

Did Women's Suffrage Change the Size and Scope of Government?

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This paper examines the growth of government during this century as a result of giving women the right to vote. Using cross-sectional time-series data for 1870–1940, we examine state government expenditures and revenue as well as voting by U.S. House and Senate state delegations and the passage of a wide range of different state laws. Suffrage coincided with immediate increases in state government expenditures and revenue and more liberal voting patterns for federal representatives, and these effects continued growing over time as more women took advantage of the franchise. Contrary to many recent suggestions, the gender gap is not something that has arisen since the 1970s, and it helps explain why American government started growing when it did.

More married women did not vote for Dole because of a widespread sense of societal insecurity: “It is not that they distrust their husband, but they have seen

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divorce all around them and know they could be next." The Polling Company's Kellyanne Fitzpatrick is categorical: "Women see government as their insurance." [*Richmond Times Dispatch*, December 5, 1996]

I. Introduction

For decades we have known that women vote differently than men. In the presidential elections from 1980 to 1996 the gender gap—the difference between the way men voted and the way women did—was 14 points in 1980, 16 in 1984, 15 in 1988, 5 in 1992, and 17 in 1996 (Langer 1996). According to Voter News Service election day exit polls, if men alone could have voted in the 1996 presidential election, Robert Dole would have been elected president by carrying 31 states.

The source of these differences in views on the role government should play is not completely clear. Women appear to be more risk-averse than men (Jianakoplos and Bernasek 1998),¹ but why do women choose to use the government rather than other mechanisms to provide insurance?² Many government programs are primarily wealth transfer programs that do not merely provide insurance. Marriage also provides another economic basis for men's and women's preferences for different policies. It typically encourages men to accumulate market capital and leads women to acquire household skills and shoulder most of the child-rearing responsibilities. While the gains from marital specialization and from efficient statistical discrimination in the labor market can be internalized through marriage, divorced women often have been unable to recoup the full compensation for their family-specific investments through alimony. Women experience great difficulty in obtaining even court-ordered alimony payments. Since women tend to have lower incomes, they benefit more from various government programs that redistribute income to the poor, such as progressive taxation.² Hence, single women as well as women who anticipate that they may become single

¹ International polling data also find that women tend to be relatively risk-averse "almost" everywhere (see Stark 1996, p. 75).

² Even if men's and women's average incomes were equal, the higher variability of men's income implies that they would pay more in taxes with a progressive income tax. While many women will be married to these men and while many will gain through inheritance, it would appear that men, simply because some of them will be single when they earn and spend this income, would be relatively discriminated against by a progressive income tax. The sociobiology literature offers explanations for the different attitudes that men and women have toward risk (e.g., Chodorow 1978; Trivers 1985; Epstein 1992; Strauss 1992; Browne 1995).

may prefer a more progressive tax system and more wealth transfers to low-income people as an alternative to a share of a husband's uncertain future income. Indeed, we have found that after women have to raise children on their own, they are more likely to classify themselves as liberal, vote for Democrats, and support policies such as progressive income taxation (Lott and Kenny 1997).³

It is not difficult to see that giving women the right to vote is likely to have played some role in determining the path of government spending over time. One long-standing puzzle facing public choice has been why government growth started when it did (Tullock 1995). In the United States, many have noted the general problem: "The New Deal was really an extension of the type of government growth that occurred in the 1920's" (Holcombe 1996, p. 197). The literature is littered with theories from the unbalanced growth hypothesis (Baumol 1967), ratcheting effects (Peacock and Wiseman 1961), reductions in the costs of collecting taxes (Kau and Rubin 1981), entrepreneurial politicians (Becker 1985; Lott 1990, 1999), the development of interest groups (Holcombe 1999), and the notion that government is a superior good (Wagner's law).⁴

All these theories face one significant problem: government has not always been growing. Previous general discussions involving the extensions of the voting franchise (e.g., Meltzer and Richard 1978, 1981, 1983) also have problems explaining the timing of growth. Indeed in the United States, with the exceptions of wars, real per capita federal government expenditures remained remarkably constant until the 1920s. In fact, as has been widely noted by public choice scholars, World War I was the first war after which per capita government expenditures did not return to their prewar levels, and by the end of the 1920s the growth trend that we are so familiar with today had begun.⁵ To explain this timing, some point to the effect that the seemingly successful economywide regulations during the

³ We used the individual respondent data in the 1988 CBS News General Election Exit Poll and the 1990–96 Voter News Service National General Election Exit Polls. The regressions utilize, in addition to individual state dummy variables, dummy variables representing over 50 different personal characteristics. Using state-level data, we also found that increasing the number of single mothers relative to the number of couples raising children is associated with greater gender gaps for both gubernatorial and Senate elections, though the effect is statistically significant only for the larger sample of gubernatorial races. Lott and Kenny (1997) also test for whether women are more likely to vote for increased government spending because women are more likely to be employed by the government, but we find very little evidence to support this hypothesis.

⁴ For an extensive survey of Wagner's law, see Bennett and Johnson (1980).

⁵ Another argument claims that larger government has resulted from increasing income inequality and education. For different views on this, see Peltzman (1980) and Lott (1987, 1990, 1999).

war had on people's beliefs about the role of government (Higgs 1987).

We propose that giving women the right to vote changed the size of government. We examine several indicators of the size and scope of government, from state government expenditures and revenues to voting index scores for federal House and Senate members from 1870 to 1940.

Twenty-nine states gave women the right to vote before the Nineteenth Amendment to the Constitution was approved in 1920, with seven of the remaining 19 approving the amendment and 12 having women's suffrage imposed on them. Women obtained the right to vote in four states even prior to the turn of the century, in eight states between 1910 and 1914, and in 17 states in 1917–19. By 1940, the end of our sample, women had been voting in 12 states for at least 26 years and in four states for at least 44 years.

Although a number of women took advantage of their new right to vote immediately, it took several decades for turnout to fully adjust. We find that government continued to grow as female voter turnout increased over time. Since suffrage was granted to women in different states over a long period of time extending from 1869 to 1920, it is unlikely that World War I is the key. These data also allow us to address causality questions in unusual ways. The central issue is whether giving women the right to vote caused government to grow or there was something else that both contributed to women's getting the right to vote and also increased government growth. We find very similar effects of women's suffrage in states that voted for suffrage and states that were forced to give women the right to vote, which suggests that the second effect is small.

II. Changes in Voting Laws

A great expansion of voting rights has occurred over the last century and a half, with a corresponding shift in political power. It is important to account for these and other changes in voter turnout so that we do not falsely attribute changes in voting participation rates to female suffrage when other changes may have been occurring around the same time. This information will also allow us to examine whether it is an increase in the franchise per se that is producing higher government expenditures or whether extending the franchise to women was in some way unique. Table 1 describes how the legal restrictions on voting changed over time. Our data on voter turnout, state government spending, and federal legislative voting were collected beginning in 1870 or when a state entered the union, whichever is later; so column 1 lists each state's year of entry. The

TABLE 1
CHANGES IN VOTING LAWS, 1870-1940

State	Year Admitted as a State (1)	Start of Secret Ballot (2)	Start of Women's Suffrage (3)	Poll Tax (4)	Literacy Test (5)
Alabama	1819	1893	1920	1901-63	1901-
Arizona	1912	1891	1912		1912-
Arkansas	1836	1891	1917	1891-1963	
California	1850	1891	1911		1894-
Colorado	1876	1891	1893		
Connecticut	1788	1909	1920		1856-
Delaware	1787	1891	1920	-1907	1897-
Florida	1845	1895	1920	1889-1927	
Georgia	1788	1922	1920	-1945	1908-
Idaho	1890	1891	1896		
Illinois	1818	1891	1913		
Indiana	1816	1889	1919		
Iowa	1846	1892	1919		
Kansas	1861	1893	1912		
Kentucky	1792	1882	1920		
Louisiana	1812	1896	1920	1898-1934	1898-
Maine	1820	1891	1919		1892-
Maryland	1788	1892	1920		
Massachusetts	1788	1888	1920	-1891	1857-
Michigan	1837	1891	1918		
Minnesota	1858	1891	1919		
Mississippi	1817	1890	1920	1889-1963	1890-
Missouri	1821	1891	1919		
Montana	1889	1889	1914		
Nebraska	1867	1891	1917		
Nevada	1864	1891	1914	-1910	
New Hampshire	1788	1891	1920		1902-
New Jersey	1787	1911	1920		
New Mexico	1912	1912	1920		
New York	1788	1895	1917		1921-
North Carolina	1789	1929	1920	1899-1920	1900-
North Dakota	1889	1891	1917		
Ohio	1803	1891	1919		
Oklahoma	1907	1890	1918		1912-
Oregon	1859	1891	1912		1924-
Pennsylvania	1787	1891	1920	-1933	
Rhode Island	1790	1889	1917	-1888	
South Carolina	1788	1950	1920	1895-1951	1895-
South Dakota	1889	1891	1918		
Tennessee	1796	1921	1919	1870, 1890-1951	
Texas	1845	1905	1918	1902-63	
Utah	1896	1896	1870		
Vermont	1791	1890	1920		
Virginia	1788	1894	1920	1875-82, 1902-63	1902-
Washington	1889	1890	1910		1896-
West Virginia	1863	1891	1920		
Wisconsin	1848	1894	1919		
Wyoming	1890	1890	1869		1889-

one exception is Arizona, whose state expenditure and revenue data are available for 1911, when it was still a territory.

Adopting secret ballots prevented many illiterate citizens from voting; reading skills were required when voting no longer involved simply taking a colored card that represented one's party preference into the voting booth. Secret ballots also greatly hampered vote buying since it was much more difficult for those buying votes to monitor which candidates a person voted for. Column 2 illustrates how the secret ballot swept through the country, with 40 states adopting it between 1888 and 1896 (see Anderson and Tollison 1990; Heckelman 1995).

The timing of women's suffrage is shown in column 3. Women obtained the right to vote in four states even prior to the turn of the century, in eight states between 1910 and 1914, and in 17 states between 1917 and 1919. Prior to 1916, almost all states granting suffrage were in the West.

As shown in column 4, the poll tax was used by 16 states at some point during our sample period. During this time, the tax was imposed in 10 states, eliminated and reimposed in two states, and eliminated in eight states. By 1940, for five states at least 20 years had elapsed since the poll tax had been repealed.

Column 5 depicts states' reliance on the literacy test. Nineteen states used this restriction at some time during the period.

III. Effect of Suffrage on Spending and Taxation

Since simple time-series data make it difficult to convincingly show that granting women the right to vote results in higher government spending using U.S. federal data and comparable data on a large number of countries covering a long time period are unavailable, we take advantage of state-to-state variations in the timing of the granting of women's suffrage. Widespread data on local expenditures and socioeconomic characteristics during this time period are unavailable. Thus state government expenditure and revenue data offer perhaps the best chance for testing this hypothesis. Because state government accounted for only around 10 percent of total government spending when women's suffrage was most expanded, we shall later examine whether expanding state government spending is merely substituting for other government spending and seek evidence from the voting behavior of the state congressional delegations on how women's suffrage affected the federal government.

We utilize data for all 48 contiguous states from 1870 to 1940. The expenditure and taxation data prior to 1915 were provided by John Wallis. Subsequent data were obtained from various issues of *Finan-*

TABLE 2
 SAMPLE MEANS AND STANDARD DEVIATIONS FOR ENDOGENOUS VARIABLES
 EXAMINING WHY WOMEN VOTE SO DIFFERENTLY

	Mean	Standard Deviation	Observations
ln(real per capita state revenue)	2.862	.952	1,834
ln(real per capita state expenditures)	2.815	.963	1,883
ln(real per capita educational expenditures)	1.311	1.212	1,829
ln(real per capita social service expenditures)	.682	1.140	1,797
ln(real per capita transportation expenditures)	.123	2.674	1,541
ln(real per capita property taxes)	1.515	1.365	1,236
U.S. House state delegation voting index (scale -1 to 1)	.041	.348	1,588
U.S. Senate state delegation voting index (scale -1 to 1)	.025	.492	1,588

cial Statistics of States. Since the series from both sources needed to be comparable, analysis of taxation and expenditure was restricted to series satisfying that criterion: total expenditure; total revenue; property tax revenue; current and capital expenditures on elementary and secondary schools and libraries (education); current expenditures on charities, hospitals, and corrections (social services); and current and capital expenditures on highways (highway) (see table 2).⁶ Given that most serious crime is committed against males and that women may be more likely to value spending on charities, aggregating these different types of spending together under the label of social services is less than ideal. These variables are in real (1967) dollars per capita.

Figure 1 provides a simple graphic illustration on the relationship between women's suffrage and the percentage of the total population over age 21 that voted. All state dates are normalized so that year 0 on the horizontal axis is the first year in which women in a state were allowed to vote. Values to the right along the bottom axis show the number of years following suffrage, and values to the left indicate the number of years prior to the adoption of the law. While figure 1 does not control for any other factors that might influence the returns to voting, the graph is very suggestive. On average, voting participation rates were very stable in the years preceding suffrage. Yet, once suffrage was granted, participation rates immediately rose from 25 to 37 percent, with a continued slower rise to 43 percent occurring over the subsequent decade. To the extent that voting by

⁶ Although we were unable to replicate exactly the data on total expenditure from Wallis using *Financial Statistics of States*, the figures for the two series seemed close enough to permit analysis.

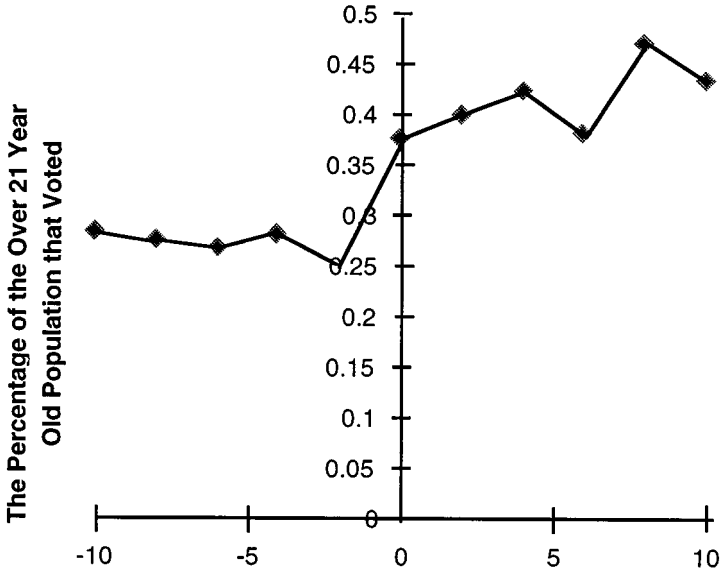


FIG. 1.—Effect of giving women the right to vote on the percentage of the adult population that votes. The horizontal axis shows the years before and after women were given the right to vote in different states: year 0 is the first year in which women were allowed to vote in different states.

women reduces the return to men's voting, the simple increase in the fraction of the population voting underestimates the number of women who vote. The Appendix provides a more systematic investigation of the factors affecting participation rates during these years.

Figure 2 graphs the simple relationship between the granting of women's suffrage and per capita state government expenditures and revenue. The bottom axis is the same as that used in figure 1, and it sets year 0 as the fiscal year during which women first voted in any state.⁷ While some caution is needed in reading this graph (since nothing else is being controlled for), the figure shows that state governments grew dramatically when women were given the right to vote. State government expenditures declined for four of the five years before women began voting, and expenditures reach their lowest point immediately before women were given the right to vote.

⁷ Because state expenditures and revenues were missing for some years, the changes in the average state's values between years were calculated for those states that had values in both adjacent years. When a state is missing no more than one consecutive year of data, the change between the two years for which the data are available is calculated and then divided by two. Graphing the means for the observed state expenditures and revenues in each year produces a very similar graph.

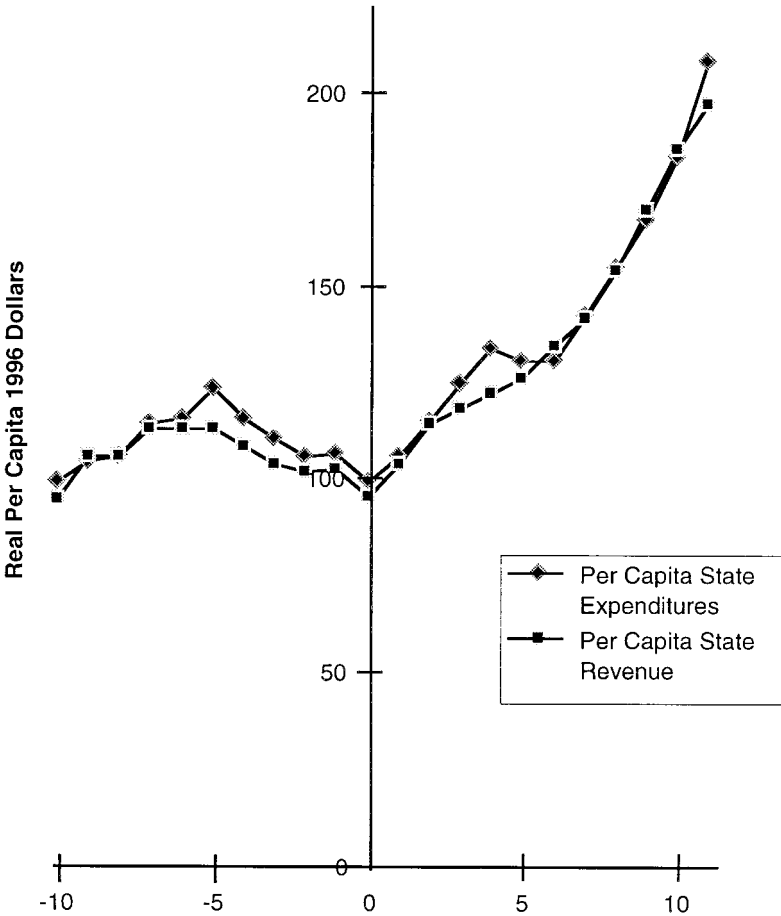


FIG. 2.—Effect of giving women the right to vote on per capita state government expenditures and revenue. The horizontal axis shows the years before and after women were given the right to vote in different states: year 0 is the first year in which women were allowed to vote in different states.

Within four years after women's suffrage, expenditures had risen above their previous peak, and within 11 years, real per capita expenditures had more than doubled from \$101 to \$208.⁸

Given that the vast majority of spending for the fiscal year that coincided with "year 0" was decided immediately before women were allowed to first vote, it appears that legislators started approving increased spending only after women began to vote. This timing sug-

⁸ By comparison, 1994 per capita state government expenditures in 1996 dollars averaged \$3,177.

gests that the causation primarily runs from giving women the right to vote to larger government as opposed to some left-out variable (e.g., a general change in values), which resulted in both women's suffrage and increased government spending.⁹ We shall return to the question of causation in Section V.

One concern with figure 2 is that many states made the decision to let women vote around World War I and that the changes brought about by the war, rather than suffrage, may have prompted higher government expenditures.¹⁰ Since the war ended in November 1918 and the Nineteenth Amendment was ratified in August 1920, examining just the 19 states that extended suffrage as a result of the amendment allows us to see whether state governments started expanding as a result of the war and not suffrage. As shown in table 1, this group of states included states from across the nation, most of which were not members of the old Confederacy (e.g., Connecticut, Delaware, Kentucky, Massachusetts, Maryland, New Hampshire, New Jersey, New Mexico, Pennsylvania, Vermont, and West Virginia). A graph like figure 2 yet using only this later group of states confirms that state governments did not start expanding as a result of either the beginning or the end of the war, but only once women were given the right to vote. Unfortunately, only one state had expenditure data and no states had revenue data for 1920, so we are not able to pinpoint exactly when state government spending and revenue increased. But state government expenditures continued to decline for at least one year after the war was over, which suggests that the subsequent increases were not due to the war.

World War I appears to have had little noticeable impact on state governments, since the slight downward trend in state per capita spending and revenue that started in 1913 continues through 1919 and is remarkably similar to the presuffrage pattern observed in the full sample. If anything, the slightly greater explosion in government spending may explain part of the reason why these states were the most reluctant to extend suffrage.

Obviously other socioeconomic variables must be accounted for when we attempt to explain changes in government revenue or

⁹ This result is quite consistent with more recent evidence that congressmen and senators do not alter their voting behavior when they face a new set of constituents—because of either their running for another office or redistricting (see Lott and Davis 1992; Lott and Bronars 1993).

¹⁰ Of the 19 states in which women voted for the first time in 1920, seven had state legislatures that approved the amendment (Kentucky, Massachusetts, New Hampshire, New Jersey, New Mexico, Pennsylvania, and West Virginia) and 12 did not (Alabama, Connecticut, Delaware, Florida, Georgia, Louisiana, Maryland, Mississippi, North Carolina, South Carolina, Vermont, and Virginia). The figure described below was put together in the exact same manner as fig. 2; see n. 7.

spending. Data on illiteracy rates, foreign-born population, male and female populations aged 21 or older, the percentage of the workforce in manufacturing, and real manufacturing wages were obtained from the eight censuses conducted during this period.¹¹ The *Historical Statistics of the United States: Colonial Times to 1970* (Bureau of the Census 1975) provided consistent decennial series on total population, rural and elderly populations, and the number of gainful female workers. Interpolation was also used to create intercensus estimates for all the socioeconomic variables. State dummies capture time-invariant cross-sectional differences in amenities, "tastes" for government, and institutional structure. The year dummies pick up changes over time in the relative price of government services, federal programs, national business cycle conditions, and "tastes" for government programs. However, the use of fixed state and year effects also has its drawbacks: while it may correctly measure left-out variables, it may falsely cause us to attribute some changes in government growth to fixed effects that should be attributed to variables such as women's voting.

Table 3 provides our first estimates of the effects of giving women the right to vote and of imposing and removing poll taxes. With the exception of property tax (1,236 observations), these regressions are based on 1,541–1,883 observations. The specification regresses our estimated effects of women's suffrage on voter turnout from the Appendix on measures of state government total expenditures and revenue. The coefficients for a female suffrage dummy, time since suffrage, and time since suffrage squared reported in specification 6 of table A1 were used to create a measure of additional turnout due to female suffrage.¹² The estimates imply that after women were given the right to vote, voter turnout increased immediately and then grew steadily for many years. Similarly, the coefficients from the same regression in the Appendix on (1) poll tax, (2) a dummy indicating whether a poll tax has been removed, (3) time since removal of the poll tax, and (4) time since removal squared have been multiplied by their variable values, creating an estimate of additional turnout due to the poll tax. The standard errors in regressions with these two variables have been modified using Murphy and Topel's

¹¹ We also tried using the real average value per farm and a very crude measure of per capita personal income based on two sources, but this produced results very similar to those we show. Since the government series on state personal income goes back only to 1929, a crude measure of per capita personal income was created by combining the government figures for 1930 and 1940 with data on 1880, 1900, and 1920 from Lee et al. (1957). Interpolated estimates for 1890 and 1910 and extrapolated estimates for 1870 were created taking into account changes in U.S. gross national product over these years.

¹² The other estimates of turnout produced similar results.

TABLE 3
EXPENDITURE AND TAXATION REGRESSIONS: ADDITIONAL TURNOUT SPECIFICATION

	ENDOGENOUS VARIABLES						
	Expenditures				Revenues		
	MEAN (1)	Total (2)	Education (3)	Social Services (4)	Highways (5)	Total (6)	Property (7)
Additional turnout due to female suffrage	.096 (.111)	.740 (2.430)	-.093 (.197)	.283 (.670)	.019 (.025)	.723 (2.392)	-.420 (.688)
Additional turnout due to the poll tax	-.030 (.052)	-.170 (.411)	2.242 (3.193)	-1.287 (2.056)	1.194 (.876)	.320 (.760)	-2.632 (2.009)
Literacy test	.257 (.437)	.051 (1.030)	.172 (2.103)	.025 (.325)	-.626 (3.999)	.149 (3.035)	-.139 (.769)
Secret ballot	.747 (.435)	-.023 (.423)	-.112 (1.294)	-.260 (3.390)	-.047 (.298)	.0013 (.022)	.037 (.233)
Motor vehicle registrations	.060 (.088)	10,710 (4,120)	...	...	18,290 (2,835)	12,136 (1,334)	...
Log density	3,379 (1.53)	-.173 (2.793)	-.153 (1.492)	-.105 (1.120)	-1.249 (5.905)	-.174 (2.766)	-.645 (3.069)

Rural	.621 (.216)	-.744 (2.651)	1.893 (4.157)	.825 (2.028)	-.865 (1.010)	-.319 (1.107)	-.877 (.911)
Fraction of the population that is black	.113 (.157)	-1.450 (1.617)	-4.445 (3.085)	-1.728 (1.358)	-17.194 (6.264)	-3.958 (4.405)	-1.866 (.710)
Fraction of the population age 65 and older	.044 (.017)	-9.715 (4.339)	-5.056 (1.425)	-11.150 (3.502)	13.086 (1.991)	-8.603 (3.653)	15.048 (2.606)
Female workers	.279 (.102)	-.927 (1.990)	1.425 (1.824)	.899 (1.284)	-4.561 (3.502)	-.496 (1.066)	-.884 (.822)
Manufacturing	.113 (.089)	1.920 (3.394)	2.003 (2.205)	-.795 (.986)	12.065 (7.621)	1.821 (3.200)	-1.704 (1.092)
Fraction of the population over age 10 that is illiterate	.099 (.114)	.612 (1.459)	-1.790 (2.578)	.338 (.549)	5.419 (3.870)	1.559 (3.522)	-1.337 (1.100)
Fraction of the population that is foreign-born	.120 (.094)	.390 (.776)	.492 (.604)	.850 (1.157)	2.003 (1.227)	.993 (1.951)	-4.268 (2.379)
Real manufacturing wage	2.332 (1.338)	-6×10^{-5} (1.360)	-2×10^{-6} (.023)	-3×10^{-4} (4.472)	-4×10^{-4} (3.371)	9×10^{-5} (2.103)	9×10^{-5} (1.127)
Fixed state effects		yes	yes	yes	yes	yes	yes
Fixed year effects		yes	yes	yes	yes	yes	yes
Adjusted R^2		.8159	.7056	.7403	.8525	.8118	.6993
Root mean squared error		.4132	.6575	.5808	1.027	.4131	.7486
F -statistic		68.815	36.915	42.957	73.374	65.286	24.546
Observations		1,883	1,829	1,797	1,541	1,834	1,236

NOTE.—In col. 1, numbers in parentheses are standard deviations; in cols. 2-7, they are absolute z -statistics.

(1985) method to take into account the error in the first-stage coefficients reported in the Appendix; otherwise the second-stage standard errors are underestimated. For these regressions we report z -statistics based on large sample standard errors.

Granting women the right to vote is estimated to raise total spending and revenue. In table 3, additional turnout due to female suffrage has significantly positive coefficients in the total expenditure and total revenue regressions but not in the other four regressions. Our voter turnout regressions implied that in a typical state, where 46 percent of the adult population is female, suffrage resulted in an immediate 17.9-percentage-point increase in the fraction of the adult population voting and in increases of 26 percentage points after 25 years and 33 percentage points after 45 years. On the basis of these estimates, granting women the right to vote caused expenditures to rise immediately by 14 percent ($.179 \times .740$ increase in log), by 21 percent after 25 years, and by 28 percent after 45 years. Similarly, female suffrage led to a 21 percent rise in revenue after 25 years and a 27 percent rise after 45 years.¹³

These are large changes, but they must be placed in historical perspective. From 1913 to 1922, real per capita state spending increased from \$63.1 to \$118.6, an increase of 88 percent. The growth that we attribute to women's suffrage accounts for approximately 16 percent of the growth in state spending over this nine-year period.

Table 4 uses a simple dummy for whether women were allowed to vote times the fraction of the population over 21 that is female and a dummy variable indicating whether a poll tax was in effect. The interaction between the suffrage dummy and the percentage female is used because the impact of suffrage on turnout depends on how many women there are in the population. In the extreme, obviously if there were no women, enacting suffrage would not increase the percentage of the adult population that voted and thereby the size of government.

The results for the simple specification in table 4 are consistent with the evidence in table 3. Female suffrage has a significant impact only on total spending and revenue. Allowing women to vote is esti-

¹³ During the 70 years we examined, there were 15 observations in which the reported year-to-year changes in state government expenditures either rose by more than 100 percent or fell by more than 50 percent. As a test of the result's sensitivity to these outliers and concerns over the rapid increase in transportation expenditures during the first couple of decades of this century, we reestimated the total expenditures and revenue regressions in table 3 without these observations and net of transportation expenditures and revenue. The new coefficients were similar though smaller than what we have already reported, with the additional turnout due to female suffrage coefficient for total expenditures now 0.64 (t -statistic = 1.83) and for total revenue 0.64 (1.92).

TABLE 4
EXPENDITURE AND REVENUE REGRESSIONS: ALTERNATIVE SPECIFICATION

DUMMY SPECIFICATION	ENDOGENOUS VARIABLES						
	MEAN (1)	Total (2)	Education (3)	Social Services (4)	Highways (5)	Total (6)	Property (7)
Female suffrage \times fraction of the population that is female	.211 (.236)	.238 (2.086)	-.183 (.991)	.063 (.383)	.120 (.389)	.215 (1.903)	-.151 (.614)
Poll tax	.228 (.420)	-.104 (2.315)	-.373 (5.065)	.101 (1.481)	-.274 (1.810)	-.120 (2.638)	.283 (1.717)

NOTE.—All the other variables controlled for in table 3 are included here, though they are not reported. In col. 1, numbers in parentheses are standard deviations; in cols. 2-7, they are absolute *t*-statistics.

mated to raise total expenditure and revenue by 13.5 and 10.4 percent, respectively, *on average* in our sample. Recall that the median state granted suffrage in 1918 and that our data do not extend past 1940.

However, tables 3 and 4 also produce a puzzle. Total spending and taxes are rising, but the components that we so far have been able to measure do not change much. The point estimates imply that social service expenditures are increasing at least at one-third the rate of the increase in total expenditures in response to the growing influence of female voters. However, the effect is only statistically significant when the fixed year effects are replaced with a quadratic time trend. Unfortunately, these categories do not capture the major trends in taxes and spending. In this sample, property taxes are only 26 percent of state revenue, and the three categories of spending that we can measure account for just 41 percent of total expenditures.

Because relatively few observations are available, tables 3 and 4 do not examine other expenditure and revenue sources. Fortunately, some evidence of total state government expenditures by type is available for selected years: 1902, 1913, 1922, and 1927 (Bureau of the Census 1975). Table 5 lists all the different components of expenditures. Over this period the eight largest absolute increases in per capita state and local government expenditures in real 1996 dollars were education, \$110; highways, \$96; state government transfers to local government, \$33; interest on general debt, \$28; "other" general expenditures, \$24; utilities, \$19; sanitation, \$12; and hospitals, \$11. The influence of female voters may have been reflected in the large increases in education, sanitation, and hospital expenditures by local governments and the large increase in state transfers to local governments, which spend over a quarter of their budgets on education.

Women's suffrage should have resulted in an expansion of local government as well as state government. It nevertheless is possible that higher state government expenditures are merely substituting for reduced expenditures at the local level. Table 5 demonstrates that both state and local government expenditures grew across the board. While total per capita state government expenditures in real 1996 dollars rose from \$42 in 1902 to \$154 in 1927, local government spending also rose dramatically over the same period: from \$219 to \$478.

For the other results, the evidence in table 4 is also weakly consistent with poll taxes' reduction of voter turnout, particularly among the poor, bringing about lower total spending and total revenue; though the effect is not always consistent with the hypothesis that

this hurt the programs benefiting the poor. Surprisingly, the literacy test, which was used to keep immigrants with poor language skills from voting and to discriminate against blacks, raised education spending and total revenues but reduced highway budgets. An increase in either the fraction of the population that is black or the fraction 65 and older is associated with a rise in the potential population who depend on assistance and a fall in per capita income. Although there are some exceptions to this pattern, on net the income effect dominates. Significantly negative coefficients are found for percentage black or elderly in five regressions. The negative coefficients for population density (log density) are consistent with economies of scale in providing government services, particularly for road building.¹⁴

Our data also allow us to test whether our results arise because we are not accounting for Stigler's hypothesis that government growth and expenditure patterns can be explained by the innovation of income taxes (Stigler 1970, p. 9). We reran the regressions shown in table 3 with a dummy variable for the introduction of the state income tax, but this did not alter our results. The dummy variable for the tax is negative but not statistically significant.¹⁵

IV. Other Dimensions of the Effect of Giving Women the Right to Vote

If women vote differently than men, giving women the right to vote should affect other aspects of politics. On the national level, we should expect that members of the House and Senate should behave differently. On the state level, other issues were being decided besides the level and composition of state government expenditures and revenue. We have gathered data on prohibition and divorce laws.

Congressional Voting Records

Although it is difficult to estimate the effect of women's suffrage on federal spending using time-series data, examining the voting behavior of the state congressional delegations provides pooled time-series, cross-sectional evidence on whether giving women the

¹⁴ The variable motor vehicle registrations per capita has the expected positive impact on highway spending (passenger cars and motor trucks combined [includes road tractors after 1923], from various years of *Statistical Abstract of the United States*).

¹⁵ For example, the coefficient for the impact of additional turnout due to female suffrage on total state government expenditures is now .832 (2.720) and on total state government revenue is .774638 (2.763).

TABLE 5
STATE AND LOCAL REAL PER CAPITA GOVERNMENT EXPENDITURES (in 1996 Dollars)

	YEAR			ABSOLUTE INCREASE IN PER CAPITA EXPENDITURES	PERCENTAGE INCREASE FROM 1902 TO 1927	
	1927	1922	1913			1902
	State Per Capita Expenditures					
Intergovernmental transfers to local governments	44.8	26.5	14.8	11.9	32.9	277%
Education	16.4	13.9	8.9	3.9	12.5	322%
Highways	38.6	25.7	4.2	.9	37.7	4,120%
Welfare	3.0	3.2	2.6	2.3	.7	32%
Hospitals	11.0	8.9	7.6	6.4	4.6	72%
Health	1.8	1.7	1.0	.9	.9	98%
Police	.5	.3	.2	.0	.5	NA
Natural resources	7.1	5.2	2.3	2.1	5.0	244%
Financial administration and general control	7.2	5.9	6.2	5.2	2.0	37%
Interest on general debt	6.2	3.8	2.3	2.3	4.0	173%
Correction	4.8	5.4	4.6	3.2	1.6	51%
Other	7.1	13.4	8.5	3.4	3.6	106%
Insurance trust expenditures	5.3	4.6	.0	.0	5.3	NA
Total per capita expenditures	153.8	118.6	63.1	42.4	111.4	262%

	Local Government Per Capita Expenditures					
Education	151.6	130.9	84.9	54.3	97.2	179%
Highways	97.3	84.2	63.9	39.0	58.3	149%
Welfare	8.3	6.9	5.9	6.2	2.2	35%
Hospitals	10.0	8.1	5.2	3.4	6.6	192%
Health	3.9	3.2	3.7	3.0	.9	32%
Police	19.8	15.8	14.3	11.4	8.3	73%
Fire protection	15.3	13.4	12.4	9.1	6.1	67%
Sanitation	23.4	16.1	15.8	11.6	11.8	101%
Financial administration and general control	23.7	20.7	28.1	26.9	-3.2	-12%
Interest on general debt	37.6	28.6	21.6	13.2	24.4	184%
Social insurance administration	11.5	7.2	9.3	6.6	4.9	74%
Other	35.6	20.6	22.3	15.7	19.9	126%
Utilities	36.9	30.5	30.2	18.3	18.6	102%
Insurance trust expenditures	2.9	1.8	1.1	.0	2.9	NA
Total per capita expenditures	477.8	387.9	318.7	218.9	258.9	120%

SOURCE.—Bureau of the Census (1975).

right to vote made legislators more liberal and thus more inclined to support a larger role for government. The measures of congressional and Senate voting behavior are obtained from the legislative vote indexes compiled by Poole and Rosenthal (1991). Since 80–83 percent of congressional voting can be described by their first index and since this score is positively correlated with what they label “conservative” positions, this is the dimension that we shall focus on. For example, more “conservative” legislators, with large positive voting index values, during the 1870–1940 period consistently opposed increased government regulation ranging from the Interstate Commerce Commission to the minimum-wage law (Poole and Rosenthal 1997, chap. 6). They also claim that over this period the index consistently predicts congressional votes on other issues such as government spending: higher scores predict opposition to greater government spending in the 1870s as well as they do in the 1930s.

As with the voter turnout data, we calculated what the average voting score was for members of the House and Senate delegations at the state level for each two-year term from 1870 to 1940. In our sample, the mean and standard deviation in the Senate (House) were 0.025 and 0.492 (0.041 and 0.348), respectively. Table 6 reports results from regressions with the same specification as tables 3 and 4. Results for the additional turnout specification of table 3 are found in panel A, and results for the dummy specification of table 4 are shown in panel B.

While the regressions reported here use the same sets of control variables that were used in table 3, only the coefficients with respect to the voting rules are reported. The two consistent results were the following: allowing female suffrage resulted in a more liberal tilt in congressional voting for both houses, and the extent of that shift was mirrored by the increase in turnout due to female suffrage. The effects are quite large. For voting by House members, a one-standard-deviation change in female suffrage \times fraction of the population over 21 that is female is able to explain 14.5 percent of a one-standard-deviation change in how a state’s House of Representatives delegation votes, and a one-standard-deviation change in the additional turnout due to female suffrage explains about 19 percent.¹⁶ For the Senate these figures are 21 and 30 percent, respectively.

Another way of understanding the importance of these changes

¹⁶ These changes in voting patterns are 10–20 times larger than the changes that are observed in other measures of contemporary congressional voting scores when constituent interests change or when redistricting occurs (e.g., Lott and Bronars 1993). See also Jung, Kenny, and Lott (1994) for a related discussion.

TABLE 6

VOTING BY MEMBERS OF THE U.S. HOUSE OF REPRESENTATIVES AND THE SENATE:
ADDITIONAL TURNOUT AND DUMMY VARIABLE SPECIFICATIONS ($N = 1,588$)

	Voting by Members of the U.S. House of Representatives	Voting by Members of the U.S. Senate
A. Additional Turnout Specification		
Additional turnout due to female suffrage	-.5859 (3.083)	-1.3388 (4.446)
Additional turnout due to poll tax	.9454 (4.378)	1.4602 (4.598)
Literacy test	-.0130 (.554)	.0142 (.413)
Secret ballot	.0632 (2.460)	.0719 (1.913)
Fixed state effects	yes	yes
Fixed year effects	yes	yes
Adjusted R^2	.6726	.6496
Root mean squared error	.1991	.2911
F -statistic	35.312	31.966
B. Dummy Specification		
Female suffrage \times frac- tion of the population over 21 that is female	-.230 (3.387)	-.4651 (4.713)
Poll tax	-.127 (5.516)	-.2120 (6.303)
Fixed state effects	yes	yes
Fixed year effects	yes	yes
Adjusted R^2	.6751	.6527
Root mean squared error	.1984	.2898
F -statistic	35.708	32.400

NOTE.—All the other variables controlled for in table 3 are included here, though they are not reported. Absolute z -statistics are in parentheses in panel A and t -statistics in panel B.

can be seen in comparing how these changes correspond to the distances between the political parties. A one-standard-deviation change in female suffrage \times fraction of the population over 21 that is female produces a change in voting behavior in the House that equals about 10 percent of the difference between the average voting score for the Republican and Democratic congressmen in 1913 and a change in the Senate that appears to equal about 18 percent of the distance between the two parties.¹⁷ Women's suffrage thus

¹⁷ The House result is based on Poole and Rosenthal (1991, fig. 1). There is no analogous breakout in their book of the numbers for the Senate during this period of time. Our conclusion for the Senate is based on the assumption that distance between the parties was the same in the Senate.

produced a much more liberal Congress, which should have contributed to a larger federal budget.

We expected that the poll tax, by reducing turnout at the lower tail of the income distribution, would result in a richer, more conservative constituency that would oppose a more expansive government. However, these results imply that the opposite occurred. The significantly negative coefficients on poll tax and the significantly positive coefficients on additional turnout due to poll tax indicate that it was associated with a more liberal voting record in Congress. (When one is interpreting these results, it is important to remember that the poll tax lowers turnout, making additional turnout due to the poll tax a negative number.) Thus, surprisingly, all four specifications imply that the poll tax works in the same direction as female suffrage, which is inconsistent with the poll tax results for spending.

State Laws

Government can make direct wealth transfers not only through taxes and expenditures but also through the assignment of legal rights and regulations. Women obviously have a self-interest from restricting alimony only to women and allowing it to be granted permanently. Indeed, estimating similar but not reported regressions to those in previous tables confirms both of these predictions. Women also dominated the temperance movement, and we find strong evidence that suffrage directly led to passage of prohibition laws.

V. The Issue of Causality

As noted earlier, one of the more difficult problems in examining these questions is the issue of causation. The preceding results, which link the extent of the legislative changes to how many more women are voting, help answer this question, but they are not enough. A general concern is that higher government spending or more liberal congressional delegations may arise not from women's voting, but from something else that may cause both women's suffrage and larger government. Fortunately, the data here provide us with a relatively unique way of dealing with this issue. Not all the states voluntarily granted suffrage. If in fact there is a political climate that promotes both suffrage and bigger government, one would expect the changes in government size to show up only in states that voluntarily granted suffrage. To do this, we defined volun-

tary states as those that either adopted women's suffrage on their own or voted for the Nineteenth Amendment.¹⁸

The results reported in table 7 imply virtually no difference in House delegation voting either from giving women the right to vote voluntarily or as a result of the Nineteenth Amendment. The results for the Senate voting do, however, indicate that while both types of states saw their Senate delegations voting more liberally, the voluntary states experienced a statistically significant bigger change. The Senate results imply that while giving women the right to vote shifted the political spectrum, at least part of the change (about a third) may have been due to other pre-existing tendencies in a state and not women's voting per se.

The results on state government revenue and expenditures differ from the Senate voting scores, though they generally confirm what was observed in figure 2. Again, while both sets of states move in similar directions, states that were forced to grant women suffrage experienced much more profound changes in voting than those that voluntarily granted these privileges. These differences are again quite statistically significant, and they strongly rule out the possibility that higher government spending simply arose because there was something that was correlated with giving women the right to vote and a desire for greater government spending.

VI. Conclusion

Giving women the right to vote significantly changed American politics from the very beginning. Despite claims to the contrary, the gender gap is not something that has arisen since the 1970s. Suffrage coincided with immediate increases in state government expenditures and revenue, and these effects continued growing as more women took advantage of the franchise. Similar changes occurred at the federal level as female suffrage led to more liberal voting records for the state's U.S. House and Senate delegations. In the Senate, suffrage changed voting behavior by an amount equal to almost 20 percent of the difference between Republican and Democratic senators. Suffrage also coincided with changes in the probability that prohibition would be enacted and changes in divorce laws. We were also able to deal with questions of causality by taking advantage of the fact that while some states voluntarily adopted suffrage, others were compelled to do so by the Nineteenth Amendment. The con-

¹⁸ The states that had not granted suffrage but voted for the Nineteenth Amendment were Kentucky, Massachusetts, New Hampshire, New Jersey, New Mexico, Pennsylvania, and West Virginia.

TABLE 7
 WHETHER STATES THAT ADOPTED THESE LAWS VOLUNTARILY DIFFER FROM THOSE THAT HAD THEM IMPOSED ON THEM BY THE
 NINETEENTH AMENDMENT

	ENDOGENOUS VARIABLES		
	House Voting (<i>N</i> = 1,588)	Senate Voting (<i>N</i> = 1,588)	Total State Revenue (<i>N</i> = 1,834)
			Total State Expenditures (<i>N</i> = 1,883)
A. Additional Turnout Specification			
Additional turnout due to female suffrage adopted voluntarily	-.6249 (3.216)	-1.483 (4.743)	.3990 (1.318)
Additional turnout due to female suffrage adopted under 19th Amendment	-.4564 (2.117)	-.8597 (2.661)	1.5708 (3.990)
Additional turnout due to poll tax	.9235 (4.271)	1.3822 (4.371)	.1657 (.394)
Literacy test	-.0147 (.628)	.0074 (.214)	.1246 (2.540)
Secret ballot	.0615 (2.388)	.0651 (1.733)	.0025 (.041)
Fixed state effects	yes	yes	yes
Fixed year effects	yes	yes	yes
Adjusted <i>R</i> ²	.6726	.6513	.8135
Root mean squared error	.1991	.2904	.4113
<i>F</i> -statistic	34.966	31.883	65.465
			69.024

	B. Dummy Specification		
Female suffrage \times fraction of the population over 21 that is female adopted suffrage voluntarily	-.2354 (3.396)	.0904 (.773)	.1135 (.966)
Female suffrage \times fraction of the population over 21 that is female adopted suffrage under 19th Amendment	-.2093 (2.419)	-.3027 (2.404)	.6396 (4.273)
Poll tax	-.1257 (5.384)	-.2013 (5.921)	-.0835 (1.853)
Fixed state effects	yes	yes	yes
Fixed year effects	yes	yes	yes
Adjusted R^2	.6749	.6535	.8140
Root mean squared error	.1984	.2895	.4109
F -statistic	35.318	32.178	65.673
			69.186

NOTE.—All the other variables controlled for in table 3 are included here, though they are not reported. Absolute t -statistics are in parentheses.

clusion was that suffrage dramatically changed government in both cases. Accordingly, the effects of suffrage we estimate are not reflecting some other factor present in only states that adopted suffrage.

Not all women immediately took advantage of the right to vote. About half of the ultimate percentage of women who eventually voted in elections appeared to have started voting immediately after suffrage was granted, and most of those women were in the 45–64-year-old age group.

More work remains to be done on why women vote so differently, but our initial work provides scant evidence that it is due to self-interest arising from their employment by government. The only evidence that we found indicated that the gender gap in part arises from women's fear that they are being left to raise children on their own (Lott and Kenny 1997). If this result is true, the continued breakdown of the family and higher divorce rates imply growing political conflicts between the sexes.¹⁹

Claims that the gender gap has arisen as men have left the Democratic party and that the "modern" gender gap has arisen only since the 1970s can now be put in a different perspective (Stark 1996, p. 78). Combining these claims with our work implies that the gender gap disappeared during the 1960s and 1970s as men moved toward women and became more liberal, but that it reappeared again when men moved back to their original position relative to women.

Appendix

The Relationship between Voter Participation Rates and Female Suffrage

A. Theory

For many individuals, the economic and consumption benefits from voting appear to barely cover the cost of voting. According to estimates, even small changes in the costs and benefits have sizable impacts on voter turnout. Over the past two centuries, the barriers to voting have been lowered successively: replacing property requirements with poll taxes, allowing black males to vote, allowing women to vote, and most recently outlawing poll taxes and literacy tests.

Over a lifetime, individuals acquire "political capital" about party positions and candidates, and this knowledge increases the likelihood of voting for the best candidate or policy. But a 50-year-old, just given the right to vote, may not find it worthwhile to acquire any political capital and there-

¹⁹ Others have also made this prediction (Colson and Pearcy 1996; Becker 1997).

fore abstains from voting. On the other hand, a 25-year-old, facing a lifetime over which to use political capital, is more likely to become informed and participate in elections. The decisions to vote and acquire political knowledge are thus simultaneously determined.²⁰

Potentially, it can take many years before the full impact of voting reform is manifested, as cohorts with only a few years to benefit from voting will gradually be replaced. The larger the necessary investments in political capital, the younger a potential voter must be before it will pay to make them, and the longer it will take before the full adjustment is made.

The growth in turnout as cohorts with little incentive to acquire knowledge are replaced by newer cohorts may be more complicated than we have just described. Elderly women have a greater starting stock of knowledge simply by virtue of having had the opportunity to learn about issues over many years. They may already have acquired a great deal of information about political issues even if they never invested particularly heavily in learning about them in any given year and thus may be more likely to take advantage of the new voting franchise, other things equal.

How long is this lag? There is little evidence on how long it takes voter turnout to fully respond to an expanded voting franchise. Filer, Kenny, and Morton (1991) found that the poll tax, which was repealed in 1964 under the Twenty-fourth Amendment, was still depressing turnout 16 years later. In fact, about a third of the poll tax's dampening impact still remained in 1980, 16 years after its removal. Their paper examined turnout in only four elections—the 1948, 1960, 1968, and 1980 presidential elections—and their data set was therefore inadequate to estimate how voting rates adjusted over time.

In contrast, we use a much larger data set over a much longer period of time, observing gubernatorial elections on a biennial basis from 1870 to 1940. The turnout in gubernatorial elections for all 48 contiguous states is viewed as dependent on the imposition and removal of poll taxes as well as giving women the right to vote. We find evidence of long lags before the full effects on voter turnout of either adopting women's suffrage or removing the poll tax were realized. Our paper also adds to the empirical literature on historical voter turnout, a literature that has been rather meager despite the many fundamental changes in voting regulations (see Settle and Abrams 1976; Rusk and Stucker 1978; Heckelman 1995).

B. The Empirical Framework

Data on up to 36 biennial years in 1870–1940 were obtained for the 48 states in our sample. Infrequent elections and recent statehood reduced the sample to 1,215 elections.²¹ The dependent variable (gov turnout) is defined as the fraction of the total population (and not just the population that was eligible to vote) aged 21 or older who voted in the state's gubernatorial

²⁰ It is interesting to note that people's political views are formed relatively early in life and appear to change relatively little over time.

²¹ Gubernatorial elections in the prior odd year were used if there was no election in the even year.

torial election.²² This variable ranges from 2 to 83 percent, with a mean of 37 percent. In 1870–1908, the mean for gov turnout was 32 percent (for all but the four states that had approved women’s suffrage before 1910). Other things equal, turnout should have risen to 59 percent after women were given the right to vote, given their slightly lower portion of the population and under the assumption that they had the same participation rate as men. By the end of our sample (1936–40), average turnout had risen to 55 percent, which is quite close to current rates.

The socioeconomic and voting law variables that are used to explain changes in voter participation rates are the same as those used in table 3. Admittedly, there are many state-specific and year-specific differences in voter turnout rates that will not be captured by the variables that we control for and other differences that might affect the returns to voting over time. One simple way of dealing with this is the use of state and time fixed effects, with a separate dummy variable used for each state and year. Again, there is still the concern that while these fixed effects may correctly measure left-out variables, they may also cause us to falsely attribute some of the impact of changes in our other variables (e.g., voting rules) to these fixed effects.

Three sets of variables are employed to estimate the effects of giving women the right to vote and of imposing and removing poll taxes. As in the government expenditure and revenue regressions, the first specification reports a simple dummy variable indicating whether a poll tax was in effect and a dummy for whether women were allowed to vote times the fraction of the population over 21 that is female. The interaction between the suffrage dummy and the percentage female is used because the impact of suffrage on turnout depends on how many women there are in the population. In the extreme, obviously if there were no women, enacting suffrage would not increase the percentage of the over 21-year-old population that voted.

The second specification allows for an initial effect that depends on the fraction of adults who were female when suffrage was adopted and captures women’s lag in taking advantage of the right to vote with a spline. The spline estimates a piecewise-linear relationship between turnout and the time since granting women’s suffrage. Define years after passage to be the time since women obtained the right to vote. Furthermore, let

female suffrage: 0– T years

$$\equiv \begin{cases} \text{years after passage} & \text{if years after passage} \leq T \\ T & \text{if years after passage} > T; \end{cases}$$

female suffrage: T + years

$$\equiv \begin{cases} 0 & \text{if years after passage} \leq T \\ \text{years after passage} - T & \text{if years after passage} > T. \end{cases}$$

²² The number of votes and the margin of victory were found in Glashan (1979).

These two variables also are multiplied by the current fraction of adults who are female. The regression coefficient on the first variable (female suffrage $0-T$ years \times fraction of the population over 21 female) captures the rate of increase in turnout over time in the first T years after suffrage was granted, and the coefficient on the second variable estimates the rate of increase in turnout after at least T years have passed. After searching in yearly increments, we estimated T to be nine years in the specification with no fixed effects. Although the fixed-effects estimation suggested that two segments were not needed, a spline for T equal to five is reported for comparison. Poll taxes are allowed to have a lingering effect. Poll tax linger α , T' equals one when a poll tax is in place, equals α immediately after the poll tax is repealed, and declines linearly to zero over T' years.

The third specification uses a quadratic time trend to estimate the lagged response to the granting of women's suffrage. This formulation includes a dummy variable for the enactment of the suffrage law, the number of years since adoption, and that time trend squared. The first is multiplied by the initial fraction of adults who are female, and the second two variables are interacted with the current fraction of the over 21-year-old population that is female. For the poll tax, similar variables (a dummy, a time trend since repeal, and that time trend squared) are also used.

C. *The Impact of Giving Women the Right to Vote and the Effect of Poll Taxes*

Table A1 reports means and standard deviations for the independent variables and the results of regressions based on the three specifications described above, both with and without year and state fixed effects. The regressions fit the turnout rates well, with little noticeable differences between the three specifications. The hypotheses regarding literacy tests, age, and real wages receive much less support in the fixed-effects specifications than in the regressions without state and year fixed effects. Generally, consistently significant and predicted effects on voter turnout were obtained for the presence of presidential elections, the winning gubernatorial candidate's vote share, the relative manufacturing wage, the percentage foreign-born, the secret ballot, female suffrage, and the poll tax. Let us now turn to the specific results.

Female suffrage \times fraction of the population over 21 female is employed in the simple specification in regressions 1 and 4. Evaluated at the mean fraction female (.46), granting women the right to vote is estimated to increase voter turnout by 14–23 percentage points *on average* over the sample. While the 14 percent estimate with the fixed effects probably underestimates the true impact, the 23 percent is likewise undoubtedly too high.

Two specifications estimate the lag in voter turnout to women being given the right to vote. Regressions 3 and 6 use a quadratic time trend. There is evidence for a diminishing rate of increase in turnout after women's suffrage was granted in regression 3, but not in the fixed-effects specification (regression 6). In regression 3, turnout initially is 17 percentage points higher and rises at a diminishing rate until 54 years after suffrage was

TABLE AI

VOTER TURNOUT REGRESSIONS ($N = 1,215$)

	REGRESSION					
	(1)	(2)	(3)	(4)	(5)	(6)
	MEAN (Standard Deviation)					
Female suffrage \times fraction of the population over 21 that is female	.183 (.232)	...	...	.310 (6.874)	...	...
Female suffrage \times initial fraction of the population over 21 that is female	.173 (.223)	.292 (7.076)	.380 (9.413)	...	.290 (5.917)	.390 (8.672)
Female suffrage: 0-7 years \times fraction of the population over 21 that is female	1.443 (2.07)	.0192 (6.692)	...	...	.0272 (4.475)	...
Female suffrage: 7+ years \times fraction of the population over 21 that is female	1.207 (3.34)	.0061 (7.252)	...	...	.0062 (3.948)	...
Female suffrage years after passage \times fraction of the population over 21 that is female	2.649 (4.82)	...	.011 (7.221)	...	...	.0072 (3.325)
(Female suffrage years after passage) ² \times fraction of the population over 21 that is female	30.22 (96.1)	...	-.0001 (1.676)	...	...	9×10^{-6} (.162)
Poll tax	.195 (.396)	...	-.113 (16.08)	-.091 (11.70)	...	-.120 (10.43)
Dummy for: after poll tax is removed	.066 (.248)	...	-.063 (2.944)	...	...	-.090 (4.421)
Poll tax linger: α , T'	...	-.116 (16.64)	...	...	-.130 (14.18)	...
Poll tax years after removed	1.394 (6.436)	...	.0038 (1.829)	...	...	.0021 (1.336)
(Poll tax years after removed) ²	43.335 (248.2)	...	1×10^{-5} (.249)	...	...	.00005 (1.515)
Dummy variable for a literacy test	.239 (.426)	-.036 (5.942)	-.033 (5.472)	.0025 (.310)	.0098 (1.248)	.014 (1.746)
Dummy variable for a secret ballot	.681 (.466)	-.030 (5.021)	-.032 (5.496)	-.047 (5.676)	-.041 (5.137)	-.039 (4.931)
Dummy variable for a presidential election	.470 (.499)	.070 (16.41)	.069 (16.36)	.047 (5.061)	.047 (5.203)	.050 (5.531)

Dummy variable for a Senate election	.297 (.457)	-.0040 (.636)	-.0028 (.461)	-.0044 (.750)	-.0002 (.038)	.0011 (.218)	.0005 (.094)
Winning governor vote share	.582 (.137)	-.396 (16.21)	-.404 (17.57)	-.394 (17.23)	-.299 (13.50)	-.286 (13.30)	-.288 (13.43)
Log population	7.070 (1.03)	-.0084 (3.123)	-.0070 (2.695)	-.0036 (1.334)	-.0078 (.846)	-.016 (1.656)	-.016 (1.587)
Fraction of the population age 65 and older	.045 (.019)	1.447 (8.056)	1.208 (6.974)	1.277 (7.375)	-.234 (.659)	-.440 (1.261)	-.443 (1.265)
Fraction of the population over age 10 that is illiterate	.097 (.117)	-.046 (1.221)	-.019 (.544)	.0027 (.076)	.438 (8.843)	.289 (5.632)	.309 (5.788)
Relative manufacturing wage	-.068 (.905)	.057 (13.02)	.051 (12.51)	.052 (12.49)	.021 (2.780)	.020 (2.682)	.020 (2.758)
Real manufacturing wage	2,096.3 (1,189)	-7×10^{-6} (2.793)	-8×10^{-6} (2.975)	-4×10^{-6} (1.442)	-1×10^{-5} (.948)	-9×10^{-6} (.831)	-1×10^{-5} (1.128)
Female workers	.283 (.114)	.030 (.774)	.025 (.695)	.016 (.447)	.435 (7.275)	.489 (8.416)	.494 (8.437)
Female workers \times female suffrage	.113 (.150)	-.244 (3.515)	-.150 (2.550)	-.240 (3.950)	-.088 (1.423)	-.132 (2.196)	-.202 (3.315)
Rural	.633 (.221)	-.228 (4.086)	-.209 (3.988)	-.055 (.907)	.125 (1.450)	.109 (1.305)	.104 (1.258)
Rural ²	.449 (.250)	.265 (5.289)	.257 (5.479)	.142 (2.745)	.124 (1.865)	.104 (1.622)	.061 (.940)
Fraction of the population that is foreign-born	.134 (.099)	-.362 (8.793)	-.281 (7.070)	-.264 (6.650)	-.461 (7.200)	-.485 (7.791)	-.481 (7.706)
Intercept		.646 (17.26)	.625 (17.27)	.537 (13.43)	...	...	...
Fixed state effects		no	no	no	yes	yes	yes
Fixed year effects		no	no	no	yes	yes	yes
Adjusted R^2		.7768	.8031	.8064	.8882	.8950	.8964
Root mean squared error		.0772	.0725	.0719	.0546	.0529	.0526
F -statistic		249.47	261.69	230.81	98.447	103.49	102.00
T		9	9	9	5	5	5
α		70	70	70	95	95	95
T'		20	20	20	30	30	30

NOTE.—Absolute t -statistics are in parentheses.

granted; at this point, turnout is 31 percentage points higher than before women got the right to vote. For regression 6, women's suffrage raises turnout initially by 17.9 percentage points and after 40 years by 32 percentage points, which is the level at which women's turnout would be the same as men's turnout prior to women's suffrage. It is interesting that, when the Census Bureau first asked people about voting in 1964, it found out that women just slightly made up the majority of voters, and their share has continued to grow over time since then (Byrne 1995, p. 1A). Given that 36 states gave women suffrage between 1917 and 1920 and that these were by far the most populous states, 40 years after 1920 is in fact 1960. It was not until 1984 that women actually voted at a higher rate than men.

The spline results are reported in regressions 2 and 5. The best fit was obtained by allowing the slope on years after passage to change nine years after suffrage was granted in regression 2. The highly significant coefficients in regression 2 imply that women's suffrage raises turnout initially by .134 and that turnout rises by .009 each year for the next nine years until it has risen by .214. The subsequent rate of growth, although significantly positive, is only one-third the growth rate found in the initial segment; it takes 47 years from passage for turnout to rise by .32. The results for regression 5 tell a similar story. Turnout initially rises by .133 and after five years has grown by .196; another 43 years are needed for suffrage to have brought about a .32 rise in voter turnout.

One further test was made on the effect of suffrage. A question exists over whether the greater share of the adjustment is made by younger or older women. If the decision to vote involves a question of whether women will be able to recoup large sunk investments in learning about politics, it will be the relatively young women who should be most responsive to the new rights. Another interpretation is that younger women do not have "habits" of not voting. It is the issue not only of having to acquire new capital, but of habits that are difficult to overcome. Both theories make the same prediction: younger women should respond the most. On the other hand, it is possible that older women—even if the returns to acquiring new political capital are low—have acquired a greater stock of political capital simply by virtue of their longer life experience.

To test this, we use not only the variable $\text{female suffrage} \times \text{fraction of the population over 21 female}$, but also two new variables that interact the suffrage dummy for the first year women are allowed to vote times the fraction of women over 21 who were either 45–64 years of age or at least 65 years old at the time suffrage was granted. The omitted category was the initial fraction of women between 21 and 44 years old. Reestimating specifications 2, 3, 5, and 6 with these new variables produced very similar results. The results consistently suggest that there was a greater initial increase in turnout in states with a larger fraction of adult women who were 45–64 years of age, with no statistically significant differences between women in the younger or older categories. In all cases the coefficient for the relative impact of middle-age women is statistically significant at the 1 percent level for a two-tailed *t*-test. A one-standard-deviation change in the percentage of adult women in the 45–64-year-old category explains slightly over 50

percent of a one-standard-deviation change in turnout rates for specifications 2 and 3, and at least 20 percent in specifications 5 and 6.

We also found that the poll tax lowered turnout. As for our findings with respect to women's voting, it took some time after its removal to offset its depressing effect. In regressions 1 and 4, the poll tax is estimated to have lowered turnout by .117 and .091, *on average*, or about 25–32 percent. Indeed, all the specifications produce similar implications. This coefficient is close to the effect estimated by Heckelman (1995) for 1870–1910. Regression 3 implies that it would take 16 years before the vote suppressing the impact of poll taxes is eliminated, with about 44 percent of the reduction made up immediately. A different specification in regressions 2 and 5 estimates the lingering impact of poll taxes. Poll tax lingers α , T' equals one when a poll tax is in place, equals α immediately after the poll tax is repealed, and declines linearly to zero over T' years. The value of α is estimated to be .70 in regression 2 and .95 in the fixed-effects regression; that is, immediately after the repeal of the poll tax, its impact falls by 5–30 percent. The estimates from regressions 2 and 5 for T' suggest that it takes 20 and 30 years, respectively, for the effects of the poll tax to fully dissipate.

Let us briefly highlight our other results, which are mostly consistent with our predictions. Turnout is expected to be higher when there is more at stake. We find that a presidential race raises turnout in gubernatorial elections, but Senate races, mandated in 1913, have no impact on turnout. The positive coefficients on relative manufacturing wage lend some support to the rising of turnout with the stakes in the struggle over income distribution, which are measured by the state's position on the national income distribution.²³

An increase in the individual's probability of affecting the outcome should cause more people to vote.²⁴ As predicted, the share of the gubernatorial vote going to the winner and the log of the state's population have negative and mostly significant impacts on voter participation.

The hypothesis that the cost of voting has a negative impact on turnout

²³ To capture how turnout depends on the state's position on the income distribution, the following variable was created:

$$\text{relative manufacturing wage} = \frac{\text{state real manufacturing wage} - \text{U.S. real manufacturing wage}}{\sigma_{\text{wage}}}$$

where U.S. real manufacturing wage is an unweighted average of the state wages and σ_{wage} represents the standard deviation across states in the real manufacturing wage that year. According to the theory, at low income levels, turnout could increase or decrease as we move up the income distribution. At higher income levels, the prediction is unambiguous; a rise in relative income should lead to greater turnout. We found no evidence for an initial drop in turnout as we moved up the income distribution. The positive coefficients on this variable are highly significant. Previous work by Filer et al. (1993) used a similar variable and also found that those at the top of the income distribution have higher turnout rates.

²⁴ There is little support for this prediction in the literature. Matsusaka and Palda (1993) report in their survey that only 30 of 43 margin of victory coefficients and nine of 21 population coefficients were negative and significant.

receives much more support in the regressions without fixed effects. In these regressions, turnout increases as real manufacturing wages fall.²⁵ Common measures of human capital (age and educational attainment) are hypothesized to be inversely related to the cost of correctly evaluating political information. There is strong evidence that turnout rises as the fraction over age 65 increases, but there is no support for the expected negative relationship between the fraction illiterate and turnout.²⁶

Voting regulations and whether one is native-born also determine the probability of voting. Turnout is lower in states with a larger population who are foreign-born and thus less likely to be citizens. The hypothesis that literacy tests kept some from voting is supported only in the regressions without fixed effects. We also find that the secret ballot lowered turnout, perhaps because it required some reading skills and made vote buying more difficult. The significantly negative coefficients on the secret ballot variable suggest that this provision lowered turnout by about 8–12 percent.²⁷

D. Conclusion

There is strong evidence that it takes a very long time for turnout to fully respond to major changes in the voting franchise. Between 40 and 54 years are needed after women are granted the voting franchise for their turnout to match men's turnout. The results consistently indicate that there was a greater initial increase in turnout in states with a larger fraction of adult women who were 45–64 years of age. And it takes 16–30 years for turnout to completely rebound after a poll tax is eliminated. Secret ballots reduced voting rates, and the impact of literacy tests was significant only for the estimates without fixed effects.

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²⁵ We get similar income effects using the real average value per farm and a very crude measure of per capita personal income based on two sources. Since the government series on state personal income goes back only to 1929, a crude measure of per capita personal income was created by combining the government figures for 1930 and 1940 with data on 1880, 1900, and 1920 from Lee et al. (1957). Interpolated estimates for 1890 and 1910 and extrapolated estimates for 1870 were created taking into account changes in U.S. GNP over these years.

²⁶ Data on illiteracy, measured as an inability to write, are available only through the 1930 census. (In 1940, the census started gathering data on educational attainment.) Illiteracy rates for 1940 were projected on the basis of changes between 1920 and 1930.

²⁷ See Heckelman (1995), who graciously provided data on secret ballots for most states.

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