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The Impact of Macro Factors on the U.S. Stock Market

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It is commonly held that economic news influences the movements of the stock market. One need only briefly watch the market to discover that there are countless unanticipated events that move asset prices. According to modern financial theory, however, the market portfolio is not subject to diversifiable risk. Rather it is only subject to “systematic” influences as sources of risk. Yet, while we can deduce that portfolio movement is the result of exogenous forces, it is less obvious which economic variables influence all of the assets in such a portfolio and to what extent.¹

John Prestbo, in his paper “The Influence of Tax Rates on the Behavior of Investors in the U.S. Stock Market,” sets out to examine and discuss the effect of tax policy on market behavior. To examine this topic, he looks at the entire 99-year history of capital gains taxes from 1913-2011 and examines their effects on the Dow Jones Industrial Average (DJIA). To do this, Prestbo separates the 99 years of data into nine periods: Five of the periods cover 63 years during which the capital gains tax was less than or equal to 25% (also referred to as “low-tax” years), and four periods cover 36 years during which the rate was more than 25% (also referred to as “high-tax” years). For each of the nine periods, Prestbo finds the annualized return of the DJIA using the calendar-year price returns of the DJIA for each year in that period. Additionally, he calculates an annualized DJIA return for both the high-tax and low-tax years. He then examines whether a clear relationship exists between the annualized DJIA returns and the capital gains tax rate.

Based on his results, Prestbo concludes that “there is no obvious relationship between capital gains tax-rate levels and DJIA performance.”² However, he offers two other conclusions based on the annualized DJIA returns for the high-tax and low-tax years. First, the annualized DJIA return for the low-tax years exceeds the return for the high-tax years by 73%. Second, the high-tax years constricted the DJIA performance more than the low-tax years enhanced it. Prestbo found that the overall annualized return of the DJIA from 1913 to 2011 was 5.11%. The low-tax years had a return 94 basis points above 5.11%, while the high-tax years had a return of 162 basis points below the historical return.

This paper extends Prestbo’s study by examining three additional economic variables: gross domestic product (GDP) growth, industrial production growth, and the unemployment rate. All of these indicators are commonly believed to be associated with the strength of the economy, and this paper includes them in an effort to better clarify which exogenous factors affect stock market returns in the same nine periods that Prestbo examines. Like Prestbo, I will examine the effect of these variables on DJIA returns, used here as a proxy for the market portfolio, over the same 99-year period, or as far back as data are available for these three variables. In the last section of the paper, I perform a time series regression in order to extend the analysis by presenting a stronger and clearer set of results. This study aims to clarify whether any of the three additional variables do in fact have an easily identifiable association with market movement as well as to provide more context (through the inclusion of more variables) examining how the capital gains tax rate influences DJIA performance.

¹ Nai-Fu Chen, Richard Roll, Stephen A. Ross, “Economic Forces and the Stock Market,” *The Journal of Business*, Vol. 59, No. 3 (1986): 383.

² John Prestbo, “The Influence of Tax Rates on the Behaviors of Investors in the U.S. Stock Market,” *George W. Bush Institute* (2012).

GDP, industrial production, and unemployment are used in this study for two reasons: to serve as representative economic indicators of the business cycle and because data are available for GDP and unemployment all the way back to 1913, and back to 1919 for industrial production. The other two sources of data used in the paper are the calendar-year-price return of the Dow Jones Industrial Average (DJIA) and the maximum capital gains tax rate, both taken from Prestbo's paper, and reproduced in Appendixes D and E. The data for all variables are summarized below in Table 1.

Table 1. DJIA Performance Relative to GDP CAGR, IP CAGR, and the Unemployment rate, and grouped by Capital Gains Tax Rates Above and Below 25%

Max Cap Gains Tx ≤25%	Range of Max CG Rates	GDP CAGR	Unemployment Rate Range	IP CAGR	DJIA Annualized Return**
1913-1916	15.00%	2.94%	5.47%-9.04%	No Available Data	1.97%
1922-1933	12.50%	0.54%	2.89%-22.89%	1.30%	1.75%
1942-1967	25.00%	4.16%	1.23%-7.13%	4.41%	8.41%
1981-1986	20%-23.7%	3.28%	7%-10.17%	1.55%	11.93%
1997-2011	15%-16.1%	2.32%	3.97%-9.63%	1.46%	4.35%
Annualized Return For All Years					
		2.86%		2.72%	6.05%

Max Cap Gains Tx >25%	Range of Max CG Rates	GDP CAGR	Unemployment Rate Range	IP CAGR	DJIA Annualized Return**
1917-1921	67%-77%	0.74%	1.24%-11.33%	*-9.92%	-3.11%
1934-1941	30%-39%	8.40%	5.99%-16.2%	11.74%	1.32%
1968-1980	26.9%-39.9%	3.07%	2.79%-8.98%	2.69%	0.49%
1987-1996	28%-33%	2.90%	5.26%-7.49%	3.22%	13.02%
Annualized Return For All Years					
		3.85%		4.15%	3.49%

*Data from 1920-1921

**Price return, in U.S. dollars

GDP

GDP is the value of all final goods and services produced within a country in a given period of time. GDP is the broadest indicator of economic performance. Therefore, we expect GDP to have a strong direct relationship with the movement of the DJIA. The analysis in this section of the paper will be concerned with the compound annual growth rate of GDP (GDP CAGR) during the same nine periods Prestbo examines. See Table 1 for the data. (Data for years 1913-2002 were obtained from *Historical*

Statistics of the United States Millennial Edition, and data for years 2003-2011 were obtained from the website for the Bureau of Economic Analysis and is reproduced in Appendix A).

After analyzing the data we can conclude that there is no consistent pattern between GDP growth and DJIA returns. However, looking at the data more closely will allow us to better understand the relationship between the two, and will help explain why the hypothesis may not be supported in a number of the periods in question.

The three periods of 1942-1967, 1981-1986, and 1987-1996 best support the hypothesis that a direct relationship exists between GDP growth and DJIA returns. These three periods exhibit both relatively strong GDP growth and large DJIA returns. It should be noted, however, that despite 1987-1996 exhibiting lower GDP growth than the other two periods, the period has a higher DJIA return. While this is not entirely consistent with the hypothesis, it may be explained, in part, by the period containing the early years of the Dot-com bubble.

The data from other periods suggest that a direct relationship between GDP and DJIA returns may not exist. For instance, the 1934-1941 period is contrary to the hypothesis. That period has the largest GDP growth of all the periods in the data set (8.40%), but has a comparably small DJIA return (1.32%). However, the discrepancy could, at least in part, be explained by the start of WWII in Europe; GDP likely increased as a result of the U.S. supplying the Allies with military goods. In contrast, the uncertainty that war brings likely had a negative impact on the stock market. Another period that does not support the hypothesis very well is 1968-1980. This period has similarly high GDP growth with periods such as 1981-1986 and 1987-1996, but shows a substantially smaller DJIA return (0.49%). However, the poor DJIA performance during the period 1968-1980 could be the result of high inflation in the late 1960s and 1970s as well as the oil crisis in 1973. The period from 1913-1916 also shows a relatively small DJIA return (1.97%) for its comparably good GDP growth (2.94%), which is most likely due to the start of WWI in Europe in 1914, a year which saw the DJIA plummet more than 30%.

After examining the data it is clear that some relationship exists between GDP growth and DJIA returns. However, by only looking at small windows of time, it is hard to say much about the strength of the relationship. Over small windows of time there are simply too many additional exogenous factors that greatly affect the data.

Industrial Production

Industrial production measures the change in the production of the nation's factories, mines, and utilities. Industrial production is commonly seen as an important measure of the health and output of factories as well as a good tool for forecasting GDP and economic performance. Therefore, because industrial production is procyclical and is a good indicator of the strength of the economy, we expect it to have a strong direct relationship with the movement of the DJIA. The analysis in this section of the paper will discuss the compound annual growth rate of industrial production (IP CAGR) during the same periods discussed in the GDP section. See Table 1 for the data results. The data were obtained from the Federal Reserve Bank of St. Louis's website and are reproduced in Appendix B.

Like GDP, there is no evident relationship between industrial production (IP) growth and DJIA returns when the data are grouped into periods based on capital gains tax rates. Additionally, much of the discrepancy between IP growth and DJIA performance during these periods can be explained by many of the same factors that helped explain the inconsistencies between GDP growth and DJIA returns. However, it is important to look at industrial production separately from GDP because there are some differences regarding how the periods correlate with DJIA returns.

The periods that best support the hypothesis that there exists a direct relationship between industrial production growth and DJIA returns are 1920-1921, 1942-1967 and 1987-1996. The latter two periods demonstrate relatively high IP growth and DJIA returns, while 1920-1921 displays negative IP growth and a negative DJIA return. It should be noted that these latter two periods are also periods for which the hypothesis of a direct relationship between GDP growth and DJIA returns holds.

The period 1934-1941 is in sharp contrast to the hypothesis: The period has very high IP growth (11.74%) but a very low DJIA return (1.32%). As mentioned above, the start of WWII in Europe likely increased U.S. production while most likely negatively impacting DJIA returns. In addition, 1968-1980 does not support the hypothesis. The period displays relatively strong IP growth (2.69%) but a very small DJIA return (0.49%). As mentioned above, the poor DJIA performance is partly explainable by high inflation as well as the oil crisis in 1973. In this case the period demonstrates similar IP growth to 1942-1967 and 1987-1996, but has a much smaller DJIA return. Another period that does not support the hypothesis is 1981-1986. This period exhibited relatively low IP growth (1.55%) but had an extremely large DJIA return (11.93%). Interestingly, this period supported the hypothesis for GDP growth, as mentioned above, but does not hold when examining IP growth. It is also interesting to point out that the periods 1922-1933 and 1997-2011 both exhibit very similar IP growth to 1981-1986, but the DJIA performance differs substantially in each of these periods. The period 1922-1933, which had small IP growth (1.30%) and a small DJIA return (1.75%), appears to support the hypothesis quite well. Meanwhile the much stronger DJIA performance from 1981-1986 (11.55%), despite weak IP growth (1.55%), may be explained by innovations in electronics.

Similar to GDP, it is clear that there exists some relationship between IP growth and DJIA returns. Again, however, by only looking at small windows of time it is difficult to comment upon the strength of the relationship between IP growth and DJIA returns.

Unemployment

The unemployment rate — which is calculated by dividing the number of unemployed individuals by the number of individuals currently in the labor force — measures the prevalence of unemployment. The unemployment rate is also regarded as a measure of the overall health of the economy. Unlike GDP and industrial production, unemployment is countercyclical and therefore it should have an inverse association with the movement of the DJIA. This paper will use the yearly unemployment rate in the civilian labor force. The data was obtained from *Historical Statistics of the United States Millennial Edition* and is reproduced in Appendix C (Data for years 1987-2011 was obtained from the website of the Bureau of Labor Statistics).

It's difficult to find any clear relationship between the unemployment rate and DJIA performance over these periods because during most of the periods, the unemployment rate varied significantly. Therefore, I will pick out a few periods to discuss that are easier to distinguish as low or high unemployment periods. For this analysis a normal unemployment rate is considered to be 6% to 7%. Unemployment rates greater than 7% are considered to be high unemployment, and unemployment rates lower than 6% are considered to be low unemployment.

The periods of 1934-1941 and 1942-1967 best support the hypothesis that the unemployment rate and DJIA performance are inversely related. The period 1942-1967, overall, exhibits a period of low unemployment (1.23%-7.13%), to match a relatively high DJIA annualized return (8.41%). Similarly, the period 1934-1941 demonstrates mostly very high unemployment (5.99%-16.2%), to go with the period's relatively low DJIA return (1.32%).

In contrast, the periods that do not support the hypothesis are 1968-1980, 1981-1986, and 1987-1996. For example, the period 1981-1986 appears to demonstrate a direct relationship between the unemployment rate and DJIA performance, rather than an inverse one: the period had relatively high unemployment (7%-10.17%) and a strong DJIA return (11.93%). In addition, the periods 1968-1980 and 1987-1996 show similarly average unemployment rates but have very different DJIA performances. However, the same factors as discussed above in the GDP section likely also partially explain the discrepancy in the DJIA returns for these two periods.

Capital Gains Tax Rate

Prestbo concludes in his paper that there is no clear relationship between capital gains tax-rate levels and DJIA returns. According to the data in Table 1, the periods of 1917-1921, 1934-1941, and 1968-1980 appear to support the hypothesis that there exists an inverse relationship between the capital gains rate and DJIA returns. However, as suggested by Prestbo, the negative DJIA performance in the period 1917-1921 is more likely due to the post-WWI recession. Furthermore, it appears that both IP growth, which is negative in this period, and GDP growth, which is close to zero, likely impacted DJIA returns more significantly during the period than did the capital gains rate. Interestingly, it appears that the capital gains tax rate has a stronger relationship with DJIA returns than IP growth or GDP growth during 1934-1941, a period which has a relatively high capital gains rate range (30%-39%) to match a very small DJIA return (1.32%). However, as mentioned above, WWII is likely responsible for the large IP and GDP growth as well as the poor DJIA performance. The period 1968-1980 is another period that suggests a strong relationship between the capital gains tax rate and DJIA returns. In this period the range of rates is relatively high (26.9%-39.9%), while IP and GDP growth are somewhat average, and the DJIA return is very small (0.49%). However, as mentioned earlier, the poor DJIA performance during the period could also be the result of high inflation as well as the oil crisis in 1973. Therefore, even in the years during which the data suggest an inverse relationship between the capital gains rate and DJIA returns, it is hard to discern the strength of that relationship.

The data from three other periods, 1913-1916, 1922-1933, and 1987-1996, suggest that an inverse relationship between DJIA returns and the capital gains tax rate may not exist. The periods 1913-1916 and 1922-1933 have very small DJIA returns (1.97% and 1.75%, respectively), despite the two periods

containing the lowest capital gains tax-rate levels in the data set. Similarly, the data shows no direct relationship between GDP growth and DJIA returns over the period 1913-1916. However, as mentioned in the GPD section above, the poor DJIA performance during the period can most likely be attributed to the start of WWI in 1914. In addition, the period 1922-1933 does not support the hypothesis that an inverse relationship exists between the capital gains tax rate and DJIA returns. By contrast, GDP and IP both show low growth during this period, which supports the hypothesis that GDP and IP have a direct relationship with DJIA returns, which were also small in this period. The period 1987-1996 is another period that is contrary to the hypothesis. The period has an extremely large DJIA return (13.02%) despite the average capital gains tax rate levels (28%-33%). In contrast, the period has relatively high GDP and IP growth to match the high DJIA return.

Summary

Overall, it appears that there exists a stronger relationship between both GDP growth and IP growth with DJIA returns than between the capital gains tax rate and DJIA returns, a result that many might expect. Similar to the capital gains tax rate, however, there is no clear or consistent relationship between the unemployment rate and DJIA returns.

As mentioned above, Prestbo performed an additional analysis in order to analyze whether, over the long term, the DJIA performed better in the low-tax years or the high-tax years. He concluded that the DJIA performed better during the low-tax years. Following the same calculations, the annualized growth rates for GDP and IP, separated into high-tax and low-tax years, are shown in Table 1, above.

The above analysis has demonstrated that a relationship exists between DJIA returns and GDP growth and IP growth. Therefore, because the annualized DJIA return is greater for the low-tax years than it is for the high-tax years, one might also expect GDP growth and IP growth to be greater for the low-tax years as well. However, the findings, in contrast, show that annualized GDP and IP growth are in fact larger during the high-tax years than during the low-tax ones. This result is not consistent with the hypotheses, and therefore further investigation is warranted into the strength of the relationship between each of the economic variables and DJIA returns.

Time Series Regression

Since it is difficult to discern clear relationships between DJIA returns and the chosen explanatory variables over the collection of time frames above, which appear to be too easily subject to other influential factors, I will also perform an ordinary least squares (OLS) regression. The base regression period is 1920 – 2011, making the number of observations N , 92. As noted earlier, data are not available further back for industrial production. Yearly data are used because monthly data are unavailable for some of the variables. However, given that the goal of the paper is to examine the long-term effect of economic factors on DJIA returns, yearly data are sufficient.

Using the same data as in the previous section, the explanatory variables used in the model will be the following: the annual growth rate of U.S. real GDP (hereinafter $GDP(t)$), the annual growth rate of U.S. industrial production (hereinafter $IP(t)$), and the annual unemployment rate of the civilian labor force (hereinafter $U(t)$). The dependent variable in the analysis will be the calendar-year DJIA price return.

The change in the capital gains tax rate is not used because of the non-normality in the residuals: There is more variation for lower rates. It should be noted that there is no multi-collinearity between GDP(t) and IP(t), as one might expect: the variance inflation factors are 1.59 and 1.44, respectively.

Table 2 reports the results. The signs on the estimated coefficients for IP(t) and U(t) are both consistent with the hypotheses: There is a positive relationship between IP(t) and DJIA returns and a negative relationship between U(t) and DJIA returns. The negative coefficient sign for GDP(t) is not consistent with what we expect to observe. According to the model, an increase in GDP(t) will actually decrease DJIA returns. However, the coefficient for GDP(t) is not of much concern because GDP(t) is not statistically significant. The F-statistic for the model is 8.85 and the p-value is <.00003.³ Hence, these three explanatory variables together explain statistically significant variation in DJIA returns. However, IP(t) is the only explanatory variable that is significant at the 99% confidence level (GDP is significant at a 90% level).⁴

Based on the very simplified regression performed for this study, it is clear that IP(t) has a significant impact on DJIA returns. Clearly, however, the scope of this paper is limited and many other variables contribute to DJIA performance. Therefore, the finding that IP growth significantly affects DJIA returns would benefit from further testing.

Table 2: Time Series Regression Summary Statistics 1920-2011

<i>Regression Statistics</i>								
Multiple R	0.4815728							
R Square	0.2319123							
Adjusted R Square	0.2057275							
Standard Error	0.1786362							
Observations	92							
ANOVA								
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>			
Regression	3	0.847880326	0.282627	8.856752	0.00003			
Residual	88	2.808157833	0.031911					
Total	91	3.656038159						
	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	0.0829577	0.047013612	1.764546	0.08111	-0.010471973	0.176387372	-0.010471973	0.176387372
GDP(t)	-0.8314151	0.477759806	-1.74024	0.085313	-1.78086228	0.11803212	-1.78086228	0.11803212
IP(t)	1.0761626	0.215936374	4.983702	0.000003	0.647034475	1.505290792	0.647034475	1.505290792
U(t)	-0.3425179	0.56779841	-0.60324	0.547902	-1.470897868	0.785862134	-1.470897868	0.785862134

³ The adjusted r-squared is .20. The residuals are of no particular concern. And the DW statistic shows no sign of serial correlation in the disturbance terms.

⁴ GDP(t-1) was also regressed on the calendar-year DJIA price return but was dropped because it made for a worse fit.

Conclusion

The first section of this paper gives some basic insight into the existence of a relationship between both GDP growth and industrial production growth with DJIA returns, as well as a weak, or more likely non-existent, relationship between the unemployment rate and DJIA returns. The analysis also finds that a weak relationship may exist between capital gains tax rates and DJIA returns in the long run. However, it is difficult to comment on the strength of the relationship because unaccounted for events as well as industrial production and GDP growth both appear to have a greater impact on DJIA returns and thereby diminish our ability to discern any clear or consistent effects of the capital gains tax rate on DJIA returns. However, analyzing the data in this manner makes it difficult to come to any strong conclusion about the extent of these relationships for two reasons: (1) using windows of time based on capital gains tax rates is somewhat arbitrary for analyzing GDP growth, IP growth, and the unemployment rate; and (2) the windows of time are short and are thereby overly subject to unaccounted for exogenous forces.

The time-series regression better enables us to deduce which macroeconomic factors have a clear impact on DJIA returns. Of the variables included in the model, only $IP(t)$ has a significant impact on DJIA returns, particularly when the data are examined over a longer period, in this case 1920-2011, we can better assert that $IP(t)$ has a strong impact on DJIA performance. As mentioned previously, however, the scope of this paper is limited; further investigation would enhance the confidence of this finding.

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Appendix A.

Annual Growth Rate of Real U.S. GDP, 1913-2011

Date	GDP-US \$ billion	% Change	Date	GDP-US \$ billion	% Change	Date	GDP-US \$ billion	% Change
1913	599.651	3.95%	1953	2347.2	4.60%	1998	10283.5	4.36%
1914	553.739	-7.66%	1954	2332.4	-0.63%	1999	10779.8	4.83%
1915	568.835	2.73%	1955	2500.3	7.20%	2000	11226	4.14%
1916	647.713	13.87%	1956	2549.7	1.98%	2001	11347.2	1.08%
1917	631.693	-2.47%	1957	2601.1	2.02%	2002	11543.1	1.73%
1918	688.666	9.02%	1958	2577.6	-0.90%	2003	11836.4	2.54%
1919	694.191	0.80%	1959	2762.5	7.17%	2004	12246.9	3.47%
1920	687.704	-0.93%	1960	2830.9	2.48%	2005	12623	3.07%
1921	671.938	-2.29%	1961	2896.9	2.33%	2006	12958.5	2.66%
1922	709.25	5.55%	1962	3072.4	6.06%	2007	13206.4	1.91%
1923	802.64	13.17%	1963	3206.7	4.37%	2008	13161.9	-0.34%
1924	827.355	3.08%	1964	3392.3	5.79%	2009	12703.1	-3.49%
1925	846.789	2.35%	1965	3610.1	6.42%	2010	13088	3.03%
1926	902.122	6.53%	1966	3845.3	6.52%	2011	13315.1	1.74%
1927	910.834	0.97%	1967	3942.5	2.53%			
1928	921.273	1.15%	1968	4133.4	4.84%			
1929	977	6.05%	1969	4261.8	3.11%			
1930	892.8	-8.62%	1970	4269.9	0.19%			
1931	834.9	-6.49%	1971	4413.3	3.36%			
1932	725.8	-13.07%	1972	4647.7	5.31%			
1933	716.4	-1.30%	1973	4917	5.79%			
1934	794.4	10.89%	1974	4889.9	-0.55%			
1935	865	8.89%	1975	4879.5	-0.21%			
1936	977.9	13.05%	1976	5141.3	5.37%			
1937	1028	5.12%	1977	5377.7	4.60%			
1938	992.6	-3.44%	1978	5677.6	5.58%			
1939	1072.8	8.08%	1979	5855	3.12%			
1940	1166.9	8.77%	1980	5839	-0.27%			
1941	1366.1	17.07%	1981	5987.2	2.54%			
1942	1618.2	18.45%	1982	5870.9	-1.94%			
1943	1883.1	16.37%	1983	6136.2	4.52%			
1944	2035.2	8.08%	1984	6577.1	7.19%			
1945	2012.4	-1.12%	1985	6849.3	4.14%			
1946	1792.2	-10.94%	1986	7086.5	3.46%			
1947	1776.1	-0.90%	1987	7313.3	3.20%			
1948	1854.2	4.40%	1988	7613.9	4.11%			
1949	1844.7	-0.51%	1989	7885.9	3.57%			
1950	2006	8.74%	1990	8033.9	1.88%			
1951	2161.1	7.73%	1991	8015.1	-0.23%			
1952	2243.9	3.83%	1992	8287.1	3.39%			
1953	2347.2	4.60%	1993	8523.4	2.85%			
1954	2332.4	-0.63%	1994	8870.7	4.07%			
1955	2500.3	7.20%	1995	9093.7	2.51%			
1956	2549.7	1.98%	1996	9433.9	3.74%			
1957	2601.1	2.02%	1997	9854.3	4.46%			

Appendix B.

Annual Growth Rate of the Industrial Production Index, 1920-2011

Date	% Change	Date	% Change	Date	% Change
1920	-17.80%	1959	8.82%	1998	3.58%
1921	-1.27%	1960	-6.16%	1999	5.38%
1922	42.58%	1961	12.53%	2000	0.91%
1923	-2.72%	1962	3.46%	2001	-5.21%
1924	2.79%	1963	6.90%	2002	2.76%
1925	9.95%	1964	8.90%	2003	1.68%
1926	2.47%	1965	9.69%	2004	3.42%
1927	-4.82%	1966	6.55%	2005	2.53%
1928	16.03%	1967	3.69%	2006	2.07%
1929	-5.82%	1968	4.59%	2007	2.11%
1930	-20.85%	1969	1.81%	2008	-11.28%
1931	-15.61%	1970	-3.68%	2009	-3.14%
1932	-12.14%	1971	5.14%	2010	6.74%
1933	19.08%	1972	11.61%	2011	3.77%
1934	10.50%	1973	4.92%		
1935	23.50%	1974	-8.46%		
1936	21.46%	1975	0.88%		
1937	-24.67%	1976	7.96%		
1938	15.93%	1977	5.94%		
1939	22.52%	1978	7.05%		
1940	13.08%	1979	-0.28%		
1941	21.21%	1980	-0.79%		
1942	19.77%	1981	-2.76%		
1943	15.94%	1982	-5.92%		
1944	0.49%	1983	10.83%		
1945	-27.04%	1984	5.15%		
1946	12.05%	1985	1.40%		
1947	5.58%	1986	1.46%		
1948	0.19%	1987	7.28%		
1949	-3.58%	1988	2.75%		
1950	24.22%	1989	-0.04%		
1951	0.16%	1990	-1.09%		
1952	11.62%	1991	0.84%		
1953	-4.78%	1992	3.83%		
1954	3.55%	1993	3.49%		
1955	13.12%	1994	6.95%		
1956	3.41%	1995	2.66%		
1957	-6.83%	1996	5.92%		
1958	5.37%	1997	8.32%		

Appendix C.

Annual Unemployment Rate, 1913-2011

Date	Unemployment rate	Date	Unemployment rate	Date	Unemployment rate
1913	5.74%	1953	3.57%	1993	6.91%
1914	8.49%	1954	6.77%	1994	6.10%
1915	9.04%	1955	5.22%	1995	5.59%
1916	6.48%	1956	4.15%	1996	5.41%
1917	5.18%	1957	4.61%	1997	4.94%
1918	1.24%	1958	7.13%	1998	4.50%
1919	2.34%	1959	5.88%	1999	4.22%
1920	5.16%	1960	5.51%	2000	3.97%
1921	11.33%	1961	6.49%	2001	4.74%
1922	8.56%	1962	5.93%	2002	5.78%
1923	4.32%	1963	5.99%	2003	5.99%
1924	5.29%	1964	5.18%	2004	5.54%
1925	4.68%	1965	4.66%	2005	5.08%
1926	2.90%	1966	3.65%	2006	4.61%
1927	3.90%	1967	3.30%	2007	4.62%
1928	4.74%	1968	3.24%	2008	5.80%
1929	2.89%	1969	2.79%	2009	9.28%
1930	8.94%	1970	4.18%	2010	9.63%
1931	15.65%	1971	5.92%	2011	8.95%
1932	22.89%	1972	5.63%		
1933	20.90%	1973	4.87%		
1934	16.20%	1974	5.49%		
1935	14.39%	1975	8.98%		
1936	9.97%	1976	8.27%		
1937	9.18%	1977	7.20%		
1938	12.47%	1978	5.44%		
1939	11.27%	1979	5.03%		
1940	9.51%	1980	6.77%		
1941	5.99%	1981	7.61%		
1942	3.10%	1982	9.93%		
1943	1.77%	1983	10.17%		
1944	1.23%	1984	7.99%		
1945	1.93%	1985	7.45%		
1946	3.95%	1986	7.00%		
1947	4.41%	1987	6.18%		
1948	3.73%	1988	5.49%		
1949	5.92%	1989	5.26%		
1950	5.13%	1990	5.62%		
1951	2.73%	1991	6.85%		
1952	2.89%	1992	7.49%		

Appendix D.

TOP FEDERAL INCOME TAX RATES SINCE 1913 (top brackets in nominal dollars)

Year	Top Regular Rates		Above Taxable Inc. (joint) of	Capital Gains Max	Capital Gains Taxation
	Wages & Other Earned	Unearned except cap gains			
1913-15	7%	7%	\$ 500,000	15%	Realized gains taxed same as other income
1916	15%	15%	2,000,000	15%	"
1917	67%	67%	2,000,000	67%	"
1918	77%	77%	1,000,000	77%	"
1919-21	73%	73%	1,000,000	73%	"
1922	58%	58%	200,000	12.5%	Maximum rate
1923	43.5%	43.5%	200,000	12.5%	"
1924	48%	48%	500,000	12.5%	"
1925-28	25%	25%	100,000	12.5%	"
1929	24%	24%	100,000	12.5%	"
1930-31	25%	25%	100,000	12.5%	"
1932-33	63%	63%	1,000,000	12.5%	"
1934-35	63%	63%	1,000,000	31.5%	Sliding exclusion of 70% > 10 yrs; 0% < 1 yr.
1936-37	78%	78%	2,000,000	39%	"
1938-40	78%	78%	2,000,000	30%	Excl. 50% > 2 yrs; 67% 18-24 mo; 0% < 18 mo; 30% Max
1941	80%	80%	2,000,000	30%	"
1942-43	88%	88%	200,000	25%	Exclusion 50% > 6 months; 25% maximum
1944-45	94%	94%	200,000	25%	"
1946-47	88.5%	88.5%	200,000	25%	"
1948-49	82.1%	82.1%	200,000	25%	"
1950	84.4%	84.4%	200,000	25%	"
51-64	91%	91%	200,000	25%	"
64-67	70%	70%	200,000	25%	"
1968	75.3%	75.3%	200,000	28.9%	Transition
1969	77%	77%	200,000	27.5%	"
1970	50%	70%	200,000	32.3%	"
1971	50%	70%	200,000	34.3%	"
1972-75	50%	70%	200,000	38.5%	50% exclusion, minimum tax effects
1976-77	50%	70%	203,200	39.9%	"
1978	50%	70%	203,200	39%	"
1979-80	50%	70%	215,400	28%	60% exclusion
1981	50%	70%	215,400	23.7%	50% or 60% exclusion, etc., transition
1982	50%	50%	85,600	20%	60% exclusion
1983	50%	50%	109,400	20%	"
1984-88	50%	50%	168,900	20%	"
1987	38.5%	38.5%	90,000	28%	Maximum rate
1988-90*	28%/33%	28%/33%	"	28%/33%	Realized gains taxed same as other income
1991-92	31.9%	31.9%	84,100	28.9%	Maximum rate
1993-98	43.7%	40.8%	255,100	29.2%	"
1997-2000	43.7%	40.8%	275,000	21.2%	"
2001	43.2%	40.3%	297,350	21.2%	"
2002	42.7%	39.8%	307,050	21.2%	18% top capital gains rate in rare cases
2003-05	39.0%	38.1%	319,200	18.1%	Reduced maximum rate, which also applied to dividends
2006-07	38.6%	35.7%	343,100	15.7%	"
2008-09	38.3%	35.4%	365,300	15.4%	"
2010-12	37.9%	35.0%	379,300	15%	"
2013-on	44.6%	44.6%	390,100	25%	21.2% income tax plus 3.8% Medicare tax; also on dividends
*1988-90	28%	28%	31,060	28%	
detail:	33%	33%	76,060	33%	
	28%	28%	155,780	28%	

Notes:

1. 1991-2009 and post 2010 rates include the tax-rate effects of the personal exemption phase-out and the partial itemized deduction disallowance enacted in 1990. These provisions began to be phased out in 2006, were eliminated in 2010-12, and are scheduled to be reinstated in 2013.
 2. 1993-2012 top regular rates on earned income include the 2.9% Medicare tax.
 3. 2013-on top rates include the 3.8% Medicare tax on most earned and unearned income for high-income taxpayers enacted in 2010, and the scheduled expiration of the Bush tax cuts after 2012.
 4. The definition of taxable income varied very substantially over the years. Taxable income is always substantially below actual income.
 5. For multi-year periods with indexed tax brackets (post-1984) the top-bracket starting points are the averages for the periods.
- Citizens for Tax Justice, November 2011.

Appendix E.

Annual Returns of the Dow Jones Industrial Average, 1913-2011

Date	DJIA Close	% Change	Date	DJIA Close	% Change	Date	DJIA Close	% Change
1913	78.78	-10.34%	1958	583.65	33.96%	1998	9181.43	16.10%
1914	54.58	-30.72%	1959	679.36	16.40%	1999	11497.12	25.22%
1915	99.15	81.66%	1960	615.89	-9.34%	2000	10786.85	-6.18%
1916	95	-4.19%	1961	731.14	18.71%	2001	10021.5	-7.10%
1917	74.38	-21.71%	1962	652.1	-10.81%	2002	8341.63	-16.76%
1918	82.2	10.51%	1963	762.95	17.00%	2003	10453.92	25.32%
1919	107.23	30.45%	1964	874.13	14.57%	2004	10783.01	3.15%
1920	71.95	-32.90%	1965	969.26	10.88%	2005	10717.5	-0.61%
1921	81.1	12.72%	1966	785.69	-18.94%	2006	12463.15	16.29%
1922	98.73	21.74%	1967	905.11	15.20%	2007	13264.82	6.43%
1923	95.52	-3.25%	1968	943.75	4.27%	2008	8776.39	-33.84%
1924	120.51	26.16%	1969	800.36	-15.19%	2009	10428.05	18.82%
1925	156.66	30.00%	1970	838.92	4.82%	2010	11577.51	11.02%
1926	157.2	0.34%	1971	890.2	6.11%	2011	12217.56	5.53%
1927	202.4	28.75%	1972	1020.02	14.58%			
1928	300	48.22%	1973	850.86	-16.58%			
1929	248.48	-17.17%	1974	616.24	-27.57%			
1930	164.58	-33.77%	1975	852.41	38.32%			
1931	77.9	-52.67%	1976	1004.65	17.86%			
1932	59.93	-23.07%	1977	831.17	-17.27%			
1933	99.9	66.69%	1978	805.01	-3.15%			
1934	104.04	4.14%	1979	838.74	4.19%			
1935	144.13	38.53%	1980	963.99	14.93%			
1936	179.9	24.82%	1981	875	-9.23%			
1937	120.85	-32.82%	1982	1046.54	19.60%			
1938	154.76	28.06%	1983	1258.64	20.27%			
1939	150.24	-2.92%	1984	1211.57	-3.74%			
1940	131.13	-12.72%	1985	1546.67	27.66%			
1941	110.96	-15.38%	1986	1895.95	22.58%			
1942	119.4	7.61%	1987	1938.83	2.26%			
1943	135.89	13.81%	1988	2168.57	11.85%			
1944	152.32	12.09%	1989	2753.2	26.96%			
1945	192.91	26.65%	1990	2633.66	-4.34%			
1946	177.2	-8.14%	1991	3168.83	20.32%			
1947	181.16	2.23%	1992	3301.11	4.17%			
1948	177.3	-2.13%	1993	3754.09	13.72%			
1949	200.13	12.88%	1994	3834.44	2.14%			
1950	235.41	17.63%	1995	5117.12	33.45%			
1951	269.23	14.37%	1996	6448.26	26.01%			
1952	291.9	8.42%	1997	7908.24	22.64%			
1953	280.9	-3.77%						
1954	404.39	43.96%						
1955	488.4	20.77%						
1956	499.47	2.27%						
1957	435.69	-12.77%						