Presidential and Congressional Vote-Share Equations: November 2018 Update

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Abstract

The three vote-share equations in Fair (2009) are updated using data available as of November 7, 2018. The equations are reestimated incorporating the new data, and forecasts of the 2020 presidential and House elections are made.

1 Introduction

Three vote-share equations are estimated in Fair (2009)—presidential, on-term House, and mid-term House. These equations are updated in this paper using data available as of November 7, 2018. The sample period in Fair (2009) was 1916–2004 for the first two equations and 1918–2006 for the third. In this update three observations have been added. The sample period is 1916–2016 for the first two equations and 1918–2018 for the third. No specification changes have been made; the equations are simply reestimated using three more observations.

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The history of the equations is briefly discussed in Section 2; the data are discussed in Section 3; the estimates are presented in Section 4; a comparison of ex ante and ex post forecasts is made in Section 5; and forecasts for the 2020 presidential and on-term House elections are presented in Section 6. Appendix A contains a complete description of how the data were collected and a listing of all the data. The results in this paper can be duplicated using these data if desired.

2 History of the Equations

The presidential vote equation was first presented in Fair (1978). The previous updates of this equation are in Fair (1982, 1988, 1990, 1996a, 1998, 2002a, 2006, 2010, 2014). The specification of the equation has not been changed since changes following the 1992 election. The easiest paper to read regarding the changes that were made to the equation between the original specification and the specification after the 1992 election is Fair (1996b). A non technical discussion is in Fair (2002b). The on-term and mid-term House equations were first presented in Fair (2009). The specification of these two equations has also not been changed for this update.

Counting the original presidential vote paper and the eight updates, there are ten estimated equations, one before each of the elections between 1980 and 2016. In Section 5 I have examined ten ex ante forecasts. Each forecast uses the relevant estimated equation and the economic data that existed at the time of the election. These forecasts are compared to ex post forecasts using the currently estimated equation and the latest economic data. This gives one a sense, among other things, of how important the specification changes after the 1992 election were.

3 The Updated Data

The National Income and Product data available as of October 26, 2018, from the Bureau of Economic Analysis (BEA) have been used. Data prior to 1929 have been obtained, as before, from Balke and Gordon (1986). The appendix discusses the splicing of the Balke and Gordon data to the BEA data.

The vote data have been obtained when possible from the *Statistical Abstract of the United States*, various issues, and the Office of the Clerk of the U.S. House of Representatives. Some of these data are slightly different from the data used in Fair (2009), which were based on data from the CQ Press (a division of Congressional Quarterly, Inc.). The differences are small between these two data sources, but the use of the new data source does mean that some of the vote-share values used for the current update do not match exactly the values used previously. The previously used data were used when data were not available from the Office of the Clerk. The value used for the mid-term 2018 House two-party vote share, 54.0, is preliminary.

4 The Updated Estimates

Tables 1 through 4 are the same as in Fair (2009) except for three more observations used. The variables are listed in Table 1. The coefficient estimates are presented in Table 2: there is one estimate for the presidential equation and two each for the on-term and mid-term House equations. The second estimate for each House equation contains restrictions on the coefficients of the economic variables based on estimates from the presidential equation. Table 3 presents the predicted values and estimated residuals from the presidential equation and the two restricted House equations. Table 4 contains FIML estimates of the three equations.

If you compare the new Table 2 with the old, you will see that the current results are close to the previous results. The economic variables all remain significant. In the presidential equation the current coefficient estimate for G is 0.673, which compares to the estimate of 0.680 in Fair (2009). For P the comparison is -0.721 versus -0.657. The change for Z, the number of strong growth quarters, is larger. The current coefficient estimate for Z is 0.792, which compares to the earlier estimate of 1.075. Of the non economic variables, the coefficient estimate of $DPER$ is 2.25 versus 3.30 earlier, and the t-statistic is now below 2.0—1.45 versus 2.34 earlier.

Regarding the two House equations, the coefficient restrictions are still strongly supported by the data. For the mid-term House equation—equation 3a—the coefficient estimate for the lagged presidential vote share is now -0.214 versus -0.355 earlier, and the t-statistic is now below 2.0 in absolute value—-1.63 versus -2.67 earlier. This variable in theory is picking up a balance effect, and so the evidence is now weaker for this effect.

Although now shown here, all the robustness tests discussed in Fair (2009) were repeated, with no change in any of the conclusions.

Table 1
Variables

Variable	Definition
V^p	Democratic share of the two-party presidential vote.
V^c	Democratic share of the two-party on-term House vote.
V^{cc}	Democratic share of the two-party mid-term House vote.
I	1 if there is a Democratic presidential incumbent at the time of the election and -1 if there is a Republican presidential incumbent.
$DPER$	1 if a Democratic presidential incumbent is running again, -1 if a Republican presidential incumbent is running again, and 0 otherwise.
DUR	0 if either party has been in the White House for one term, 1 [-1] if the Democratic [Republican] party has been in the White House for two consecutive terms, 1.25 [-1.25] if the Democratic [Republican] party has been in the White House for three consecutive terms, 1.50 [-1.50] if the Democratic [Republican] party has been in the White House for four consecutive terms, and so on.
WAR	1 for the elections of 1918, 1920, 1942, 1944, 1946, and 1948, and 0 otherwise.
G	growth rate of real per capita GDP in the first three quarters of the on-term election year (annual rate).
G^{cc}	growth rate of real per capita GDP in the first three quarters of the mid-term election year (annual rate).
P	absolute value of the growth rate of the GDP deflator in the first 15 quarters of the administration (annual rate) except for 1920, 1944, and 1948, where the values are zero.
P^{cc}	absolute value of the growth rate of the GDP deflator in the first 7 quarters of the administration (annual rate) except for 1918, 1942, and 1946, where the values are zero.
Z	number of quarters in the first 15 quarters of the administration in which the growth rate of real per capita GDP is greater than 3.2 percent at an annual rate except for 1920, 1944, and 1948, where the values are zero.
Z^{cc}	$\frac{15}{7}$ times number of quarters in the first 7 quarters of the administration in which the growth rate of real per capita GDP is greater than 3.2 percent at an annual rate except for 1918, 1942, and 1946, where the values are zero.

• Sample period: 1916, 1920, . . . , 2016 for the V^p and V^c equations and 1918, 1922, . . . , 2018 for the V^{cc} equation.

Table 2
Estimated Equations

	Eq. 1 V^p	Eq. 2 V^c	Eq. 2a V^c	Eq. 3 V^{cc}	Eq. 3a V^{cc}
$Index$	–	–	0.558	–	0.623
			(5.64)		(2.53)
$G \cdot I$	0.673	0.391	*0.375*	–	–
	(5.21)	(3.45)			
$P \cdot I$ or $P^{cc} \cdot I$	−0.721	−0.414	*−0.402*	−0.434	*−0.449*
	(−2.19)	(−1.48)		(−2.00)	
$Z \cdot I$ or $Z^{cc} \cdot I$	0.792	0.372	*0.442*	0.511	*0.493*
	(3.01)	(1.51)		(2.09)	
$DPER$	2.25	2.30	2.32	–	–
	(1.45)	(2.13)	(2.39)		
DUR	−3.76	–	–	–	–
	(−2.73)				
I	0.21	−2.30	−2.70	−3.23	−3.14
	(0.09)	(−1.38)	(−3.19)	(−2.81)	(−3.64)
WAR	3.25	1.08	1.36	0.26	0.15
	(1.18)	(0.49)	(0.80)	(0.13)	(0.08)
$CNST$	48.06	50.20	50.22	48.89	48.89
	(73.13)	(89.44)	(95.08)	(74.80)	(76.86)
$V^{cc}_{-2} - 50$	–	0.594	0.576	–	–
		(4.09)	(4.80)		
$V^{c}_{-2} - 50$	–	–	–	0.716	0.725
				(3.86)	(4.36)
$V^{p}_{-2} - 50$	–	–	–	−0.219	−0.214
				(−1.57)	(−1.63)
SE	2.95	2.46	2.34	2.47	2.41
R^2	0.862	0.803	0.802	0.767	0.767
No. obs.	26	26	26	26	26

• Estimation method: OLS; t-statistics are in parentheses.
• Estimation period: 1916–2016 for V^p and V^c, 1918–2018 for V^{cc}.
• $Index$ for V^c is $0.673 \cdot G \cdot I - 0.721 \cdot P \cdot I + 0.792 \cdot Z \cdot I$. The hypothesis that the weights in this index are correct is not rejected: F-value of 0.046, which with 2,18 degrees of freedom has a p-value of 0.955.
• $Index$ for V^{cc} is $-0.721 \cdot P^{cc} \cdot I + 0.792 \cdot Z^{cc} \cdot I$. The hypothesis that the weights in this index are correct is not rejected: F-value of 0.016, which with 1,19 degrees of freedom has a p-value of 0.898.
• Values in italics are implied values.

Table 3
Predicted Values and Estimated Residuals from Table 2

	Act.	Eq. 1		Act.	Eq. 2a		Act.	Eq. 3a		
t	V^p	$\hat{V}^p$	$\hat{u}^p$	V^c	$\hat{V}^c$	$\hat{u}^c$	V^{cc}	$\hat{V}^{cc}$	$\hat{u}^{cc}$	$t+2$
1916	51.7	51.3	-0.3	48.9	50.6	1.7	45.1	44.8	-0.3	1918
1920	36.1	40.1	3.9	38.0	41.6	3.6	46.4	44.9	-1.5	1922
1924	41.7	44.0	2.3	42.1	48.0	5.9	41.6	42.8	1.3	1926
1928	41.2	43.1	1.8	42.8	43.1	0.3	45.7	47.6	1.9	1930
1932	59.1	61.8	2.6	56.9	54.7	-2.2	56.5	51.2	-5.3	1934
1936	62.2	63.7	1.5	58.5	60.9	2.5	50.8	52.3	1.5	1938
1940	55.0	55.7	0.7	53.0	55.2	2.2	47.7	47.0	-0.7	1942
1944	53.8	51.8	-2.0	51.7	51.5	-0.2	45.3	46.3	1.0	1946
1948	52.3	50.4	-1.9	53.2	49.8	-3.4	50.0	50.6	0.6	1950
1952	44.7	46.2	1.5	49.9	50.0	0.0	52.5	52.5	-0.1	1954
1956	42.9	43.8	0.9	51.0	51.1	0.1	56.0	54.4	-1.5	1958
1960	50.1	48.6	-1.4	54.8	54.8	0.0	52.5	54.1	1.6	1962
1964	61.2	60.2	-1.0	57.3	56.5	-0.8	51.2	52.8	1.6	1966
1968	49.4	51.3	1.8	50.9	52.0	1.0	54.4	54.0	-0.4	1970
1972	38.2	42.0	3.7	52.7	51.0	-1.6	58.5	57.9	-0.6	1974
1976	51.0	50.5	-0.6	56.9	57.3	0.5	54.4	51.8	-2.6	1978
1980	44.8	46.4	1.6	51.4	50.0	-1.3	56.0	55.2	-0.8	1982
1984	40.9	39.4	-1.5	52.8	50.8	-1.9	55.1	56.0	0.9	1986
1988	46.2	48.9	2.7	54.0	54.3	0.3	54.2	55.3	1.1	1990
1992	53.6	48.2	-5.4	52.7	51.7	-1.0	46.5	48.1	1.6	1994
1996	54.7	54.4	-0.3	50.2	50.0	-0.1	49.5	47.4	-2.1	1998
2000	50.3	50.3	0.0	49.8	50.4	0.5	47.6	52.7	5.1	2002
2004	48.8	44.1	-4.7	48.6	48.0	-0.6	54.1	50.6	-3.5	2006
2008	53.7	53.1	-0.6	55.5	56.0	0.4	46.6	49.6	3.0	2010
2012	52.0	51.8	-0.2	50.7	48.7	-2.0	47.0	47.1	0.1	2014
2016	51.2	45.9	-5.3	50.5	46.7	-3.8	54.0	52.1	-1.9	2018
RMSE			2.46			2.05			2.11	

- $\hat{u}^p = \hat{V}^p - V^p$.
- $\hat{u}^c = \hat{V}^c - V^c$.
- $\hat{u}^{cc} = \hat{V}^{cc} - V^{cc}$.
- RMSE = root mean squared error.

Table 4
Full Information
Maximum Likelihood Estimates

	Eq. 1 V^p	Eq. 2a V^c	Eq. 3a V^{cc}
$G \cdot I$	0.678	0.365	–
	(6.43)	(5.03)	
$P \cdot I$ or $P^{cc} \cdot I$	−0.721	*−0.388*	−0.332
	(−3.05)		(−1.98)
$Z \cdot I$ or $Z^{cc} \cdot I$	0.782	*0.421*	*0.360*
	(3.78)		
$DPER$	2.16	2.66	–
	(1.72)	(3.19)	
DUR	−3.81	–	–
	(−3.84)		
I	0.32	−2.72	−2.80
	(0.20)	(−3.01)	(−3.33)
WAR	3.24	1.31	0.34
	(1.51)	(0.91)	(0.22)
$CNST$	48.06	50.22	49.24
	(88.24)	(109.40)	(82.45)
$V^{cc}_{-2} - 50$	–	0.569	–
		(6.23)	
$V^{c}_{-2} - 50$	–	–	0.621
			(3.70)
$V^{p}_{-2} - 50$	–	–	−0.150
			(−1.19)
SE	2.46	2.07	2.22
No. obs.	26	26	26

• Estimation method: FIML.
• Coefficient constraints on equations (2a) and (3a) imposed.
• Errors assumed to be correlated across equations.
• t-statistics are in parentheses, not adjusted for degrees of freedom.
• Values in italics are implied values.

Looking at Table 3, the largest three errors for the presidential equation are -5.4 in 1992 (W. Clinton > G. H. Bush), -4.7 in 2004 (Kerry < G. W. Bush), and -5.3 in 2016 (H. Clinton versus Trump). The errors for 1996, 2000, 2008, and 2012 are all close to zero. The error for 2016 is interesting. The Democrats were predicted to lose with only 45.9 percent of the two-party vote. They in fact got 51.2 percent of the vote, although lost in the electoral college. The Democrats did much better in 2016 than the equation predicted. The Democrats also did better than predicted in the House election in 2016 with 50.5 percent of the vote versus 46.7 predicted. They also did slightly better in the 2018 House election with 54.0 percent of the vote versus 52.1 percent predicted. The root mean squared error over the 26 elections is about 2.5 percentage points for the presidential equation and 2.0 percentage points for the House equations. For the presidential equation, the landslide elections are predicted quite well—1920, 1924, 1928, 1932, 1936, 1956, 1964, 1972, and 1984. The reasons for these accurate predictions can be seen by examining the economic variables relevant to each election.

5 Ex Ante versus Ex Post Forecasts

As noted in Section 2, ten estimated presidential equations can be examined, one for each of the elections between 1980 and 2016. Beginning with the 1996 election, the last forecast before the election is available from my website. In each case this forecast uses the actual economic data that were known at the time (no predicted economic data are needed right before the election). For the elections of 1984, 1988, and 1992, tables of vote forecasts were presented in the respective papers—Fair (1982, 1988, 1990)—for different values of the economic variables. For present purposes I took the values of the economic variables that were available right before the election (from past issues of the *Survey of Current Business*) and chose the relevant vote forecast from the tables. Interpolation was used to get the exact forecast. For the 1980 election I used the equation in row 4 of Table 2 in Fair (1978).

The ex ante forecasts of the presidential elections are presented in Table 5 along with the ex post forecasts from Table 3. The ex post forecasts use the estimated equation in Table 2—equation 1—and the latest revised economic data. The mean absolute error (MAE) for the ten ex ante errors is 3.90, which compares to 2.23 for the ex post errors. As with the ex post errors, the three largest ex ante errors are -10.5 for 1992, -6.5 for 2004, and -7.2 for 2016. In all three of these elections the Democrats did considerably better than predicted. The other seven elections are forecast fairly well. The next largest ex ante error is -3.7 percentage points in 1996, where the Democrats (W. Clinton) got 54.7 percent and were predicted to get only 51.0 percent. In 2012 they got 52.0 percent and were predicted to get only 49.0 percent, for an error of -3.0 percent.

As noted in Section 2, some specification changes were made to the presidential equation after the 1992 election, but from 1996 on the specification has remained the same—unchanged for 6 elections and 24 years!

Table 5
Ex Ante and Ex Post Predictions
Democratic Share of the Two-Party Vote

		Ex Ante		Ex Post		
	Act.	**Pred.**	**Error**	**Pred.**	**Error**	**Outcome**
Presidential Equation						
1980	44.8	46.4	1.6	46.4	1.6	Carter < Reagan
1984	40.9	43.2	2.3	39.4	-1.5	Mondale < Reagan
1988	46.2	48.1	1.9	48.9	2.7	Dukakis < G.H.Bush
1992	53.6	43.1	-10.5	48.2	-5.4	w.Clinton > G.H.Bush
1996	54.7	51.0	-3.7	54.4	-0.3	W.Clinton > Dole
2000	50.3	50.8	0.5	50.3	0.0	Gore vs G.W.Bush
2004	48.8	42.3	-6.5	44.1	-4.7	Kerry < G.W.Bush
2008	53.7	51.9	-1.8	53.1	-0.6	Obama > McCain
2012	52.0	49.0	-3.0	51.8	-0.2	Obama > Romney
2016	51.2	44.0	-7.2	45.9	-5.3	H.Clinton vs Trump
MAE			3.90		2.23	
On-Term House Equation						
2008	55.5	55.8	0.3	56.0	0.4	
2012	50.7	46.0	-4.7	48.7	-2.0	
2016	50.5	45.0	-5.5	46.7	-3.8	
MAE			3.50		2.07	
Mid-Term House Equation						
2010	46.6	49.2	2.6	49.6	3.0	
2014	47.0	50.9	3.9	47.1	0.1	
2018	54.0	50.7	-3.3	52.1	-1.9	
MAE			3.27		1.67	

- Ex Post forecasts from Table 3.
- Ex Ante forecasts explained in the text.

There are three ex ante forecasts available for the on-term House election and the mid-term House election. These are presented in Table 5 along with the ex post forecasts from Table 3. The MAEs for the ex ante errors are 3.50 for the on-term election and 3.27 for the mid-term election, which compare to 2.07 and 1.67 for the ex post errors. The largest error is for the 2016 election, where the Democrats got 50.5 percent of the two-party vote and were predicted to get only 45.0 percent. As in the presidential election, they did much better than predicted.

6 Forecasts for 2020

The values of the non economic variables for 2020 are $I = -1$ (the Republicans are in power), $DPER = -1$ (assuming Trump runs), $DUR = 0.00$ (the Republicans have not been in power for two or more consecutive terms), $WAR = 0$, and $V^{cc} = 54.00$. Using equations 1 and 2a in Table 2, the two equations for 2020 are:

$$V^p = 45.60 - 0.673 \cdot G + 0.721 \cdot P - 0.792 \cdot Z$$

$$V^c = 52.90 - 0.375 \cdot G + 0.402 \cdot P - 0.442 \cdot Z$$

The constant terms incorporate the non economic values just mentioned. These values do not change unless Trump does not run again.

Given forecasts of the three economic variables, predictions of the vote shares can be made. Table 6 presents three predictions per equation. For the first, the economic forecasts dated October 27, 2018 from my US model are used. The US model is forecasting modest growth for the rest of the Trump administration. The per capita growth rate (at an annual rate) in the first three quarters of 2020 (G)

Table 6
Forecasts for 2020
Democratic Share of Two-Party Vote

Forecast	G	P	Z	
				Presidential Equation (V^p)
45.7	1.2	2.4	1	October 27, 2018, economic forecast from US model
40.7	4.0	2.4	5	Strong economy
49.2	-4.0	2.4	1	Recession in 2020
				On-Term House Equation (V^c)
53.0	1.2	2.4	1	October 27, 2018, economic forecast from US model
50.2	4.0	2.4	5	Strong economy
54.9	-4.0	2.4	1	Recession in 2020

The two equations are:

$$V^p = 45.60 - 0.673 \cdot G + 0.721 \cdot P - 0.792 \cdot Z$$

$$V^c = 52.90 - 0.375 \cdot G + 0.402 \cdot P - 0.442 \cdot Z$$

is forecast to be 1.2 percent. The inflation rate at an annual rate in the first 15 quarters of the Trump administration (P) is forecast to be 2.4 percent. The number of strong growth quarters is forecast to be only 1, which was the second quarter of 2018. This economic forecast is thus neither boom nor bust. Conditional on these forecasts, the prediction for V^p is 45.7 and the prediction for V^c is 53.0. In this situation the Democrats are predicted to lose the presidential election by 4.3 percentage points, larger than one standard error, and win the two-party House vote by 3.0 percent points, a little over one standard error.

For the second prediction in Table 6 G is increased to 4.0 percent and the number of strong growth quarters is increased to 5. In this case the Democrats get only 40.7 percent of the two-party vote in the presidential election. The third prediction assumes a recession in 2020. G is decreased to -4.0 percent. In this case the presidential election is very close, with the Democrats predicted to get 49.2 percent of the two-party vote.

Why is the presidential equation so pessimistic for the Democrats? The current case is the best possible one for the Republicans according to the equation: President running again and no negative duration effect. In this case, as just seen, it takes a weak economy to have the voting equation predict the Democrats getting close to 50 percent of the two-party vote. This analysis, of course, does not take into account anything about the personalities of the candidates.

Data Appendix

The data used in this paper are presented in Table A. Quarterly data on nominal GDP, real GDP, and population are needed to construct G, G^{cc},P, Z, P^{cc}, and Z^{cc}. Let GDP denote nominal GDP, let $GDPR$ denote real GDP, and let POP denote population. Let a subscript k denote the kth quarter of the sixteen-quarter period of an administration. Also, let $Y = GDPR/POP$, which is real per capita GDP, and let $GDPD = GDP/GDPR$, which is the GDP deflator. Then G, G^{cc}, P, and P^{cc} are constructed as:

$$G = [(Y_{15}/Y_{12})^{(4/3)} - 1] \cdot 100$$
$$G^{cc} = [(Y_7/Y_4)^{(4/3)} - 1] \cdot 100$$
$$P = [(GDPD_{15}/GDPD_{16}(-1))^{(4/15)} - 1] \cdot 100$$
$$P^{cc} = [(GDPD_7/GDPD_{16}(-1))^{(4/7)} - 1] \cdot 100$$

where (-1) means the previous four-year election period. To construct Z and Z^{cc} one needs to define the growth rate in a given quarter, which for quarter k is $g_k = [(Y_k/Y_{k-1})^4 - 1] \cdot 100$ for quarters 2 through 16 and $g_k = [(Y_1/Y_{16}(-1))^4 - 1] \cdot 100$ for quarter 1. Z is then the number of quarters in the first 15 quarters of an administration in which g_k is greater than 3.2, and Z^{cc} is $\frac{15}{7}$ times the number of quarters in the first 7 quarters of an administration in which g_k is greater than 3.2.

The data on nominal GDP were obtained as follows. Annual data for 1929–1946 and quarterly data for 1947:1–2014:3 were obtained from the Bureau of Economic Analysis (BEA) website on October 30, 2014. Quarterly data for 1913:1–1946:4 are available from Balke and Gordon (1986), pp. 789–795. The Balke and

Gordon values for 1913:1–1928:4 were used exactly, but the values for 1929:1–1946:4 were adjusted to take account of the BEA annual data. For 1929:1–1946:4 each quarterly value for a given year was multiplied by a splicing factor for that year. The splicing factor is the ratio of the BEA value for that year to the respective yearly value in Balke and Gordon (1976), pp. 782–783.

The data on real GDP were obtained in a similar way. Annual data for 1929–1946 and quarterly data for 1947:1–2018:3 were obtained from the BEA website on October 26, 2018. Quarterly data for 1913:1–1946:4 are available from Balke and Gordon (1986), pp. 789–795. The Balke and Gordon values were spliced to the BEA values. All the Balke and Gordon quarterly values for 1913:1–1929:4 were multiplied by the same number. This number is the ratio of the BEA value for 1929 to the 1929 value in Balke and Gordon (1976), p. 782. For 1930:1–1946:4 each Balke and Gordon quarterly value for a given year was multiplied by a splicing factor for that year. The splicing factor is the ratio of the BEA value for that year to the respective yearly value in Balke and Gordon (1976), pp. 782–783.

The data on population were obtained as follows. For 1913–1928 annual data were obtained from U.S. Department of Commerce (1973), pp. 200–201, A114 series. Each of these observations was multiplied by 1.000887, a splicing factor. The splicing factor is the ratio of the A114 value for 1929 in U.S. Department of Commerce (1973) to the value for 1929 in Table 8.2 in U.S. Department of Commerce (1992). For 1929–1945 annual data were obtained from U.S. Department of Commerce (1992), Table 8.2. Quarterly observations for 1877:1–1945:4 were obtained by interpolating the annual observations using the method presented in Fair (1994), Table B.6. For 1946:1–1946:4 quarterly data were obtained from the BEA website on October 27, 2006. For 1947:1–2018:3 quarterly data were obtained from the BEA website on October 26, 2018.

Turning now to the vote data, V^p is the Democratic vote divided by the Democratic plus Republican vote except for the 1924 election. For 1924, V^p is the Democratic vote plus 0.765 times the LaFollette vote divided by the Democratic plus Republican plus LaFollette vote. The presidential vote data for 1916 were obtained from U.S. Department of Commerce (1975), pp. 1078–1079. Data for the elections after 1916 were obtained from past issues of the *Statistical Abstract of the United States* and from the website of the Office of the Clerk of the U.S. House of Representatives.

V^c and V^{cc} are the Democratic House vote divided by the Democratic plus Republican House vote. No adjustments were made to these data. The vote data were obtained when possible from the website of the Office of the Clerk of the U.S. House of Representatives. Most of the data from 1930 on were available from this website. When data were not available, past issues of the *Statistical Abstract of the United States* were tried, working from the most recent back. When data from this source were not available, the data were obtained from U.S. Department of Commerce (1975), p. 1084. The value of V^{cc} of 0.540 for 2018 is preliminary.

I, $DPER$, DUR, and WAR are defined in the text. In the construction of $DPER$ Ford is not counted as an incumbent running again, since he was not an elected vice president, whereas the other vice presidents who became president while in office are counted.

Table A
Data for the V^p and V^c Equations

t	V^p	V^c	I	$DPER$	DUR	WAR	G	P	Z
1916	51.682	48.881	1	1	0.00	0	2.229	4.252	3
1920	36.148	37.957	1	0	1.00	1	-11.463	0.000	0
1924	41.737	42.093	-1	-1	0.00	0	-3.872	5.161	10
1928	41.244	42.838	-1	0	-1.00	0	4.623	0.183	7
1932	59.149	56.874	-1	-1	-1.25	0	-14.361	6.926	4
1936	62.226	58.476	1	1	0.00	0	11.616	2.467	9
1940	54.983	52.967	1	1	1.00	0	3.963	0.041	8
1944	53.778	51.718	1	1	1.25	1	4.067	0.000	0
1948	52.319	53.190	1	1	1.50	1	3.348	0.000	0
1952	44.710	49.944	1	0	1.75	0	1.027	2.369	7
1956	42.906	50.970	-1	-1	0.00	0	-1.250	1.894	5
1960	50.087	54.790	-1	0	-1.00	0	0.643	1.971	5
1964	61.203	57.324	1	1	0.00	0	5.099	1.234	9
1968	49.425	50.921	1	0	1.00	0	5.107	3.085	7
1972	38.209	52.660	-1	-1	0.00	0	5.862	4.812	4
1976	51.049	56.850	-1	0	-1.00	0	3.828	7.476	5
1980	44.842	51.383	1	1	0.00	0	-3.596	7.827	5
1984	40.877	52.778	-1	-1	0.00	0	5.438	5.277	8
1988	46.168	54.011	-1	0	-1.00	0	2.342	2.817	4
1992	53.621	52.744	-1	-1	-1.25	0	3.053	3.210	3
1996	54.737	50.158	1	1	0.00	0	3.300	2.040	4
2000	50.262	49.819	1	0	1.00	0	2.069	1.642	7
2004	48.767	48.632	-1	-1	0.00	0	2.118	2.085	2
2008	53.689	55.535	-1	0	-1.00	0	-1.701	2.692	2
2012	52.010	50.681	1	1	0.00	0	1.094	1.442	2
2016	51.163	50.546	1	0	1.00	0	1.208	1.411	2

• The values of P for 1920, 1944, and 1948 before multiplication by zero are 16.535, 5.478, and 8.718, respectively, and the values of Z are 5, 14, and 5.

Table A (continued)
Data for the V^{cc} Equation

t	V^{cc}	I	WAR	G^{cc}	P^{cc}	Z^{cc}
1914	50.338					
1918	45.096	1	1	22.006	0.000	0.0000
1922	46.400	-1	0	14.368	11.480	12.8571
1926	41.572	-1	0	3.461	0.117	10.7143
1930	45.741	-1	0	-11.194	2.077	4.2857
1934	56.509	1	0	12.767	3.966	8.5714
1938	50.815	1	0	4.601	0.089	6.4286
1942	47.664	1	1	16.069	0.000	0.0000
1946	45.277	1	1	-4.428	0.000	0.0000
1950	50.044	1	0	13.432	0.200	6.4286
1954	52.537	-1	0	-0.720	0.785	2.1429
1958	55.983	-1	0	-1.162	2.711	2.1429
1962	52.492	1	0	3.800	1.091	10.7143
1966	51.250	1	0	3.768	2.573	10.7143
1970	54.403	-1	0	0.020	5.022	2.1429
1974	58.530	-1	0	-2.957	8.121	4.2857
1978	54.416	1	0	5.943	6.711	8.5714
1982	55.994	-1	0	-2.867	7.222	4.2857
1986	55.085	-1	0	2.259	2.352	2.1429
1990	54.177	-1	0	0.838	3.828	4.2857
1994	46.476	1	0	2.717	2.206	4.2857
1998	49.533	1	0	3.140	1.362	6.4286
2002	47.562	-1	0	1.646	1.782	0.0000
2006	54.120	-1	0	1.352	3.143	4.2857
2010	46.561	1	0	1.956	0.741	2.1429
2014	46.973	1	0	2.225	1.854	4.2857
2018	54.000	-1	0	2.584	2.085	2.1429

- Observation of V^{cc} for 1914 needed for the V^c equation.
- The values of P^{cc} for 1918, 1942, and 1946 before multiplication by zero are 15.735, 8.082, and 10.518, respectively, and the values of Z^{cc} are 10.7143, 15.0000, and 4.2857.

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