Supplementary/Online Appendix for:

State Policy Mood: The Importance of Over-Time Dynamics

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Peter K. Enns
peterenns@cornell.edu
Cornell University

Julianna Koch
julianna.koch@gmail.com
Cornell University

Contents

Appendix 1 Data Sources **A-1**

Appendix 2 Time Series Models **A-2**

Appendix 3 Robustness Checks **A-5**

Appendix 1 Data Sources

Figure 1 in the text and Table A-2, below, report the over–time relationships between the two measures of state policy mood and three of the issue areas BRFH analyzed—the state tax revenue rate (in constant dollars, 1956–2010), AFDC/TANF Benefits for a four–person family (in constant dollars, 1980–2010), and state health expenditures (in constant dollars, 1977–2010)—plus Jacoby and Schneider's (2009) measure of state policy spending priorities (1982–2005).

BRFH's measure of citizen ideology (i.e. policy mood) comes from `http://rcfording.wordpress.com/state-ideology-data/`. Our measure of policy mood is available at `http://thedata.harvard.edu/dvn/dv/Enns`. Following BRFH, the tax data come from the U.S. Census Bureau Database on Historical State Tax Collections `http://www.census.gov/govs/statetax/historical_data.html`). To generate state tax rates, the total tax revenue was divided by the state population (`https://www.census.gov/popest/data/historical/index.html`) and these rates were then adjusted for inflation based on the Historical Consumer Price Index for All Urban Consumers in the 2014 CPI Detailed Report (`http://www.bls.gov/cpi/cpid1404.pdf`). Also following BRFH, the welfare data come from University of Kentucky Center for Poverty Research. 2014. "UKCPR National Welfare Data, 1980-2013." Gatton College of Business & Economics, University of Kentucky, Lexington, KY. `http://www.ukcpr.org/data` (accessed January 2015). Again, we used CPI data to adjust these benefit levels for inflation.

BRFH also used the UKCPR National Welfare Data to determine the number of Medicaid beneficiaries. These data only begin in 1990, providing a short time series. Thus, we relied on state health care spending to measure state commitment to health care. These data come from the State & Local Finance Data Query System (`http://slfdqs.taxpolicycenter.org/pages.cfm`) and extend from 1977 to 2011 (E055: Health). Jacoby and Schneider's (2009) State Policy Spending Priorities is available from `http://polisci.msu.edu/jacoby/research/polprior/priorlist.html`.

The welfare data in Figure 2 are from Berry, Fording and Hanson (2003) and were downloaded from from the Inter-university Consortium for Political and Social Research (ICPSR) `http://doi.org/10.3886/ICPSR01294.v1`.

Appendix 2 Time Series Models

The four policy series analyzed are all nonstationary. For tax revenue rates, health expenditures, and policy priority scores, an augmented dickey fuller test rejects the null of a unit root for only 1, 5, and 2 states, respectively. For welfare benefits, we reject the null of a unit root for 18 states, meaning for these states the welfare benefits (after being adjusted for inflation) may be a stationary series. These states do not pose a problem for analysis because the error correction model utilized to analyze welfare benefits is appropriate with stationary data or with nonstationary data that are cointegrated (De Boef and Keele 2008, Enns, Masaki and Kelly 2014).

Because our dependent series are nonstationary, we conduct a series of tests for cointegration. Cointegration would imply that the public's policy preferences and policy move together in a long run equilibrium. Pedroni (1999) describes seven tests of cointegration for panel data. We report the results of each of these tests below in Table A-1. Evidence of cointegration between a policy variable and policy mood appears in bold.

Table A-1: Cointegration Tests

	Tax Revenue		Welfare Benefits		Health Care		Policy Priority	
	E&K	BRFH	E&K	BRFH	E&K	BRFH	E&K	BRFH
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel Tests								
υ	**2.074**	**2.671**	**2.56**	1.778	0.779	0.268	-0.280	-0.410
ρ	**-3.827**	**-4.76**	**-3.742**	**-3.114**	-1.539	-1.436	**-2.105**	**-2.528**
t	**-4.017**	**-4.981**	**-6.848**	**-6.656**	**-2.563**	**-2.492**	**-5.141**	**-5.314**
ADF	**-4.180**	**-4.279**	**-5.131**	**-4.446**	-0.136	-1.110	**-2.384**	**-2.555**
Group Tests								
ρ	-1.468	**-2.290**	-1.485	-0.977	0.121	0.588	0.611	0.466
t	**-2.686**	**-3.735**	**-6.29**	**-6.433**	**-2.057**	-1.306	**-4.039**	**-3.831**
ADF	**-3.773**	**-3.688**	**-5.045**	**-4.713**	-0.437	-1.051	-1.555	-1.907

Notes: Cell entries represent t-statistics. All test statistics are distributed N(0,1), under a null of no cointegration. Thus, absolute values ≥ 1.96 (shown in bold) provide evidence of cointegration. All tests include a linear trend.

Although all seven tests rarely all reach the same conclusion, the tests strongly suggest that cointegrating relationships exist for tax revenue, welfare benefits, and policy priority scores. Thus, for these variables we estimate single equation error correction models, which take the form,

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \gamma_1 \Delta X_t + \beta_1 X_{t-1} + \epsilon_t \quad (1)$$

where, γ_1 and β_1 represent the immediate and long-run effect of X, respectively.[1]

We do not observe evidence of cointegration for health expenditures. Thus, we estimate a first differences model,

$$\Delta Y_t = \alpha_0 + \gamma_1 \Delta X_t + \epsilon_t \tag{2}$$

Table A-2 presents the results from these models. These results were used to generate Figure 1 in the text, which reports the over–time relationship between the four measures of state policy and the Enns and Koch and BRFH measures of mood. Note, panels a, b, and d in Figure 1 report the long run multiplier, which is calculated by dividing the lagged coefficient for policy mood by the error correction rate. We estimate the standard error of the LRM following De Boef and Keele (2008).

The lag length differs across models. Tax Revenue data (Columns 1 & 2) are based the fiscal year, which begins on July 1 of the previous year (in all states but 4). Because mood follows the calendar year, we lag the mood variables by two years. Welfare benefit data and Policy priority data (Columns 3, 4, 7, & 8) follow the calendar year, so we lag mood by one year. Health care expenditure data (Columns 5 & 6) correspond with the fiscal year, but are based on decisions from the previous year. Governors typically submit a budget to the legislature in January of the previous year, so we lag mood by two years. Thus a shift in mood from 1999 to 2000 is allowed to influence governors' and legislators' decisions in the first half of 2001, which would determine the budget from July 2001 to June 2002.

[1]The long-run estimate (β_1) can be thought of the combined effect of X_t and X_{t-1}. Since this combined effect is distributed over future time periods (through Y_{t-1}), we can estimate the total effect of X with the long-run multiplier (LRM), which equals $\frac{\beta_1}{\alpha_1}$.

Table A-2: Complete Results for the Over–Time Relationships Reported in Figure 1

	Tax Revenue			Welfare Benefits			Health Care			Policy Priority		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ΔE&K Mood$_{t-(\kappa-1)}$	-0.06		-0.03	24.88		22.38	3.75		4.13	0.01		0.01
	(0.11)		(0.12)	(42.00)		(41.54)	(12.21)		(12.15)	(0.02)		(0.02)
E&K Mood$_{t-\kappa}$	-0.03		-0.04	36.16		28.70				0.05*		0.05*
	(0.07)		(0.08)	(22.87)		(22.76)				(0.01)		(0.01)
ΔBRFH Mood$_{t-(\kappa-1)}$		-0.04	-0.03		5.28	-3.71		-10.83	-10.93		0.03	0.01
		(0.13)	(0.13)		(29.78)	(28.78)		(9.06)	(9.04)		(0.02)	(0.01)
BRFH Mood$_{t-\kappa}$		-0.16	-0.15		49.94	30.91					0.035*	0.01
		(0.13)	(0.13)		(28.07)	(25.49)					(0.016)	(0.01)
Error Correction	-0.17*	-0.17*	-0.17*	-0.18*	-0.18*	-0.18*				-0.13*	-.15*	-0.13*
	(0.06)	(0.07)	(0.07)	(0.03)	(0.03)	(0.03)				(0.03)	(0.04)	(0.03)
R^2	0.09	0.09	0.09	0.17	0.17	0.17	0.02	0.02	0.02	0.18	0.12	0.18
N	2,642	2,450	2,450	1,500	1,500	1,500	1,650	1,650	1,650	1,150	1,150	1,150
Lag Length		κ=2			κ=1			κ=3			κ=1	

Notes: All models include state fixed effects, a linear trend, and a constant (not shown). OLS coefficients with panel corrected standard errors in parentheses, *=p<0.05.

Appendix 3 Robustness Checks

The results in Figure 1 and Table A-2 are based on models that include state fixed effects and a linear time trend. Table A-3 shows that the results are not sensitive to the inclusion of either fixed effects or a linear time trend.

Another modeling decision was estimating panel corrected standard errors. An alternate approach is to estimate bootstrap clustered standard errors (BCSE) (Harden 2011, Harden 2012). The results in Table A-4 include BCSEs. These models do not include fixed effects. The findings are analogous to previous results. The main difference is the standard errors are smaller for the welfare benefits analysis. When both measures of policy mood are included (Column 6), the short and long terms relationships for the Enns and Koch measure are statistically significant.

Table A-3: Estimating the Over–Time Relationships Reported in Figure 1 without Fixed Effects or a Linear Trend

	Tax Revenue			Welfare Benefits			Health Care			Policy Priority		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ΔE&K Mood$_{t-(\kappa-1)}$	-0.06		-0.05	30.75		28.56	3.58		4.20	0.01		0.01
	(0.11)		(0.13)	(45.35)		(45.08)	(12.15)		(12.07)	(0.02)		(0.02)
E&K Mood$_{t-\kappa}$	-0.07		-0.10	31.62		24.97				0.03*		0.03*
	(0.08)		(0.09)	(20.26)		(21.38)				(0.01)		(0.01)
ΔBRFH Mood$_{t-(\kappa-1)}$		0.10	0.10		0.50	-3.96		-11.33	-11.48		0.02	0.01
		(0.12)	(0.12)		(29.90)	(28.43)		(9.07)	(9.04)		(0.02)	(0.01)
BRFH Mood$_{t-\kappa}$		0.09	0.12		22.86*	16.37					0.01	-0.005
		(0.06)	(0.07)		(10.92)	(11.43)					(0.01)	(0.005)
Error Correction	-0.06	-0.063*	-0.07	-0.04*	-0.04*	-0.04*				-0.03*	-.04*	-0.03*
	(0.03)	(0.031)	(0.04)	(0.01)	(0.01)	(0.01)				(0.01)	(0.01)	(0.01)
R^2	0.03	0.03	0.04	0.07	0.07	0.07	0.00	0.00	0.00	0.06	0.03	0.07
N	2,642	2,450	2,450	1,500	1,500	1,500	1,650	1,650	1,650	1,150	1,150	1,150
Lag Length		κ=2			κ=1			κ=3			κ=1	

Notes: OLS coefficients with panel corrected standard errors in parentheses, *=p<0.05. Models include a constant (not shown)

Table A-4: Estimating the Over–Time Relationships Reported in Figure 1 with Bootstrap Clustered Standard Errors

	Tax Revenue			Welfare Benefits			Health Care			Policy Priority		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ΔE&K Mood$_{t-(\kappa-1)}$	-0.01		-0.03	32.55*		29.99*	4.97		5.33	0.015		0.017*
	(0.03)		(0.03)	(15.76)		(15.25)	(13.43)		(12.49)	(0.008)		(0.008)
E&K Mood$_{t-\kappa}$	0.01		-0.05	33.17*		27.01*				0.05*		0.05*
	(0.03)		(0.05)	(9.85)		(9.19)				(0.00)		(0.01)
ΔBRFH Mood$_{t-(\kappa-1)}$		0.09*	0.09*		0.49	-4.56		-10.63	-10.75		0.017*	0.008
		(0.04)	(0.04)		(16.54)	(16.88)		(7.50)	(7.60)		(0.006)	(0.006)
BRFH Mood$_{t-\kappa}$		0.10*	0.11*		22.78*	13.27					0.008*	-0.006
		(0.03)	(0.04)		(11.40)	(11.16)					(0.003)	(0.004)
Error Correction	-0.07*	-0.08*	-0.08*	-0.03*	-0.04*	-0.04*				-0.06*	-.05*	-0.05*
	(0.03)	(0.03)	(0.03)	(0.01)	(0.01)	(0.01)				(0.01)	(0.01)	(0.01)
R^2	0.03	0.04	0.04	0.07	0.07	0.07	0.00	0.00	0.00	0.11	0.04	0.12
N	2,642	2,450	2,450	1,500	1,500	1,500	1,650	1,650	1,650	1,150	1,150	1,150
Lag Length		κ=2			κ=1			κ=3			κ=1	

Notes: OLS coefficients with bootstrap clustered standard errors in parentheses, *=p<0.05. Models include a linear trend and a constant (not shown).

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