Polarized Expectations, Polarized Consumption

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- Fundamental relationship between economic decisions and agents' expectations

- Workhorse approach: full-information rational expectations (FIRE)
  - Useful theoretical benchmark, but requires strong assumptions

- Survey-based measures of beliefs systematically deviate from FIRE

This Paper:

- Political affiliation is a key driver of household expectations and actions

FACT 1: Consumer beliefs follow a single factor (sentiment) model

- Using survey data, we show that household beliefs can be largely summarized by a single factor
- Essentially, households fall on a spectrum of optimism to pessimism ("sentiment")

Five Facts About Expectations, Consumption, and Polarization

FACT 1: Consumer beliefs follow a single factor (sentiment) model

FACT 2: Large sentiment heterogeneity explained by political affiliation

- Based on our factor analysis, there is a high degree of sentiment heterogeneity across households
- While aggregate sentiment fluctuates with the business cycle, there is a wide dispersion of optimistic and pessimistic households at any point in time
- Utilizing political affiliation in surveys, we show that this heterogeneity correlates with political ideology
  - Democrats tend to be optimistic when Republicans are pessimistic, and vice versa

Five Facts About Expectations, Consumption, and Polarization

FACT 1: Consumer beliefs follow a single factor (sentiment) model

FACT 2: Large sentiment heterogeneity explained by political affiliation

FACT 3: Sentiment persistence falls when the White House changes party

- Analyzing sentiment persistence within households, we find a high degree of stability
- One striking exception: strong switching behavior following presidential elections when the White House changes parties
  - Optimists become pessimistic, and pessimists become optimistic
  - This switching occurs at virtually no other time (eg., midterm elections, major macro events, presidential elections without a change of party)

Five Facts About Expectations, Consumption, and Polarization

FACT 1: Consumer beliefs follow a single factor (sentiment) model

FACT 2: Large sentiment heterogeneity explained by political affiliation

FACT 3: Sentiment persistence falls when the White House changes party

FACT 4: Sentiment-switching has increased over time

- Over time, the magnitude of switching behavior has increased
- Comparing the change in autocorrelation of sentiment following White House changes, we find a monotonic increase since 1980

Five Facts About Expectations, Consumption, and Polarization

FACT 1: Consumer beliefs follow a single factor (sentiment) model

FACT 2: Large sentiment heterogeneity explained by political affiliation

FACT 3: Sentiment persistence falls when the White House changes party

FACT 4: Sentiment-switching has increased over time

FACT 5: Partisan consumption response to White House elections

- 2016 case study (high-frequency consumption and voting data at the zip code):
    - Zip codes with a higher fraction of Trump votes increased consumption
- 2020 case study (linked individual-level high-frequency consumption data and political affiliation):
    - Republican households decreased consumption
- In both cases, the consumption response is sizable, immediate, and relatively long-lasting

Five Facts About Expectations, Consumption, and Polarization

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FACT 5: Partisan consumption response to White House elections

Implications for expectation formation:

- Political affiliation and polarization is crucial for understanding the dynamics and dispersion of household beliefs and actions
- No "off-the-shelf" macro theories of expectation formation can rationalize all facts

Related Literature

- Deviations from FIRE, and the links between expectations and actions:
  - Croushore (1993, 1997), Coibion & Gorodnichenko (2015), Coibion, Gorodnichenko, & Kamdar (2018), Bram & Ludvigson (1998), Ludvigson (2004), Malmendier & Nagel (2016), …

- Polarization and Expectations:
  - Bartels (2002), Gerber & Huber (2009), Benhabib & Spiegel (2019), Coibion , Gorodnichenko, & Weber (2020), D'Acunto, Hoang, & Weber (2016)...

- Polarization and Actions:
  - Gillitzer & Prasad (2018), Mian, Sufi, & Khoshkhou (2021), Meeuwis, Parker, Schoar, & Simester, (2022), Cassidy & Vorsatz (2021), Rice (2020), Dagostino, Gao, & Ma (2020), Kempf & Tsoutsoura (2021)....

Survey Expectations

Data: Michigan Survey of Consumers (MSC)

Michigan Survey of Consumers

- 1978-present, monthly, consumer survey of ≈ 500 households
- Rotating panel (up to 2x, six months apart)

Questions

- Includes forward- and backward-looking questions
- Includes aggregate and personal belief questions
- Sporadic questions regarding political party affiliation
- Majority of questions in the MSC are simple, qualitative questions

Comparison: Survey of Professional Forecasters

- Quantitative forecasts from professionals (quarterly survey since 1960s)

- Conduct a factor analysis
  - Categorical responses: multiple correspondence analysis (MCA)

- Included questions:
  - Aggregate: business conditions have/will improve, state of the economy in next 1/5 years, unemployment/inflation/interest rates up/down, government policy
  - Personal: financial conditions have/will improve, family income up/down

MSC MCA Results: First Component Loadings

	Responses				
	(1)	(2)	(3)	(4)	(5)
Unemployment Up/Down (Next Year)	-1.50		0.38		1.49
Prices Up/Down (Next Year)	-1.06	-0.36	0.12	0.62	0.63
Interest Rates Up/Down (Next Year)	-0.17		0.25		0.05
Economy Better/Worse (Last Year)	1.17		0.09		-1.17
Economy Better/Worse (Next Year)	1.34		-0.01		-2.03
Economy Good/Bad (Next Year)	1.31	0.73	0.10	-0.74	-1.47
Economy Good/Bad (Next 5 Years)	1.39	1.00	0.17	-0.77	-1.41
Government Policy Good/Bad	1.48		0.20		-1.47
Family Income Up/Down (Next Year)	0.84	0.61	0.16	-0.65	-1.51
Personal Finances Better/Worse (Last Year)	0.84		-0.17		-1.14
Personal Finances Better/Worse (Next Year)	0.98		-0.22		-2.16
Real Income Up/Down (Next Year)	1.33		0.35		-1.18

Notes: column (1) is the MCA loading for responses associated with "up"/"better"/"good"; (5) is associated with "down"/"worse"/"bad"; columns (2) through (4) are intermediate or neutral responses.

- Monotonic loadings for first component ("sentiment") across responses

	Baseline		Aggregate		Personal		Backward
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Explained (1)	80.97	87.13	94.24	75.96	80.68	77.20	85.07
% Explained (2)	6.29	3.52	2.76	4.52	14.21	14.36	14.93
Baseline Corr.		0.923	0.916	0.916	0.657	0.695	0.673
Observations	207,327	233,678	254,685	129,906	260,460	130,321	297,967
Start Date	1978	1978	1978	1990	1978	1990	1978

Notes: (2) aggregate questions only; (3) does not include price/rate questions; (4) includes price/rate as well as 5-year price/gas price questions; (5) personal questions only; (6) adds home price question; (7) backward-looking questions only.

· First component explains a huge fraction of responses $\implies$ dimension reduction
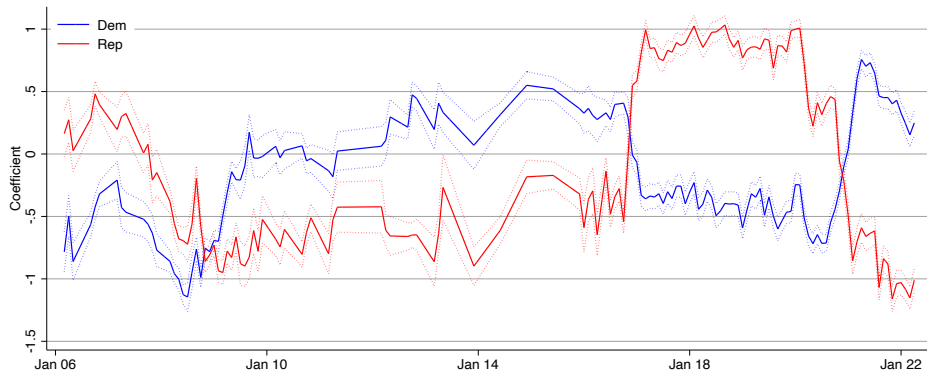
MSC MCA Results: Sentiment Distribution across Time
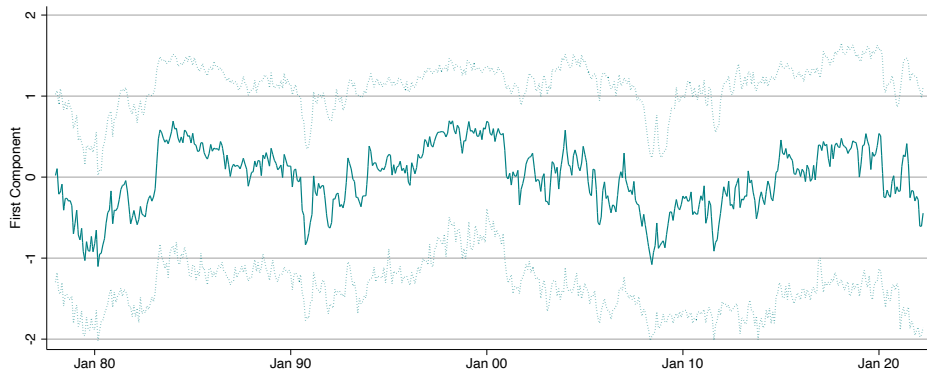
Notes: time series of the first component $f_{i,t}$ from the baseline MCA. The solid line is the median value of sentiment, while the dotted lines are the 90-10 percent distribution.

· Wide dispersion of beliefs across households at any given time

Notes: results of a rolling regression of $f_{i,t}$ on political affiliation dummy variables, where $f_{i,t}$ is the first component from the baseline MCA. Dotted lines represent 90% confidence intervals.

- Sentiment correlated with political affiliation
  - Democratic consumers tend to be optimistic when Republican consumers are pessimistic, and vice versa `personal only` `backward only` `R2`

	Baseline	By Income		By Education		By Pol. Affil.	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
% Explained (1)	80.97	79.16	79.74	81.64	79.25	76.09	87.59
% Explained (2)	6.29	7.78	6.34	6.09	6.92	6.85	4.05
Baseline Corr.		0.999	0.999	1.000	1.000	0.998	0.999
Observations	207,327	24,182	49,764	123,304	84,023	21,679	20,287
Start Date	1978	1979	1979	1978	1978	2006	2006

Notes: (2) bottom quintile income consumers; (3) top quintile income consumers; (4) consumers without college education; (5) consumers with college education; (6) Democratic consumers; (7) Republican consumers.

- Estimates highly similar across subgroups $\implies$ mapping from sentiment to beliefs is relatively homogeneous
  - Loadings: income   education   political affiliation
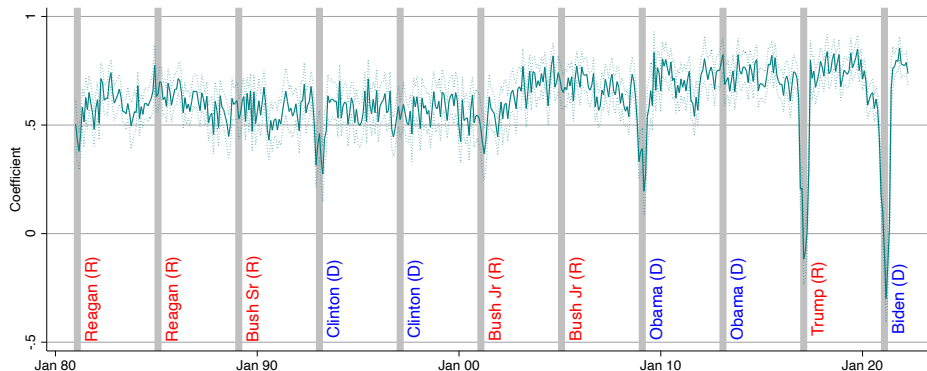
Notes: results of a rolling regression $f_{i,t} = \alpha_t + \beta_t f_{i,t-6} + \varepsilon_{i,t}$, where $f_{i,t}$ is the first component from the baseline MCA. Dotted lines represent 90% confidence intervals.

- Sentiment is highly persistent, except following changes in the White House `by question`
- Switching behavior is increasing over time `personal only` `backward only`

Comparison to Professional Forecasters

In comparison to households, professional forecasters exhibit...

- Higher dimension factor structure of expectations `factors`

- Less dispersion in first component at a given point in time `time series`

- Less persistence in first component and no change when the White House switches party `persistence`

Case Study: 2016 Election

Data: Nielsen Home Scanner

- Large panel data of household consumption
  - 60,000 households; participating households scan their purchases
  - Consumption identified at the UPC level (mostly non-durable)

- Aggregate to total spending at the zip code, weekly data

- Combine with 2016 voting data at the zip code level
  - Voting data is reported at the precinct level (raw data and shapefiles from US Election Project)
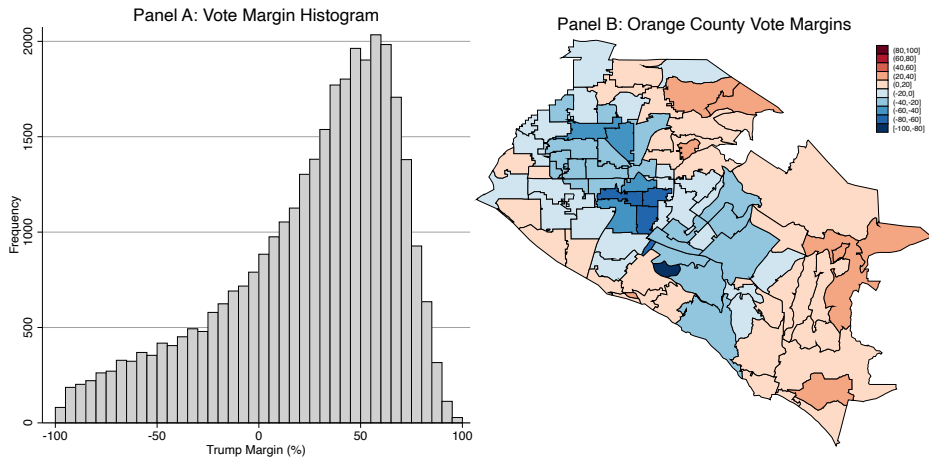
Notes: histogram of the Trump vote margin across all zip codes (Panel A) and Trump/Clinton vote margins across Orange County (Clinton won Orange country by 8.6%).

- Event study design:

$$c_{z,t,y} = \alpha_{z,t} + \gamma_{t,y} + \sum_{k=-\underline{T}}^{\overline{T}} \beta_{k,y} \cdot v_z^{16} \cdot I_{t=k} + \varepsilon_{z,t,y}$$

- $c_{z,t,y}$: (log) consumption in zip code z during week t ($t = 0$: week of election) in year y
- v_z^{16}: Trump's vote margin in zip code z: $-1 \leq v_z^{16} \leq 1$
- $\hat{\beta}_{k,2016}$: percent change in consumption for a 1ppt increase in a zip code's Trump vote share margin, k weeks after the 2016 election
- Include consumption data for 2014-2016 to control for different seasonal consumption patterns across zip codes with more/less Trump voters

2016 Event Study: Consumption Responses
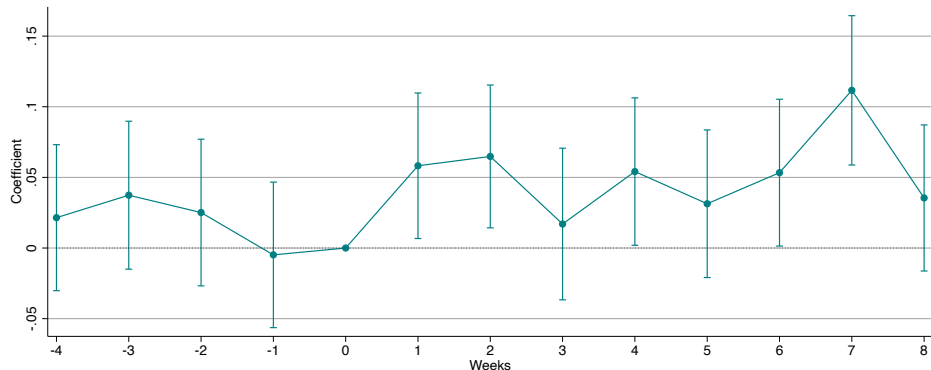
Notes: results of the 2016 event study across all zip codes with at least 100 votes. Vertical lines represent 90% confidence intervals.

- Polarized response of actual consumption to election results, although estimates are noisy

Results are highly robust:

- Consumption response lasts into the next year `larger window`

- Consumption responds even focusing on high-margin zip codes `high margin only`

- Similar results even within red and blue states `CA and TX`

- Results much noisier when using 3-digit zip codes ($\approx$ counties) `3-digit zip`

Case Study: 2020 Election

Data: 2020 Election Survey

- Survey of households participating in Nielsen Homescan (from Coibion, Gorodnichenko, & Weber (2020)) conducted in the days before and after the 2020 election

- Questions regarding macroeconomic expectations and consumption attitudes (and political affiliation)
  - Allows us to trace out how beliefs and consumption attitudes changed in the days before and after the election

- By linking with Homescan data, can also see how actual consumption responded in the weeks before and after the election

- Event study design:

$$y_{i,t} = \gamma_t + \sum_{\kappa=-\underline{T}}^{\overline{T}} \beta_\kappa \cdot \mathsf{I}_{i \in R} \cdot \mathsf{I}_{t=\kappa} + \varepsilon_{i,t}$$

  - $y_{i,t}$: response of household i during day t
  - $\mathsf{I}_{i \in R}$: whether household i is politically affiliated with the Republican party
  - $\hat{\beta}_\kappa$: differential response of Republican relative to Democratic HH t days following the election
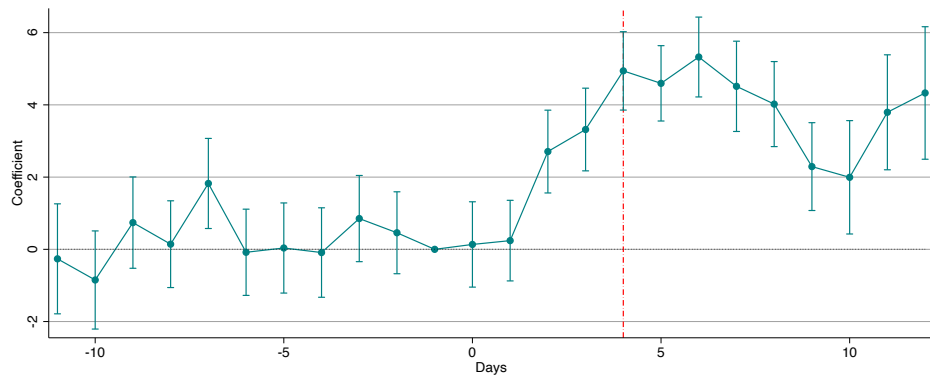
2020 Event Study: Inflation Expectations
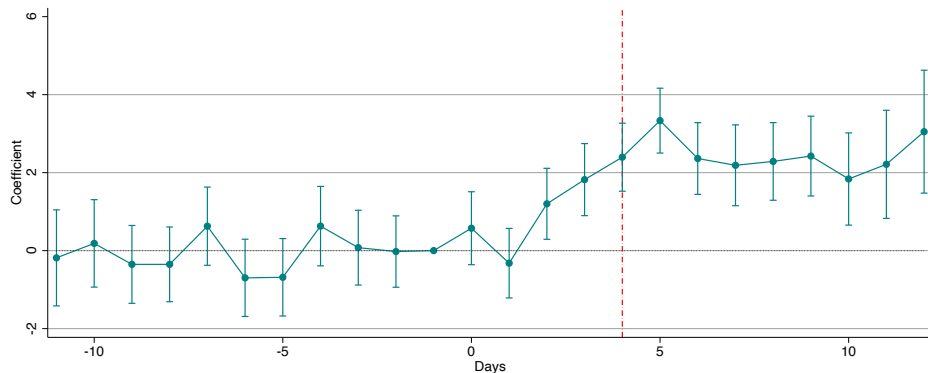
Notes: results of the 2020 event study for inflation expectations; responses are in percentage points. Vertical lines represent 90% confidence intervals.

- Strong and (almost) immediate reaction following the election, but not in the lead-up (media election calls occurred on days 3-5)

2020 Event Study: Unemployment Expectations

Notes: results of the 2020 event study for unemployment expectations; responses are in percentage points. Vertical lines represent 90% confidence intervals.

2020 Event Study: Appliance Purchase Attitudes
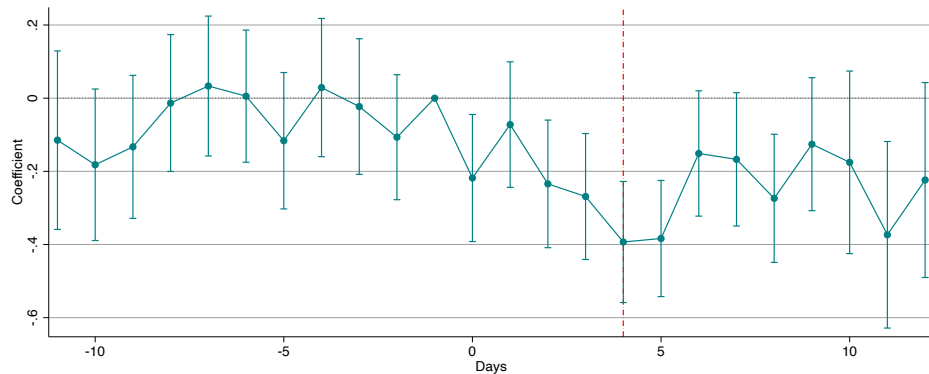
Notes: results of the 2020 event study for appliance purchase attitudes; responses range from 1 (very bad time to buy) to 5 (very good time to buy). Vertical lines represent 90% confidence intervals.

# Event Study Design: 2020 Election and Consumption

- Event study design:

$$c_{i,t,y} = \alpha_{i,t} + \gamma_{t,y} + \sum_{k=-\underline{T}}^{\overline{T}} \beta_{k,y} \cdot \mathsf{I}_{i \in R} \cdot \mathsf{I}_{t=k} + \varepsilon_{i,t,y}$$

- $c_{i,t,y}$: (log) consumption for HH i during week t ($t = 0$: week of election) in year y
- $\mathsf{I}_{i \in R}$: whether household i is politically affiliated with the Republican party
- $\hat{\beta}_{k,2020}$: percent change in consumption of Republican relative to Democratic HHs, k weeks following the 2020 election
- Include consumption data for 2019-2020 to control for different seasonal consumption patterns across Republican/Democratic HHs
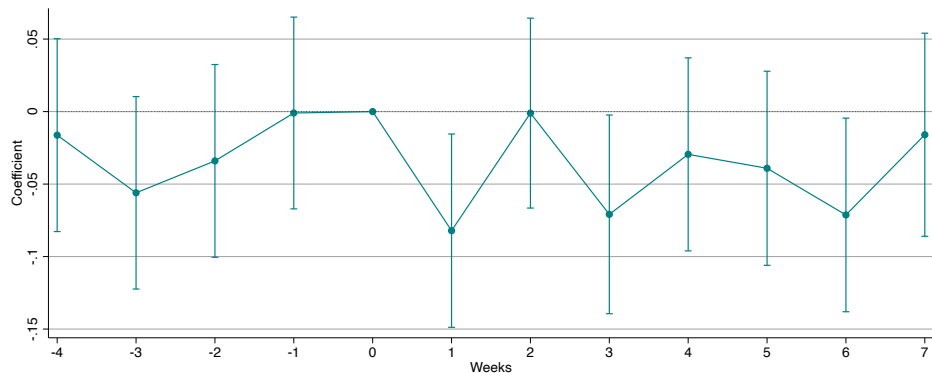
Notes: results of the 2020 event study for weekly log consumption. Vertical lines represent 90% confidence intervals.

Implications for Existing Theory

Implications for Existing Theory

Challenge: simultaneously explain:

- Single dimension factor structure
- Household expectations and consumption fall along party lines
- Strong reaction to changes in the White House
- Weak/no reaction to outcomes of Congressional elections, Presidential elections without a change of party, or in lead-up to a Presidential election

Models that do not (fully) work:

- FIRE
- Models with consistent under/over-reaction (sticky information, rational inattention, diagnostic expectations)
- "Agree to disagree" economic policy models
- Robustness/ambiguity aversion models
- "Cheerleading" models

Conclusion

Five Facts

- Household beliefs are well-described by a single factor, sentiment
- At any time, there is wide dispersion in household sentiment, largely driven by political affiliation
- Household sentiment is highly persistent, except when the White House switches party, when optimistic households become pessimistic and vice versa
- The magnitude of this switching behavior has increased over time
- Consumption responds differentially along party lines following changes in the White House

Standard theories of expectation formation struggle to simultaneously rationalize the facts

Thank You!

	Responses				
	(1)	(2)	(3)	(4)	(5)
Unemployment Up/Down (Next Year)	-1.38		0.49		1.50
Prices Up/Down (Next Year)	-0.84	-0.25	-0.04	0.55	0.92
Interest Rates Up/Down (Next Year)	-0.30		0.45		0.19
Economy Better/Worse (Last Year)	1.36		0.17		-1.09
Economy Better/Worse (Next Year)	1.52		0.01		-1.99
Economy Good/Bad (Next Year)	1.49	0.92	0.30	-0.58	-1.30
Economy Good/Bad (Next 5 Years)	1.66	1.31	0.40	-0.41	-1.19
Government Policy Good/Bad	1.68		0.33		-1.35
Family Income Up/Down (Next Year)	1.00	0.58	0.26	-0.41	-1.32
Personal Finances Better/Worse (Last Year)	1.01		0.16		-0.83
Personal Finances Better/Worse (Next Year)	0.99		-0.07		-1.99
Real Income Up/Down (Next Year)	1.44		0.54		-0.89

back

	Responses				
	(1)	(2)	(3)	(4)	(5)
Unemployment Up/Down (Next Year)	-1.63		0.36		1.39
Prices Up/Down (Next Year)	-1.22	-0.46	0.17	0.64	0.36
Interest Rates Up/Down (Next Year)	-0.07		0.16		-0.10
Economy Better/Worse (Last Year)	1.07		0.12		-1.27
Economy Better/Worse (Next Year)	1.16		0.02		-2.17
Economy Good/Bad (Next Year)	1.20	0.60	0.06	-0.87	-1.65
Economy Good/Bad (Next 5 Years)	1.22	0.82	-0.00	-1.04	-1.60
Government Policy Good/Bad	1.25		0.12		-1.60
Family Income Up/Down (Next Year)	0.73	0.51	0.01	-0.75	-1.60
Personal Finances Better/Worse (Last Year)	0.68		-0.36		-1.34
Personal Finances Better/Worse (Next Year)	0.93		-0.31		-2.33
Real Income Up/Down (Next Year)	1.07		0.10		-1.53

back

	Responses				
	(1)	(2)	(3)	(4)	(5)
Unemployment Up/Down (Next Year)	-1.47		0.43		1.52
Prices Up/Down (Next Year)	-0.93	-0.30	0.07	0.56	0.73
Interest Rates Up/Down (Next Year)	-0.22		0.29		0.14
Economy Better/Worse (Last Year)	1.22		0.11		-1.15
Economy Better/Worse (Next Year)	1.41		-0.01		-2.06
Economy Good/Bad (Next Year)	1.34	0.74	0.08	-0.74	-1.43
Economy Good/Bad (Next 5 Years)	1.46	1.04	0.25	-0.68	-1.33
Government Policy Good/Bad	1.57		0.24		-1.44
Family Income Up/Down (Next Year)	0.86	0.61	0.25	-0.58	-1.47
Personal Finances Better/Worse (Last Year)	0.89		-0.09		-1.06
Personal Finances Better/Worse (Next Year)	0.99		-0.17		-2.13
Real Income Up/Down (Next Year)	1.44		0.45		-1.08

MSC MCA Results: College Loadings

	Responses				
	(1)	(2)	(3)	(4)	(5)
Unemployment Up/Down (Next Year)	-1.57		0.34		1.42
Prices Up/Down (Next Year)	-1.25	-0.45	0.11	0.64	0.53
Interest Rates Up/Down (Next Year)	-0.10		0.18		-0.06
Economy Better/Worse (Last Year)	1.09		0.07		-1.21
Economy Better/Worse (Next Year)	1.24		0.03		-2.04
Economy Good/Bad (Next Year)	1.28	0.68	0.06	-0.81	-1.53
Economy Good/Bad (Next 5 Years)	1.30	0.89	0.03	-0.92	-1.53
Government Policy Good/Bad	1.34		0.18		-1.54
Family Income Up/Down (Next Year)	0.78	0.58	0.05	-0.71	-1.56
Personal Finances Better/Worse (Last Year)	0.75		-0.28		-1.23
Personal Finances Better/Worse (Next Year)	0.95		-0.27		-2.24
Real Income Up/Down (Next Year)	1.13		0.25		-1.32

back

	Responses				
	(1)	(2)	(3)	(4)	(5)
Unemployment Up/Down (Next Year)	-1.52		0.23		1.67
Prices Up/Down (Next Year)	-1.11	-0.54	-0.02	0.70	0.65
Interest Rates Up/Down (Next Year)	-0.05		0.29		-0.53
Economy Better/Worse (Last Year)	1.34		-0.07		-1.01
Economy Better/Worse (Next Year)	1.43		0.01		-1.77
Economy Good/Bad (Next Year)	1.60	1.11	0.40	-0.69	-1.22
Economy Good/Bad (Next 5 Years)	1.62	1.22	0.10	-0.79	-1.20
Government Policy Good/Bad	1.61		0.32		-1.26
Family Income Up/Down (Next Year)	0.88	0.78	0.24	-0.49	-1.35
Personal Finances Better/Worse (Last Year)	0.80		-0.15		-0.97
Personal Finances Better/Worse (Next Year)	0.99		-0.14		-2.03
Real Income Up/Down (Next Year)	1.19		0.40		-0.99

back

	Responses				
	(1)	(2)	(3)	(4)	(5)
Unemployment Up/Down (Next Year)	-1.60		0.03		1.21
Prices Up/Down (Next Year)	-1.47	-0.67	0.05	0.83	0.69
Interest Rates Up/Down (Next Year)	-0.11		0.19		-0.05
Economy Better/Worse (Last Year)	1.07		0.02		-1.13
Economy Better/Worse (Next Year)	1.18		-0.17		-1.90
Economy Good/Bad (Next Year)	1.18	0.69	-0.09	-0.74	-1.46
Economy Good/Bad (Next 5 Years)	1.17	0.78	-0.03	-0.93	-1.51
Government Policy Good/Bad	1.30		0.16		-1.39
Family Income Up/Down (Next Year)	0.84	0.77	0.30	-0.54	-1.41
Personal Finances Better/Worse (Last Year)	0.85		-0.27		-1.32
Personal Finances Better/Worse (Next Year)	1.05		-0.23		-2.14
Real Income Up/Down (Next Year)	1.20		0.34		-1.12

# MSC MCA Results: Sentiment Distribution by Affiliation (Personal Qs)
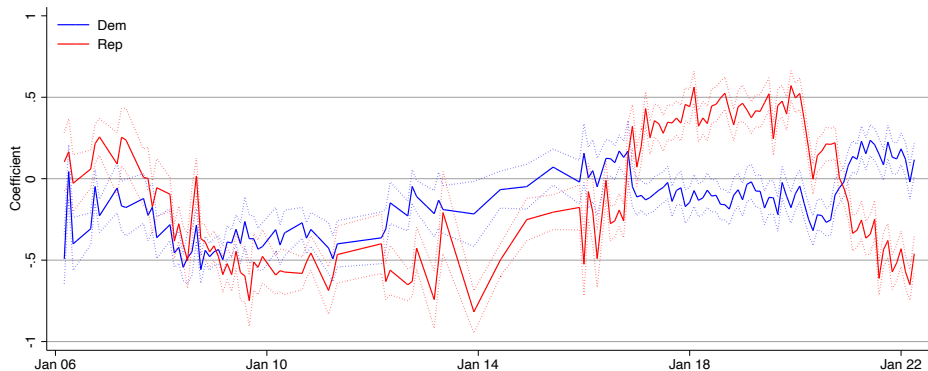
Notes: results of a rolling regression of $\tilde{f}_{i,t}$ on political affiliation dummy variables, where $\tilde{f}_{i,t}$ is the first component from the MCA with only personal responses. Dotted lines represent 90% confidence intervals.

back

MSC MCA Results: Sentiment Distribution by Affiliation (Backward Qs)
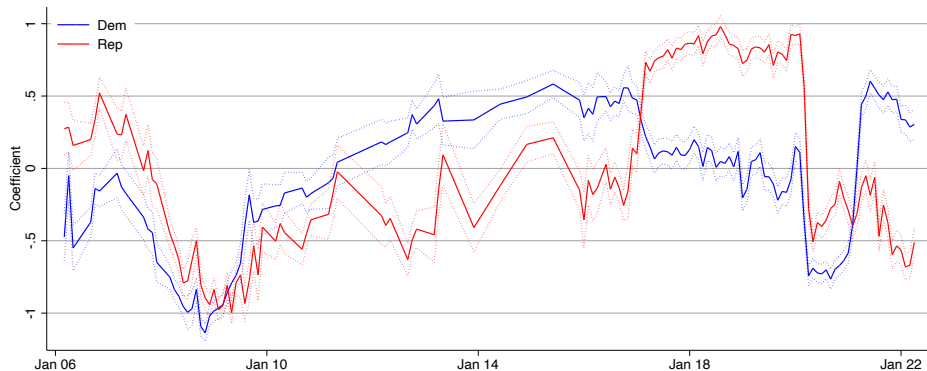
Notes: results of a rolling regression of $\tilde{f}_{i,t}$ on political affiliation dummy variables, where $\tilde{f}_{i,t}$ is the first component from the MCA with only backward-looking responses. Dotted lines represent 90% confidence intervals.
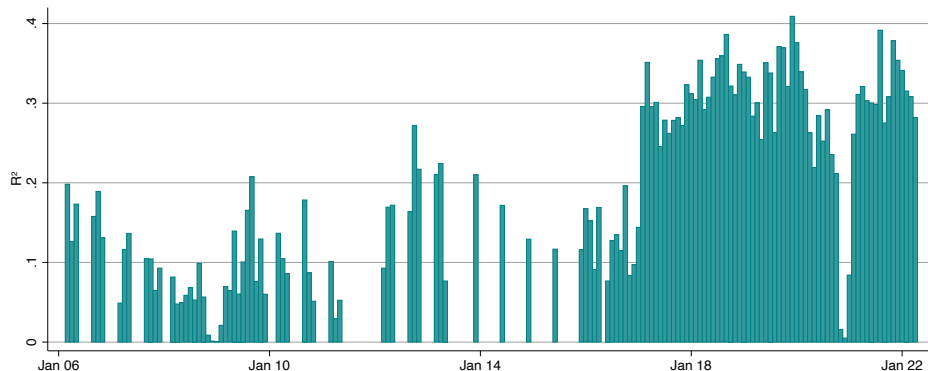
back

Notes: R^2 from a rolling regression of $f_{i,t}$ on political affiliation dummy variables, where $f_{i,t}$ is the first component from the baseline MCA. back

MSC Multinomial Logit Results: 2016
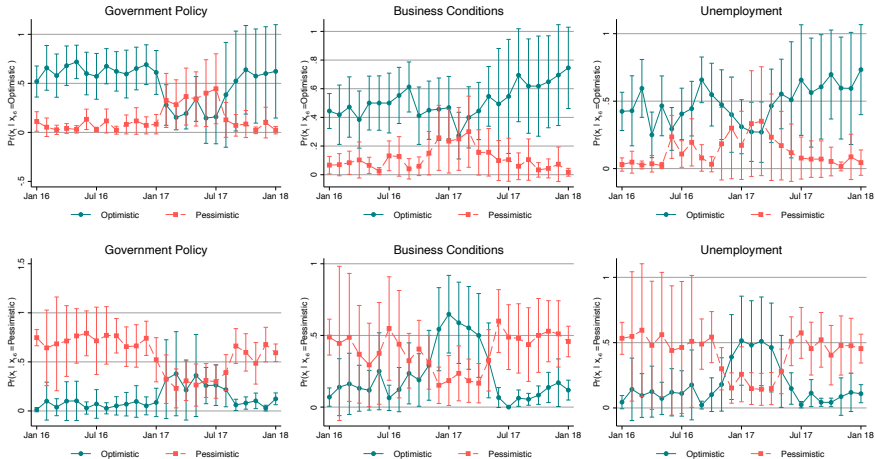
Notes: probability of an optimistic or pessimistic response conditional on an individual giving an optimistic response (top panels) or pessimistic response (bottom panels) in the previous survey 6 months ago. Estimates from a period-by-period multinomial logit model; vertical lines represent 90% confidence intervals. back

MSC Multinomial Logit Results: 2020
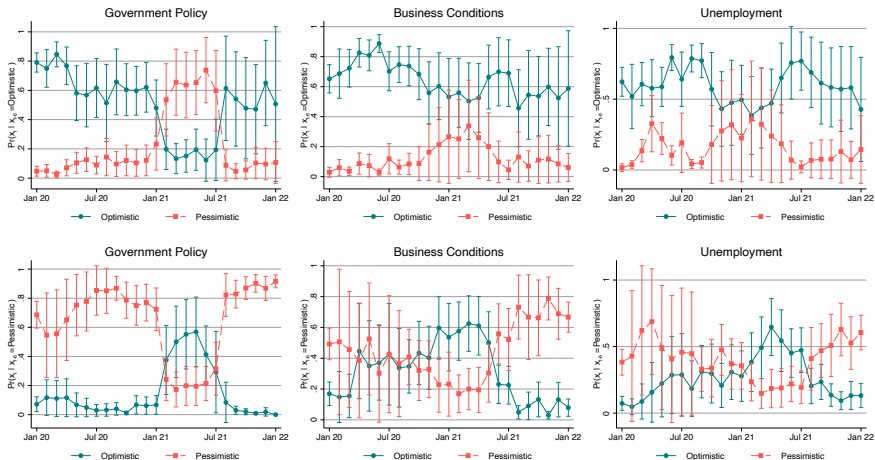
Notes: probability of an optimistic or pessimistic response conditional on an individual giving an optimistic response (top panels) or pessimistic response (bottom panels) in the previous survey 6 months ago. Estimates from a period-by-period multinomial logit model; vertical lines represent 90% confidence intervals. back

MSC MCA Results: Sentiment Persistence (Personal Qs)
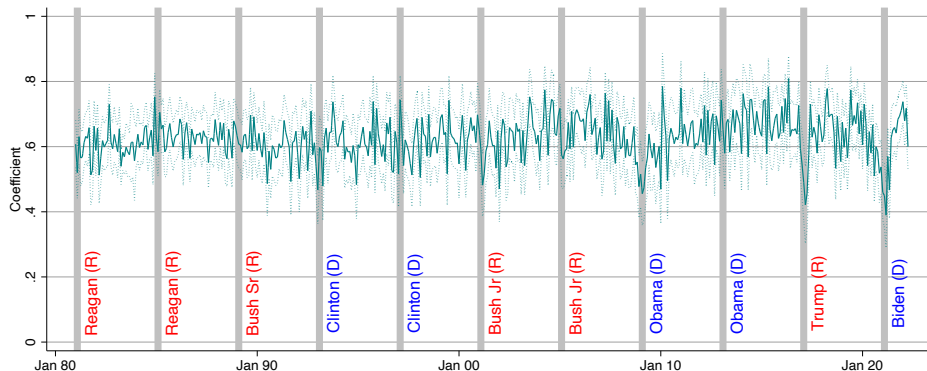
Notes: results of a rolling regression $\tilde{f}_{i,t} = \alpha_t + \beta_t \tilde{f}_{i,t-6} + \varepsilon_{i,t}$, where $\tilde{f}_{i,t}$ is the first component from the MCA with only personal responses. Dotted lines represent 90% confidence intervals. (back)

MSC MCA Results: Sentiment Persistence (Backward Qs)
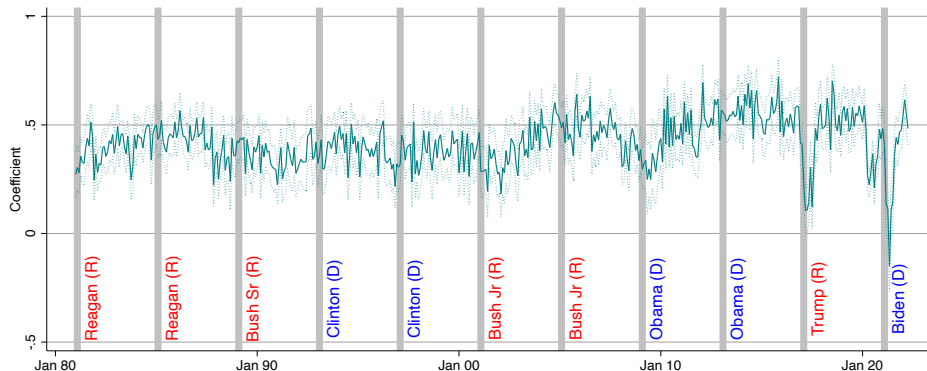
Notes: results of a rolling regression $\tilde{f}_{i,t} = \alpha_t + \beta_t \tilde{f}_{i,t-6} + \varepsilon_{i,t}$, where $\tilde{f}_{i,t}$ is the first component from the MCA with only backward-looking responses. Dotted lines represent 90% confidence intervals. back

Comparison: SPF PCA Loadings and Fraction Explained

	Dim 1	Dim 2	Dim 3	Dim 4
Nominal Growth (Current Quarter)	0.398	0.019	0.105	-0.257
Nominal Growth (Next Year)	0.325	0.338	0.138	0.039
Inflation (Current Quarter)	0.134	0.498	0.187	-0.143
Inflation (Next Year)	0.148	0.512	0.193	-0.100
Corporate Profit Growth (Current Quarter)	0.247	-0.082	0.031	0.457
Corporate Profit Growth (Next Year)	0.205	0.127	-0.089	0.671
Unemployment Change (Current Quarter)	-0.358	0.157	0.022	0.322
Unemployment Change (Next Year)	-0.368	0.119	0.083	0.047
Industrial Production Growth (Current Quarter)	0.369	-0.179	0.073	-0.116
Industrial Production Growth (Next Year)	0.332	-0.016	-0.062	0.272
Housing Starts Growth (Current Quarter)	0.242	-0.109	-0.480	-0.200
Housing Starts Growth (Next Year)	0.070	0.069	-0.658	-0.014
T-Bill Rate Change (Current Quarter)	0.102	-0.371	0.348	-0.017
T-Bill Rate Change (Next Year)	0.098	-0.356	0.298	0.094
% Explained	34.113	18.979	11.494	9.618

- In contrast, higher dimension factor structure of forecaster expectations
 - Also holds for "pseudo-MCA" (binning responses)

back

Comparison: SPF First Component Distribution Across Time
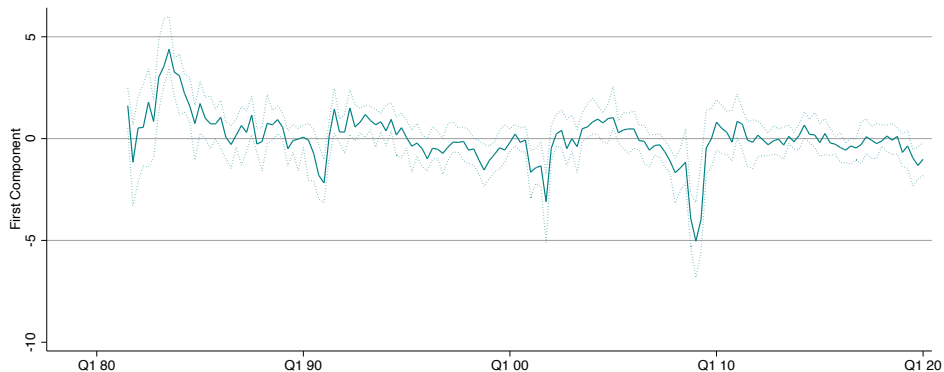
Notes: time series of the first component $f_{i,t}$ from the SPF PCA. The solid line is the median value, while the dotted lines are the 90-10 percent distribution.
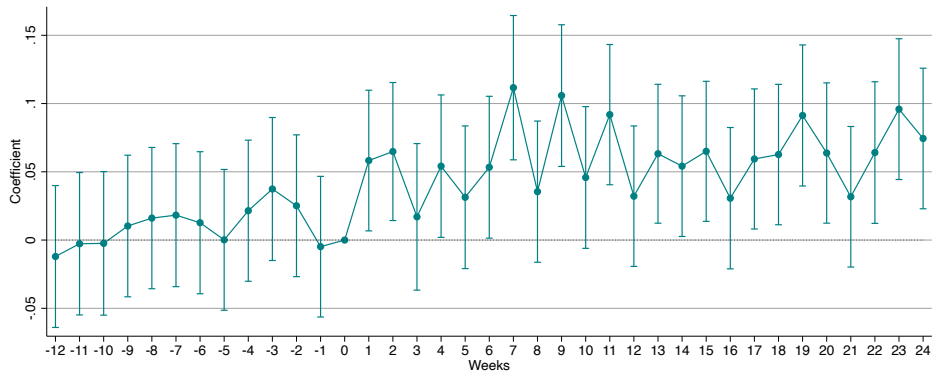
· In contrast, first component of forecasters' beliefs is less dispersed than households

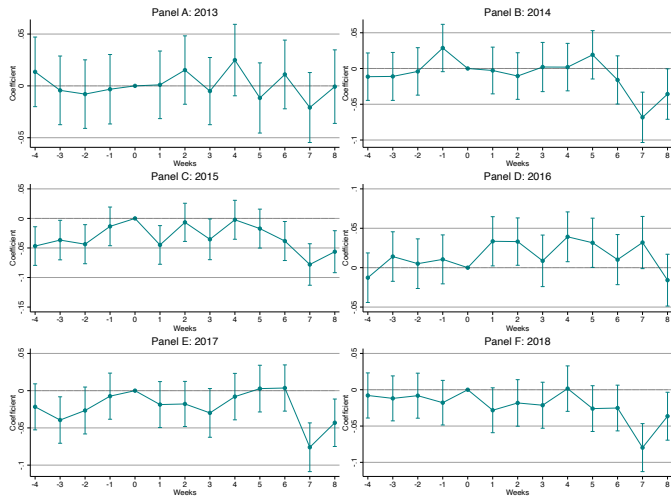back

Comparison: SPF Persistence, First Component
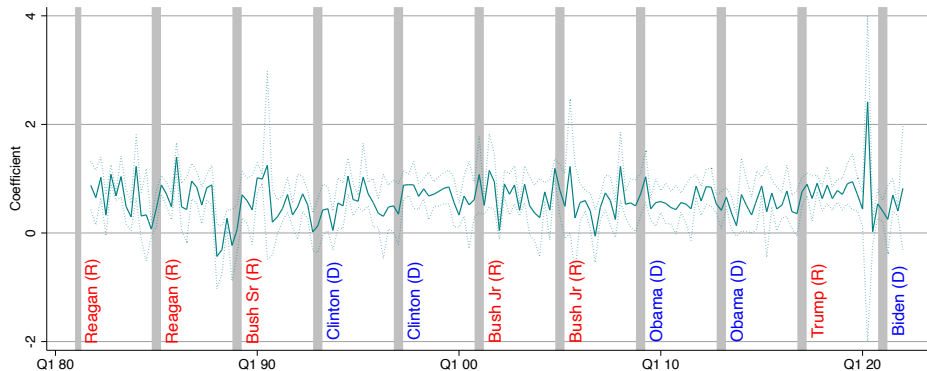
Notes: results of a rolling regression $f_{i,t} = \alpha_t + \beta_t f_{i,t-1} + \varepsilon_{i,t}$, where $f_{i,t}$ is the first component from the SPF PCA. Dotted lines represent 90% confidence intervals.

back

2016 Event Study: Consumption Responses, Larger Window

Notes: results of the 2016 event study across all zip codes with at least 100 votes. Vertical lines represent 90% confidence intervals. back
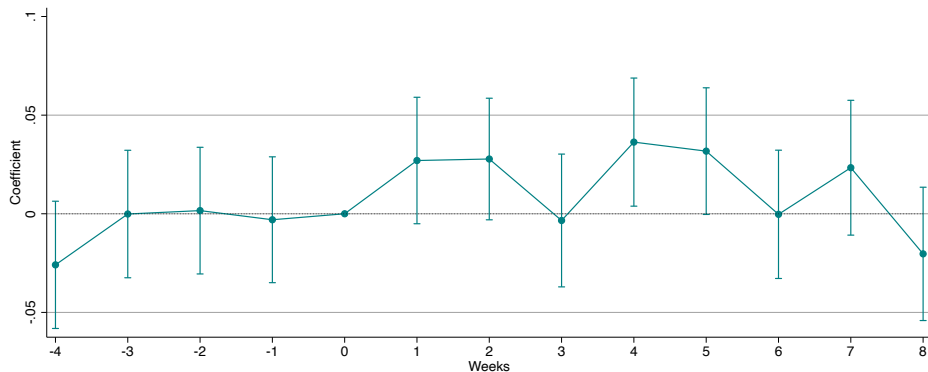
Year-by-Year Event Study: Consumption Responses

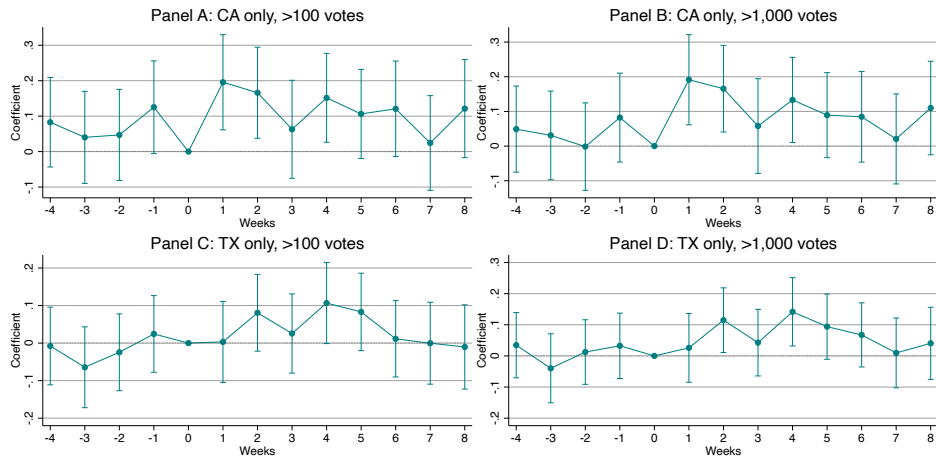Notes: year-specific results. Vertical lines represent 90% confidence intervals. back

2016 Event Study: Consumption Responses, High Margin Only

Notes: results of the 2016 event study across all zip codes with at least 100 votes and a margin of victory for either candidate of at least 25%. Vertical lines represent 90% confidence intervals. back
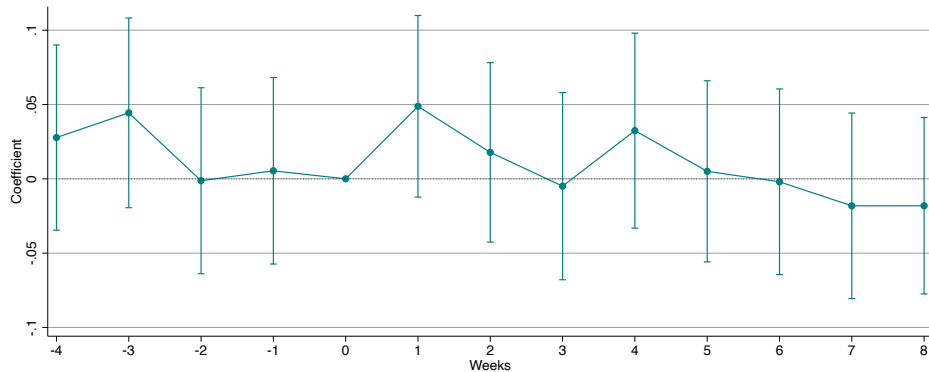
2016 Event Study: Consumption Responses, CA and TX

Notes: results of the 2016 event study for California (top panels) or Texas (bottom panels) only; and restricted to zip codes with at least 100 votes (left panels) or at least 1,000 votes (right panels). Vertical lines represent 90% confidence intervals. back

2016 Event Study: 3-Digit Zip Codes ($\approx$ Counties)

Notes: results of the 2016 event study across all 3-digit zip codes with at least 100 votes. Vertical lines represent 90% confidence intervals. back