changes in institutions such as the minimum wage and unionization account for a large part of the increase in U. S.

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35. Emphasizing the role of social norms and unionization is of course not new and has been pointed out as important elements explaining the wage compression of the 1940s and 1950s by several studies [Brown 1977; Goldin and Margo 1992; Goldin and Katz 1999]. Moreover, as emphasized by Goldin and Margo [1992] and Goldin and Katz [1999], it is possible that the large increase in the supply of college graduates contributed to make the drop in top wage shares persistent.

wage inequality from 1973 to 1992. As emphasized by Acemoglu, Aghion, and Violante [2001], it is possible that these changes in institutions have been triggered by previous technological changes making it impossible to sustain previous labor market arrangements.[36] It seems unlikely, however, that changes in unionization or the minimum wage can explain the surge in very top wages. The marginal product of top executives in large corporations is notoriously difficult to estimate, and executive pay is probably determined to a significant extent by herd behavior. Changing social norms regarding inequality and the acceptability of very high wages might partly explain the rise in U. S. top wage shares observed since the 1970s.

V. CONCLUSION

This paper has presented new homogeneous series on top shares of income and wages from 1913 to 1998. Perhaps surprisingly, nobody had tried to extend the pioneering work of Kuznets [1953] to more recent years. Moreover, important wage income statistics from tax returns had never been exploited before. The large shocks that capital owners experienced during the Great Depression and World War II seem to have had a permanent effect: top capital incomes are still lower in the late 1990s than before World War I. We have tentatively suggested that steep progressive taxation, by reducing the rate of wealth accumulation, has yet prevented the large fortunes to recover fully from these shocks. The evidence for wage series shows that top wage shares were flat before World War II and dropped precipitously during the war. Top wage shares have started recovering from this shock only since the 1970s but are now higher than before World War II.

To what extent is the U. S. experience representative of other developed countries' long-run inequality dynamics? Existing inequality series are unfortunately very scarce and incomplete for most countries,[37] and it is therefore very difficult to provide a fully satisfactory answer to this question. However, it is interesting to compare the U. S. top income share series with comparable series recently constructed for France by Piketty [2001a, 2001b] and for the United Kingdom by Atkinson [2001]. There are im-

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36. See also Acemoglu [2002].
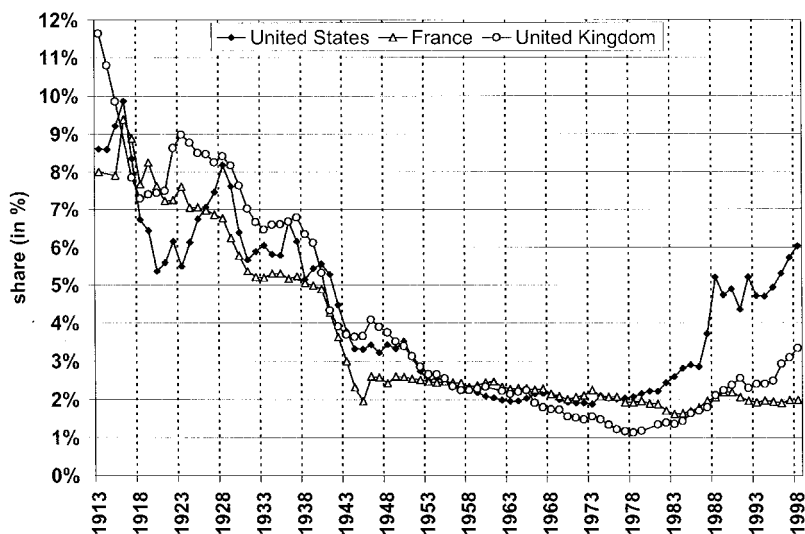37. See Lindert [2000] and Morrisson [2000] for recent surveys.

FIGURE XII

Top 0.1 Percent Income Shares in the United States, France, and the United
Kingdom, 1913–1998

Sources: United States: Table II, column P99.9–100.

France: Computations are based on income tax returns by Piketty [2001, Table A1, column P99.9–100].

United Kingdom: Computations are based on income tax returns by Atkinson [2001, column top 0.1 percent in Tables 1 and 4]. Years 1987–1992 and 1994–1998 are extrapolated from Atkinson top 0.5 percent series. Discontinuity from 1989 to 1990 due to switch from family to individual base is corrected.

In all three countries, income is defined before individual taxes and excludes capital gains. The unit is the family as in the current U. S. tax law.

portant similarities between the American, French, and British pattern of the top 0.1 percent income share displayed in Figure XII.[38] In all three countries, top income shares fell considerably during the 1914 to 1945 period, and they were never able to come back to the very high levels observed on the eve of World War I. It is plausible to think that in all three countries, top capital incomes have been hit by the depression and wars shocks of the first part of the century and could not recover because of the dynamic effects of progressive taxation on capital. Piketty [2001a] also shows that in France, there was no spontaneous decline of

38. Due to very high exemption thresholds in the United Kingdom prior to World War II, Atkinson was not able to compute top decile or even top percentile series covering the entire century (only the top 0.1 percent, and higher fractiles series are available for the entire century for all three countries).

top wage shares before World War II. In France, top wage shares declined during World War I, but they quickly recovered during the 1920s and were stable until World War II.

Some important differences, however, need to be emphasized. First, the shock of World War II was more pronounced in France and in the United Kingdom than in the United States. This is consistent with the fact that capital owners suffered from physical capital losses during the war in Europe, while there was no destruction on U. S. soil.[39] Second, the World War II wage compression was very short-lived in France, while it had long-lasting effects in the United States. In France, wage inequality, measured both in terms of top wage shares and in terms of interdecile ratios, appears to have been extremely stable over the course of the twentieth century. The U. S. history of wage inequality looks very different: the war compression had long-lasting effects, and then wage inequality increased considerably since the 1970s, which explains the U. S. upturn of top income shares since the 1970s.[40] The fact that France and the United States display such diverging trends is consistent with our interpretation that technical change alone cannot account for the U. S. increase in inequality.

These diverging trends in top wages over the past 30 years explain why the income composition patterns of top incomes look so different in France and in the United States at the end of the century. In France, top incomes are still composed primarily of dividend income, although wealth concentration is much lower than what it was one century ago. In the United States, due to the very large rise of top wages since the 1970s, the coupon-clipping rentiers have been overtaken by the working rich. Such a pattern might not last for very long because our proposed interpretation also suggests that the decline of progressive taxation observed since the early 1980s in the United States could very well spur a revival of high wealth concentration and top capital incomes during the next few decades.

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39. Estate tax data also show that the fall in top estates was substantially larger in France (see Piketty [2001a, 2001b]).
40. The United Kingdom also experienced an increase in top shares in the last two decades but much more modest than in the United States.

References

Acemoglu, Daron, "Technical Change, Inequality, and the Labor Market," *Journal of Economic Literature,* XL (2002), 7–72.
Acemoglu, Daron, Philippe Aghion, and Giovanni Violante, "Deunionization, Technical Change, and Inequality," Working paper, Harvard University, 2001.
Atkinson, Anthony B., "Top Incomes in the United Kingdom over the Twentieth Century," mimeo, Nuffied College, Oxford, August 2001.
Brown, Henry P., *The Inequality of Pay* (New York: Oxford University Press, 1977).
Brownlee, W. Elliot, "Historical Perspective on U. S. Tax Policy toward the Rich," in Joel Slemrod, ed., *Does Atlas Shrug? The Economic Consequences of Taxing the Rich* (New York: Russell Sage Foundation; Cambridge, MA: Harvard University Press, 2000).
Bureau of Census, *Statistical Abstract of the United States* (Washington, DC: 1999).
Cartter, Allan M., "Income Shares of Upper Income Groups in Great Britain and the United States," *American Economic Review,* XLIV (1954), 875–883.
Cooper, George, *A Voluntary Tax? New Perspectives on Sophisticated Estate Tax Avoidance* (Washington, DC: The Brookings Institution, 1979).
De Long, J. Bradford, "Robber Barons," mimeo, University of California Berkeley, 1998.
DiNardo, John, Nicole Fortin, and Thomas Lemieux, "Labor Market Institutions and the Distribution of Wages, 1973–1992: A Semiparametric Approach," *Econometrica,* LXIV (1996), 1001–1044.
Fama, Eugene, and Kenneth French, "Disappearing Dividends: Changing Firm Characteristics or Lower Propensity to Pay?" Working Paper No. 509, Center for Research in Security Prices, 2000.
Feenberg, Daniel, and James Poterba, "Income Inequality and the Incomes of Very High Income Taxpayers: Evidence from Tax Returns," *Tax Policy and the Economy* J. Poterba, ed. (Cambridge, MA: MIT Press, 1993), pp. 145–177.
Feenberg, Daniel, and James Poterba, "The Income and Tax Share of Very High Income Households, 1960–1995," *American Economic Review,* XC (2000), 264–270.
Goldin, Claudia, and Lawrence Katz, "The Returns to Skill across the Twentieth Century United States," NBER Working Paper No. 7126, 1999.
Goldin, Claudia, and Robert Margo, "The Great Compression: The Wage Structure in the United States at Mid-Century," *Quarterly Journal of Economics,* CVII (1992), 1–34.
Goldsmith, Selma, George Jaszi, Hyman Kaitz, and Maurice Liebenberg, "Size Distribution of Income Since the Mid-Thirties," *Review of Economics and Statistics,* XXXVI (1954), 1–32.
Goolsbee, Austan, "What Happens When You Tax the Rich? Evidence from Executive Compensation," *Journal of Political Economy,* CVIII (2000), 352–378.
Gordon, Roger, and Joel Slemrod, "Are 'Real' Responses to Taxes Simply Income Shifting between Corporate and Personal Tax Bases," in Joel Slemrod, ed., *Does Atlas Shrug? The Economic Consequences of Taxing the Rich* (New York: Russell Sage Foundation; Cambridge, MA: Harvard University Press, 2000).
Karoly, Lynn A., "The Trend in Inequality among Families, Individuals, and Workers in the United States: A Twenty-five Year Perspective," in S. Danziger and P. Gottschalk, eds., *Uneven Tides: Rising Inequality in America* (New York: Russell Sage Foundation, 1993), pp. 99–164.
Katz, Lawrence, and David Autor, "Changes in the Wage Structure and Earnings Inequality," in *Handbook of Labor Economics,* O. Ashenfelter and D. Card, eds. (Amsterdam: North-Holland, 1999), Volume 3A.
Katz, Lawrence, and Kevin Murphy, "Changes in Relative Wages, 1963–1987; Supply and Demand Factors," *Quarterly Journal of Economics,* CVII (1992), 35–78.
Keat, Paul, "Long-Run Changes in Occupational Wage Structure, 1900–1956," *Journal of Political Economy,* LXVIII (1960), 584–600.

Kuznets, Simon, *National Income and Its Composition, 1919–1938* (New York: National Bureau of Economic Research, 1941).

——, *National Product in Wartime* (New York: National Bureau of Economic Research, 1945).

——, *Shares of Upper Income Groups in Income and Savings* (New York: National Bureau of Economic Research, 1953).

——, "Economic Growth and Economic Inequality," *American Economic Review,* XLV (1955), 1–28.

Lampman, R. J., *The Share of Top Wealth-Holders in National Wealth, 1922–1956* (Princeton, NJ: NBER and Princeton University Press, 1962).

Lewellen, Wilbur G., *Executive Compensation in Large Industrial Corporations* (New York: NBER, 1968).

Lindert, Peter, "Three Centuries of Inequality in Britain and America," in Anthony Atkinson and François Bourguignon, eds., *Handbook of Income Distribution* (Amsterdam: North-Holland, 2000), pp. 167–216.

Mellon, Andrew, *Taxation: The People's Business* (New York: Macmillan, 1924).

Morrisson, Christian, "Historical Perspectives on Income Distribution: The Case of Europe," in Anthony Atkinson and François Bourguignon, eds., *Handbook of Income Distribution* (Amsterdam: North-Holland, 2000), pp. 217–260.

Piketty, Thomas, *Les hauts revenus en France au 20eme siècle–Inégalités et redistributions, 1901–1998* (Paris: Editions Grasset, 2001a).

——, "Income Inequality in France, 1901–1998," CEPR Discussion Paper No. 2876, 2001b, *Journal of Political Economy,* forthcoming.

Piketty Thomas, and Emmanuel Saez, "Income Inequality in the United States, 1913–1998," NBER Working Paper No. 8467, 2001.

Poterba, James, "The Estate Tax and After-Tax Investment Returns," in Joel Slemrod, ed., *Does Atlas Shrug? The Economic Consequences of Taxing the Rich* (New York: Russell Sage Foundation; Cambridge, MA: Harvard University Press, 2000).

Slemrod, Joel, "High Income Families and the Tax Changes of the 1980s: The Anatomy of Behavioral Response," in *Empirical Foundations of Household Taxation,* M. Feldstein and J. Poterba, eds. (Chicago: University of Chicago Press, 1996).

Slemrod, Joel, and Jon Bakija, "Does Growing Inequality Reduce Tax Progressivity? Should it?" NBER Working Paper No. 7576, 2000.

U. S. Bureau of Old-Age, *Handbook of Old-Age and Survivors Insurance Statistics, 1949* (Washington, DC: 1952).

U. S. Department of Commerce, Bureau of Census, *Historical Statistics of the United States: Colonial Times to 1970* (Washington, DC, 1975).

U. S. Department of Commerce, Bureau of Economic Analysis, *National Income and Product Accounts of the United States, 1929–97* (Washington, DC: 2000) (www.bea.doc.gov/bea/dn/nipaweb/).

U. S. Treasury Department, Internal Revenue Service, *Statistics of Income: Individual Income Tax Returns* (Washington, DC: annual 1916–1998).

U. S. Treasury Department, Internal Revenue Service, *Statistics of Income: Corporate Income Tax Returns* (Washington, DC: annual 1916–1998).

U. S. Treasury Department, Internal Revenue Service, *Statistics of Income: Estate and Gift Tax Returns* (Washington, DC: various years, 1922–1997).

Williamson, Jeffrey, and Peter Lindert, *American Inequality—A Macroeconomic History* (New York: Academic Press, 1980).