



PPIC

PUBLIC POLICY
INSTITUTE OF CALIFORNIA

California's Missing Voters

Who Is Not Voting and Why

Technical Appendices

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Appendix A: Regression Models

TABLE A1

Regression model for Figure 4: California relative registration decline counterfactual

	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016
Intercept	1.021*** (0.009)	1.036*** (0.009)	0.979*** (0.01)	1.011*** (0.008)	1.047*** (0.009)	1.01*** (0.007)	1.007*** (0.009)	1.006*** (0.008)	0.98*** (0.008)	0.975*** (0.008)	0.938*** (0.009)	0.982*** (0.008)
Age: 18-24	-0.217*** (0.007)	-0.2*** (0.008)	-0.244*** (0.008)	-0.198*** (0.008)	-0.241*** (0.007)	-0.149*** (0.007)	-0.212*** (0.007)	-0.13*** (0.007)	-0.212*** (0.007)	-0.183*** (0.007)	-0.218*** (0.007)	-0.133*** (0.007)
Age: 25-34	-0.177*** (0.006)	-0.161*** (0.006)	-0.152*** (0.007)	-0.147*** (0.006)	-0.157*** (0.006)	-0.118*** (0.006)	-0.139*** (0.006)	-0.101*** (0.006)	-0.138*** (0.006)	-0.113*** (0.006)	-0.133*** (0.006)	-0.1*** (0.006)
Age: 35-44	-0.118*** (0.006)	-0.106*** (0.005)	-0.108*** (0.006)	-0.104*** (0.005)	-0.113*** (0.005)	-0.085*** (0.005)	-0.099*** (0.005)	-0.087*** (0.005)	-0.102*** (0.005)	-0.087*** (0.005)	-0.091*** (0.005)	-0.078*** (0.005)
Age: 45-54	-0.073*** (0.006)	-0.078*** (0.005)	-0.073*** (0.006)	-0.079*** (0.005)	-0.083*** (0.005)	-0.068*** (0.005)	-0.071*** (0.005)	-0.053*** (0.005)	-0.072*** (0.005)	-0.065*** (0.004)	-0.066*** (0.005)	-0.049*** (0.004)
Age: 55-64	-0.032*** (0.006)	-0.028*** (0.006)	-0.026*** (0.006)	-0.039*** (0.006)	-0.045*** (0.005)	-0.036*** (0.005)	-0.047*** (0.005)	-0.036*** (0.005)	-0.042*** (0.005)	-0.037*** (0.004)	-0.042*** (0.005)	-0.032*** (0.004)
Latino	-0.074*** (0.011)	-0.05*** (0.01)	-0.058*** (0.009)	-0.07*** (0.009)	-0.076*** (0.009)	-0.065*** (0.008)	-0.081*** (0.008)	-0.074*** (0.008)	-0.081*** (0.008)	-0.068*** (0.008)	-0.074*** (0.008)	-0.073*** (0.007)
Asian American	-0.183*** (0.018)	-0.142*** (0.016)	-0.202*** (0.017)	-0.19*** (0.016)	-0.174*** (0.015)	-0.179*** (0.014)	-0.174*** (0.014)	-0.154*** (0.013)	-0.166*** (0.012)	-0.146*** (0.012)	-0.152*** (0.012)	-0.144*** (0.011)
African American	0.026*** (0.007)	0.043*** (0.007)	0.046*** (0.007)	0.057*** (0.006)	0.042*** (0.006)	0.049*** (0.006)	0.038*** (0.006)	0.069*** (0.005)	0.06*** (0.006)	0.088*** (0.005)	0.071*** (0.006)	0.062*** (0.005)
Woman	0.021*** (0.003)	0.028*** (0.003)	0.025*** (0.003)	0.029*** (0.003)	0.028*** (0.003)	0.027*** (0.003)	0.028*** (0.003)	0.033*** (0.003)	0.025*** (0.003)	0.03*** (0.003)	0.029*** (0.003)	0.024*** (0.003)
Single	-0.075*** (0.004)	-0.06*** (0.004)	-0.073*** (0.004)	-0.076*** (0.004)	-0.073*** (0.004)	-0.055*** (0.004)	-0.063*** (0.004)	-0.054*** (0.004)	-0.062*** (0.004)	-0.041*** (0.004)	-0.052*** (0.004)	-0.047*** (0.004)
No college	-0.245*** (0.006)	-0.251*** (0.005)	-0.228*** (0.006)	-0.23*** (0.005)	-0.227*** (0.005)	-0.221*** (0.004)	-0.209*** (0.005)	-0.215*** (0.005)	-0.213*** (0.005)	-0.209*** (0.004)	-0.21*** (0.005)	-0.214*** (0.004)
Some college	-0.083*** (0.006)	-0.084*** (0.005)	-0.073*** (0.006)	-0.081*** (0.005)	-0.075*** (0.005)	-0.065*** (0.004)	-0.056*** (0.005)	-0.066*** (0.004)	-0.06*** (0.005)	-0.063*** (0.004)	-0.069*** (0.005)	-0.065*** (0.004)
Bachelor's only	-0.018** (0.006)	-0.022*** (0.005)	-0.017** (0.006)	-0.005 (0.005)	-0.007 (0.005)	-0.016*** (0.004)	-0.011* (0.005)	-0.009* (0.004)	-0.006 (0.005)	-0.008* (0.004)	-0.013** (0.005)	-0.009* (0.004)
Unemployed	-0.039*** (0.011)	-0.047*** (0.011)	-0.027* (0.012)	-0.093*** (0.013)	-0.031** (0.01)	-0.033*** (0.01)	-0.051*** (0.012)	-0.044*** (0.009)	-0.014 (0.008)	-0.023** (0.008)	-0.016 (0.01)	-0.031** (0.011)
Moved last year	-0.2*** (0.006)	-0.118*** (0.006)	-0.166*** (0.007)	-0.105*** (0.006)	-0.145*** (0.006)	-0.101*** (0.006)	-0.149*** (0.006)	-0.084*** (0.006)	-0.136*** (0.006)	-0.084*** (0.006)	-0.117*** (0.006)	-0.069*** (0.006)
Moved last 2 years	-0.133*** (0.006)	-0.069*** (0.006)	-0.106*** (0.006)	-0.063*** (0.006)	-0.086*** (0.006)	-0.06*** (0.005)	-0.083*** (0.006)	-0.059*** (0.005)	-0.078*** (0.006)	-0.047*** (0.006)	-0.057*** (0.006)	-0.04*** (0.005)
Home owner	0.043*** (0.004)	0.045*** (0.004)	0.042*** (0.004)	0.044*** (0.004)	0.043*** (0.004)	0.042*** (0.004)	0.039*** (0.004)	0.037*** (0.004)	0.038*** (0.004)	0.058*** (0.005)	0.082*** (0.005)	0.058*** (0.005)
Partisan margin	-0.009 (0.011)	-0.028* (0.011)	0.028** (0.011)	0.009 (0.011)	-0.072*** (0.01)	-0.004 (0.01)	-0.021 (0.011)	-0.019 (0.011)	0.013 (0.01)	-0.016 (0.009)	-0.013 (0.01)	-0.035*** (0.008)
California	-0.001 (0.022)	0.002 (0.021)	0.008 (0.025)	0.008 (0.023)	-0.018 (0.025)	-0.018 (0.021)	0.004 (0.022)	-0.029 (0.02)	0.016 (0.02)	-0.011 (0.022)	-0.038 (0.023)	-0.014 (0.02)
Age: 18-24 X CA	0.007 (0.027)	0.026 (0.026)	-0.011 (0.028)	0.019 (0.026)	0.02 (0.027)	0.032 (0.025)	-0.021 (0.025)	0.04 (0.023)	0.052* (0.023)	0.06** (0.023)	0.049* (0.023)	0.006 (0.023)
Age: 25-34 X CA	0.037 (0.021)	0.006 (0.021)	-0.018 (0.023)	0.009 (0.022)	-0.018 (0.025)	0.01 (0.022)	-0.017 (0.022)	0.028 (0.02)	0.023 (0.02)	0.042* (0.02)	0.017 (0.02)	0.028 (0.019)
Age: 35-44 X CA	-0.011 (0.019)	0.024 (0.018)	-0.055** (0.02)	-0.004 (0.019)	-0.012 (0.021)	-0.001 (0.019)	-0.02 (0.018)	0.014 (0.018)	0.01 (0.018)	0.033 (0.018)	0.002 (0.019)	-0.001 (0.018)
Age: 45-54 X CA	0.00 (0.018)	0.013 (0.018)	-0.04 (0.02)	-0.001 (0.019)	-0.012 (0.02)	0.019 (0.018)	-0.012 (0.017)	0.012 (0.016)	0.002 (0.017)	0.026 (0.016)	0.013 (0.017)	0.008 (0.016)
Age: 55-64 X CA	-0.041 (0.022)	0.01 (0.018)	-0.055* (0.021)	-0.009 (0.021)	-0.031 (0.021)	0.009 (0.018)	-0.005 (0.017)	0.014 (0.016)	0.01 (0.016)	0.017 (0.017)	0.014 (0.016)	0.009 (0.015)
Latino X CA	-0.003 (0.023)	0.005 (0.021)	0.042 (0.023)	0.004 (0.021)	0.022 (0.022)	-0.042* (0.019)	0.023 (0.018)	0.047** (0.017)	0.021 (0.017)	0.018 (0.016)	0.007 (0.017)	0.007 (0.017)
Asian American X CA	0.011 (0.036)	-0.001 (0.029)	0.038 (0.032)	0.044 (0.029)	0.04 (0.029)	0.007 (0.026)	0.024 (0.024)	0.026 (0.023)	0.027 (0.022)	0.042 (0.022)	0.023 (0.022)	0.02 (0.021)
African American X CA	-0.013 (0.028)	-0.019 (0.025)	0.009 (0.027)	-0.035 (0.023)	-0.001 (0.025)	0.017 (0.022)	-0.058* (0.026)	-0.019 (0.022)	-0.051 (0.026)	-0.026 (0.022)	-0.035 (0.025)	-0.087*** (0.024)

	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016
Woman X CA	0.028** (0.01)	0.004 (0.011)	0.002 (0.011)	-0.003 (0.011)	0.013 (0.011)	0.005 (0.01)	-0.006 (0.01)	0.015 (0.009)	-0.027** (0.01)	-0.003 (0.009)	-0.003 (0.01)	0.001 (0.009)
Single X CA	0.025 (0.014)	0.044** (0.013)	0.019 (0.014)	-0.008 (0.014)	0.018 (0.015)	0.013 (0.013)	0.023 (0.013)	0.007 (0.012)	-0.004 (0.013)	-0.017 (0.013)	0.008 (0.013)	0.014 (0.012)
No college X CA	-0.001 (0.019)	-0.014 (0.017)	-0.037 (0.021)	-0.016 (0.018)	-0.04 (0.022)	0.001 (0.018)	-0.028 (0.019)	-0.028 (0.017)	-0.048** (0.017)	-0.044** (0.016)	-0.014 (0.018)	-0.029 (0.017)
Some college X CA	0.006 (0.018)	-0.009 (0.016)	0.009 (0.02)	-0.003 (0.017)	-0.022 (0.02)	-0.01 (0.016)	-0.034 (0.018)	-0.017 (0.015)	-0.024 (0.016)	-0.026 (0.015)	0.003 (0.016)	-0.033* (0.015)
Bachelor's only X CA	-0.012 (0.019)	-0.016 (0.016)	0.015 (0.02)	-0.002 (0.017)	-0.004 (0.021)	-0.014 (0.016)	0.003 (0.018)	-0.007 (0.015)	-0.019 (0.016)	-0.001 (0.014)	-0.005 (0.017)	-0.009 (0.014)
Unemployed X CA	-0.008 (0.032)	0.069* (0.033)	0.009 (0.036)	0.032 (0.04)	0.001 (0.036)	-0.048 (0.035)	-0.021 (0.036)	0.062* (0.026)	-0.021 (0.022)	-0.005 (0.026)	-0.002 (0.029)	0.03 (0.032)
Moved last year X CA	-0.001 (0.022)	-0.025 (0.02)	0.037 (0.021)	-0.027 (0.022)	0.002 (0.023)	0.024 (0.02)	-0.013 (0.021)	0.003 (0.019)	0.026 (0.02)	0.049* (0.02)	0.001 (0.021)	0.043* (0.019)
Moved last 2 years X CA	0.009 (0.022)	-0.034 (0.019)	0.023 (0.022)	0.023 (0.019)	0.01 (0.021)	0.002 (0.019)	-0.01 (0.019)	-0.002 (0.018)	0.012 (0.018)	0.011 (0.018)	-0.001 (0.019)	-0.01 (0.018)
Home owner X CA	0.004 (0.013)	0.004 (0.013)	0.001 (0.014)	0.002 (0.013)	0.003 (0.014)	0.002 (0.013)	0.00 (0.013)	0.01 (0.012)	0.005 (0.012)	-0.017 (0.015)	0.018 (0.015)	0.018 (0.015)

SOURCES: US Census Current Population Survey November Supplement, 1994–2016.

NOTES: Missing values in the data were imputed using Amelia for R (King et al. 2001). For more details see appendix of McGhee (2014).

TABLE A2

Regression model for Figure 5: California relative registration decline counterfactual with immigrant generation controlled

	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016
Intercept	1.026*** (0.009)	1.037*** (0.009)	0.986*** (0.01)	1.016*** (0.008)	1.053*** (0.009)	1.019*** (0.007)	1.02*** (0.009)	1.008*** (0.008)	0.992*** (0.008)	0.983*** (0.008)	0.945*** (0.009)	0.988*** (0.008)
Age: 18–24	-0.222*** (0.008)	-0.202*** (0.008)	-0.248*** (0.008)	-0.202*** (0.008)	-0.247*** (0.007)	-0.154*** (0.007)	-0.219*** (0.007)	-0.136*** (0.007)	-0.219*** (0.007)	-0.189*** (0.007)	-0.223*** (0.007)	-0.138*** (0.007)
Age: 25–34	-0.179*** (0.006)	-0.163*** (0.006)	-0.155*** (0.007)	-0.149*** (0.006)	-0.163*** (0.006)	-0.123*** (0.006)	-0.146*** (0.006)	-0.105*** (0.006)	-0.144*** (0.006)	-0.118*** (0.006)	-0.138*** (0.006)	-0.104*** (0.006)
Age: 35–44	-0.119*** (0.006)	-0.107*** (0.005)	-0.109*** (0.006)	-0.105*** (0.005)	-0.116*** (0.005)	-0.089*** (0.005)	-0.103*** (0.005)	-0.089*** (0.005)	-0.105*** (0.005)	-0.089*** (0.005)	-0.093*** (0.005)	-0.08*** (0.005)
Age: 45–54	-0.073*** (0.006)	-0.079*** (0.006)	-0.074*** (0.006)	-0.08*** (0.005)	-0.086*** (0.005)	-0.071*** (0.005)	-0.075*** (0.005)	-0.055*** (0.005)	-0.075*** (0.005)	-0.066*** (0.004)	-0.067*** (0.005)	-0.049*** (0.004)
Age: 55–64	-0.032*** (0.006)	-0.028*** (0.006)	-0.026*** (0.006)	-0.038*** (0.006)	-0.047*** (0.005)	-0.038*** (0.005)	-0.05*** (0.005)	-0.038*** (0.005)	-0.044*** (0.005)	-0.039*** (0.004)	-0.044*** (0.005)	-0.033*** (0.004)
Latino	-0.064*** (0.011)	-0.04*** (0.01)	-0.04*** (0.01)	-0.055*** (0.01)	-0.049*** (0.01)	-0.042*** (0.009)	-0.048*** (0.009)	-0.052*** (0.009)	-0.049*** (0.008)	-0.046*** (0.008)	-0.046*** (0.009)	-0.05*** (0.008)
Asian American	-0.143*** (0.019)	-0.107*** (0.017)	-0.148*** (0.017)	-0.145*** (0.017)	-0.111*** (0.016)	-0.133*** (0.015)	-0.104*** (0.014)	-0.102*** (0.014)	-0.101*** (0.013)	-0.099*** (0.013)	-0.102*** (0.013)	-0.104*** (0.012)
African American	0.027*** (0.007)	0.044*** (0.007)	0.048*** (0.007)	0.059*** (0.006)	0.046*** (0.006)	0.052*** (0.006)	0.043*** (0.006)	0.073*** (0.005)	0.066*** (0.006)	0.093*** (0.005)	0.076*** (0.006)	0.065*** (0.005)
Woman	0.021*** (0.003)	0.028*** (0.003)	0.026*** (0.003)	0.029*** (0.003)	0.028*** (0.003)	0.027*** (0.003)	0.028*** (0.003)	0.033*** (0.003)	0.026*** (0.003)	0.031*** (0.003)	0.029*** (0.003)	0.025*** (0.003)
Single	-0.073*** (0.004)	-0.061*** (0.004)	-0.074*** (0.004)	-0.077*** (0.004)	-0.074*** (0.004)	-0.056*** (0.004)	-0.065*** (0.004)	-0.056*** (0.004)	-0.065*** (0.004)	-0.043*** (0.004)	-0.054*** (0.004)	-0.049*** (0.004)
1st generation immigrant	-0.084*** (0.011)	-0.065*** (0.011)	-0.102*** (0.011)	-0.082*** (0.01)	-0.108*** (0.01)	-0.08*** (0.01)	-0.125*** (0.01)	-0.098*** (0.01)	-0.116*** (0.009)	-0.088*** (0.009)	-0.085*** (0.009)	-0.072*** (0.009)
2nd generation immigrant	0.009 (0.007)	0.006 (0.008)	0.011 (0.008)	0.009 (0.008)	-0.012 (0.009)	-0.023** (0.009)	-0.026** (0.01)	-0.007 (0.009)	-0.02* (0.009)	-0.013 (0.009)	-0.032** (0.01)	-0.021* (0.009)
No college	-0.246*** (0.006)	-0.252*** (0.005)	-0.229*** (0.006)	-0.231*** (0.005)	-0.229*** (0.005)	-0.224*** (0.004)	-0.212*** (0.005)	-0.216*** (0.005)	-0.216*** (0.005)	-0.211*** (0.004)	-0.212*** (0.005)	-0.216*** (0.004)
Some college	-0.085*** (0.006)	-0.085*** (0.005)	-0.075*** (0.006)	-0.083*** (0.005)	-0.077*** (0.005)	-0.067*** (0.004)	-0.06*** (0.005)	-0.068*** (0.004)	-0.064*** (0.005)	-0.065*** (0.004)	-0.071*** (0.005)	-0.067*** (0.004)
Bachelor's only	-0.018** (0.006)	-0.023*** (0.005)	-0.018** (0.006)	-0.006 (0.005)	-0.008 (0.005)	-0.017*** (0.004)	-0.012* (0.005)	-0.01* (0.004)	-0.008 (0.005)	-0.009* (0.004)	-0.014** (0.005)	-0.01* (0.004)
Unemployed	-0.039*** (0.011)	-0.047*** (0.011)	-0.027* (0.012)	-0.094*** (0.013)	-0.032** (0.01)	-0.034*** (0.01)	-0.053*** (0.012)	-0.044*** (0.009)	-0.014 (0.008)	-0.023** (0.008)	-0.017 (0.01)	-0.031** (0.011)
Moved last year	-0.2*** (0.006)	-0.118*** (0.006)	-0.166*** (0.007)	-0.105*** (0.006)	-0.145*** (0.006)	-0.102*** (0.006)	-0.149*** (0.006)	-0.085*** (0.006)	-0.137*** (0.006)	-0.085*** (0.006)	-0.118*** (0.006)	-0.069*** (0.006)
Moved last 2 years	-0.133*** (0.006)	-0.069*** (0.006)	-0.106*** (0.006)	-0.062*** (0.006)	-0.086*** (0.006)	-0.059*** (0.005)	-0.082*** (0.006)	-0.059*** (0.005)	-0.078*** (0.006)	-0.047*** (0.006)	-0.058*** (0.006)	-0.04*** (0.005)
Home owner	0.042*** (0.004)	0.045*** (0.004)	0.041*** (0.004)	0.044*** (0.004)	0.042*** (0.004)	0.041*** (0.003)	0.038*** (0.004)	0.037*** (0.004)	0.037*** (0.004)	0.057*** (0.005)	0.081*** (0.005)	0.057*** (0.005)
Partisan margin	-0.011 (0.011)	-0.025* (0.011)	0.025* (0.011)	0.007 (0.011)	-0.068*** (0.01)	-0.004 (0.01)	-0.025* (0.011)	-0.01 (0.01)	0.013 (0.01)	-0.015 (0.009)	-0.01 (0.01)	-0.034*** (0.008)
California	0.002 (0.023)	0.003 (0.021)	0.02 (0.025)	0.025 (0.023)	0 (0.025)	-0.02 (0.021)	0.006 (0.022)	-0.025 (0.02)	0.021 (0.02)	-0.008 (0.022)	-0.024 (0.023)	-0.002 (0.02)
Age: 18–24 X CA	0 (0.027)	0.022 (0.026)	-0.019 (0.028)	0.009 (0.026)	0.009 (0.027)	0.032 (0.026)	-0.028 (0.025)	0.037 (0.023)	0.052* (0.023)	0.052* (0.023)	0.043 (0.023)	-0.002 (0.023)
Age: 25–34 X CA	0.034 (0.021)	0.004 (0.021)	-0.022 (0.023)	0.002 (0.022)	-0.026 (0.025)	0.01 (0.022)	-0.018 (0.022)	0.023 (0.02)	0.023 (0.02)	0.037 (0.02)	0.013 (0.02)	0.02 (0.019)
Age: 35–44 X CA	-0.009 (0.02)	0.022 (0.018)	-0.059** (0.02)	-0.012 (0.019)	-0.017 (0.021)	0 (0.019)	-0.018 (0.018)	0.012 (0.018)	0.01 (0.018)	0.034 (0.018)	-0.002 (0.019)	-0.002 (0.018)
Age: 45–54 X CA	0 (0.019)	0.012 (0.018)	-0.043* (0.02)	-0.009 (0.019)	-0.016 (0.02)	0.02 (0.018)	-0.01 (0.017)	0.011 (0.016)	0.004 (0.017)	0.027 (0.016)	0.012 (0.017)	0.008 (0.016)
Age: 55–64 X CA	-0.04 (0.022)	0.01 (0.018)	-0.058** (0.022)	-0.014 (0.021)	-0.034 (0.021)	0.009 (0.018)	-0.004 (0.017)	0.012 (0.016)	0.012 (0.016)	0.019 (0.017)	0.013 (0.016)	0.007 (0.015)
Latino X CA	0 (0.024)	0.006 (0.022)	0.054* (0.024)	0.029 (0.022)	0.035 (0.023)	-0.047* (0.021)	0.012 (0.021)	0.047* (0.018)	0.028 (0.019)	0.01 (0.018)	0.017 (0.019)	0.009 (0.018)
Asian American X CA	0.029 (0.038)	-0.005 (0.032)	0.049 (0.034)	0.077* (0.033)	0.066* (0.033)	-0.007 (0.03)	0.001 (0.028)	0.01 (0.026)	0.025 (0.025)	0.026 (0.026)	0.034 (0.024)	0.03 (0.024)
African American X CA	-0.016 (0.028)	-0.022 (0.025)	0.003 (0.027)	-0.042 (0.023)	-0.008 (0.025)	0.014 (0.023)	-0.063* (0.026)	-0.025 (0.022)	-0.057* (0.026)	-0.033 (0.022)	-0.045 (0.025)	-0.093*** (0.024)
Woman X CA	0.027** (0.01)	0.004 (0.011)	0.002 (0.011)	-0.004 (0.011)	0.014 (0.011)	0.006 (0.01)	-0.006 (0.01)	0.015 (0.009)	-0.026** (0.01)	-0.002 (0.009)	-0.003 (0.01)	0.001 (0.009)

	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016
Single X CA	0.024 (0.014)	0.043** (0.013)	0.016 (0.014)	-0.011 (0.014)	0.011 (0.014)	0.012 (0.013)	0.018 (0.013)	0.006 (0.012)	-0.01 (0.013)	-0.019 (0.013)	0.002 (0.013)	0.009 (0.012)
1st generation immigrant X CA	-0.028 (0.027)	0.012 (0.025)	-0.005 (0.026)	-0.031 (0.024)	-0.03 (0.026)	0.03 (0.023)	0.035 (0.023)	0.034 (0.02)	0.011 (0.02)	0.025 (0.021)	-0.022 (0.02)	-0.021 (0.02)
2nd generation immigrant X CA	0.005 (0.023)	-0.015 (0.023)	-0.038 (0.026)	-0.066** (0.024)	-0.025 (0.026)	-0.003 (0.025)	0.021 (0.024)	-0.024 (0.022)	-0.041 (0.022)	0.012 (0.022)	-0.033 (0.022)	-0.013 (0.022)
No college X CA	0 (0.019)	-0.012 (0.017)	-0.038 (0.021)	-0.015 (0.018)	-0.041 (0.021)	0.007 (0.018)	-0.022 (0.019)	-0.024 (0.017)	-0.039* (0.017)	-0.039* (0.016)	-0.011 (0.018)	-0.023 (0.017)
Some college X CA	0.006 (0.018)	-0.007 (0.016)	0.005 (0.02)	-0.005 (0.017)	-0.028 (0.02)	-0.008 (0.016)	-0.034 (0.018)	-0.017 (0.015)	-0.021 (0.016)	-0.024 (0.015)	0 (0.016)	-0.034* (0.015)
Bachelor's only X CA	-0.011 (0.019)	-0.014 (0.016)	0.015 (0.02)	-0.002 (0.017)	-0.008 (0.021)	-0.012 (0.016)	0.003 (0.017)	-0.006 (0.015)	-0.014 (0.016)	-0.001 (0.014)	-0.005 (0.017)	-0.008 (0.014)
Unemployed X CA	-0.007 (0.032)	0.069* (0.033)	0.011 (0.036)	0.031 (0.04)	0.003 (0.036)	-0.047 (0.035)	-0.02 (0.036)	0.06* (0.026)	-0.02 (0.022)	-0.006 (0.026)	-0.004 (0.029)	0.034 (0.032)
Moved last year X CA	-0.002 (0.022)	-0.025 (0.02)	0.035 (0.021)	-0.029 (0.021)	0.002 (0.023)	0.025 (0.02)	-0.013 (0.021)	0.001 (0.019)	0.025 (0.02)	0.048* (0.02)	-0.001 (0.021)	0.039* (0.019)
Moved last 2 years X CA	0.011 (0.022)	-0.034 (0.019)	0.02 (0.022)	0.022 (0.019)	0.009 (0.021)	0.001 (0.019)	-0.009 (0.019)	-0.002 (0.018)	0.01 (0.018)	0.01 (0.018)	-0.001 (0.019)	-0.012 (0.018)
Home owner X CA	0.003 (0.013)	0.004 (0.013)	0 (0.014)	0.001 (0.013)	0.002 (0.014)	0.003 (0.013)	0 (0.012)	0.01 (0.012)	0.005 (0.012)	-0.018 (0.015)	0.017 (0.015)	0.016 (0.014)

SOURCES: US Census Current Population Survey November Supplement, 1994–2016.

NOTES: Missing values in the data were imputed using Amelia for R (King et al. 2001). For more details see appendix of McGhee (2014).

TABLE A3

Regression model for Figure 6: California midterm decline counterfactual

	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016
Intercept	1.014*** (0.022)	0.952*** (0.021)	0.976*** (0.026)	1.028*** (0.02)	0.983*** (0.028)	1.015*** (0.018)	0.968*** (0.024)	0.993*** (0.016)	0.984*** (0.022)	0.958*** (0.02)	0.918*** (0.027)	0.975*** (0.018)
Age: 18–24	-0.128*** (0.03)	-0.114*** (0.026)	-0.228*** (0.034)	-0.11*** (0.027)	-0.244*** (0.034)	-0.078** (0.024)	-0.26*** (0.032)	-0.052* (0.021)	-0.222*** (0.029)	-0.095*** (0.022)	-0.27*** (0.029)	-0.035 (0.022)
Age: 25–34	-0.141*** (0.022)	-0.109*** (0.02)	-0.217*** (0.026)	-0.133*** (0.022)	-0.27*** (0.029)	-0.05** (0.018)	-0.224*** (0.025)	-0.037* (0.017)	-0.181*** (0.023)	-0.102*** (0.019)	-0.288*** (0.025)	-0.047** (0.018)
Age: 35–44	-0.091*** (0.019)	-0.091*** (0.018)	-0.141*** (0.021)	-0.069*** (0.017)	-0.181*** (0.023)	-0.062*** (0.016)	-0.163*** (0.02)	-0.034* (0.014)	-0.127*** (0.02)	-0.07*** (0.016)	-0.236*** (0.023)	-0.071*** (0.017)
Age: 45–54	-0.055** (0.018)	-0.028 (0.016)	-0.093*** (0.02)	-0.039* (0.015)	-0.151*** (0.022)	-0.038** (0.014)	-0.123*** (0.018)	-0.017 (0.013)	-0.083*** (0.018)	-0.04** (0.014)	-0.153*** (0.021)	-0.029* (0.014)
Age: 55–64	-0.037 (0.02)	0.01 (0.015)	-0.007 (0.019)	-0.035* (0.017)	-0.081** (0.024)	-0.031* (0.015)	-0.025 (0.017)	-0.01 (0.012)	-0.024 (0.016)	-0.034* (0.013)	-0.086*** (0.019)	-0.011 (0.013)
Latino	0.024 (0.021)	-0.042* (0.02)	0.03 (0.023)	-0.032 (0.019)	-0.037 (0.024)	-0.041* (0.016)	-0.016 (0.019)	-0.007 (0.013)	-0.06** (0.018)	0.006 (0.014)	-0.056** (0.02)	-0.022 (0.014)
Asian American	-0.063* (0.028)	-0.038 (0.024)	-0.105** (0.033)	-0.064* (0.025)	-0.06 (0.031)	-0.086*** (0.021)	-0.087*** (0.023)	-0.063*** (0.016)	-0.116*** (0.024)	-0.08*** (0.019)	-0.108*** (0.024)	-0.043** (0.016)
African American	-0.069* (0.03)	0.015 (0.023)	-0.031 (0.031)	-0.021 (0.024)	0.038 (0.03)	-0.004 (0.021)	-0.011 (0.029)	0.052** (0.016)	-0.005 (0.028)	0.045* (0.022)	-0.079** (0.03)	-0.035 (0.025)
Woman	0.01 (0.011)	0.014 (0.01)	0.007 (0.012)	0.006 (0.01)	-0.011 (0.013)	0.012 (0.009)	0.003 (0.011)	0.01 (0.008)	0.005 (0.011)	0.011 (0.009)	-0.005 (0.011)	0.014 (0.009)
Married	-0.064*** (0.014)	-0.044*** (0.013)	-0.039* (0.016)	-0.044*** (0.013)	-0.074*** (0.017)	-0.032** (0.011)	-0.06*** (0.014)	-0.032** (0.01)	-0.02 (0.014)	-0.012 (0.012)	-0.058*** (0.016)	-0.035** (0.011)
No college	-0.186*** (0.019)	-0.099*** (0.018)	-0.151*** (0.023)	-0.142*** (0.017)	-0.204*** (0.025)	-0.116*** (0.015)	-0.146*** (0.021)	-0.111*** (0.013)	-0.169*** (0.019)	-0.121*** (0.016)	-0.188*** (0.022)	-0.122*** (0.015)
Some college	-0.088*** (0.016)	-0.033* (0.016)	-0.073*** (0.021)	-0.079*** (0.015)	-0.107*** (0.023)	-0.051*** (0.014)	-0.072*** (0.02)	-0.047*** (0.011)	-0.11*** (0.018)	-0.055*** (0.014)	-0.106*** (0.019)	-0.061*** (0.014)
Bachelor's only	-0.031 (0.017)	0.002 (0.016)	-0.035 (0.021)	-0.026 (0.015)	-0.025 (0.023)	-0.015 (0.013)	0.005 (0.02)	-0.013 (0.011)	-0.054** (0.018)	-0.002 (0.014)	-0.049* (0.02)	-0.011 (0.013)
Unemployed	-0.046 (0.038)	0.009 (0.032)	-0.051 (0.046)	0.002 (0.044)	0.018 (0.044)	0.006 (0.031)	-0.047 (0.047)	0.033 (0.02)	-0.028 (0.026)	-0.009 (0.025)	-0.006 (0.033)	-0.011 (0.031)
Moved last year	-0.098*** (0.024)	-0.029 (0.02)	-0.098*** (0.026)	-0.099*** (0.023)	-0.13*** (0.029)	-0.093*** (0.02)	-0.117*** (0.026)	-0.077*** (0.017)	-0.125*** (0.024)	-0.092*** (0.019)	-0.065* (0.025)	-0.096*** (0.019)
Moved last 2 years	-0.034 (0.021)	-0.023 (0.019)	-0.081** (0.025)	-0.008 (0.017)	-0.078** (0.026)	-0.069*** (0.017)	-0.066** (0.022)	-0.049** (0.016)	-0.069** (0.021)	-0.033 (0.018)	-0.018 (0.023)	-0.069*** (0.018)
Home owner	0.031* (0.014)	0.043*** (0.013)	0.031* (0.015)	0.017 (0.013)	0.042* (0.016)	0.013 (0.011)	0.033* (0.014)	0.012 (0.01)	0.033* (0.014)	0.037** (0.014)	0.059** (0.019)	0.029* (0.013)

SOURCES: US Census Current Population Survey November Supplement, 1994–2016.

NOTES: Missing values in the data were imputed using Amelia for R (King et al. 2001). For more details see appendix of McGhee (2014).

TABLE A4

Regression model for Figure 6 with interactions between age and Latino/Asian American ethnicity

	1994	1996	1998	2000	2002	2004	2006	2008	2010	2012	2014	2016
Intercept	1.017*** (0.022)	0.948*** (0.021)	0.973*** (0.026)	1.022*** (0.02)	0.988*** (0.028)	1.004*** (0.018)	0.97*** (0.024)	0.999*** (0.016)	0.993*** (0.021)	0.953*** (0.02)	0.925*** (0.027)	0.979*** (0.018)
Age: 18–24	-0.13*** (0.034)	-0.089** (0.029)	-0.23*** (0.04)	-0.106** (0.033)	-0.239*** (0.041)	-0.062* (0.029)	-0.233*** (0.04)	-0.065* (0.025)	-0.235*** (0.037)	-0.072* (0.027)	-0.296*** (0.037)	-0.049 (0.03)
Age: 25–34	-0.144*** (0.024)	-0.106*** (0.022)	-0.21*** (0.029)	-0.121*** (0.025)	-0.293*** (0.032)	-0.021 (0.02)	-0.233*** (0.03)	-0.041* (0.019)	-0.195*** (0.027)	-0.096*** (0.023)	-0.29*** (0.03)	-0.057** (0.022)
Age: 35–44	-0.091*** (0.019)	-0.078*** (0.018)	-0.137*** (0.023)	-0.065*** (0.018)	-0.189*** (0.025)	-0.043* (0.017)	-0.181*** (0.023)	-0.047** (0.016)	-0.141*** (0.023)	-0.068*** (0.019)	-0.255*** (0.027)	-0.07*** (0.02)
Age: 45–54	-0.061** (0.019)	-0.025 (0.017)	-0.088*** (0.022)	-0.032 (0.016)	-0.146*** (0.023)	-0.026 (0.015)	-0.116*** (0.02)	-0.03* (0.013)	-0.083*** (0.019)	-0.035* (0.016)	-0.156*** (0.023)	-0.026 (0.015)
Age: 55–64	-0.039 (0.021)	0.014 (0.016)	-0.003 (0.02)	-0.017 (0.018)	-0.093*** (0.026)	-0.026 (0.016)	-0.026 (0.018)	-0.011 (0.012)	-0.033 (0.017)	-0.028 (0.014)	-0.098*** (0.021)	-0.01 (0.014)
Latino	-0.049 (0.067)	0.062 (0.036)	0.035 (0.042)	0.012 (0.04)	-0.039 (0.061)	0.023 (0.031)	0 (0.036)	-0.046 (0.032)	-0.038 (0.041)	0.018 (0.027)	-0.104* (0.042)	0.001 (0.028)
Asian American	-0.007 (0.065)	-0.072 (0.076)	-0.055 (0.053)	-0.03 (0.042)	-0.138* (0.065)	-0.013 (0.036)	-0.12* (0.05)	-0.083 (0.047)	-0.199*** (0.052)	-0.044 (0.035)	-0.122* (0.05)	-0.085** (0.031)
African American	-0.069* (0.03)	0.016 (0.023)	-0.031 (0.031)	-0.021 (0.024)	0.038 (0.03)	-0.006 (0.021)	-0.01 (0.029)	0.053** (0.016)	-0.003 (0.028)	0.045* (0.022)	-0.08** (0.03)	-0.034 (0.025)
Age: 18–24 X Latino	0.077 (0.09)	-0.206** (0.069)	-0.012 (0.077)	-0.051 (0.067)	-0.041 (0.085)	-0.066 (0.053)	-0.074 (0.068)	0.047 (0.048)	-0.02 (0.065)	-0.031 (0.046)	0.075 (0.064)	-0.023 (0.049)
Age: 25–34 X Latino	0.086 (0.08)	-0.093 (0.056)	0 (0.066)	-0.092 (0.061)	0.067 (0.08)	-0.12* (0.048)	-0.005 (0.057)	0.031 (0.042)	-0.021 (0.057)	-0.04 (0.043)	0.037 (0.057)	-0.019 (0.041)
Age: 35–44 X Latino	0.079 (0.079)	-0.151** (0.054)	0.006 (0.058)	-0.043 (0.053)	0.028 (0.074)	-0.074 (0.045)	0.031 (0.054)	0.036 (0.04)	-0.043 (0.055)	-0.009 (0.04)	0.068 (0.058)	-0.031 (0.042)
Age: 45–54 X Latino	0.08 (0.077)	-0.03 (0.052)	-0.005 (0.064)	0.003 (0.05)	-0.06 (0.08)	-0.056 (0.044)	-0.04 (0.053)	0.073 (0.039)	0.001 (0.055)	0.002 (0.039)	0.005 (0.058)	-0.028 (0.038)
Age: 55–64 X Latino	0.088 (0.08)	-0.081 (0.052)	-0.022 (0.064)	-0.074 (0.062)	0.009 (0.084)	-0.03 (0.047)	-0.017 (0.053)	0.042 (0.042)	-0.02 (0.054)	0.011 (0.039)	0.128* (0.057)	-0.025 (0.038)
Age: 18–24 X Asian	-0.062 (0.103)	0.068 (0.101)	0.037 (0.126)	0.025 (0.077)	0.084 (0.107)	-0.091 (0.078)	-0.022 (0.091)	0.057 (0.071)	0.142 (0.093)	-0.125 (0.074)	0.059 (0.085)	0.128* (0.058)
Age: 25–34 X Asian	-0.086 (0.095)	0.061 (0.092)	-0.1 (0.093)	0.006 (0.069)	0.126 (0.096)	-0.088 (0.057)	0.065 (0.075)	0.02 (0.06)	0.136 (0.078)	0.019 (0.054)	0.003 (0.071)	0.085 (0.048)
Age: 35–44 X Asian	-0.097 (0.089)	0.032 (0.091)	-0.075 (0.083)	0.002 (0.056)	0.057 (0.087)	-0.118* (0.058)	0.101 (0.069)	0.062 (0.056)	0.164* (0.067)	-0.019 (0.054)	0.045 (0.073)	0.035 (0.049)
Age: 45–54 X Asian	-0.003 (0.076)	-0.007 (0.09)	-0.072 (0.083)	-0.106 (0.067)	0.06 (0.084)	-0.079 (0.053)	-0.007 (0.07)	0.016 (0.058)	-0.013 (0.07)	-0.059 (0.052)	0.045 (0.068)	0.018 (0.047)
Age: 55–64 X Asian	-0.083 (0.095)	0.034 (0.09)	-0.031 (0.086)	-0.154 (0.103)	0.17* (0.077)	-0.05 (0.056)	0.028 (0.066)	-0.035 (0.059)	0.095 (0.062)	-0.069 (0.052)	-0.045 (0.071)	0.023 (0.047)
Woman	0.01 (0.011)	0.014 (0.01)	0.008 (0.012)	0.007 (0.01)	-0.01 (0.013)	0.012 (0.009)	0.003 (0.011)	0.01 (0.008)	0.005 (0.011)	0.011 (0.009)	-0.005 (0.011)	0.014 (0.009)
Married	-0.064*** (0.014)	-0.046*** (0.013)	-0.039* (0.016)	-0.046*** (0.013)	-0.074*** (0.017)	-0.033** (0.011)	-0.06*** (0.014)	-0.032** (0.01)	-0.022 (0.014)	-0.011 (0.012)	-0.059*** (0.016)	-0.037*** (0.011)
No college	-0.186*** (0.019)	-0.102*** (0.018)	-0.153*** (0.023)	-0.142*** (0.016)	-0.204*** (0.025)	-0.12*** (0.015)	-0.147*** (0.021)	-0.111*** (0.013)	-0.17*** (0.019)	-0.122*** (0.016)	-0.186*** (0.022)	-0.122*** (0.015)
Some college	-0.088*** (0.016)	-0.034* (0.016)	-0.074*** (0.021)	-0.079*** (0.015)	-0.109*** (0.023)	-0.052*** (0.014)	-0.074*** (0.02)	-0.046*** (0.011)	-0.111*** (0.018)	-0.055*** (0.014)	-0.104*** (0.019)	-0.062*** (0.014)
Bachelor's only	-0.031 (0.017)	0 (0.016)	-0.034 (0.021)	-0.027 (0.015)	-0.026 (0.023)	-0.016 (0.013)	0.005 (0.02)	-0.012 (0.011)	-0.054** (0.018)	-0.002 (0.013)	-0.047* (0.02)	-0.012 (0.013)
Unemployed	-0.045 (0.038)	0.009 (0.031)	-0.05 (0.046)	0.001 (0.044)	0.015 (0.044)	0.006 (0.032)	-0.051 (0.047)	0.034 (0.02)	-0.027 (0.026)	-0.007 (0.025)	-0.005 (0.033)	-0.008 (0.031)
Moved last year	-0.099*** (0.024)	-0.031 (0.02)	-0.099*** (0.026)	-0.098*** (0.023)	-0.13*** (0.029)	-0.093*** (0.02)	-0.118*** (0.026)	-0.077*** (0.017)	-0.124*** (0.024)	-0.091*** (0.019)	-0.064* (0.025)	-0.097*** (0.019)
Moved last 2 years	-0.035 (0.021)	-0.023 (0.019)	-0.08** (0.025)	-0.008 (0.017)	-0.076** (0.026)	-0.07*** (0.017)	-0.066** (0.022)	-0.049** (0.016)	-0.067** (0.021)	-0.033 (0.017)	-0.018 (0.023)	-0.07*** (0.018)
Home owner	0.03* (0.014)	0.043*** (0.012)	0.031* (0.015)	0.017 (0.013)	0.042* (0.016)	0.013 (0.011)	0.034* (0.014)	0.012 (0.01)	0.033* (0.014)	0.037** (0.014)	0.059** (0.019)	0.028* (0.013)

SOURCES: US Census Current Population Survey November Supplement, 1994–2016.

NOTES: Missing values in the data were imputed using Amelia for R (King et al. 2001). For more details see appendix of McGhee (2014).

TABLE A5

Vote-by-mail differences are robust to a variety of control variables

	Coefficient	Standard Error
Intercept	0.333	0.001
Vote by mail	0.190	0.001
Lagged vote	0.356	0.001
New registrant	0.289	0.001
Vote by mail X Lagged vote	-0.100	0.001
Vote by mail X New registrant	-0.119	0.002
Latino	-0.040	0.001
Asian American	-0.058	0.001
Foreign born	-0.032	0.001
Age	0.004	0.000
Age ²	0.000	0.000
Home owner	0.108	0.001
Fixed cohort effects?	Yes	
Fixed year effects?	Yes	
RMSE	0.403	
Adjusted R ²	0.286	
N	1,970,267	

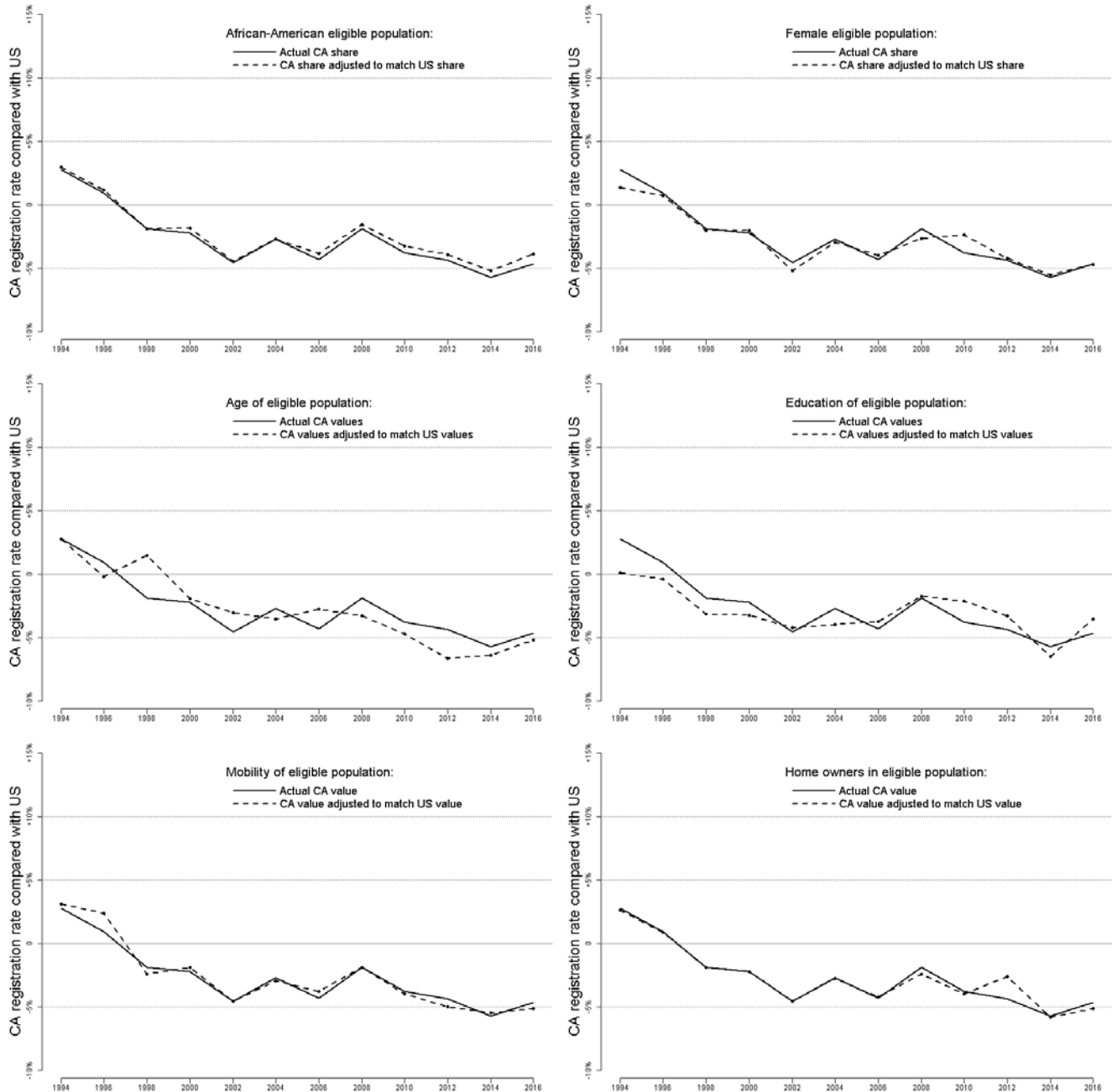
SOURCES: Political Data, Inc.

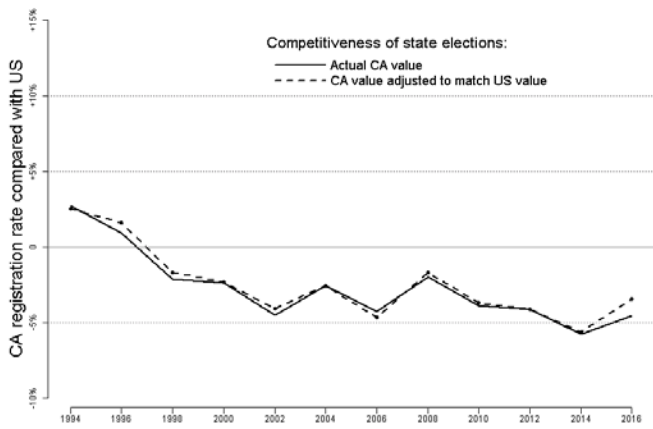
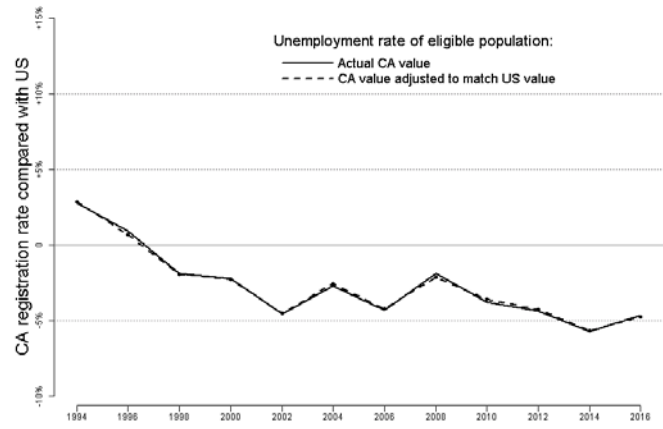
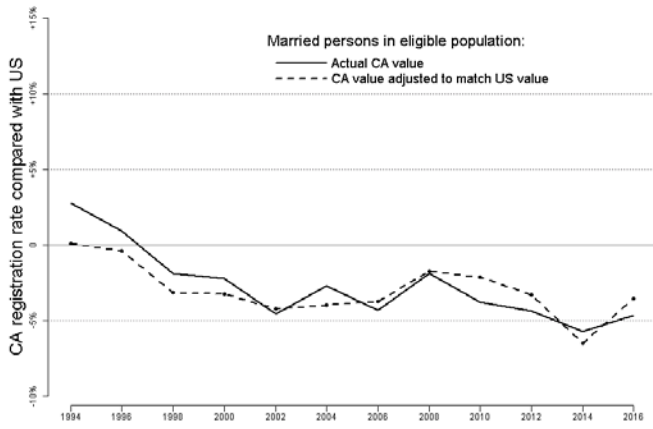
NOTES: Original data are a random sample of 400,000 registrants each from archived registration files for general elections from 2008 through 2016. Coefficients, standard errors, and model fit come from a linear probability model. All coefficients are statistically significant at the 0.001 level.

Appendix B: Alternative Counterfactuals

FIGURE B1

Alternative Figure 4 registration counterfactuals setting California to national averages on different demographic and political variables



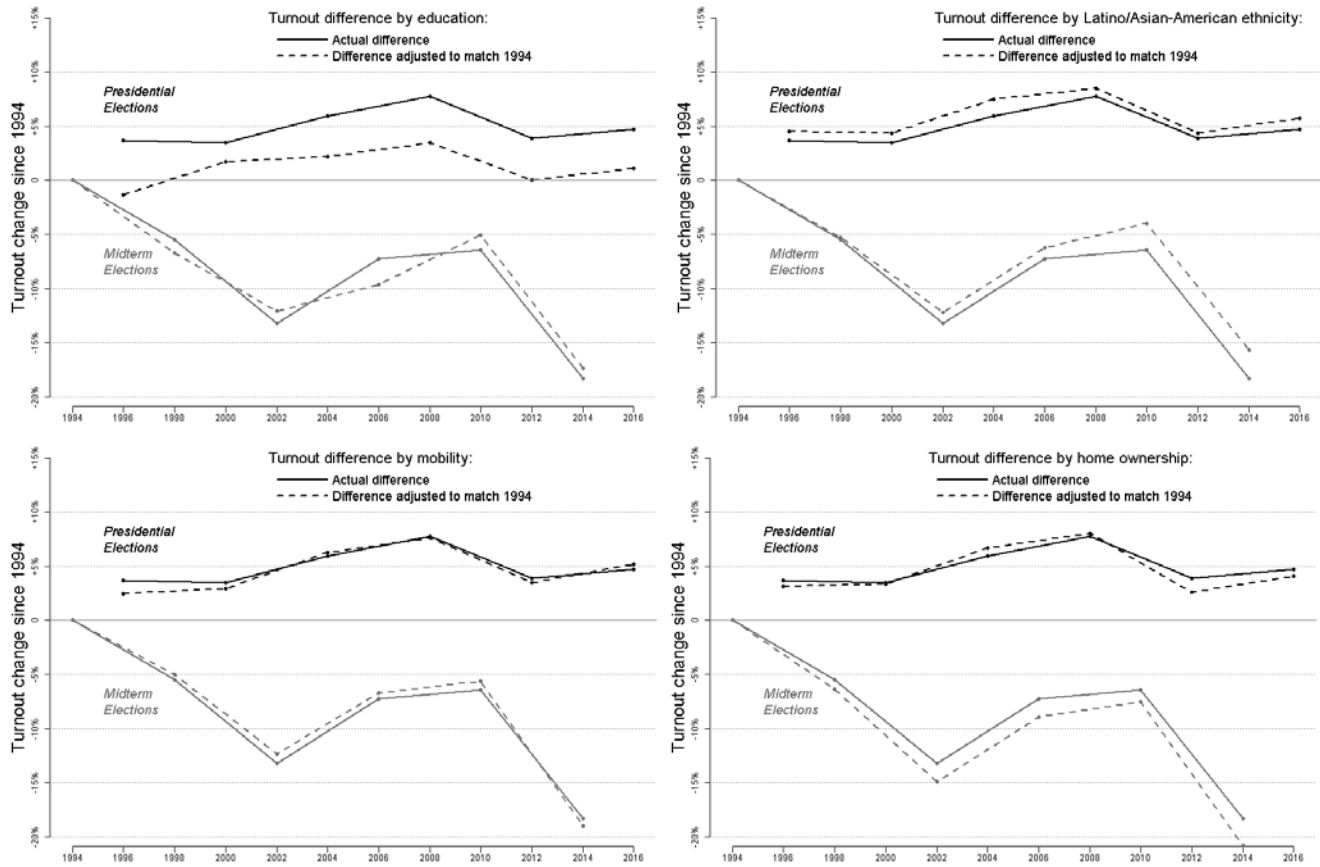


SOURCE: US Census Current Population Survey November Supplement, 1994–2016.

NOTE: Each graph shows a counterfactual similar to Figure 5, where California’s registration rate is calculated with the indicated variable set to the national mean and entered into the relevant regression equation in Table A1.

FIGURE B2

Alternative versions of Figure 6 counterfactual using different variables

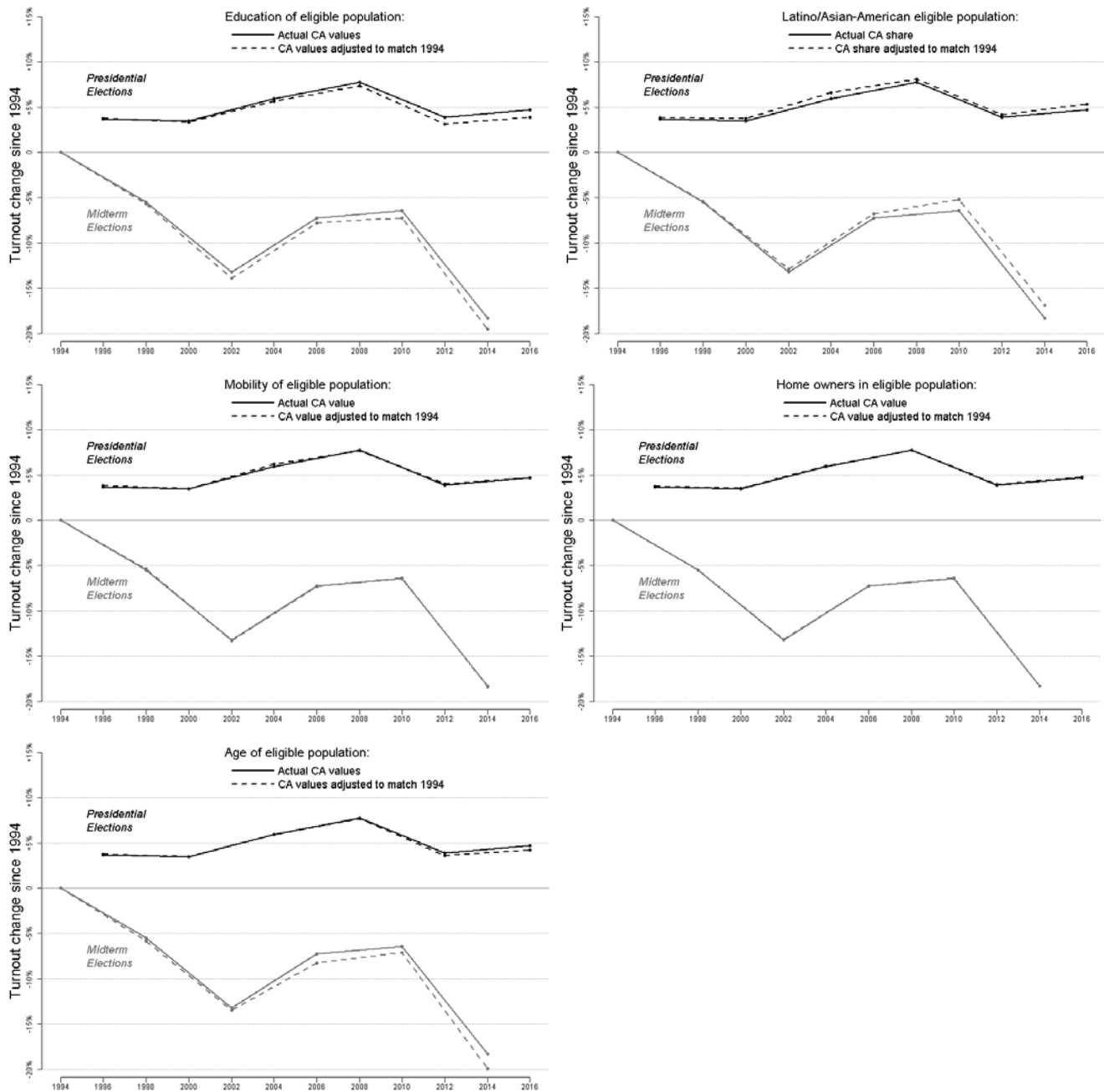


SOURCE: US Census Current Population Survey November Supplement, 1994–2016.

NOTE: Trend lines show the change in turnout from 1994. The solid lines are the original trends, with black for presidential elections and grey for midterms. The dotted lines are the trends after the differences between each group and the rest of the state has been set to equal the level in 1994.

FIGURE B3

Alternative versions of Figure 6 counterfactual using compositional change rather than effect change



SOURCE: US Census Current Population Survey November Supplement, 1994–2016.

NOTE: Trend lines show the change in turnout from 1994. The solid lines are the original trends, with black for presidential elections and grey for midterms. The dotted lines are the trends after each groups composition of the electorate has been set to the values from 1994.



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