Economic Uncertainty's Impact on Employment Fluctuations: Estimating the Importance of the Age Distribution Online Appendix

October 25, 2025

Appendix: Tables, Figures, and Data

Table B.1: Covariance Among Uncertainty Measures

	(1) $\Delta SEPU$	(2) ΔEPU	(3) $\Delta GEPU$	(4) ΔNPU	(5) ΔVIX	(6) ΔBAA	(7) $UMCS$
$\Delta SEPU$	1.000						
ΔEPU	0.456*	1.000					
$\Delta GEPU$	0.427*	0.823*	1.000				
ΔNPU	0.454*	0.946*	0.867*	1.000			
ΔVIX	0.320*	0.602*	0.644*	0.600*	1.000		
ΔBAA	0.287*	0.444*	0.533*	0.434*	0.624*	1.000	
$\Delta UMCS$	0.254*	0.380*	0.384*	0.403*	0.380*	0.432*	1.000

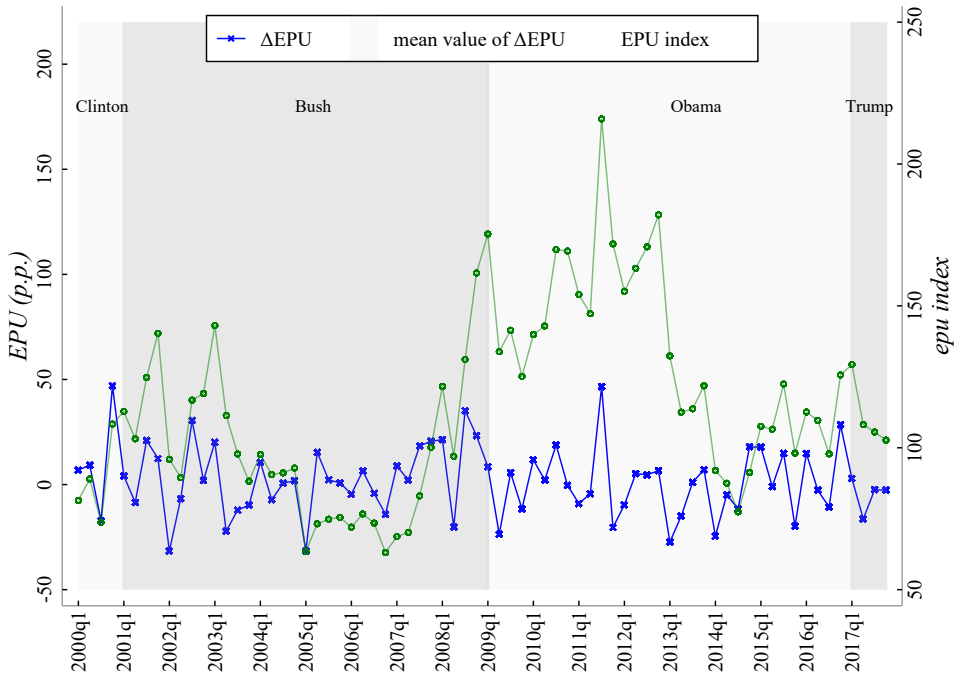
Note: This table displays the correlations among the uncertainty measures used in this paper, with significance levels indicated.

Table B.2: Correlation Among Ages and Age*$\Delta SEPU$ Interactions

	(1)	(2)	(3)	(4)	(5)	(6)
$\Delta SEPU * Young$	1.000					
$\Delta SEPU * Prime$	-0.175*	1.000				
$\Delta SEPU * Old$	-0.447*	-0.802*	1.000			
Young	-0.003	-0.002	0.003	1.000		
Prime	-0.003	-0.001	0.002	0.998*	1.000	
Old	0.001	0.000	0.000	0.971*	0.973*	1.000

Note: This table presents correlations among demographic groups and their interactions with $\Delta SEPU$.

Figure B.1: Economic Uncertainty Measure Plots with Presidency



Note: This figure plots quarterly U.S. policy uncertainty ΔEPU from 2000Q1 to 2017Q4. The blue series plots ΔEPU (left axis); the green series plots the EPU index (right axis). The horizontal line marks the sample mean of ΔEPU. Shaded panels denote presidential administrations (Clinton, Bush, Obama, Trump). Overall, the EPU index rises into the late-2000s, peaks around 2011–2012, then moderates with a smaller uptick near 2016–2017; ΔEPU oscillates around zero with episodic spikes that align with major policy events.

Table B.3: Summary Statistics for Control Variables

	Mean	Min	Max	SD	N
Mediator					
Manufacturing	95,319	-67.97	746,986	105,235	3,404
Health	90,913	5,114	649,032	98,601	3,416
Retail Trade	55,173	3,061	409,413	62,867	3,416
Transportation and Public Utilities	31,235	1,667	229,932	35,365	3,400
Construction	54,008	3,361	452,084	62,023	3,400
Gross State Product	307,104	180,13	2,939,071	374,929	3,416
Immigrant Share	4.77	0.04	18.43	3.29	3,416
Demographics					
Female Marriage	31.01	21.34	36.44	1.80	3,416
Female Work	24.37	18.71	32.05	1.95	3,416
White	83.00	29.58	98.63	10.89	3,416
Black	10.98	0.00	66.52	11.10	3,416
Low Skill	58.20	35.50	73.03	5.35	3,416
Hispanic	9.97	0.20	49.15	10.11	3,416
Hours Work	38.87	36.11	41.51	0.78	3,416
Less High	13.79	6.82	23.51	2.89	3,416
High School	24.01	12.11	37.13	3.52	3,416
Some College	21.17	9.72	29.23	2.87	3,416
College	13.41	5.98	25.72	2.77	3,416
Graduate	7.21	2.74	30.10	3.01	3,416
Individual Income					
Total Personal Income	25,723	18,118	41,560	2,758	3,416
Wage and Salary	23,451	16,045	38,723	2,549	3,416
Non-farm Business	107.18	-106.02	1,641	147.53	3,416
Welfare/Public Assistance	13.37	0.00	233.36	19.31	3,416
Retirement	332.77	0.00	2,736	263.04	3,416
Unemployment Benefit	125.05	0.00	1,141	97.94	3,416
Welfare and Poverty Policies					
Food Insecure	13.54	3.27	25.22	3.37	3,416
Workers' Compensation	298,834	4,220	3,507,711	530,654	3,416
Poverty Rate	12.84	4.50	23.10	3.32	3,416
State EITC Rate	0.07	0.00	0.85	0.11	3,416
State Min Wage	6.69	2.65	12.81	1.39	3,416
Medicaid Beneficiaries	1,126,960	45,141	12,656,781	1,499,903	3,416
Political Climate					
Governor is Democrat (1=Yes)	0.44	0.00	1.00	0.48	3,344
Number in Lower House Democrat	57.01	8.00	239.00	32.00	3,272
Number in Lower House Republican	57.14	6.00	296.00	33.95	3,272

Note: This table summarizes the controls. State demographics and education from IPUMS–CPS; sectoral income and GSP from the BEA; individual income, welfare benefits, and political climate from the Center for Poverty Research.

Table B.4: Correlation of State Birth Rates (Ages 20–29), 2000–2015: Author vs. Basso and Rachedi (2021)

	From Basso and Rachedi (2021)	Collected by the author
From Basso and Rachedi (2021)	1.000	
Collected by author	0.996*	1.000

Note: Birth rates per thousand residents (1936–2002) are from NCHS Vital Statistics.[1] Because Alaska and Hawaii lack data before 1956, the panel covers the 48 states plus the District of Columbia. Lagged birth-rate rolling averages serve as instruments for age shares in 2000–2017—for example, the 25–54 cohort in 2000 uses 1946–1975 averages, and 2001 uses 1947–1976. Validity is checked by comparing birth rates for ages 20–29 with Basso and Rachedi (2021) for 2000–2015, yielding a 99.6% correlation (see Table B.4). This hand-collected series extends coverage to 1936–2002, enabling broader analysis of age heterogeneity.

Table B.5: Summary Statistics of Supplementary Uncertainty Measures

	Mean	Min	Max	SD	N
ΔEPU	1.71	-31.63	46.94	16.61	3,416
$\Delta GEPU$	3.14	-31.90	74.99	20.87	3,416
ΔNPU	3.99	-40.43	102.41	27.18	3,416
ΔVIX	1.47	-39.20	133.48	25.84	3,416
ΔBAA	0.61	-32.34	66.91	13.20	3,416
$UMCS$	-0.15	-16.98	18.24	6.41	3,416

Note: This table documents supplementary uncertainty and financial variables and their sources. *EPU*—the U.S. Economic Policy Uncertainty index (Baker, Bloom, and Davis 2016)—is constructed from the relative frequency of policy-uncertainty terms in 10 leading newspapers, augmented with policy reports and tax-code changes; it is widely used and predictive of macro activity. *NPU* is the news-based policy-uncertainty index from the same source, built by counting articles containing policy and uncertainty terms in 10 major newspapers, dividing by total articles, and normalizing by paper (data from the EPU website). *GEPU*—the global EPU (Davis 2016)—is a GDP-weighted average of country indices (21 countries, available since 1997) and captures external uncertainty shocks affecting the U.S. *VIX* is the CBOE implied volatility index; it responds strongly to financial events (e.g., WorldCom, Lehman). In our data, corr(EPU, VIX) = 0.602, close to the 0.58 reported by Bloom (2009). *BAA* is the Moody's Baa corporate bond spread over Treasuries (FRED), a standard proxy for credit conditions; it is often a leading recession indicator but may raise reverse-causality concerns. *UMCS* is the University of Michigan Consumer Sentiment index, based on household surveys; we use the negated series so larger values indicate greater uncertainty, aligning its cyclical behavior with the other measures (Leduc and Liu 2016).

Appendix: Additional Robustness Checks

Table B.6: Reduced-Form Regressions (Prime–Old): Partial vs. Fully Reduced

	(1) Prime-Old Partial	(2) Prime-Old Reduced
$N_{i,t} - \overline{N}$	113.31***	144.01
	(26.28)	(173.59)
$(N_{i,t} - \overline{N}) \times (D_{i,t}^{young} - \overline{D})$	40.84	
	(35.50)	
$(N_{i,t} - \overline{N}) \times (D_{i,t}^{prime} - \overline{D})$	-75.46**	
	(34.11)	
$(N_{i,t} - \overline{N}) \times (D_{i,t}^{young\ birth} - \overline{D})$		51.01**
		(25.71)
$(N_{i,t} - \overline{N}) \times (D_{i,t}^{prime\ birth} - \overline{D})$		-42.80***
		(16.47)
F	61.23	70.80
Observations	3,416	3,416

Note: Note: The dependent variable is cyclical employment volatility. Column (1) ("Prime–Old Partial") estimates a reduced form that includes national uncertainty $N_{i,t} - \bar{N}$ directly and its interactions with observed prime- and young-age shares $(D_{i,t}^{\text{prime}} - \bar{D})$ and $(D_{i,t}^{\text{young}} - \bar{D})$. Column (2) ("Prime–Old Reduced") replaces the observed age shares with their birth-rate proxies in the interactions $(D_{i,t}^{\text{prime birth}} - \bar{D})$ and $(D_{i,t}^{\text{young birth}} - \bar{D})$, yielding a fully reduced form. Across specifications, national uncertainty raises volatility (Column 1 coefficient = 113.31^{***}); the interaction with the prime-age share is negative and significant (Column 1: -75.46^{**}; Column 2: -42.80^{***}), indicating that a larger prime-age presence dampens the effect of uncertainty. The interaction with the young share is small and insignificant in the partial reduced form (Column 1: 40.84), but becomes positive and significant when proxied by birth rates in the fully reduced form (Column 2: 51.01^{**}), suggesting greater exposure in younger states. Magnitudes imply that, relative to the main uncertainty effect, the prime interaction offsets roughly two-thirds of the effect in Column (1) and about one-third in Column (2). All regressions include state fixed effects and Newey–West standard errors. F-statistics and observations are reported at the bottom. Standard errors are in parentheses; $* \ p < 0.10$, $** \ p < 0.05$, $*** \ p < 0.01$.

Table B.7: Robustness Regressions with Alternative Outcome Windows

	(1) Center-17 Quarters	(2) Center-13 Quarters	(3) Center-9 Quarters	(4) Center-5 Quarters	(5) Backward-17 Quarters	(6) Forward-17 Quarters
$U_{i,t} - \overline{U}$	84.93***	71.79***	47.40**	45.88***	44.79***	47.70**
	(21.09)	(21.87)	(21.16)	(16.70)	(17.22)	(22.14)
$(U_{i,t} - \overline{U}) \times (D_{i,t}^{prime} - \overline{D})$	-48.38**	-36.90*	-22.17	-17.62	-26.74	-60.79***
	(21.18)	(22.26)	(21.63)	(16.85)	(18.17)	(20.97)
$(U_{i,t} - \overline{U}) \times (D_{i,t}^{young} - \overline{D})$	21.05	16.11	7.53	7.81	5.99	21.27
	(22.19)	(21.44)	(19.16)	(14.98)	(19.18)	(17.51)
F	49.19	38.54	31.71	23.49	45.56	40.00
Observations	3,416	3,416	3,416	3,416	3,416	3,024

Note: IV estimates of the effect of uncertainty on cyclical employment volatility under alternative outcome constructions. The dependent variable is the rolling volatility of employment computed with centered windows of 17, 13, 9, and 5 quarters (Columns 1–4), a backward-looking 17-quarter window (Column 5), and a forward-looking 17-quarter window (Column 6). Regressions follow the main IV specification: state uncertainty is instrumented with national ΔEPU; age shares are instrumented with lagged birth rates; interaction terms are instrumented accordingly. Across specifications, $U_{i,t} - \bar{U}$ is positive and significant; the prime-age interaction is negative and generally significant, while the young-age interaction is small and typically insignificant. This confirms the main result: state prime-aged populations affects the impact of uncertainty. *F*-statistics and observations are reported below; standard errors in parentheses.

Table B.8: Robustness Checks across Subsamples

	(1) Baseline	(2) Without California	(3) Without 2001 Recession	(4) Without 2008 Recession
$U_{i,t} - \overline{U}$	84.93***	72.11***	84.06***	39.32***
	(21.09)	(15.49)	(20.67)	(14.33)
$(U_{i,t} - \overline{U}) \times (D_{i,t}^{prime} - \overline{D})$	-48.38**	-34.92***	-49.89**	-26.13**
	(21.18)	(11.12)	(25.07)	(12.15)
$(U_{i,t} - \overline{U}) \times (D_{i,t}^{young} - \overline{D})$	21.05	8.75	28.32	11.36
	(22.19)	(11.34)	(27.70)	(13.24)
F	49.19	53.19	43.44	53.65
Observations	3416	3344	3242	2899

Note: This table presents robustness checks excluding specific periods and regions. Column (2) reports results excluding the largest economic state, California; Column (3) excludes the 2001 recession period (2002Q1–Q4); and Columns (4)–(5) exclude the 2008 financial crisis period (2007Q4–2009Q2).

Table B.9: Robustness Checks: Alternative Demeaning of Age Distribution

	(1) Baseline	(2) State-Level Demean	(3) Time-Level Demean
$U_{i,t} - \overline{U}$	84.93***		
	(21.09)		
$(U_{i,t} - \overline{U}) \times (D_{i,t}^{prime} - \overline{D})$	-48.38**		
	(21.18)		
$(U_{i,t} - \overline{U}) \times (D_{i,t}^{young} - \overline{D})$	21.05		
	(22.19)		
$U_{i,t} - \overline{U_i}$		73.72***	
		(15.55)	
$(U_{i,t} - \overline{U_i}) \times (D_{i,t}^{prime} - \overline{D_i})$		-27.01***	
		(8.64)	
$(U_{i,t} - \overline{U_i}) \times (D_{i,t}^{young} - \overline{D_i})$		42.93	
		(30.88)	
$U_{i,t} - \overline{U_t}$			-48.30
			(40.18)
$(U_{i,t} - \overline{U_t}) \times (D_{i,t}^{prime} - \overline{D_t})$			28.18
			(65.82)
$(U_{i,t} - \overline{U_t}) \times (D_{i,t}^{young} - \overline{D_t})$			14.80
			(53.61)
F	49.19	61.32	21.89
Observations	3416	3416	3416

Note: This table presents regression results that separate the sample into state-level and quarter-level demand to identify which dimension drives the main findings. Column (2) reports demand variation within each state, while Column (3) reports demand variation within each quarter. The results indicate that the main effects are largely driven by changes over time, as the coefficient for demand within each quarter in Column (3) is not statistically significant.

Table B.10: Robustness Checks: With Year Controls

	(1) Baseline	(2) Baseline	(3) OLS	(4) OLS	(5) Prime-Old Partial	(6) Prime-Old Partial	(7) Prime-Old Reduced	(8) Prime-Old Reduced
$U_{i,t} - \overline{U}$	84.93***	54.72**	13.11***	10.01**				
	(21.09)	(22.92)	(5.05)	(4.99)				
$(U_{i,t} - \overline{U}) \times (D_{i,t}^{prime} - \overline{D})$	-48.38**	-11.76	-0.67	-0.46				
	(21.18)	(24.32)	(1.57)	(1.65)				
$(U_{i,t} - \overline{U}) \times (D_{i,t}^{young} - \overline{D})$	21.05	-0.52	-4.88*	-3.61				
	(22.19)	(22.82)	(2.50)	(2.37)				
$N_{i,t} - \overline{N}$					113.31***	77.14***	144.01	122.13
					(26.28)	(29.43)	(173.59)	(180.83)
$(N_{i,t} - \overline{N}) \times (D_{i,t}^{prime} - \overline{D})$					-75.46**	-13.73		
					(34.11)	(40.09)		
$(N_{i,t} - \overline{N}) \times (D_{i,t}^{young} - \overline{D})$					40.84	-1.68		
					(35.50)	(42.53)		
$(N_{i,t} - \overline{N}) \times (D_{i,t}^{primebirth} - \overline{D})$							-42.80***	-39.89**
							(16.47)	(16.10)
$(N_{i,t} - \overline{N}) \times (D_{i,t}^{youngbirth} - \overline{D})$							51.01**	48.11*
							(25.71)	(25.70)
Year		-10178.94***		-2448.40***		-10494.60***		-2726.95***
		(3017.96)		(299.17)		(2975.70)		(550.01)
F	49.19	34.02	77.94	72.89	61.23	35.19	70.80	66.29
Observations	3416	3416	3416	3416	3416	3416	3416	3416

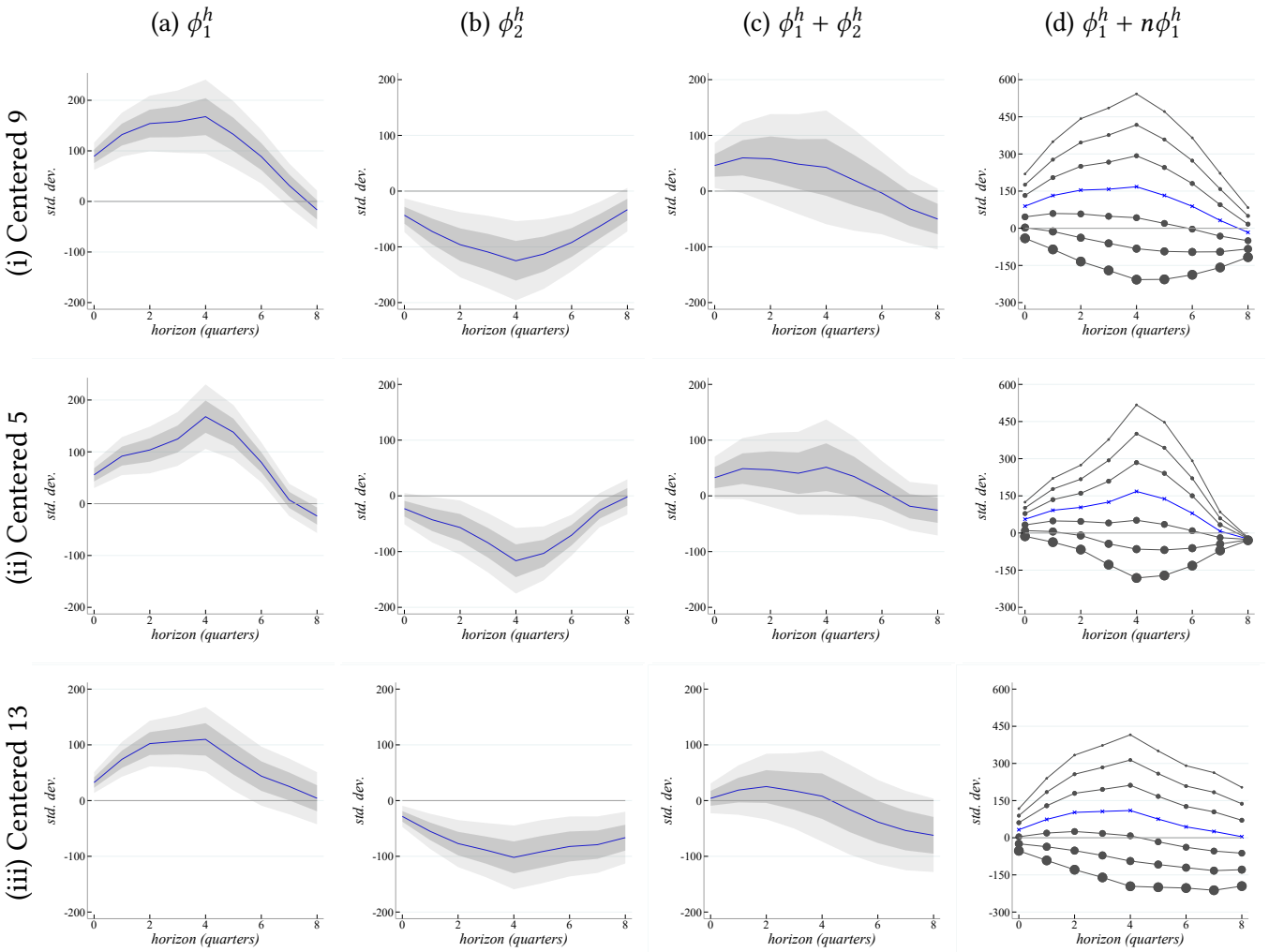
Note: This table presents robustness checks comparing specifications with and without year fixed effects. Columns (1)–(2) report the baseline results, while Columns (3)–(4) show OLS estimates excluding the instrumental variables (birth rate and national EPU). Columns (5)–(6) replace the age share with the birth rate, and Columns (7)–(8) include both birth rate and national EPU in the reduced-form IV specification. The results indicate that adding year controls captures considerable variation related to age distribution effects, most notably in Columns (2) and (6).

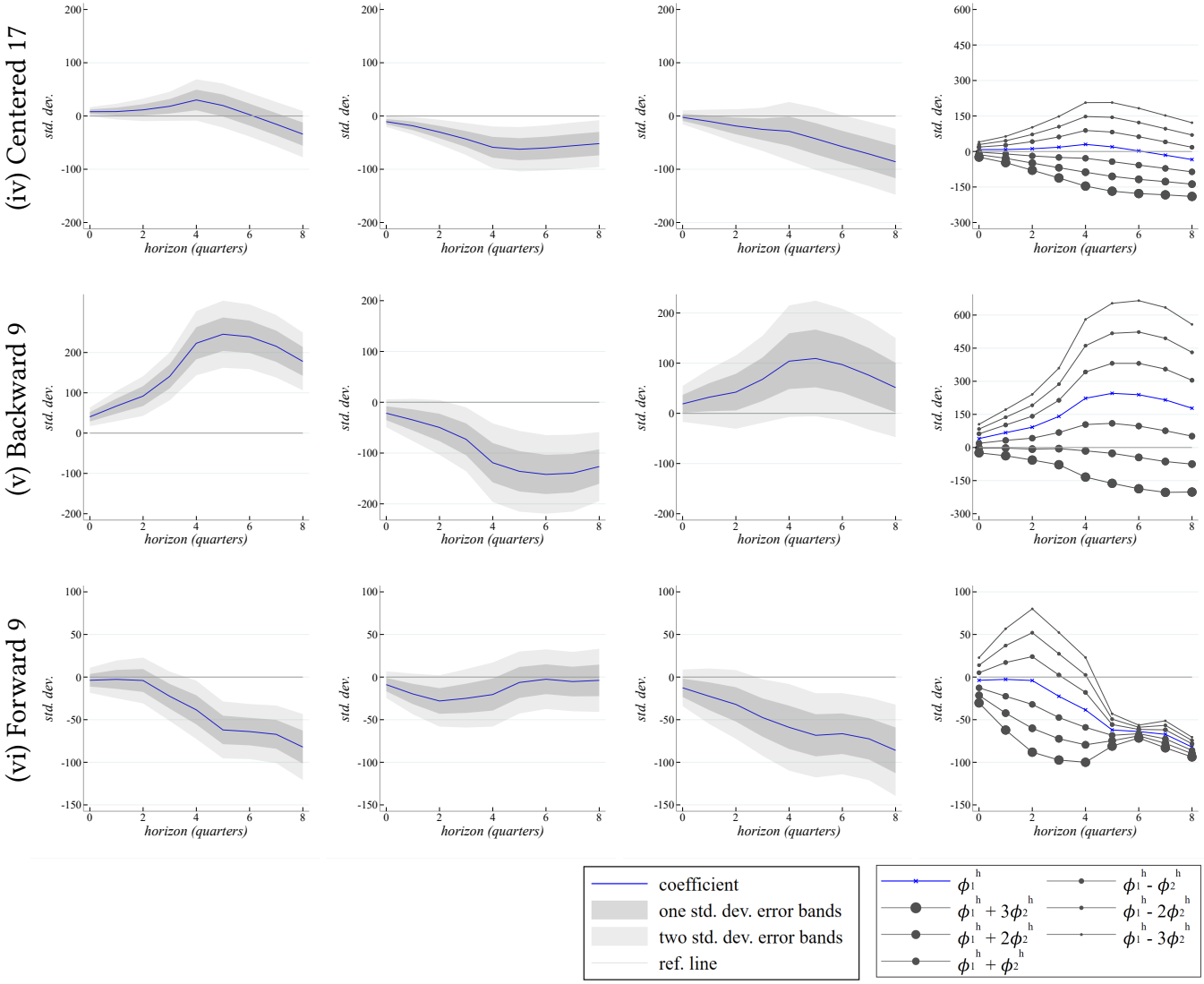
Table B.11: Robustness Checks: With Year–Quarter Controls

	(1) Baseline	(2) Baseline	(3) OLS	(4) OLS	(5) Prime-Old Partial	(6) Prime-Old Partial	(7) Prime-Old Reduced	(8) Prime-Old Reduced
$U_{i,t} - \overline{U}$	84.93***	71.94***	13.11***	12.40**				
	(21.09)	(24.85)	(5.05)	(4.99)				
$(U_{i,t} - \overline{U}) \times (D_{i,t}^{prime} - \overline{D})$	-48.38**	10.77	-0.67	-0.19				
	(21.18)	(31.81)	(1.57)	(1.64)				
$(U_{i,t} - \overline{U}) \times (D_{i,t}^{young} - \overline{D})$	21.05	-13.07	-4.88*	-3.75				
	(22.19)	(27.74)	(2.50)	(2.34)				
$N_{i,t} - \overline{N}$					113.31***	110.57***	144.01	125.96
					(26.28)	(32.80)	(173.59)	(181.26)
$(N_{i,t} - \overline{N}) \times (D_{i,t}^{prime} - \overline{D})$					-75.46**	23.16		
					(34.11)	(52.84)		
$(N_{i,t} - \overline{N}) \times (D_{i,t}^{young} - \overline{D})$					40.84	-24.43		
					(35.50)	(52.93)		
$(N_{i,t} - \overline{N}) \times (D_{i,t}^{primebirth} - \overline{D})$							-42.80***	-38.96**
							(16.47)	(16.14)
$(N_{i,t} - \overline{N}) \times (D_{i,t}^{youngbirth} - \overline{D})$							51.01**	47.28*
							(25.71)	(25.75)
Year-Quarter		-3906.43***		-632.48***		-3904.96***		-739.92***
		(1309.45)		(76.78)		(1300.69)		(145.78)
F	49.19	25.25	77.94	72.54	61.23	25.82	70.80	66.24
Observations	3416	3416	3416	3416	3416	3416	3416	3416

Note: This table reports robustness checks comparing models with and without year–quarter fixed effects. Columns (1)–(2) show the baseline results; Columns (3)–(4) present OLS estimates excluding the instruments (birth rate and national EPU); Columns (5)–(6) replace the age share with birth rate; and Columns (7)–(8) include both birth rate and national EPU in the reduced-form IV specification. Adding year–quarter time controls captures significant variation associated with age distribution effects.

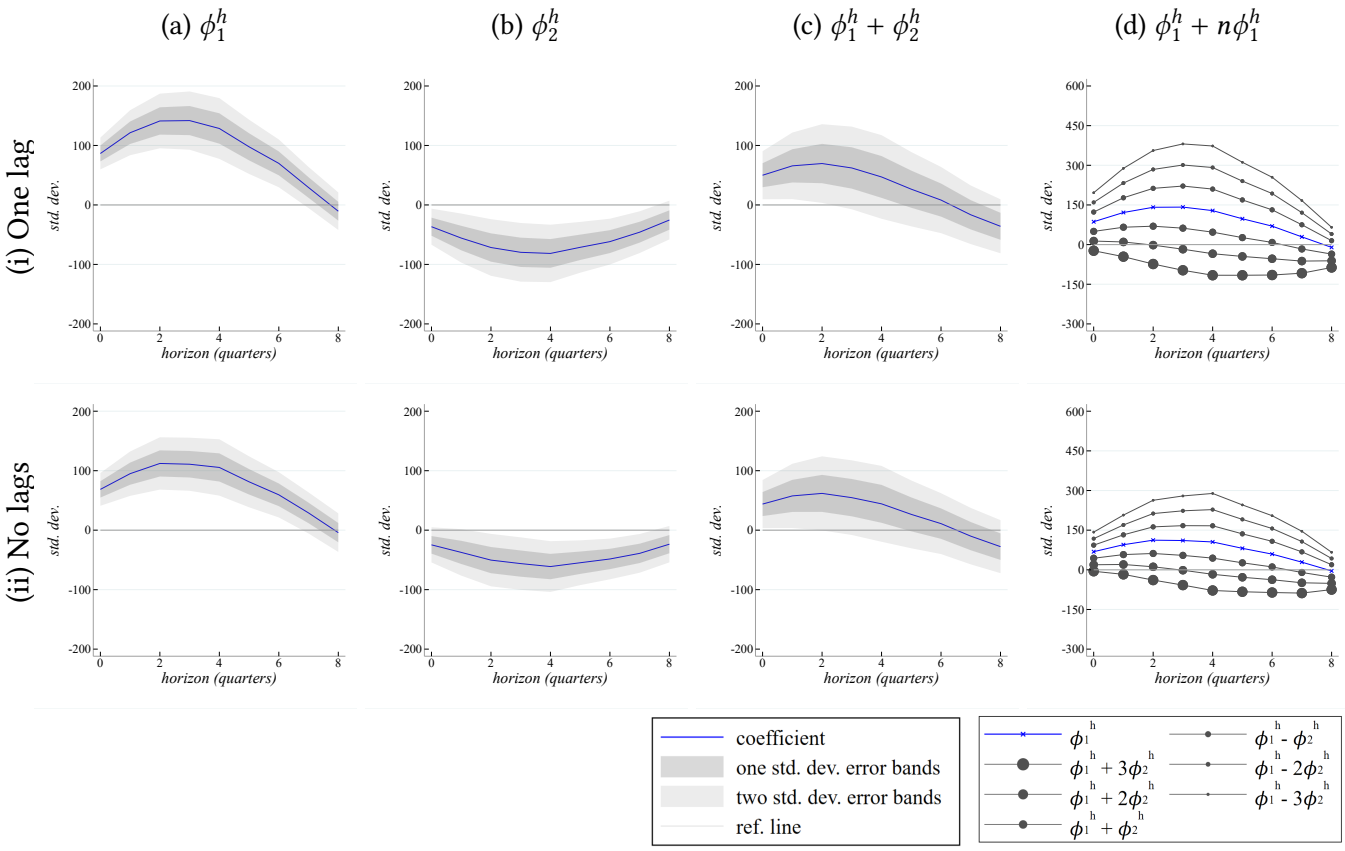
Figure B.2: Response of Employment Volatility with Various Outcome Windows





Note: The figure plots LP–IV impulse responses of *cumulative* cyclical employment volatility to a state policy-uncertainty shock, with columns showing (a) the baseline response at the national age structure (ϕ_1^h), (b) the marginal effect of a +1 pp prime–old share (ϕ_2^h), (c) the total for a +1 pp deviation ($\phi_1^h + \phi_2^h$), and (d) the profile for $n = \pm1, \pm2, \pm3$ pp deviations ($\phi_1^h + n\phi_2^h$), while rows vary the outcome construction by computing volatility with centered 9, 5, 13, and 17-quarter windows and backward and forward 9-quarter windows; vertical axes report standard-deviation units and shaded bands denote ±1 and ±2 Newey–West s.e., and across all constructions the shock raises volatility while a larger prime-age share consistently attenuates the response.

Figure B.3: Response of Employment Volatility with Various Lags in Outcome Variable



Note: In this figure, rows vary the number of lags used in the LP–IV regressions: row (i) includes one lag of uncertainty, the interaction, and the outcome; row (ii) includes no lags. Qualitative patterns are unchanged—uncertainty raises volatility, and a larger prime-age share reduces the response, though magnitudes are smaller with fewer (or no) lags. For conventions and additional details, see the notes in Figure B.2.