

Appendix A: Data Descriptions

A.1 Elections included in Dataset

Country	Election
Angola	1992(P), 2008(L), 2012(L), 2017(L)
Benin	1991(R1/R2), 1996(R1/R2), 2001(R1/R2), 2011(P), 2016(R1/R2)
Burkina Faso	2005(P), 2010(P)
Burundi	1993(P), 2015(P), 2020(P)
Cameroon	1992(P), 2011(P), 2018(P)
Côte d'Ivoire	2010(R1/R2), 2015(P)
Djibouti	1999(P)
Congo, D.R.	2006(R1/R2), 2011(P)
Congo, R.	1992(R1)
Gabon	2016(P)
Gambia	1992(P), 1996(P), 2001(P), 2006(P), 2011(P), 2016(P)
Ghana	1992(P), 1996(P), 2000(P), 2004(P), 2008(P), 2012(P), 2016(P)
Guinea-Bissau	1996(R1/R2), 1999(R2), 2009(R1/R2), 2019(R1)
Kenya	1992(P), 1997(P), 2002(P), 2007(P), 2013(P), 2017(P)
Liberia	2011(R1/R2), 2017(R1/R2)
Madagascar	2001(P), 2006(P), 2018(R1)
Malawi	1994(P), 1999(P), 2004(P), 2009(P), 2014(P), 2019(P), 2020(P)
Mali	2002(R2), 2007(P), 2018(R2)
Mozambique	1994(P), 1999(P), 2004(P), 2009(P), 2014(P), 2019(P)
Namibia	1994(P), 1999(P), 2004(P), 2009(P)
Niger	1993(R1/R2), 1996(P)
Nigeria	1999(P), 2003(P), 2011(P), 2015(P), 2019(P)
Rwanda	2003(P), 2010(P), 2017(P)
Senegal	1993(P), 2000(R1/R2), 2007(P), 2012(R1/R2), 2019(P)
Sierra Leone	1996(R1/R2), 2002(P), 2007(R1/R2), 2012(P), 2018(R1/R2)
South Africa	1994(L), 1999(L), 2004(L), 2009(L), 2014(L), 2019(L)
Sudan	2010(P)
Tanzania	1995(P), 2005(P), 2010(P), 2015(P)
Togo	1993(P), 1998(P), 2003(P), 2010(P), 2015(P), 2020(P)
Uganda	1996(P), 2001(P), 2006(P), 2011(P), 2016(P)
Zambia	1991(P), 1996(P), 2001(P), 2006(P), 2008(P), 2011(P), 2015(P), 2016(P)
Zimbabwe	2002(P), 2008(R1/R2), 2013(P), 2018(P)
Note: L = Legislative, P = Presidential, R1/R2 = Presidential Round 1/Round 2	

A.2 Afrobarometer Surveys and Dates

Country	Field Dates	Sample Size
	Round 5	44389
Benin	11/16/2011 - 12/06/2011	1200
Botswana	6/30/2012 - 7/12/2012	1200
Burkina Faso	12/03/2012 - 12/17/2012	1200
Burundi	11/28/2012 - 12/10/2012	1200
Cameroon	3/17/2013 - 4/02/2013	1200
Cote d'Ivoire	3/11/2013 - 3/26/2013	1200
Ghana	5/08/2012 - 5/27/2012	2400
Guinea	3/23/2013 - 4/12/2013	1200
Kenya	11/02/2011 - 11/29/2011	2399
Lesotho	11/26/2012 - 12/29/2012	1197
Liberia	6/25/2012 - 7/25/2012	1199
Madagascar	3/11/2013 - 4/07/2013	1200
Malawi	6/04/2012 - 7/01/2012	2407
Mali	12/16/2012 - 1/10/2013	1200
Mozambique	11/17/2012 - 12/09/2012	2400
Namibia	11/19/2012 - 12/09/2012	1200
Niger	3/31/2013 - 4/15/2013	1199
Nigeria	10/30/2012 - 1/19/2013	2400
Senegal	2/18/2013 - 3/02/2013	1200
Sierra Leone	6/23/2012 - 7/17/2012	1190
South Africa	10/20/2011 - 11/30/2011	2399
Sudan	2/13/2013 - 2/23/2013	1199
Swaziland	5/22/2013 - 6/04/2013	1200
Tanzania	5/28/2013 - 6/30/2013	2400
Togo	12/17/2012 - 12/29/2012	1200
Uganda	12/02/2011 - 2/28/2012	2400
Zambia	1/21/2012 - 2/29/2013	1200
Zimbabwe	7/16/2012 - 7/30/2012	2400

Country	Field Dates	Sample Size
	Round 6	45541
Benin	5/25/2014 - 6/09/2014	1200
Botswana	6/28/2014 - 7/12/2014	1200
Burkina Faso	4/19/2015 - 5/05/2015	1200
Burundi	9/29/2014 - 10/10/2014	1200
Cameroon	1/24/2015 - 2/08/2015	1182
Cote d'Ivoire	8/26/2014 - 9/08/2014	1199
Gabon	9/18/2015 - 10/03/2015	1198
Ghana	5/20/2014 - 7/10/2014	2400
Guinea	3/16/2015 - 4/05/2015	1200
Kenya	11/12/2014 - 12/05/2014	2397
Lesotho	5/05/2014 - 5/31/2014	1200
Liberia	5/06/2014 - 5/22/2014	1199
Madagascar	12/12/2014 - 1/13/2015	1200
Malawi	3/01/2014 - 4/27/2014	2400
Mali	12/01/2014 - 12/14/2014	1200
Mozambique	6/30/2015 - 9/07/2015	2400
Namibia	9/22/2014 - 8/27/2014	1200
Niger	4/01/2015 - 4/18/2015	1200
Nigeria	12/05/2014 - 1/09/2015	2400
Senegal	11/22/2014 - 12/08/2014	1200
Sierra Leone	5/22/2015 - 6/10/2015	1191
South Africa	8/13/2015 - 9/21/2015	2390
Sudan	6/09/2015 - 6/26/2015	1200
Swaziland	4/21/2015 - 5/10/2015	1200
Tanzania	8/26/2014 - 10/19/2014	2386
Togo	10/12/2014 - 10/24/2014	1200
Uganda	5/07/2015 - 5/26/2015	2400
Zambia	10/03/2014 - 10/30/2014	1199
Zimbabwe	11/16/2014 - 11/29/2014	2400

Country	Field Dates	Sample Size
	Round 7	39824
Benin	12/24/2016 - 1/02/2017	1200
Botswana	6/21/2017 - 7/05/2017	1198
Burkina Faso	10/02/2018 - 10/18/2018	1200
Cameroon	5/07/2018 - 5/25/2018	1202
Cote d'Ivoire	12/30/2016 - 1/11/2017	1200
Gabon	11/02/2017 - 11/14/2017	1199
Gambia	7/23/2018 - 8/12/2018	1200
Ghana	9/09/2017 - 9/25/2017	2400
Guinea	5/13/2017 - 5/31/2017	1194
Kenya	9/13/2016 - 10/08/2016	1599
Lesotho	11/25/2017 - 12/11/2017	1200
Liberia	6/19/2018 - 7/16/2018	1200
Madagascar	1/20/2018 - 2/26/2018	1200
Malawi	12/26/2016 - 2/14/2017	1200
Mali	2/08/2017 - 2/24/2017	1200
Mozambique	6/13/2018 - 9/03/2018	2392
Namibia	11/06/2017 - 12/21/2017	1200
Niger	4/13/2018 - 4/30/2018	1200
Nigeria	4/26/2017 - 5/10/2017	1600
Senegal	12/02/2017 - 12/19/2017	1200
Sierra Leone	7/06/2018 - 7/28/2018	1200
South Africa	7/30/2018 - 9/26/2018	1840
Sudan	7/22/2018 - 8/25/2018	1200
Swaziland	3/13/2018 - 3/28/2018	1200
Tanzania	4/30/2017 - 6/17/2017	2400
Togo	11/11/2017 - 11/23/2017	1200
Uganda	12/26/2016 - 1/08/2017	1200
Zambia	4/08/2017 - 4/25/2017	1200
Zimbabwe	1/28/2017 - 2/10/2017	1200

A.3 Variable Descriptions and Sources

Name	Description	Source
Incumbent Share	Proportion of valid votes for incumbent executive, party, or party's candidate.	Election commission websites Media reports
Margin	Difference in share of valid votes for incumbent and leading challenger.	Election commission websites Media reports
Turnout	Proportion of registered voters who cast ballots (Includes invalid votes).	Election commission websites Media reports
Months from Harvest	Months from average maximum NDVI date.	USGS, Landsat 5, 7, 8.
Growing Season Length	Days between average maximum and minimum NDVI dates.	USGS, Landsat 5, 7, 8.
GDP PC PPP	Gross Domestic Product per capita, Purchasing Parity Power	World Bank, World Development Indicators
Pct. Employed Ag.	Percentage of the workforce employed in agriculture.	World Bank, World Development Indicators
Pct. GDP from Ag.	Percentage of gross domestic product in agriculture.	World Bank, World Development Indicators
Polity 2	Polity score, level of democracy.	Center for Systemic Peace
Pol. Comp.	Political competition concept.	Center for Systemic Peace
Urbanization	Proportion of population in cities by subnational unit based on census data.	Henderson et al. (2017)
Economic Performance	Respondent says government does fairly or very well at handling the economy.	Afrobarometer
Poverty Performance	Respondent says government does fairly or very well at improving living standards of the poor.	Afrobarometer
Prices Performance	Respondent says government does fairly or very well at keeping prices down.	Afrobarometer
Living Conditions	Respondent's evaluation of their personal living conditions.	Afrobarometer
Economic Conditions	Respondent's evaluation of country's economic conditions.	Afrobarometer
Traditional Leader Performance	Respondent approves or disapproves of trad. leader's performance.	Afrobarometer
Ethnic ID	Respondent identifies as member of ethnic group over nation.	Afrobarometer
Rural	Enumerator recorded location.	Afrobarometer
Age	Respondent's age in years.	Afrobarometer
Employed	Respondent has job that pays cash.	Afrobarometer
Female	Enumerator recorded gender.	Afrobarometer
Education	Highest level of education completed by respondent.	Afrobarometer
Party Memb.	Respondent identifies as member of any political party.	Afrobarometer

A.4 Summary Statistics

Table A1: African Elections Analysis

	Unique (#)	Missing (%)	Mean	SD	Min	Median	Max
Incumbent Share	1408	0	0.6	0.3	0.0	0.6	1.0
Margin of Victory	1535	1	0.2	0.5	-1.0	0.3	1.0
Turnout	861	30	0.7	0.2	0.1	0.7	1.0
Months from Max	348	0	5.8	2.9	0.0	5.9	12.2
Polity	17	7	3.5	4.1	-6.0	5.0	9.0
GDP PC PPP	126	0	3323.5	2470.4	475.2	2754.2	15359.7
Pct. Employed Ag.	122	2	53.7	17.3	4.7	51.2	92.2
Pct. GDP Ag.	125	1	25.0	11.7	1.9	25.0	58.9
Pol. Comp	9	12	7.1	2.0	2.0	8.0	10.0
Urbanization	360	37	0.3	0.2	0.0	0.2	1.0
NDVI (Last Harvest)	1184	17	0.5	0.1	0.0	0.5	0.8
Season Length	239	0	186.7	99.9	1.0	190.5	365.0

Table A2: Zambian Elections Analysis

	Unique (#)	Missing (%)	Mean	SD	Min	Median	Max
Incumbent Share	300	0	0.5	0.3	0.0	0.5	0.9
Margin of Victory	300	0	0.1	0.5	-1.0	0.2	0.9
Turnout	300	0	0.4	0.1	0.1	0.4	0.6
Months from Max	120	0	8.4	1.5	4.2	8.0	11.2
Season Length	91	0	243.8	42.4	26.0	244.5	350.0
NDVI (Last Harvest)	298	0	0.6	0.1	0.3	0.6	0.7
Urban	2	0	0.3	0.4	0.0	0.0	1.0

Table A3: Afrobarometer Analysis

	Unique (#)	Missing (%)	Mean	SD	Min	Median	Max
Econ. Performance	5	6	1.2	1.0	0.0	1.0	3.0
Econ. Performance (Dummy)	3	6	0.4	0.5	0.0	0.0	1.0
Pov. Performance	5	4	1.0	0.9	0.0	1.0	3.0
Pov. Performance (Dummy)	3	4	0.3	0.5	0.0	0.0	1.0
Price Performance	5	4	0.8	0.9	0.0	1.0	3.0
Price Performance (Dummy)	3	4	0.2	0.4	0.0	0.0	1.0
Living Conditions	6	0	1.7	1.2	0.0	2.0	4.0
Living Conditions (Dummy)	3	0	0.5	0.5	0.0	1.0	1.0
Economic Conditions	6	2	1.5	1.3	0.0	1.0	4.0
Economic Conditions (Dummy)	3	2	0.4	0.5	0.0	0.0	1.0
Trad. Leader Performance	5	45	1.8	0.9	0.0	2.0	3.0
Trad. Leader Performance (Dummy)	3	45	0.7	0.5	0.0	1.0	1.0
Ethnic ID	3	9	0.5	0.5	0.0	1.0	1.0
Months from Harvest	13	0	5.7	3.2	0.0	5.0	12.0
Rural	2	0	0.6	0.5	0.0	1.0	1.0
Age	88	1	36.8	14.6	18.0	33.0	106.0
Education	11	0	3.3	2.2	0.0	3.0	9.0
Employed	3	0	0.3	0.5	0.0	0.0	1.0
Female	3	0	0.5	0.5	0.0	1.0	1.0
Farmer	3	35	0.3	0.4	0.0	0.0	1.0
Party Memb.	3	8	0.6	0.5	0.0	1.0	1.0

Table A4: Correlation Matrix, Afrobarometer Performance Questions

	Econ. Perf.	Pov. Perf.	Price Perf.
Econ. Perf.	1.00	0.63	0.47
Pov. Perf.	0.63	1.00	0.52
Price Perf.	0.47	0.52	1.00

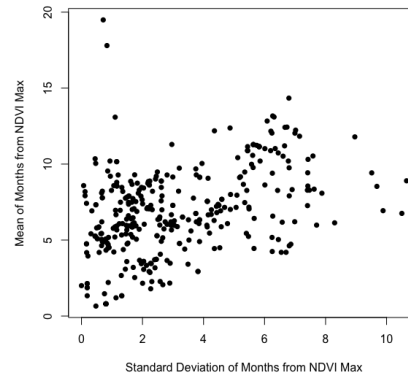


Figure A1: Within-Subnat. Unit Standard Deviation and Mean Months from Max HDVI

Appendix B: Additional Models

B.1 Additional African Election Models

Below I report several sets of additional models. First, I re-estimate my Africa-wide models with Months from Harvest included just as a linear regressor rather than as a polynomial. Next, I re-estimate Africa-wide models on a subset of observations with above-average polity scores. I then consider potential heterogeneous treatment effects by estimating a series of models interacting Months from Harvest with urbanization by subnational unit, a country's level of political competition from Polity, a subnational unit's NDVI value during the last harvest, and measures of the percentage of a country employed in agriculture and the percentage of a country's GDP from agriculture. Lastly, I re-estimate my main models seen in the main text using country fixed effects instead of subnational unit ones.

Table B1: African Elections by Subnational Unit - Linear Models

	Incumbent Share		Margin	
	Reduced	Controls	Reduced	Controls
Months from Harvest	0.003 (0.002)	0.003 (0.002)	0.004 (0.004)	0.004 (0.004)
Harvest NDVI		-0.068 (0.131)		-0.140 (0.253)
GDP PC PPP		-0.000 (0.000)		-0.000 (0.000)
Pct. Employed Ag.		-0.002 (0.003)		-0.001 (0.006)
Pct. GDP from Ag.		-0.011** (0.004)		-0.014+ (0.008)
Num.Obs.	1159	1150	1152	1143
AIC	-468.5	-494.0	1020.3	994.1
BIC	1619.3	1610.9	3105.6	3096.4
RMSE	0.14	0.14	0.26	0.26
Subnat. Unit FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes

Standard Errors Clustered by Subnational Unit

+ $p < 0.1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table B2: African Elections by Subnational Unit - Polity greater than 3.5

	Incumbent Share		Margin	
	Reduced	Controls	Reduced	Controls
Months from Harvest	0.020** (0.008)	0.022** (0.008)	0.043** (0.015)	0.048** (0.016)
Months from Harvest ²	-0.001** (0.000)	-0.001*** (0.000)	-0.003*** (0.001)	-0.003*** (0.001)
Harvest NDVI		-0.117 (0.189)		-0.376 (0.344)
GDP PC PPP		0.000+ (0.000)		0.000* (0.000)
Pct. Employed Ag.		0.006 (0.006)		0.008 (0.012)
Pct. GDP from Ag.		-0.017** (0.006)		-0.016 (0.012)
Num.Obs.	745	745	738	738
AIC	-792.9	-822.9	128.1	111.5
BIC	-779.1	-790.6	141.9	143.7
RMSE	0.14	0.14	0.26	0.26
Subnat. Unit FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes

Standard Errors Clustered by Subnational Unit

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table B3: African Elections by Subnational Unit - Heterogeneous Treatment Effects

	Share	Margin	Share	Margin	Share	Margin	Share	Margin	Share	Margin
Months from Harvest	0.007 (0.014)	0.015 (0.028)	-0.016 (0.020)	-0.007 (0.036)	0.052+ (0.028)	0.098+ (0.050)	-0.023 (0.021)	-0.053 (0.037)	0.013 (0.013)	0.042+ (0.025)
Months from Harvest ²	-0.001 (0.001)	-0.002+ (0.001)	0.002 (0.001)	0.001 (0.002)	-0.003+ (0.002)	-0.005+ (0.003)	0.002 (0.001)	0.004+ (0.002)	-0.000 (0.001)	-0.001 (0.001)
Urbanization	-0.011 (0.163)	-0.365 (0.307)								
Months from Harvest*Urbanization	-0.014 (0.028)	-0.031 (0.056)								
Months from Harvest ² *Urbanization	0.002 (0.001)	0.004 (0.002)								
Pol. Comp			-0.026 (0.019)	-0.028 (0.041)						
Months from Harvest*Pol. Comp			0.004 (0.002)	0.005 (0.005)						
Months from Harvest ² *Pol. Comp			-0.000* (0.000)	-0.000 (0.000)						
Harvest NDVI					-0.196 (0.193)	-0.408 (0.371)				
Months from Harvest*HarvNDVI					0.049 (0.041)	0.118 (0.078)				
Months from Harvest ² *HarvNDVI					-0.002 (0.002)	-0.005 (0.004)				
Pct. Employed Ag.							-0.007* (0.003)	-0.010+ (0.005)		
Months from Harvest*Ag. Employ							0.001+ (0.000)	0.001* (0.001)		
Months from Harvest ² *Ag. Employ							-0.000* (0.000)	-0.000** (0.000)		
Pct. GDP from Ag.									-0.011** (0.004)	-0.012 (0.007)
Months from Harvest*GDP Ag.									0.000 (0.001)	-0.000 (0.001)
Months from Harvest ² *GDP Ag.									-0.000 (0.000)	-0.000 (0.000)
Num.Obs.	744	737	1108	1101	1159	1152	1159	1152	1150	1143
AIC	-411.8	554.1	-567.2	844.7	-473.5	1012.5	-487.6	995.4	-508.9	967.8
BIC	722.8	1686.3	1512.1	2921.3	1634.5	3118.0	1620.4	3100.9	1590.9	3065.1
RMSE	0.13	0.25	0.13	0.24	0.14	0.26	0.14	0.26	0.14	0.26
Subnat. Unit FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Standard Errors Clustered by Subnational Unit

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

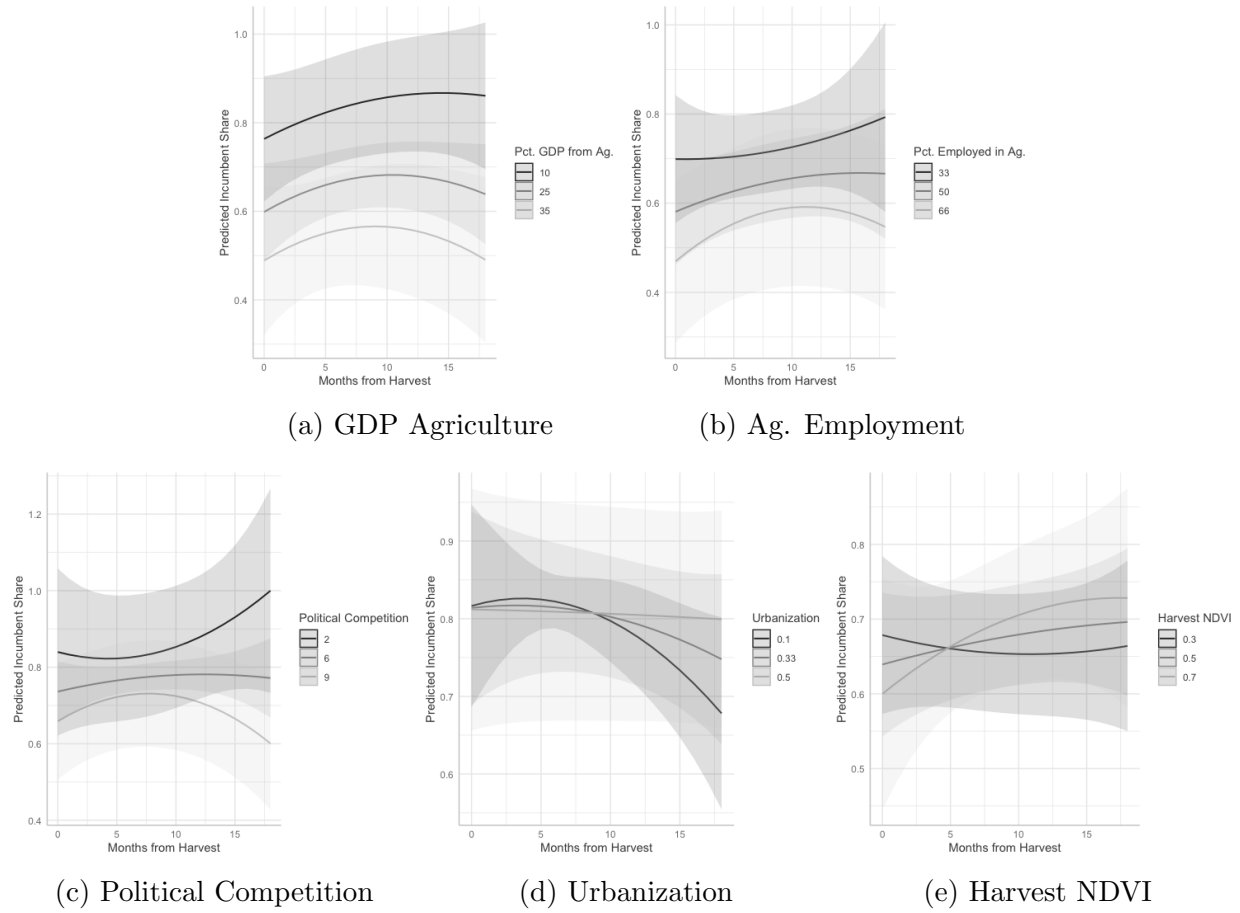


Figure B1: Predicted Incumbent Vote Share - Heterogeneous Treatment Effect Models

Table B4: African Elections by Subnational Unit - Within Country Models

	Incumbent Share		Margin	
	Reduced	Controls	Reduced	Controls
Months from Harvest	0.014*	0.014*	0.022+	0.023+
	(0.007)	(0.007)	(0.013)	(0.013)
Months from Harvest ²	-0.000	-0.001	-0.001	-0.001
	(0.000)	(0.000)	(0.001)	(0.001)
Harvest NDVI		0.098		0.183
		(0.091)		(0.175)
Polity		-0.011		-0.019
		(0.008)		(0.016)
GDP PC PPP		0.000*		0.000*
		(0.000)		(0.000)
Pct. Employed Ag.		-0.001		-0.000
		(0.003)		(0.006)
Pct. GDP from Ag.		-0.006		-0.005
		(0.004)		(0.008)
Num.Obs.	1159	1150	1152	1143
AIC	-59.0	-61.9	1425.2	1411.3
BIC	219.0	235.9	1702.9	1708.7
RMSE	0.22	0.22	0.43	0.43
Country FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes

Standard Errors Clustered by Subnational Unit

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

B.2 Additional Zambian Election Models

In addition to the Africa-wide models, I estimate several additional models on the Zambian quasi-experimental data. First, I re-estimate my Zambia models with Months from Harvest included just as a linear regressor rather than as a polynomial. Next, I re-estimate my Zambia models swapping province fixed-effects for constituency fixed-effects, and standard errors clustered by province-year for constituency-year. Finally, to consider if the effect is stronger in rural areas, I re-estimate these models including an interaction term of whether the constituency is rural.

Table B5: Zambian Presidential Elections, Linear Models

	Incumbent	Margin	Incumbent	Margin
Months from Harvest	0.014 (0.015)	0.026 (0.035)	0.012 (0.012)	0.030 (0.031)
Harvest NDVI	1.055 (1.035)	2.859 (2.372)	1.130 (1.015)	2.684 (2.253)
Lagged DV			0.179 (0.579)	-0.269 (0.795)
Num.Obs.	300	300	300	300
AIC	196.5	707.5	196.1	707.8
BIC	763.2	1274.1	766.5	1278.2
RMSE	0.20	0.47	0.20	0.47
Constituency FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes
Standard Errors Clustered by Province-Year				
+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001				

Table B6: Zambian Presidential Elections, Province FEs

	Incumbent	Margin	Incumbent	Margin
Months from Harvest	0.031* (0.013)	0.068* (0.026)	0.026* (0.010)	0.064* (0.023)
Months from Harvest ²	-0.001* (0.001)	-0.003** (0.001)	-0.001* (0.000)	-0.003** (0.001)
Harvest NDVI	0.272 (0.201)	0.587 (0.429)	0.168 (0.188)	0.511 (0.433)
Lagged DV			0.251 (0.210)	0.100 (0.230)
Num.Obs.	300	300	300	300
AIC	-66.9	429.7	-76.1	430.7
BIC	-52.1	444.5	-57.6	449.2
RMSE	0.21	0.49	0.21	0.49
Province FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes
Standard Errors Clustered by Province-Year				
+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001				

Table B7: Zambian Presidential Elections, Rural Interaction

	Incumbent	Margin	Incumbent	Margin
Months from Harvest	-0.128*	-0.272*	-0.127*	-0.274*
	(0.051)	(0.119)	(0.051)	(0.121)
Months from Harvest*Rural	0.158**	0.332*	0.150**	0.329*
	(0.052)	(0.120)	(0.051)	(0.119)
Months from Harvest ²	0.013**	0.029**	0.013**	0.029*
	(0.004)	(0.010)	(0.004)	(0.010)
Months from Harvest ² *Rural	-0.015**	-0.033**	-0.015**	-0.033**
	(0.004)	(0.010)	(0.004)	(0.010)
Harvest NDVI	0.133	0.268	0.020	0.182
	(0.151)	(0.309)	(0.148)	(0.358)
Lagged DV			0.295	0.125
			(0.180)	(0.210)
Num.Obs.	300	300	300	300
AIC	-94.8	403.2	-109.2	403.8
BIC	-31.9	466.2	-42.6	470.5
RMSE	0.20	0.45	0.19	0.45
Province FEs	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes

Standard Errors Clustered by Province-Year

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

B.3 Additional Afrobarometer Models

In the main text I report results from a series of OLS regressions using survey data from the Afrobarometer. Those four regressions show the relationship between months from harvest and:

- a respondent's evaluation of the incumbent government's performance on the economy (0-3; Strongly disapprove, disapprove, approve, strongly approve),
- a respondent's evaluation of the incumbent government's performance on improving living standards (0-3; Strongly disapprove, disapprove, approve, strongly approve),
- a respondent's evaluation of the incumbent government's performance on keeping prices down (0-3; Strongly disapprove, disapprove, approve, strongly approve),

- a respondent's evaluation of their present personal living conditions at present (0-4; Very bad, bad, neither good nor bad, good, very good),
- a respondent's evaluation of their country's current economic conditions (0-4; Very bad, bad, neither good nor bad, good, very good),
- a respondent's evaluation of their traditional leader's performance (0-3; Strongly disapprove, disapprove, approve, strongly approve),
- whether a respondent identifies with their ethnic group more than their nation (0-1).

I repeat these models in several ways. First, I dichotomize ordinal measures by splitting them into agree/disagree, and re-run the same models as linear probability models, logit and probit regressions. Second, I repeat these models on two subsets: farmers, and those who say their present living conditions as very or fairly bad. Finally, I consider estimate models interacting Months from Harvest with whether a respondent lives in a rural area.

Table B8: Seasonality and the Afrobarometer - Linear Probability Models

	Economic Performance	Poverty Performance	Price Performance	Living Conditions	Economic Conditions	Trad. Leader Performance	Ethnic ID
Months from Harvest	0.018*** (0.004)	0.009** (0.004)	0.006* (0.003)	-0.000 (0.003)	0.011** (0.004)	-0.001 (0.003)	0.003 (0.004)
Months from Harvest ²	-0.001*** (0.000)	-0.000* (0.000)	-0.000+ (0.000)	0.000 (0.000)	-0.000+ (0.000)	0.000 (0.000)	-0.000 (0.000)
Harvest NDVI	0.116+ (0.060)	0.146** (0.052)	0.267*** (0.048)	0.107* (0.051)	0.091 (0.058)	0.036 (0.063)	0.077 (0.059)
Rural	0.005 (0.007)	-0.003 (0.006)	0.005 (0.006)	-0.026*** (0.006)	0.007 (0.006)	0.045*** (0.007)	0.014* (0.007)
Age	0.000 (0.000)	-0.000 (0.000)	-0.000* (0.000)	-0.002*** (0.000)	-0.001*** (0.000)	0.001*** (0.000)	-0.000+ (0.000)
Employed	0.002 (0.005)	0.008+ (0.004)	-0.009+ (0.004)	0.029*** (0.004)	-0.003 (0.004)	-0.001 (0.005)	-0.016*** (0.005)
Female	-0.016*** (0.003)	-0.011*** (0.003)	-0.011*** (0.003)	0.010** (0.003)	-0.005 (0.003)	-0.001 (0.004)	0.020*** (0.003)
Education	0.003* (0.001)	0.003** (0.001)	0.002+ (0.001)	0.028*** (0.001)	0.009*** (0.001)	-0.010*** (0.001)	-0.007*** (0.001)
Party Membership	0.026*** (0.004)	0.026*** (0.004)	0.026*** (0.004)	-0.002 (0.004)	0.024*** (0.004)	0.039*** (0.005)	-0.016*** (0.004)
Constant	-0.000 (0.084)	0.055 (0.072)	0.033 (0.054)	0.500*** (0.063)	0.031 (0.076)	0.414*** (0.078)	1.012*** (0.064)
Num.Obs.	101763	103502	103039	106977	106020	56776	100915
Unit FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month and Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Weights and Survey Design Included

Standard Errors Clustered by PSU

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table B9: Seasonality and the Afrobarometer - Logits

	Economic Performance	Poverty Performance	Price Performance	Living Conditions	Economic Conditions	Trad. Leader Performance	Ethnic ID
Months from Harvest	0.081*** (0.019)	0.050** (0.018)	0.050** (0.019)	-0.003 (0.015)	0.050** (0.019)	0.000 (0.019)	0.014 (0.018)
Months from Harvest ²	-0.004** (0.001)	-0.003* (0.001)	-0.003* (0.001)	0.000 (0.001)	-0.002 (0.001)	0.000 (0.001)	-0.001 (0.001)
Harvest NDVI	0.555+ (0.291)	0.763** (0.284)	1.810*** (0.298)	0.497* (0.236)	0.454 (0.282)	0.208 (0.357)	0.312 (0.265)
Rural	0.027 (0.035)	-0.015 (0.032)	0.029 (0.035)	-0.116*** (0.026)	0.033 (0.030)	0.243*** (0.036)	0.066* (0.030)
Age	0.001 (0.001)	-0.000 (0.001)	-0.002* (0.001)	-0.007*** (0.001)	-0.003*** (0.001)	0.006*** (0.001)	-0.001* (0.001)
Employed	0.010 (0.025)	0.042+ (0.024)	-0.051+ (0.027)	0.129*** (0.020)	-0.015 (0.020)	-0.008 (0.027)	-0.075*** (0.022)
Female	-0.075*** (0.016)	-0.062*** (0.016)	-0.068*** (0.017)	0.044** (0.015)	-0.022 (0.016)	-0.007 (0.022)	0.092*** (0.014)
Education	0.013* (0.006)	0.016** (0.005)	0.011+ (0.006)	0.125*** (0.005)	0.041*** (0.005)	-0.055*** (0.007)	-0.033*** (0.005)
Party Membership	0.122*** (0.021)	0.142*** (0.021)	0.159*** (0.022)	-0.006 (0.018)	0.111*** (0.019)	0.217*** (0.028)	-0.071*** (0.021)
Constant	-2.344*** (0.467)	-2.246*** (0.474)	-2.641*** (0.390)	-0.045 (0.279)	-2.227*** (0.438)	-0.343 (0.423)	2.861*** (0.600)
Num.Obs.	101763	103502	103039	106977	106020	56776	100915
Unit FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month and Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Weights and Survey Design Included

Standard Errors Clustered by PSU

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table B10: Seasonality and the Afrobarometer - Probits

	Economic Performance	Poverty Performance	Price Performance	Living Conditions	Economic Conditions	Trad. Leader Performance	Ethnic ID
Months from Harvest	0.049*** (0.011)	0.028** (0.010)	0.025* (0.011)	-0.001 (0.009)	0.030** (0.011)	-0.000 (0.011)	0.008 (0.011)
Months from Harvest ²	-0.002*** (0.001)	-0.001* (0.001)	-0.001* (0.001)	0.000 (0.001)	-0.001 (0.001)	0.000 (0.001)	-0.000 (0.001)
Harvest NDVI	0.346* (0.175)	0.469** (0.168)	1.021*** (0.169)	0.304* (0.144)	0.290+ (0.168)	0.137 (0.207)	0.195 (0.163)
Rural	0.016 (0.021)	-0.010 (0.019)	0.017 (0.020)	-0.071*** (0.016)	0.019 (0.018)	0.143*** (0.021)	0.041* (0.018)
Age	0.001 (0.000)	-0.000 (0.000)	-0.001* (0.000)	-0.004*** (0.000)	-0.002*** (0.000)	0.003*** (0.001)	-0.001+ (0.000)
Employed	0.007 (0.015)	0.026+ (0.014)	-0.028+ (0.016)	0.080*** (0.012)	-0.009 (0.012)	-0.007 (0.016)	-0.045*** (0.013)
Female	-0.047*** (0.009)	-0.038*** (0.009)	-0.040*** (0.010)	0.027** (0.009)	-0.014 (0.010)	-0.002 (0.013)	0.056*** (0.008)
Education	0.008* (0.003)	0.009** (0.003)	0.006* (0.003)	0.076*** (0.003)	0.025*** (0.003)	-0.033*** (0.004)	-0.020*** (0.003)
Party Membership	0.074*** (0.013)	0.084*** (0.013)	0.091*** (0.013)	-0.004 (0.011)	0.067*** (0.012)	0.129*** (0.016)	-0.044*** (0.013)
Constant	-1.429*** (0.272)	-1.347*** (0.267)	-1.541*** (0.218)	-0.023 (0.170)	-1.363*** (0.252)	-0.237 (0.248)	1.665*** (0.313)
Num.Obs.	101763	103502	103039	106977	106020	56776	100915
Unit FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month and Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Weights and Survey Design Included

Standard Errors Clustered by PSU

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table B11: Seasonality and the Afrobarometer - Farmers Subset

	Economic Performance	Poverty Performance	Price Performance	Living Conditions	Economic Conditions	Trad. Leader Performance	Ethnic ID
Months from Harvest	0.044** (0.014)	0.014 (0.013)	0.021 (0.013)	0.004 (0.016)	0.033* (0.015)	-0.006 (0.014)	0.000 (0.006)
Months from Harvest ²	-0.003** (0.001)	-0.001 (0.001)	-0.002* (0.001)	-0.000 (0.001)	-0.002* (0.001)	0.000 (0.001)	-0.000 (0.000)
Harvest NDVI	0.050 (0.209)	0.195 (0.205)	0.324 (0.211)	0.150 (0.264)	0.306 (0.252)	0.291 (0.227)	-0.017 (0.111)
Rural	-0.009 (0.028)	-0.025 (0.028)	-0.054* (0.026)	-0.047 (0.038)	-0.016 (0.039)	0.048+ (0.027)	0.016 (0.014)
Age	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.003*** (0.001)	-0.001 (0.001)	0.002*** (0.001)	-0.001* (0.000)
Employed	-0.148*** (0.025)	-0.109*** (0.024)	-0.070** (0.023)	-0.015 (0.029)	-0.065* (0.028)	-0.006 (0.026)	-0.027+ (0.014)
Female	-0.036* (0.015)	-0.005 (0.015)	0.008 (0.014)	-0.002 (0.020)	0.007 (0.021)	-0.023 (0.016)	0.034*** (0.008)
Education	-0.010+ (0.006)	0.002 (0.005)	-0.003 (0.005)	0.019** (0.007)	-0.001 (0.007)	-0.022*** (0.005)	-0.008** (0.003)
Party Membership	0.053** (0.020)	0.056** (0.019)	0.031+ (0.018)	0.109*** (0.024)	0.130*** (0.024)	0.043* (0.019)	-0.018+ (0.010)
Constant	-0.369+ (0.205)	-0.505** (0.191)	-0.467* (0.209)	2.432*** (0.266)	0.265 (0.257)	1.834*** (0.182)	0.932*** (0.105)
Num.Obs.	17273	17569	17493	17960	17827	15448	16776
Unit FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month and Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Weights and Survey Design Included

Standard Errors Clustered by PSU

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table B12: Seasonality and the Afrobarometer - Bad Living Conditions Subset

	Economic Performance	Poverty Performance	Price Performance	Economic Conditions	Trad. Leader Performance	Ethnic ID
Months from Harvest	0.034*** (0.008)	0.013* (0.007)	0.008 (0.006)	0.008 (0.007)	0.006 (0.009)	0.003 (0.004)
Months from Harvest ²	-0.002*** (0.001)	-0.001* (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.001)	-0.000 (0.000)
Harvest NDVI	0.321* (0.131)	0.278* (0.119)	0.450*** (0.116)	0.066 (0.134)	0.002 (0.186)	0.088 (0.065)
Rural	0.001 (0.016)	-0.003 (0.013)	0.008 (0.013)	0.019 (0.015)	0.108*** (0.016)	0.014* (0.007)
Age	0.000 (0.000)	-0.000 (0.000)	-0.001* (0.000)	-0.002*** (0.000)	0.003*** (0.000)	-0.000+ (0.000)
Employed	-0.028* (0.012)	-0.008 (0.010)	-0.030** (0.010)	-0.038*** (0.011)	-0.017 (0.013)	-0.017** (0.005)
Female	-0.032*** (0.007)	-0.006 (0.006)	-0.013* (0.006)	-0.038*** (0.008)	-0.005 (0.010)	0.020*** (0.004)
Education	-0.004 (0.003)	0.002 (0.002)	-0.002 (0.002)	0.008** (0.003)	-0.027*** (0.003)	-0.006*** (0.001)
Party Membership	0.040*** (0.010)	0.040*** (0.009)	0.044*** (0.009)	0.038*** (0.011)	0.070*** (0.012)	-0.018*** (0.005)
Constant	0.311 (0.226)	0.276+ (0.155)	0.287+ (0.158)	0.408* (0.191)	1.092*** (0.157)	0.931*** (0.085)
Num.Obs.	68703	70014	69697	71779	37817	68223
Unit FEs	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes
Month and Year FEs	Yes	Yes	Yes	Yes	Yes	Yes

Weights and Survey Design Included

Standard Errors Clustered by PSU

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

Table B13: Seasonality and the Afrobarometer - Heterogeneous Treatment Effects

	Economic Performance	Poverty Performance	Price Performance	Living Conditions	Economic Conditions	Trad. Leader Performance	Ethnic ID
Months from Harvest	0.118** (0.038)	0.061* (0.027)	0.077** (0.029)	0.050+ (0.030)	0.119** (0.040)	0.037 (0.031)	0.022 (0.019)
Months from Harvest ²	-0.018* (0.008)	-0.010+ (0.005)	-0.011+ (0.006)	-0.007 (0.005)	-0.017* (0.008)	-0.007 (0.007)	-0.003 (0.004)
Rural	-0.030 (0.040)	-0.031 (0.034)	0.042 (0.034)	-0.034 (0.040)	0.010 (0.048)	0.141*** (0.031)	0.035* (0.017)
Months from Harvest*Rural	0.046 (0.038)	0.028 (0.032)	-0.027 (0.031)	-0.012 (0.037)	0.021 (0.045)	-0.034 (0.031)	-0.016 (0.017)
Months from Harvest ² *Rural	-0.011 (0.008)	-0.006 (0.006)	0.003 (0.006)	-0.000 (0.007)	-0.004 (0.009)	0.005 (0.006)	0.002 (0.004)
Harvest NDVI	0.264* (0.128)	0.310** (0.113)	0.546*** (0.113)	0.286* (0.142)	0.218 (0.165)	0.025 (0.161)	0.075 (0.059)
Female	-0.033*** (0.006)	-0.013* (0.006)	-0.014** (0.006)	0.023** (0.008)	-0.018* (0.008)	-0.011 (0.008)	0.020*** (0.003)
Age	0.000 (0.000)	-0.000 (0.000)	-0.001* (0.000)	-0.004*** (0.000)	-0.002*** (0.000)	0.002*** (0.000)	-0.000* (0.000)
Employed	-0.004 (0.011)	0.006 (0.010)	-0.017+ (0.009)	0.069*** (0.011)	-0.006 (0.012)	0.001 (0.011)	-0.016*** (0.005)
Education	0.000 (0.002)	0.005* (0.002)	0.002 (0.002)	0.065*** (0.003)	0.016*** (0.003)	-0.025*** (0.002)	-0.007*** (0.001)
Party Membership	0.054*** (0.009)	0.057*** (0.008)	0.051*** (0.008)	0.003 (0.010)	0.070*** (0.010)	0.072*** (0.010)	-0.016*** (0.004)
Constant	0.304+ (0.179)	0.285+ (0.151)	0.239+ (0.137)	1.668*** (0.175)	0.434* (0.210)	1.149*** (0.130)	0.995*** (0.065)
Num.Obs.	101763	103502	103039	106977	106020	56776	100915
Unit FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Month and Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Weights and Survey Design Included

Standard Errors Clustered by PSU

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001

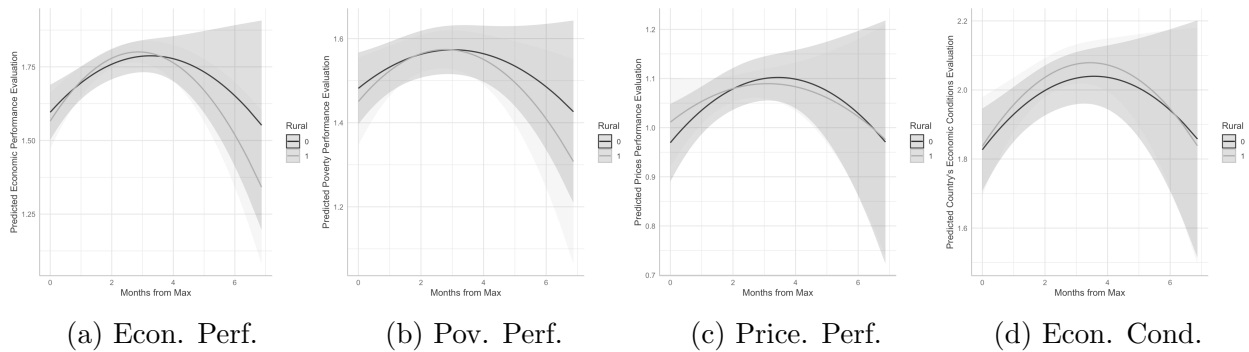


Figure B2: Afrobarometer Analysis - Heterogeneous Treatment Effect Models

B.4 Instrumental Variable Extension

Another way of thinking about the link between agricultural seasons and performance evaluations is as first stage of a potential instrumental variable analysis of voter choice. One challenge facing researchers interested in identifying retrospective voting using survey data of African voters is the simultaneity between a respondent's vote choice and their performance evaluations. For example, voters may prefer a candidate due to a shared ethnicity and evaluate their preferred candidate in a more favorable light, while also using that evaluation as another justification for their support. An instrumental variable approach might allow us to use exogenous variation in performance evaluations to more reliably estimate the independent effect of retrospective voting.

Table B11 shows estimates of such an analysis, using agricultural seasons as an exogenous variable predicting a survey respondent's economic performance evaluation. The first stage is analogous to the model estimated in Table 4, with the outcome of the second stage being a respondent stating their intent to vote for the incumbent executive in the next election. These estimates are consistent with prior results, illustrating that performance evaluations correlate with agricultural seasons and that, in turn, a statistically significant relationship exists between performance evaluations and intent to vote for incumbent politicians.

Importantly, the plausibility of these results rests on the exclusion restriction being satisfied. To recover a reliable estimate of performance voting, agricultural seasons must be otherwise unrelated to support for incumbent politicians aside from its influence on retrospective evaluations. While this restriction is unknowable, the inability to find a relationship between agricultural seasons and turnout and self-reported identification improves the plausibility of the exclusion restriction being met. This instrumental variable analysis should be interpreted cautiously, given the inability to assess possible exclusions. However, with some assumptions, this analysis provides compelling evidence that African voters engage in retrospective voting.

Table B14: Instrumental Variable Extension

	Economic Performance	Incumbent Vote
Months from Harvest	0.162*** (0.040)	
Months from Harvest ²	-0.026** (0.008)	
Econ. Performance		0.138* (0.069)
Harvest NDVI	0.324* (0.159)	-0.027 (0.077)
Rural	-0.011 (0.013)	0.014* (0.006)
Age	0.001** (0.000)	0.001*** (0.000)
Employed	0.003 (0.014)	-0.015** (0.005)
Female	-0.032*** (0.008)	0.032*** (0.005)
Party Membership	-0.012 (0.012)	0.030*** (0.006)
Education	-0.001 (0.003)	-0.020*** (0.001)
Num.Obs.	74777	74777
Controls	Yes	Yes
Unit FEs	Yes	Yes
Year FEs	Yes	Yes
Month FEs	Yes	Yes
Month and Year FEs	Yes	Yes
First Stage F-Test	10.93***	

Standard Errors Clustered by PSU, Survey Weights Included

+ p < 0.1, * p < 0.05, ** p < 0.01, *** p < 0.001