

Rainfall, Agricultural Output, and Persistent Democratization

by

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Online Appendix

**APPENDIX TABLE 1. Rainfall and Democratization since 1960:
Acemoglu et al. (2019) data**

	Acemoglu et al. Democratization between t-1 and			
	<u>t (1-Year)</u> (1)	<u>t+2 (3-Year)</u> (2)	<u>t+4 (5-Year)</u> (3)	<u>t+9 (10-Year)</u> (4)
Rainfall t	-0.032* (0.016)	-0.027 (0.021)	-0.062** (0.024)	-0.057** (0.024)
Quadratic Rainfall t	0.001* (0.000)	0.000 (0.001)	0.001* (0.001)	0.001** (0.001)
Rainfall t-1	0.022 (0.014)	-0.010 (0.022)	-0.029 (0.021)	-0.045* (0.025)
Quadratic Rainfall t-1	-0.001 (0.000)	0.000 (0.001)	0.001 (0.001)	0.001* (0.001)
Rainfall t-2	-0.016 (0.016)	-0.057*** (0.021)	-0.050** (0.021)	-0.031 (0.027)
Quadratic Rainfall t-2	0.000 (0.000)	0.001** (0.001)	0.001** (0.001)	0.001 (0.001)
Countries	26	26	26	26
Observations	946	911	883	811
R Squared	0.020	0.038	0.064	0.031

Note: The left-hand-side variables in all columns are democratization indicators based on the classification of democratic and nondemocratic regimes of Acemoglu, Naidu, Restrepo, and Robinson (2019) except that we drop years where according to Geddes, Wright, and Frantz (2014) the country is not independent, is occupied by a foreign nation, or there is no government controlling most of the territory. The left-hand-side democratization indicator in column (1) takes the value of 1 if a country that is an nondemocracy at t-1 is a democracy at t (one year later) and the value of 0 otherwise. The left-hand-side democratization indicator in column (2) takes the value of 1 if a country that is an nondemocracy at t-1 is a democracy at t+2 (three years later) and the value of 0 otherwise. The left-hand-side democratization indicator in column (3) is an indicator variable that takes the value of 1 if a country that is an nondemocracy at t-1 is a democracy at t+4 (five years later) and the value of 0 otherwise. The left-hand-side democratization indicator in column (4) takes the value of 1 if a country that is an nondemocracy at t-1 is a democracy at t+9 (10 years later) and the value of 0 otherwise. The included countries are all countries with an average share of agriculture in GDP over the 1970-2013 period in the top quintile of the distribution. The specification includes country fixed effects, year fixed effects, and linear & quadratic contemporaneous and lagged temperature effects. The specification also includes a linear and quadratic term for rainfall lagged by three years but these terms are generally statistically insignificant and not reported for brevity. The table reports heteroskedastic and autocorrelation-consistent (HAC) standard errors that are robust to both arbitrary heteroskedasticity and serial correlation. * denotes significance at the 10% level; ** significance at the 5% level; and *** significance at the 1% level.

APPENDIX TABLE 2A. Rainfall and Democratization since 1960: Robustness Acemoglu et al. (2019)
Democratization between t-1 and t (1-Year Period)

	Dropping Countries					MAIN SAMPLE	Adding Countries				
	DROP 5	DROP 4	DROP 3	DROP 2	DROP 1		ADD 1	ADD 2	ADD 3	ADD 4	ADD 5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Rainfall t	-0.019 (0.017)	-0.030* (0.017)	-0.030* (0.017)	-0.030* (0.017)	-0.029* (0.016)	-0.031** (0.016)	-0.030* (0.016)	-0.026* (0.015)	-0.024 (0.016)	-0.024 (0.015)	-0.026* (0.015)
Quadratic Rainfall t	0.000 (0.000)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)
Rainfall t-1	0.012 (0.013)	0.012 (0.012)	0.013 (0.012)	0.013 (0.012)	0.014 (0.012)	0.015 (0.011)	0.017 (0.011)	0.007 (0.012)	0.007 (0.012)	0.007 (0.012)	-0.000 (0.013)
Quadratic Rainfall t-1	-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 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Rainfall t-2	-0.012 (0.017)	-0.014 (0.016)	-0.013 (0.015)	-0.013 (0.015)	-0.011 (0.015)	-0.016 (0.015)	-0.014 (0.014)	-0.013 (0.014)	-0.015 (0.014)	-0.015 (0.014)	-0.005 (0.015)
Quadratic Rainfall t-2	0.0004 (0.0003)	0.0012*** (0.0005)	0.0008* (0.0004)	0.0011** (0.0006)	0.0003 (0.0003)	0.0006 (0.0004)	0.0003 (0.0004)	0.0005 (0.0005)	-0.0004 (0.0003)	0.0002 (0.0004)	0.0005 (0.0004)
Countries	27	28	29	29	30	31	32	33	34	35	36
Observations	1,019	1,052	1,083	1,083	1,115	1,132	1,180	1,219	1,238	1,247	1,279
R Squared	0.009	0.015	0.014	0.014	0.014	0.016	0.015	0.012	0.012	0.012	0.012

Note: The left-hand-side variable in all columns is a democratization indicator that takes the value of 1 if a country that is a nondemocracy at t-1 is a democracy at t (one year later) and the value of 0 otherwise. The classification of countries into democratic and nondemocratic regimes is based on Acemoglu, Naidu, Restrepo, and Robinson (2019). The main specification in column (6) is identical to the Acemoglu et al. (2019) specification in Table 3 in the main text and includes countries with an average share of agriculture in GDP over the 1970-2013 period in the top quintile of the distribution. Starting from this specification we either drop countries with the lowest agricultural GDP share within the top quintile of the distribution one by one or we add countries with the highest agricultural GDP share outside the top quintile of the distribution one by one. The empirical specification also includes a linear and quadratic term for rainfall lagged by three years but these terms are generally statistically insignificant and not reported for brevity. The table reports heteroskedastic and autocorrelation-consistent (HAC) standard errors that are robust to both arbitrary heteroskedasticity and serial correlation. * denotes significance at the 10% level; ** significance at the 5% level; and *** significance at the 1% level.

APPENDIX TABLE 2B. Rainfall and Democratization since 1960: Robustness Acemoglu et al. (2019) Democratization between t-1 and t+2 (3-Year Period)

	Dropping Countries					MAIN SAMPLE	Adding Countries				
	DROP 5	DROP 4	DROP 3	DROP 2	DROP 1		ADD 1	ADD 2	ADD 3	ADD 4	ADD 5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Rainfall t	-0.031 (0.023)	-0.044** (0.022)	-0.043* (0.022)	-0.043* (0.022)	-0.039* (0.021)	-0.044** (0.020)	-0.042** (0.020)	-0.036* (0.019)	-0.037* (0.019)	-0.038** (0.019)	-0.037* (0.019)
Quadratic Rainfall t	0.001 (0.001)	0.001* (0.001)	0.001* (0.001)	0.001* (0.001)	0.001 (0.000)	0.001* (0.000)	0.001* (0.000)	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)
Rainfall t-1	0.003 (0.023)	-0.003 (0.022)	-0.002 (0.022)	-0.002 (0.022)	-0.004 (0.022)	-0.008 (0.021)	-0.006 (0.021)	0.002 (0.020)	-0.009 (0.020)	-0.009 (0.020)	-0.001 (0.020)
Quadratic Rainfall t-1	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	-0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	-0.000 (0.001)
Rainfall t-2	-0.055*** (0.020)	-0.058*** (0.020)	-0.057*** (0.020)	-0.057*** (0.020)	-0.054*** (0.019)	-0.060*** (0.019)	-0.057*** (0.018)	-0.054*** (0.018)	-0.056*** (0.018)	-0.056*** (0.018)	-0.038* (0.021)
Quadratic Rainfall t-2	0.001** (0.000)	0.001** (0.000)	0.001** (0.000)	0.001** (0.000)	0.001** (0.000)	0.001** (0.000)	0.001** (0.000)	0.001** (0.000)	0.001** (0.000)	0.001** (0.000)	0.001 (0.001)
Countries	27	28	29	29	30	31	32	33	34	35	36
Observations	990	1,023	1,052	1,052	1,083	1,100	1,146	1,185	1,203	1,210	1,242
R Squared	0.032	0.042	0.040	0.040	0.040	0.043	0.041	0.035	0.033	0.033	0.027

Note: The left-hand-side variable in all columns is a democratization indicator that takes the value of 1 if a country that is a nondemocracy at t-1 is a democracy at t+2 (three years later) and the value of 0 otherwise. The classification of countries into democratic and nondemocratic regimes is based on Acemoglu, Naidu, Restrepo, and Robinson (2019). The main specification in column (6) is identical to the Acemoglu et al. (2019) specification in Table 3 in the main text and includes countries with an average share of agriculture in GDP over the 1970-2013 period in the top quintile of the distribution. Starting from this specification we either drop countries with the lowest agricultural GDP share within the top quintile of the distribution one by one or we add countries with the highest agricultural GDP share outside the top quintile of the distribution one by one. The empirical specification also includes a linear and quadratic term for rainfall lagged by three years but these terms are generally statistically insignificant and not reported for brevity. The table reports heteroskedastic and autocorrelation-consistent (HAC) standard errors that are robust to both arbitrary heteroskedasticity and serial correlation. * denotes significance at the 10% level; ** significance at the 5% level; and *** significance at the 1% level.

APPENDIX TABLE 2C. Rainfall and Democratization since 1960: Robustness Acemoglu et al. (2019) Democratization between t-1 and t+9 (10-Year Period)

	Dropping Countries					MAIN SAMPLE	Adding Countries				
	DROP 5	DROP 4	DROP 3	DROP 2	DROP 1		ADD 1	ADD 2	ADD 3	ADD 4	ADD 5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Rainfall t	-0.034 (0.026)	-0.054** (0.024)	-0.052** (0.024)	-0.052** (0.024)	-0.052** (0.023)	-0.056** (0.022)	-0.054** (0.022)	-0.052** (0.021)	-0.063*** (0.021)	-0.063*** (0.021)	-0.039* (0.022)
Quadratic Rainfall t	0.001 (0.001)	0.001* (0.001)	0.001* (0.001)	0.001* (0.001)	0.001* (0.001)	0.001** (0.001)	0.001* (0.001)	0.001** (0.001)	0.001*** (0.001)	0.001*** (0.001)	0.001* (0.001)
Rainfall t-1	-0.040 (0.027)	-0.054** (0.025)	-0.053** (0.025)	-0.053** (0.025)	-0.051** (0.024)	-0.051** (0.024)	-0.048** (0.023)	-0.051** (0.022)	-0.051** (0.021)	-0.051** (0.021)	-0.043** (0.020)
Quadratic Rainfall t-1	0.001 (0.001)	0.001** (0.001)	0.001** (0.001)	0.001** (0.001)	0.001** (0.001)	0.001** (0.001)	0.001* (0.001)	0.001** (0.001)	0.001** (0.001)	0.001** (0.001)	0.001** (0.000)
Rainfall t-2	-0.039 (0.028)	-0.055** (0.025)	-0.055** (0.025)	-0.055** (0.025)	-0.048* (0.025)	-0.051** (0.024)	-0.048** (0.024)	-0.042* (0.023)	-0.037* (0.022)	-0.037* (0.022)	-0.046** (0.022)
Quadratic Rainfall t-2	0.001 (0.001)	0.001** (0.001)	0.001** (0.001)	0.001** (0.001)	0.001* (0.001)	0.001** (0.001)	0.001* (0.001)	0.001* (0.001)	0.001 (0.001)	0.001 (0.001)	0.001** (0.001)
Countries	26	27	28	28	29	30	31	32	33	33	34
Observations	872	905	927	927	958	975	1,014	1,048	1,065	1,065	1,090
R Squared	0.013	0.029	0.028	0.028	0.029	0.029	0.027	0.028	0.029	0.029	0.029

Note: The left-hand-side variable in all columns is a democratization indicator that takes the value of 1 if a country that is a nondemocracy at t-1 is a democracy at t+9 (ten years later) and the value of 0 otherwise. The classification of countries into democratic and nondemocratic regimes is based on Acemoglu, Naidu, Restrepo, and Robinson (2019). The main specification in column (6) is identical to the Acemoglu et al. (2019) specification in Table 3 in the main text and includes countries with an average share of agriculture in GDP over the 1970-2013 period in the top quintile of the distribution. Starting from this specification we either drop countries with the lowest agricultural GDP share within the top quintile of the distribution one by one or we add countries with the highest agricultural GDP share outside the top quintile of the distribution one by one. The empirical specification also includes a linear and quadratic term for rainfall lagged by three years but these terms are generally statistically insignificant and not reported for brevity. The table reports heteroskedastic and autocorrelation-consistent (HAC) standard errors that are robust to both arbitrary heteroskedasticity and serial correlation. * denotes significance at the 10% level; ** significance at the 5% level; and *** significance at the 1% level.

APPENDIX TABLE 3A. Rainfall and Democratization since 1960: Robustness Przeworski et al. (2000) Democratization between t-1 and t (1-Year Period)

	Dropping Countries					MAIN SAMPLE	Adding Countries				
	DROP 5	DROP 4	DROP 3	DROP 2	DROP 1		ADD 1	ADD 2	ADD 3	ADD 4	ADD 5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Rainfall t	-0.034* (0.018)	-0.034** (0.016)	-0.034** (0.016)	-0.034** (0.016)	-0.032** (0.015)	-0.031** (0.015)	-0.030** (0.014)	-0.027** (0.013)	-0.023* (0.012)	-0.023* (0.012)	-0.019* (0.011)
Quadratic Rainfall t	0.001* (0.001)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)
Rainfall t-1	0.020 (0.014)	0.010 (0.014)	0.010 (0.014)	0.010 (0.014)	0.012 (0.013)	0.011 (0.012)	0.012 (0.012)	0.010 (0.011)	0.014 (0.011)	0.014 (0.011)	0.009 (0.011)
Quadratic Rainfall t-1	-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 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Rainfall t-2	-0.026* (0.016)	-0.028* (0.015)	-0.028* (0.015)	-0.028* (0.015)	-0.025* (0.014)	-0.021 (0.013)	-0.019 (0.013)	-0.015 (0.011)	-0.024** (0.012)	-0.024** (0.012)	-0.028** (0.012)
Quadratic Rainfall t-2	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 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (0.000)	0.001* (0.000)
Countries	23	24	24	24	25	26	27	28	29	29	30
Observations	948	989	989	989	1,021	1,054	1,102	1,162	1,178	1,178	1,210
R Squared	0.030	0.034	0.034	0.034	0.032	0.029	0.028	0.026	0.024	0.024	0.024

Note: The left-hand-side variable in all columns is a democratization indicator that takes the value of 1 if a country that is a nondemocracy at t-1 is a democracy at t (one year later) and the value of 0 otherwise. The classification of countries into democratic and nondemocratic regimes is based on Przeworski, Alvarez, Cheibub, and Limongi (2000) as updated by Cheibub, Gandhi, and Vreeland (2010) and Bjornskov and Rode (2017). The main specification in column (6) is identical to the Przeworski et al. (2000) specification in Table 3 in the main text and includes countries with an average share of agriculture in GDP over the 1970-2013 period in the top quintile of the distribution. Starting from this specification we either drop countries with the lowest agricultural GDP share within the top quintile of the distribution one by one or we add countries with the highest agricultural GDP share outside the top quintile of the distribution one by one. The empirical specification also includes a linear and quadratic term for rainfall lagged by three years but these terms are generally statistically insignificant and not reported for brevity. The table reports heteroskedastic and autocorrelation-consistent (HAC) standard errors that are robust to both arbitrary heteroskedasticity and serial correlation. * denotes significance at the 10% level; ** significance at the 5% level; and *** significance at the 1% level.

APPENDIX TABLE 3B. Rainfall and Democratization since 1960: Robustness Przeworski et al. (2000) Democratization between t-1 and t+2 (3-Year Period)

	Dropping Countries					MAIN SAMPLE	Adding Countries				
	DROP 5	DROP 4	DROP 3	DROP 2	DROP 1		ADD 1	ADD 2	ADD 3	ADD 4	ADD 5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Rainfall t	-0.043* (0.024)	-0.052** (0.023)	-0.052** (0.023)	-0.052** (0.023)	-0.047** (0.021)	-0.043** (0.020)	-0.039** (0.020)	-0.034* (0.018)	-0.033* (0.017)	-0.033* (0.017)	-0.045** (0.019)
Quadratic Rainfall t	0.001 (0.001)	0.001** (0.001)	0.001** (0.001)	0.001** (0.001)	0.001* (0.001)	0.001* (0.001)	0.001* (0.001)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.001** (0.001)
Rainfall t-1	-0.011 (0.020)	-0.026 (0.020)	-0.026 (0.020)	-0.026 (0.020)	-0.025 (0.019)	-0.020 (0.018)	-0.017 (0.018)	-0.013 (0.015)	-0.016 (0.016)	-0.016 (0.016)	-0.019 (0.015)
Quadratic Rainfall t-1	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 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Rainfall t-2	-0.035* (0.021)	-0.042** (0.020)	-0.042** (0.020)	-0.042** (0.020)	-0.039** (0.019)	-0.034* (0.017)	-0.031* (0.017)	-0.024* (0.014)	-0.030* (0.015)	-0.030* (0.015)	-0.022 (0.017)
Quadratic	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)	0.000 (0.000)	0.001 (0.000)	0.001 (0.000)	0.001 (0.000)
Countries	23	24	24	24	25	26	27	28	29	29	30
Observations	913	954	954	954	985	1,016	1,062	1,120	1,134	1,134	1,166
R Squared	0.022	0.035	0.035	0.035	0.035	0.031	0.028	0.025	0.024	0.024	0.031

Note: The left-hand-side variable in all columns is a democratization indicator that takes the value of 1 if a country that is a nondemocracy at t-1 is a democracy at t+2 (two years later) and the value of 0 otherwise. The classification of countries into democratic and nondemocratic regimes is based on Przeworski, Alvarez, Cheibub, and Limongi (2000) as updated by Cheibub, Gandhi, and Vreeland (2010) and Bjornskov and Rode (2017). The main specification in column (6) is identical to the Przeworski et al. (2000) specification in Table 3 in the main text and includes countries with an average share of agriculture in GDP over the 1970-2013 period in the top quintile of the distribution. Starting from this specification we either drop countries with the lowest agricultural GDP share within the top quintile of the distribution one by one or we add countries with the highest agricultural GDP share outside the top quintile of the distribution one by one. The empirical specification also includes a linear and quadratic term for rainfall lagged by three years but these terms are generally statistically insignificant and not reported for brevity. The table reports heteroskedastic and autocorrelation-consistent (HAC) standard errors that are robust to both arbitrary heteroskedasticity and serial correlation. * denotes significance at the 10% level; ** significance at the 5% level; and *** significance at the 1% level.

APPENDIX TABLE 3C. Rainfall and Democratization since 1960: : Robustness Przeworski et al. (2000) Democratization between t-1 and t+9 (10-Year Period)

	Dropping Countries					MAIN SAMPLE	Adding Countries				
	DROP 5	DROP 4	DROP 3	DROP 2	DROP 1		ADD 1	ADD 2	ADD 3	ADD 4	ADD 5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Rainfall t	-0.018 (0.023)	-0.045** (0.023)	-0.045** (0.023)	-0.045** (0.023)	-0.044** (0.022)	-0.042** (0.021)	-0.039* (0.021)	-0.035* (0.018)	-0.030 (0.019)	-0.030 (0.019)	-0.018 (0.019)
Quadratic Rainfall t	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)
Rainfall t-1	-0.033 (0.024)	-0.053** (0.022)	-0.053** (0.022)	-0.053** (0.022)	-0.048** (0.022)	-0.044** (0.020)	-0.041** (0.020)	-0.038** (0.018)	-0.027 (0.018)	-0.027 (0.018)	-0.025 (0.018)
Quadratic Rainfall t-1	0.001 (0.001)	0.001* (0.001)	0.001* (0.001)	0.001* (0.001)	0.001* (0.001)	0.001* (0.001)	0.001 (0.001)	0.001* (0.000)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
Rainfall t-2	-0.025 (0.023)	-0.039* (0.022)	-0.039* (0.022)	-0.039* (0.022)	-0.031 (0.022)	-0.029 (0.021)	-0.025 (0.020)	-0.021 (0.018)	-0.015 (0.019)	-0.015 (0.019)	-0.030 (0.019)
Quadratic Rainfall t-2	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)
Countries	23	24	24	24	25	26	27	28	29	29	30
Observations	799	840	840	840	871	895	934	985	998	998	1,023
R Squared	0.008	0.023	0.023	0.023	0.021	0.020	0.017	0.017	0.017	0.017	0.023

Note: The left-hand-side variable in all columns is a democratization indicator that takes the value of 1 if a country that is a nondemocracy at t-1 is a democracy at t+9 (ten years later) and the value of 0 otherwise. The classification of countries into democratic and nondemocratic regimes is based on Przeworski, Alvarez, Cheibub, and Limongi (2000) as updated by Cheibub, Gandhi, and Vreeland (2010) and Bjornskov and Rode (2017). The main specification in column (6) is identical to the Przeworski et al. (2000) specification in Table 3 in the main text and includes countries with an average share of agriculture in GDP over the 1970-2013 period in the top quintile of the distribution. Starting from this specification we either drop countries with the lowest agricultural GDP share within the top quintile of the distribution one by one or we add countries with the highest agricultural GDP share outside the top quintile of the distribution one by one. The empirical specification also includes a linear and quadratic term for rainfall lagged by three years but these terms are generally statistically insignificant and not reported for brevity. The table reports heteroskedastic and autocorrelation-consistent (HAC) standard errors that are robust to both arbitrary heteroskedasticity and serial correlation. * denotes significance at the 10% level; ** significance at the 5% level; and *** significance at the 1% level.

APPENDIX TABLE 4A. Rainfall and Democratization since 1960: Robustness Geddes et al. (2014) Democratization between t-1 and t (1-Year Period)

	Dropping Countries					MAIN SAMPLE	Adding Countries				
	DROP 5	DROP 4	DROP 3	DROP 2	DROP 1		ADD 1	ADD 2	ADD 3	ADD 4	ADD 5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Rainfall t	-0.012 (0.013)	-0.015 (0.012)	-0.015 (0.012)	-0.015 (0.012)	-0.013 (0.012)	-0.012 (0.011)	-0.011 (0.011)	-0.011 (0.011)	-0.012 (0.012)	-0.012 (0.012)	-0.018 (0.011)
Quadratic Rainfall t	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 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Rainfall t-1	-0.036* (0.020)	-0.035** (0.017)	-0.035** (0.017)	-0.035** (0.017)	-0.034** (0.016)	-0.033** (0.015)	-0.031** (0.015)	-0.025* (0.014)	-0.018 (0.013)	-0.018 (0.013)	-0.023* (0.013)
Quadratic Rainfall t-1	0.001* (0.001)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)
Rainfall t-2	0.019 (0.015)	0.010 (0.013)	0.010 (0.013)	0.010 (0.013)	0.012 (0.013)	0.014 (0.012)	0.014 (0.012)	0.012 (0.013)	0.006 (0.014)	0.006 (0.014)	0.013 (0.014)
Quadratic Rainfall t-2	-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 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Countries	23	24	24	24	25	26	27	28	29	29	30
Observations	940	984	984	984	1,016	1,049	1,097	1,144	1,163	1,163	1,208
R Squared	0.020	0.019	0.019	0.019	0.017	0.017	0.016	0.011	0.011	0.011	0.019

Note: The left-hand-side variable in all columns is a democratization indicator that takes the value of 1 if a country that is a nondemocracy at t-1 is a democracy at t (one year later) and the value of 0 otherwise. The classification of countries into democratic and nondemocratic regimes is based on Geddes, Wright, and Frantz (2014). The main specification in column (6) is identical to the Geddes et al. (2014) specification in Table 3 in the main text and includes countries with an average share of agriculture in GDP over the 1970-2013 period in the top quintile of the distribution. Starting from this specification we either drop countries with the lowest agricultural GDP share within the top quintile of the distribution one by one or we add countries with the highest agricultural GDP share outside the top quintile of the distribution one by one. The empirical specification also includes a linear and quadratic term for rainfall lagged by three years but these terms are generally statistically insignificant and not reported for brevity. The table reports heteroskedastic and autocorrelation-consistent (HAC) standard errors that are robust to both arbitrary heteroskedasticity and serial correlation. * denotes significance at the 10% level; ** significance at the 5% level; and *** significance at the 1% level.

APPENDIX TABLE 4B. Rainfall and Democratization since 1960: Robustness Geddes et al. (2014) Democratization between t-1 and t+2 (3-Year Period)

	Dropping Countries					MAIN SAMPLE	Adding Countries				
	DROP 5	DROP 4	DROP 3	DROP 2	DROP 1		ADD 1	ADD 2	ADD 3	ADD 4	ADD 5
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Rainfall t	-0.005 (0.022)	-0.017 (0.019)	-0.017 (0.019)	-0.017 (0.019)	-0.013 (0.018)	-0.011 (0.017)	-0.009 (0.017)	-0.002 (0.016)	-0.003 (0.017)	-0.003 (0.017)	-0.016 (0.018)
Quadratic Rainfall t	-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 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Rainfall t-1	-0.030 (0.024)	-0.038* (0.022)	-0.038* (0.022)	-0.038* (0.022)	-0.036* (0.021)	-0.032* (0.019)	-0.032* (0.019)	-0.022 (0.018)	-0.025 (0.018)	-0.025 (0.018)	-0.024 (0.016)
Quadratic Rainfall t-1	0.001 (0.001)	0.001* (0.001)	0.001* (0.001)	0.001* (0.001)	0.001* (0.001)	0.001* (0.001)	0.001* (0.001)	0.001 (0.000)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)
Rainfall t-2	-0.006 (0.019)	-0.019 (0.019)	-0.019 (0.019)	-0.019 (0.019)	-0.020 (0.018)	-0.018 (0.017)	-0.016 (0.017)	-0.005 (0.016)	-0.015 (0.017)	-0.015 (0.017)	-0.003 (0.019)
Quadratic Rainfall t-2	-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 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Countries	23	24	24	24	25	26	27	28	29	29	30
Observations	905	949	949	949	981	1,012	1,058	1,105	1,123	1,123	1,167
R Squared	0.018	0.025	0.025	0.025	0.025	0.024	0.022	0.019	0.019	0.019	0.021
	23	24	24	24	25	26	27	28	29	29	30

Note: The left-hand-side variable in all columns is a democratization indicator that takes the value of 1 if a country that is a nondemocracy at t-1 is a democracy at t+2 (three years later) and the value of 0 otherwise. The classification of countries into democratic and nondemocratic regimes is based on Geddes, Wright, and Frantz (2014). The main specification in column (6) is identical to the Geddes et al. (2014) specification in Table 3 in the main text and includes countries with an average share of agriculture in GDP over the 1970-2013 period in the top quintile of the distribution. Starting from this specification we either drop countries with the lowest agricultural GDP share within the top quintile of the distribution one by one or we add countries with the highest agricultural GDP share outside the top quintile of the distribution one by one. The empirical specification also includes a linear and quadratic term for rainfall lagged by three years but these terms are generally statistically insignificant and not reported for brevity. The table reports heteroskedastic and autocorrelation-consistent (HAC) standard errors that are robust to both arbitrary heteroskedasticity and serial correlation. * denotes significance at the 10% level; ** significance at the 5% level; and *** significance at the 1% level.

APPENDIX TABLE 4C. Rainfall and Democratization since 1960: Robustness Geddes et al. (2014) Democratization between t-1 and t+9 (10-Year Period)

	Dropping Countries					MAIN SAMPLE	Adding Countries				
	DROP 5	DROP 4	DROP 3	DROP 2	DROP 1		ADD 1	ADD 2	ADD 3	ADD 4	ADD 5
	(1)	(2)	(3)	(4)	(5)		(6)	(7)	(8)	(9)	(10)
Rainfall t	-0.017 (0.027)	-0.041* (0.024)	-0.041* (0.024)	-0.041* (0.024)	-0.045* (0.023)	-0.041* (0.021)	-0.039* (0.021)	-0.033* (0.020)	-0.040** (0.019)	-0.040** (0.019)	-0.030* (0.017)
Quadratic Rainfall t	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001* (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001** (0.000)	0.001** (0.000)	0.001* (0.000)
Rainfall t-1	-0.020 (0.023)	-0.040* (0.021)	-0.040* (0.021)	-0.040* (0.021)	-0.040** (0.020)	-0.037* (0.019)	-0.034* (0.019)	-0.035* (0.019)	-0.034* (0.018)	-0.034* (0.018)	-0.037** (0.016)
Quadratic Rainfall t-1	0.001 (0.001)	0.001* (0.001)	0.001* (0.001)	0.001* (0.001)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.001* (0.000)	0.001** (0.000)	0.001** (0.000)	0.001** (0.000)
Rainfall t-2	-0.021 (0.024)	-0.039* (0.022)	-0.039* (0.022)	-0.039* (0.022)	-0.036* (0.021)	-0.033* (0.020)	-0.030 (0.020)	-0.020 (0.018)	-0.020 (0.018)	-0.020 (0.018)	-0.029* (0.016)
Quadratic Rainfall t-2	0.000 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.000)	0.001 (0.000)	0.000 (0.000)	0.000 (0.000)	0.000 (0.000)	0.001 (0.000)
Countries	23	24	24	24	25	26	27	28	29	29	30
Observations	799	843	843	843	875	899	938	981	999	999	1,036
R Squared	0.016	0.033	0.033	0.033	0.038	0.037	0.033	0.033	0.035	0.035	0.052

Note: The left-hand-side variable in all columns is a democratization indicator that takes the value of 1 if a country that is a nondemocracy at t-1 is a democracy at t+9 (ten years later) and the value of 0 otherwise. The classification of countries into democratic and nondemocratic regimes is based on Geddes, Wright, and Frantz (2014). The main specification in column (6) is identical to the Geddes et al. (2014) specification in Table 3 in the main text and includes countries with an average share of agriculture in GDP over the 1970-2013 period in the top quintile of the distribution. Starting from this specification we either drop countries with the lowest agricultural GDP share within the top quintile of the distribution one by one or we add countries with the highest agricultural GDP share outside the top quintile of the distribution one by one. The empirical specification also includes a linear and quadratic term for rainfall lagged by three years but these terms are generally statistically insignificant and not reported for brevity. The table reports heteroskedastic and autocorrelation-consistent (HAC) standard errors that are robust to both arbitrary heteroskedasticity and serial correlation. * denotes significance at the 10% level; ** significance at the 5% level; and *** significance at the 1% level.

**APPENDIX TABLE 5. Rainfall and Democratization since 1960:
Log Rainfall Specification of Brückner and Ciccone (2011)**

	PANEL A: Acemoglu et al. (2019) data				PANEL B: Przeworski et al. (2000) data				PANEL C: Geddes et al. (2014) data			
	Acemoglu et al. Democratization between t-1 and				Przeworski et al. Democratization between t-1 and				Geddes et al. Democratization between t-1 and			
	t (1-Year)	t+2 (3-Year)	t+4 (5-Year)	t+9 (10-Year)	t (1-Year)	t+2 (3-Year)	t+4 (5-Year)	t+9 (10-Year)	t (1-Year)	t+2 (3-Year)	t+4 (5-Year)	t+9 (10-Year)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Log Rainfall t	-0.067 (0.048)	-0.103 (0.063)	-0.124* (0.071)	-0.146** (0.073)	-0.084** (0.039)	-0.061 (0.065)	-0.112* (0.066)	-0.062 (0.068)	-0.017 (0.035)	-0.048 (0.057)	-0.099 (0.065)	-0.134* (0.078)
Log Rainfall t-1	0.013 (0.034)	-0.070 (0.060)	-0.112* (0.058)	-0.112 (0.070)	0.060 (0.040)	-0.053 (0.058)	-0.086 (0.058)	-0.117* (0.068)	-0.064 (0.046)	-0.015 (0.058)	-0.051 (0.065)	-0.084 (0.065)
Log Rainfall t-2	-0.031 (0.045)	-0.137** (0.062)	-0.134** (0.055)	-0.102 (0.074)	-0.053 (0.046)	-0.084 (0.056)	-0.108* (0.059)	-0.120* (0.072)	0.040 (0.039)	-0.064 (0.052)	-0.134** (0.053)	-0.153** (0.068)
Log Rainfall t-3	-0.075* (0.043)	-0.152*** (0.054)	-0.073 (0.067)	-0.050 (0.076)	-0.058* (0.031)	-0.081 (0.053)	-0.053 (0.054)	0.009 (0.072)	-0.054 (0.041)	-0.132** (0.061)	-0.106* (0.054)	-0.037 (0.074)
Countries	31	31	31	30	26	26	26	26	26	26	26	26
Observations	1,132	1,100	1,069	975	1,054	1,016	981	895	1,049	1,012	978	899
R Squared	0.012	0.035	0.040	0.019	0.021	0.019	0.024	0.012	0.010	0.023	0.044	0.035

Note: The left-hand-side variable in columns (1), (5) and (9) is a democratization indicator that takes the value of 1 if a country that is a nondemocracy at t-1 is a democracy at t (one year later) and the value of 0 otherwise. The left-hand-side variable in columns (2), (6) and (10) is an indicator variable that takes the value of 1 if a country that is a nondemocracy at t-1 is a democracy at t+2 (three years later) and the value of 0 otherwise. The left-hand-side variable in columns (3), (7) and (11) is an indicator variable that takes the value of 1 if a country that is a nondemocracy at t-1 is a democracy at t+4 (five years later) and the value of 0 otherwise. The left-hand-side variable in columns (4), (8) and (12) is an indicator variable that takes the value of 1 if a country that is a nondemocracy at t-1 is a democracy at t+9 (ten years later) and the value of 0 otherwise. The classification of democratic and nondemocratic regimes in columns (1)-(4) is based on Acemoglu, Naidu, Restrepo, and Robinson (2019). The classification of democratic and nondemocratic regimes in columns (5)-(8) is based on Bjornskov and Rode (2017) who extend the dataset of Cheibub, Gandhi, and Vreeland (2010) and Przeworski, Alvarez, Cheibub, and Limongi (2000). The classification of democratic and nondemocratic regimes in columns (9)-(12) is based on Geddes, Wright, and Frantz (2014). The included countries are all countries with an average share of agriculture in GDP over the 1970-2013 period in the top quintile of the distribution. The table reports heteroskedastic and autocorrelation-consistent (HAC) standard errors that are robust to both arbitrary heteroskedasticity and serial correlation. * denotes significance at the 10% level; ** significance at the 5% level; and *** significance at the 1% level.

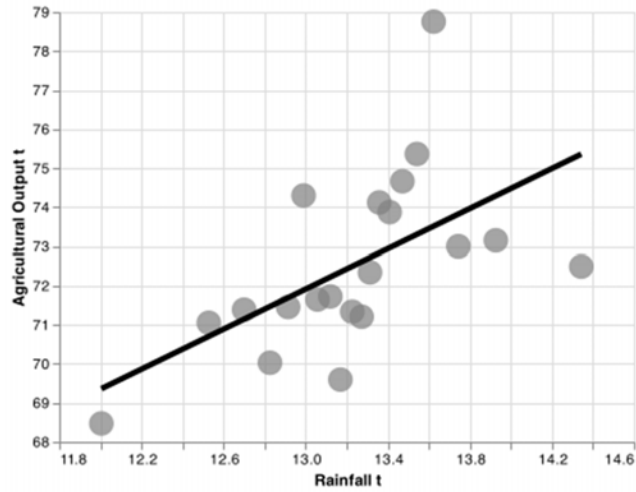
APPENDIX TABLE 6. Rainfall and Polity IV Project/Freedom House Democratic Change since 1960: From Short to Longer Term

	Polity IV Project Combined Polity Score				Freedom House Political Rights Index			
	Polity Score Change between t-1 and				Political Rights Index Change between t-1 and			
	t (1-Year)	t+2 (3-Year)	t+4 (5-Year)	t+9 (10-Year)	t (1-Year)	t+2 (3-Year)	t+4 (5-Year)	t+9 (10-Year)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Rainfall t	-0.180 (0.120)	-0.615*** (0.209)	-0.575** (0.224)	-0.558** (0.244)	-0.063** (0.030)	-0.139** (0.056)	-0.218*** (0.076)	-0.228*** (0.088)
Quadratic Rainfall t	0.003 (0.003)	0.013*** (0.005)	0.010** (0.005)	0.011* (0.006)	0.001** (0.001)	0.003*** (0.001)	0.004** (0.002)	0.004** (0.002)
Rainfall t-1	-0.122 (0.105)	-0.258 (0.182)	-0.367* (0.201)	-0.262 (0.265)	0.016 (0.029)	-0.103* (0.054)	-0.195*** (0.072)	-0.155 (0.096)
Quadratic Rainfall t-1	0.004 (0.003)	0.005 (0.004)	0.007 (0.005)	0.007 (0.006)	0.000 (0.001)	0.002* (0.001)	0.003** (0.002)	0.003 (0.002)
Rainfall t-2	-0.346** (0.135)	-0.459** (0.190)	-0.303 (0.205)	-0.056 (0.262)	-0.104*** (0.036)	-0.197*** (0.059)	-0.142** (0.071)	-0.165* (0.100)
Quadratic Rainfall t-2	0.008** (0.003)	0.010** (0.004)	0.006 (0.005)	0.001 (0.006)	0.002** (0.001)	0.003*** (0.001)	0.002 (0.002)	0.003 (0.002)
Countries	30	30	30	30	31	31	31	31
Observations	1,125	1,094	1,056	969	1,176	1,104	1,038	886
R Squared	0.028	0.056	0.056	0.035	0.029	0.036	0.039	0.022

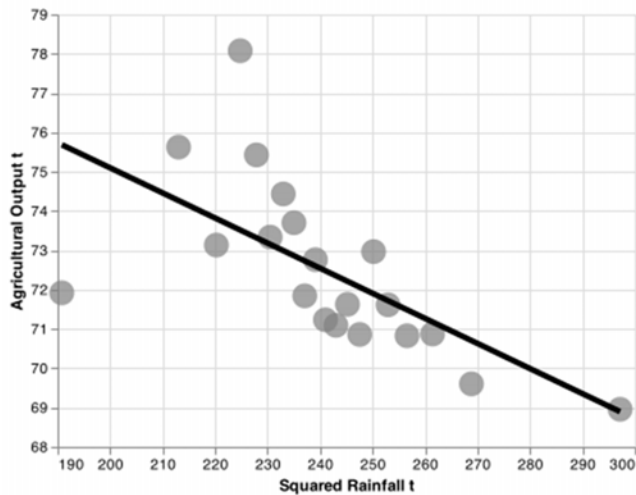
Note: The left-hand-side variables in columns (1) to (4) are the changes in the Polity IV Project combined polity score in nondemocracies over different time periods. The left-hand-side variable in column (1) is the change in the polity score between years t-1 and t; the left-hand-side variable in column (2) is the change in the polity score between years t-1 and t+2; the left-hand-side variable in column (3) is the change in the polity score between years t-1 and t+4; and the left-hand-side variable in column (4) is the change in the polity score between years t-1 and t+9. The left-hand-side variables in columns (5) to (8) are the negative changes in the Freedom House political rights index over different time periods. We consider negative changes to ensure that a higher Freedom House index indicates more political rights and thereby make results comparable to those with the change in the polity score). The left-hand-side variable in column (5) is the change in the political rights index between years t-1 and t; the left-hand-side variable in column (6) is the change in the political rights index between years t-1 and t+2; the left-hand-side variable in column (7) is the change in the political rights index between years t-1 and t+4; and the left-hand-side variable in column (8) is the change in the political rights index between years t-1 and t+9. The countries included are those with an average share of agricultural in GDP over the sample period in the top quintile of the distribution (in Table 1 column (1)) and with Polity Project/Freedom House data. The table reports robust standard errors clustered at the country level. * denotes significance at the 10% level; ** significance at the 5% level; and *** significance at the 1% level.

APPENDIX FIGURE 1. Binned Scatter Plots

PANEL A1: Agricultural Output, Linear Rainfall Effect

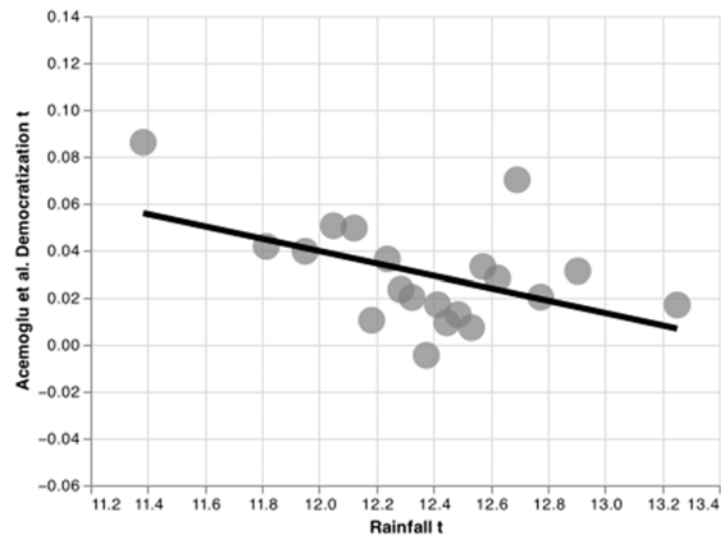


PANEL A2: Agricultural Output, Quadratic Rainfall Effect

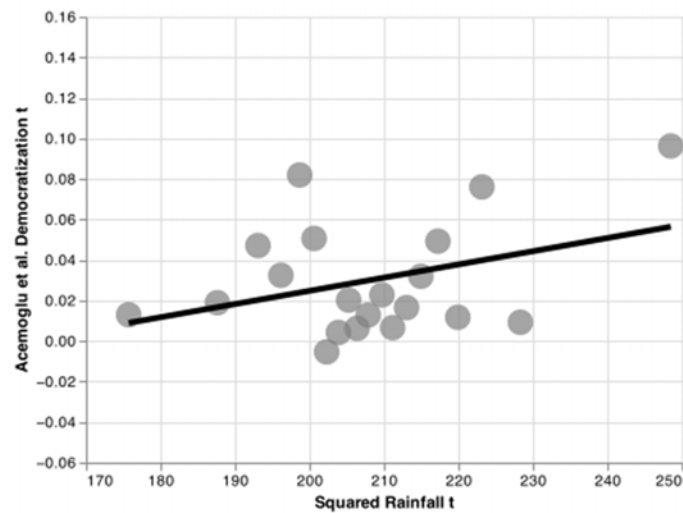


Note: Panel A1 and A2 illustrate the empirical fit of the quadratic effect of rainfall in year t on agricultural output in year t using binned scatter plots. Panel A1 is a binned scatter plot of the linear term of the quadratic effect of rainfall on agricultural output. Panel A2 is a binned scatter plot of the rainfall squared term of the quadratic effect of rainfall on agricultural output. See Table 2 for the right-hand-side variables included in the regression.

PANEL B1: Acemoglu et al. Democratization, Linear Rainfall Effect

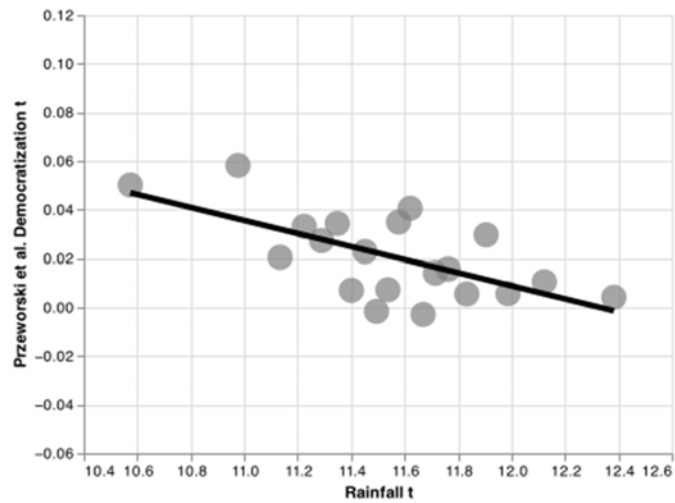


PANEL B2: Acemoglu et al. Democratization, Quadratic Rainfall Effect

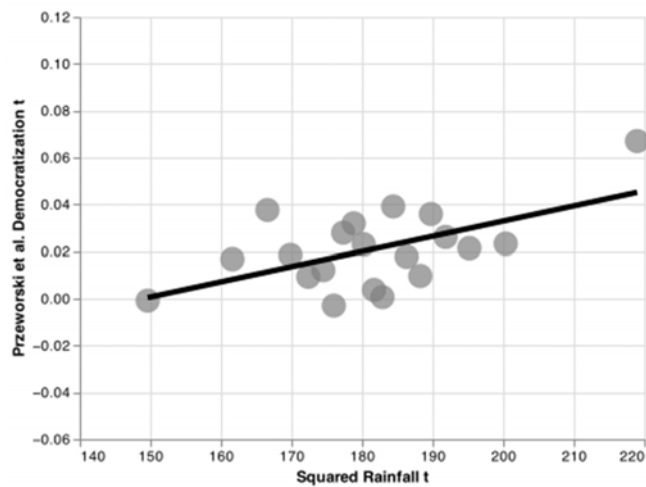


Note: Panel B1 and B2 illustrate the empirical fit of the quadratic effect of rainfall in year t on the probability of democratization between years $t-1$ and using binned scatter plots. The classification of democratic and nondemocratic regimes is that of Acemoglu, Naidu, Restrepo, and Robinson (2019). Panel B1 is a binned scatter plot of the linear term of the quadratic effect of rainfall on agricultural output. Panel B2 is a binned scatter plot of the rainfall squared term of the quadratic effect of rainfall on agricultural output. See Table 3 for the right-hand-side variables included in the regression.

PANEL C1: Przeworski et al. Democratization, Linear Rainfall Effect

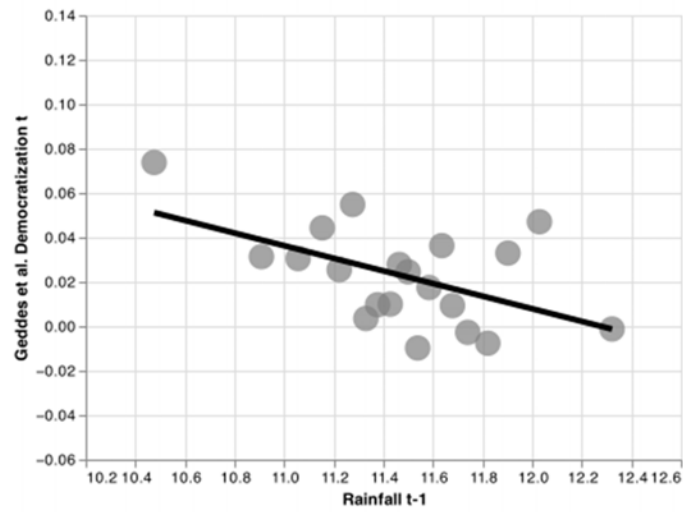


PANEL C2: Przeworski et al. Democratization, Quadratic Rainfall Effect

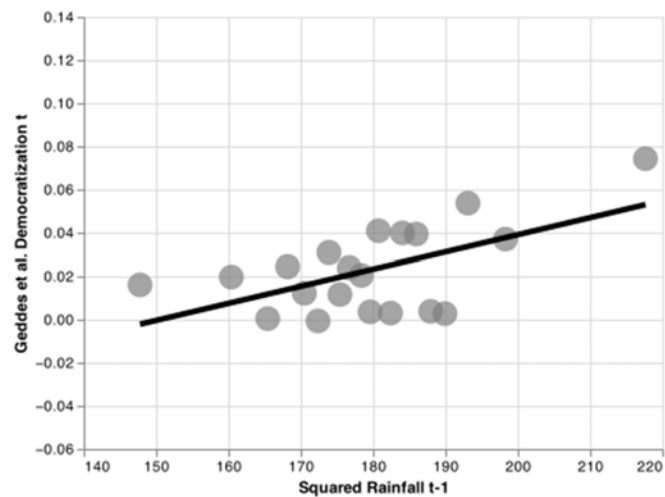


Note: Panel C1 and C2 illustrate the empirical fit of the quadratic effect of rainfall in year t on the probability of democratization between years $t-1$ and using binned scatter plots. The classification of democratic and nondemocratic regimes is that of Przeworski, Alvarez, Cheibub, and Limongi (2000) as updated by Cheibub, Gandhi, and Vreeland (2010) and Bjornskov and Rode (2020). Panel C1 is a binned scatter plot of the linear term of the quadratic effect of rainfall on agricultural output. Panel C2 is a binned scatter plot of the rainfall squared term of the quadratic effect of rainfall on agricultural output. See Table 3 for the right-hand-side variables included in the regression.

PANEL D1: Geddes et al. Democratization, Linear Rainfall Effect



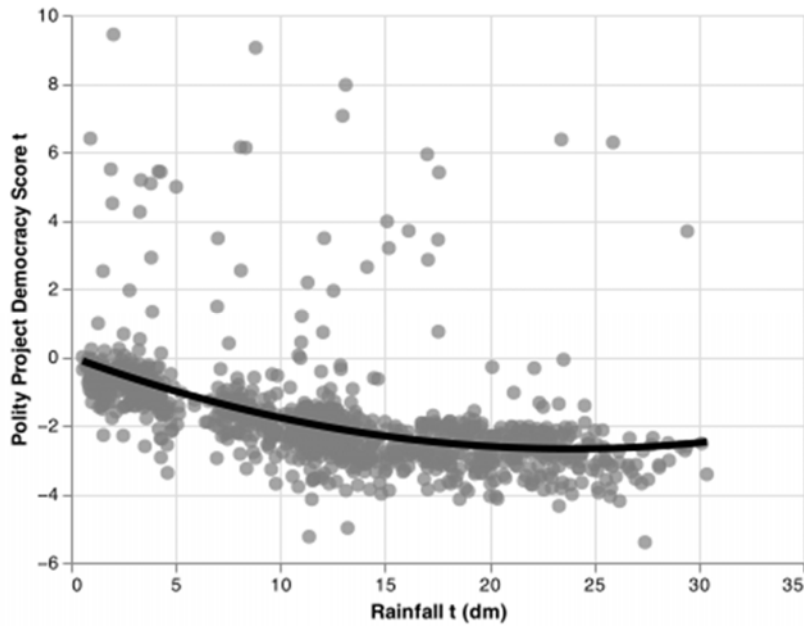
PANEL D2: Geddes et al. Democratization, Quadratic Rainfall Effect



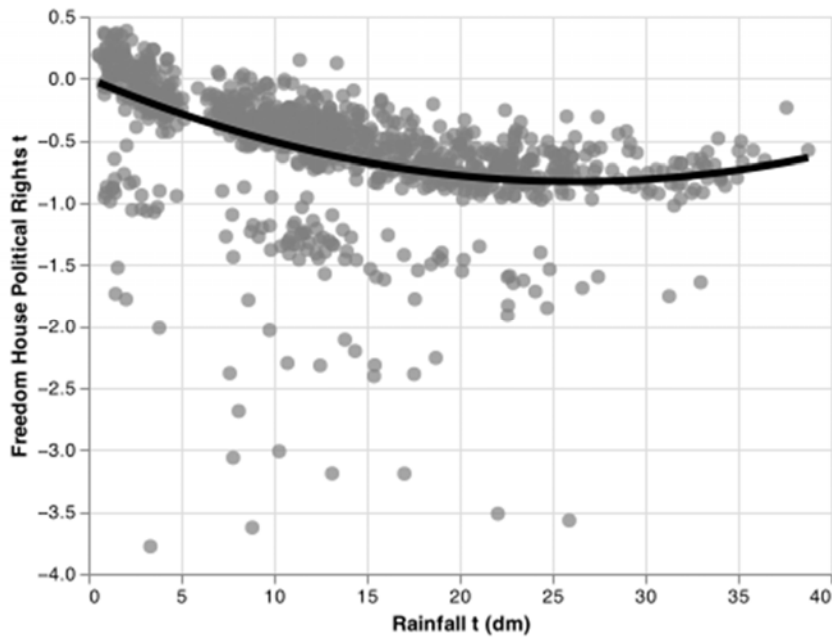
Note: Panel D1 and D2 illustrate the empirical fit of the quadratic effect of rainfall in year t on the probability of democratization between years $t-1$ and using binned scatter plots. The classification of democratic and nondemocratic regimes is that of Acemoglu, Geddes, Wright, and Frantz (2014). Panel D1 is a binned scatter plot of the linear term of the quadratic effect of rainfall on agricultural output. Panel D2 is a binned scatter plot of the rainfall squared term of the quadratic effect of rainfall on agricultural output. See Table 3 for the right-hand-side variables included in the regression.

FIGURE 2. Augmented Component Plus Residual Plots

PANEL A: Improvement in Combined Polity Score in Autocracies



PANEL B: Improvement in Freedom House Political Rights



Note: Panel A uses an augmented-component-plus-residual plot to illustrate the empirical fit of the U-shaped effect of rainfall in year t on the improvement in the combined Polity score in nondemocracies between years t-1 and t. The vertical axis represents the improvement in the combined Polity score explained by rainfall and its square plus the residuals from the (full) regression of the improvement in the combined Polity score in nondemocracies on all the right-hand-side variables in Panel A of Table 4. Panel B illustrates the empirical fit of the U-shaped effect of rainfall in year t on the improvement in the Freedom House political rights index between years t-1 and t. The vertical axis represents the improvement in political rights explained by rainfall and its square plus the residuals from the (full) regression of the improvement in the Freedom House political rights index all the right-hand-side variables in Panel C of Table 4.