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The Changing Impact of Conservatism on Civic Engagement A Time Series Analysis Using ARFIMA and Time-varying Parameter Modeling

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Abstract

This paper examines the role of conservatism as a root of civic engagement from 1973 to 1994. I hypothesize that the political climate shift in a conservative direction promotes civic engagement, but the effect varies over time because of the changing nature of conservatism. To test the hypothesis, I model the dynamics of the civic engagement as an autoregressive fractionally integrated moving average (ARFIMA) process and introduce a time-varying parameter associated with the effect of the conservative mood among citizens on civic engagement. The findings are generally consistent with my theoretical prediction.

Keywords: time-series analysis, ARFIMA, time-varying parameter, conservatism, social capital, civic engagement

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1 Introduction

A civil society, in which citizens act together to express their own interests, to exchange information, to strive for mutual goals, and to influence government, has long been considered a common feature of every successful democracy. Such civic engagements as joining political parties, signing petitions, keeping abreast of the news, and in particular, joining community organizations have both increased and decreased at different times in history. The two decades following 1945, for example, saw a period in which community involvement was the most prevalent in American history. Since the late 1960s or early 1970s, however, the level of civic engagement has declined significantly (Putnam 2000).

This paper examines the role of conservatism as a root of civic engagement. In doing so, I address a set of related questions. I begin with a descriptive question: How general are declining trends in several forms of civic engagement? To answer this question, I create and present three civic engagement measures which represent theoretically different forms of civic engagement on a quarterly basis using the Roper Social and Political Trends Data from 1973 to 1994.[1]

Then I turn to explanations for the trends and ask: Why does the civic engagement fluctuate over time? I hypothesize that a shift in the political climate toward a conservative direction influences activeness of civic engagement, but the effect varies over time because of the changing nature of conservatism. To test the hypothesis, I model

[1]The dataset includes selected items from 207 public opinion surveys conducted as part of the Roper Reports series by the Roper Organization or its successor organization RoperASW between 1973 and 1994. More than 400,000 unique respondents are included in this cumulative file.

Each survey contains a twelve-item battery of questions about participation in political and social activities as well as information about respondents' demographic characteristics. With varying frequency, these surveys also include a wide range of other social and civic activities ranging from volunteer work to church attendance to dinner with friends.

the dynamics of the civic engagement as an autoregressive fractionally integrated moving average (ARFIMA) process and introduce a time-varying parameter associated with the effect of the conservative mood among citizens on the civic engagement.

A understanding of the impact of conservatism and its dynamics alerts us to the factors that promote a civil society. Answers to these questions will help us find the way by which civic engagement, a key to a successful democracy, is revived.

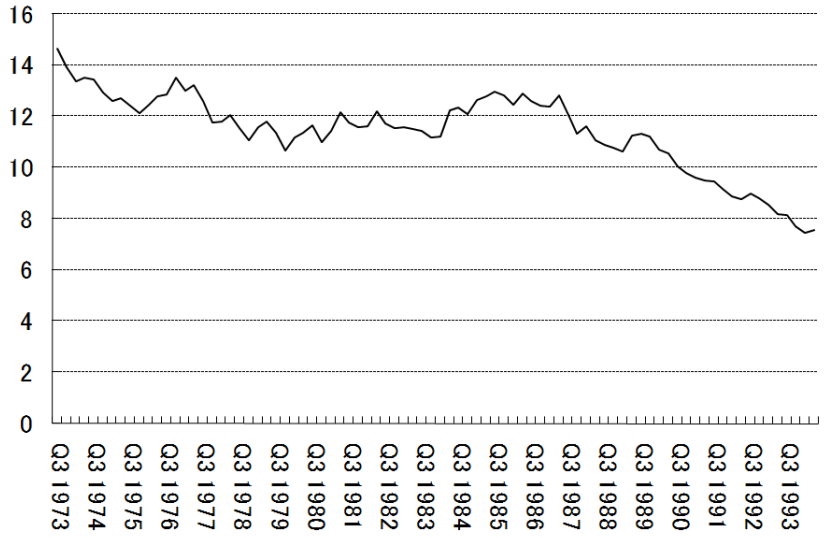
2 Building Measures of Civic Engagement

Given that civic engagement takes various forms, the question is how to construct empirical measures of civic engagement so that we can see if it has really declined. The Roper Social and Political Trends Data has a simple check list of twelve different civic activities shown in Table 1, and asked thousands of Americans "Which, if any, of these things have you happened to do in the past year?" almost every month from 1973 to 1994. First, I transform each activity into a time series by tracking the percentage of respondents reporting to have done it. Then, to aggregate these twelve activities into a time series of civic engagement, I use the "recursive dyadic dominance method" (Stimson 1999) for constructing a time series from survey marginals.[2] Stimson's modeling process is designed to identify the shared movement over time across different public opinion time series, using an exponential smoothing model to decrease the amount of fluctuation due to sampling. The resulting measure is a quarterly civic engagement time series, scaled from

[2]Stimson's method has been widely used to construct time series measures of public opinion (Durr, Martin and Wolbrecht 2000; Freeman, Kellstedt and Williams 1998; Chanley, Rudolph and Rahn 2000; Kellstedt 2000; Keele 2005). Especially Keele (2005) develops empirical measures of social capital in the form of time series measures of civic engagement and interpersonal trust composed of over 20 indicators and 1000 survey marginals.

0 to 100 with higher values indicating higher levels of civic engagement for the period 1973:3 to 1994:2, and is displayed in Figure 1.[3]

Figure 1: Trend in Civic Engagement



Civic engagement exhibits little short-term movement but has steadily declined during the period under observation. Although it is hard to judge whether the decline is moderate or steep, civic engagement did drop over six points.

Next, because Putnam (2000) suggests that these twelve civic activities can be categorized into three forms, which are partisan activity, communal participation, and public expression, I develop the corresponding time series measures of civic engagement, also scaled from 0 to 100 for the same period. The components of each form of civic engagement are shown in Table 1. Stimson's method produces the quarterly time series of partisan activity, communal participation, and public expression displayed in Figures 2,

[3]No surveys on these twelve civic activities are available for October and November from 1973-1994. Stimson's algorithm solves the missing values problem and creates a time series of civic engagement from the twelve civic activity measures including missing values. The time series are constructed on a quarterly basis because my key independent variable, a conservative mood time series, is measured quarterly.

3, and 4, respectively.

Table 1: Forms of Civic Engagement

Civic Engagement

- Partisan Activity
  - Attending political rally or speech
  - Working for a political party
  - Holding or running for political office
- Communal Participation
  - Attending a public meeting on town or school affairs
  - Serving as an officer of some club or organization
  - Serving on a committee for some local organization
  - Being a member of some group interested in better government
- Public Expression
  - Signing a petition
  - Writing Congressional Representatives or Senator
  - Writing a letter to the paper
  - Making a speech
  - Writing an article for a magazine or newspaper

Partisan activity, communal participation, and public expression appear to share some common variation as they declined noticeably in the 1990s. But while all of them experience noticeable drops, the declines are different in magnitude. The decline in communal participation(about 8 point) is greater than those in partisan activity and public expression (about 5 and 6 point, respectively). These time series are also different as partisan activity fluctuates more than communal participation and public expression.

Figure 2: Trend in Partisan Activity

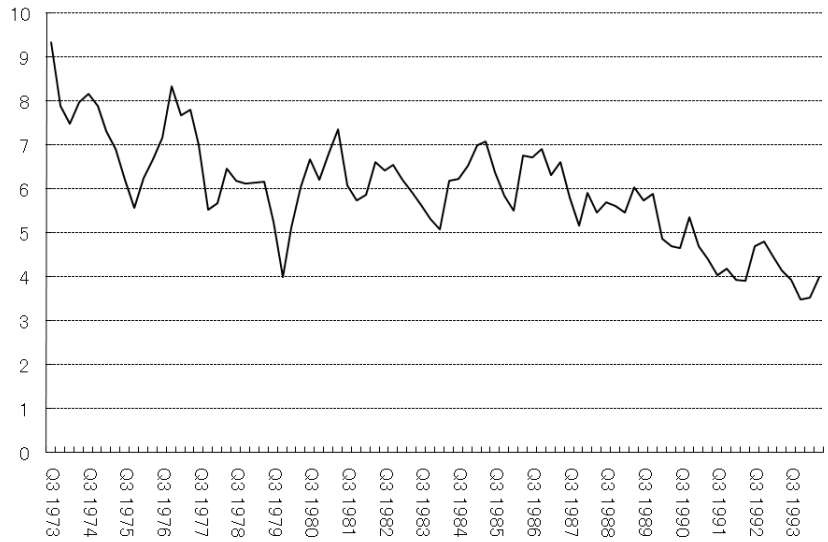


Figure 3: Trend in Communal Participation

Figure 4: Trend in Public Expression

3 Explaining the Dynamics of the Civic Engagement

While identifying the decline in civic engagement is easy, separating out causal mechanisms to explain it has proved difficult. Previous explanations for the declines in civic engagement have focused on mobilization, and time and money resources (Rosenstone and Hansen 1993; Verba, Schlozman and Brady 1995; Putnam 2000), yet many of these explanations have overlooked the role of the political climate. In addition, they have been cast largely in static terms.[4] I offer a hypothesis that predicts the aggregate dynamics of civic engagement, focusing on the role of the political climate, specifically conservatism.

[4]The longitudinal analysis in Rosenstone and Hansen (1993) models the month-to-month changes in political involvement from late 1973 to the end of 1990, but it is not a rigorous time-series analysis. A notable exception is Keele (2005).

3.1 Political Climate and Civic Engagement

The political climate, especially its ideological nature, has important implications for how politically active citizens are . As Verba and Nie (1972) note, participation levels of Democrats and Republicans are different. I argue further that ideological distinctions may have a changing impact on political participation or civic engagement over time. I hypothesize that as the political climate becomes more conservative, civic engagement should increase.

During the period of my analysis, especially in the 1980s, the evangelical movement experienced phenomenal growth and began to impact the political landscape (Diamond 1995). During the 1970s, the major social issues such as women's equality, abortion, and gay rights were raised, which might develop individualism and even selfishness among people. As a reaction, evangelicals started to promote the supremacy of the traditional family and community values. For example, Pat Robertson, who is a conservative tel-evangelist and the founder of the Christian Coalition, expressed his concern about the collapse of American society caused by moral decay in his speech in 1985, saying:

> "What kind of a monstrous thing have we got? When there is no vision of God, when there's no vision of God's law, when there's no vision of right and wrong, when there's no vision of ultimate reward and ultimate punishment, when there's no vision of decency, when there's no standard of values, society breaks apart and everybody does what he wants to do."(Robertson 1985)

Evangelicals are different from mainline protestants in their mobilization strategies. As Wuthnow (1999) observes, the Moral Majority, Religious Roundtable, and other conservative Christian movements that emerged between 1978 and 1980 mobilized more attention

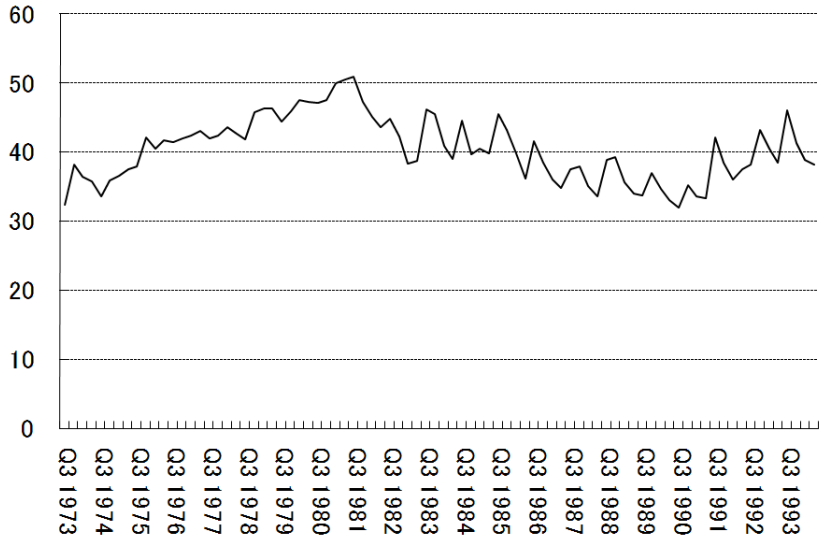
in the media than they did energy among evangelical church members. Although Wuthnow (1999) and Putnam (2000) claim that evangelicals are less likely to participate in community activity than mainline protestants, I argue that the political climate created by the evangelical movements in the 1980s stimulated civic activism by articulating the idea of community.

I do not expect, however, that the effect of conservatism on civic engagement is constant over time as the ideology-participation relationship (Beck and Jennings 1979, 1984) and partisanship-participation relationship (Verba and Nie 1972; Gershtenson 2002) are changing. In the 1970s, conservatives did not have any issues that promote civic engagement while liberals might have. But, in the 1980s, as noted above, the rise of the conservative Christian movements made conservatism more family and community oriented. Thus, I predict that conservatism among citizens has a more positive (or less negative) impact on civic engagement in the 1980s than in the 1970s.

I measure the degree of conservatism that characterizes the political environment by the "policy mood" measure of Stimson (1999). Stimson's "policy mood" is a quarterly time series, scaled from 0 to 100 with higher values indicating more liberal mood. He created it based on 197 survey questions on domestic issues such as gun control, environment, and welfare, using his recursive dyadic dominance method. Conceptually, it is "the shared thing carried by individual people that underlies common response to disparate issues."(Stimson 1999, p.3) Because it originally measures the degree of liberalism, it must be recalculate to measure conservatism; 100− "policy mood" as displayed in Figure 5.

What can be seen in Figure 5 is a pattern of conservatism building in the early 1970s, peaking in the early 1980s, followed by a movement to a liberal peak around 1990, and a returning trend to conservatism.

Figure 5: Trend in Conservatism



4 Analysis

The first half of this section examines the causal relationships between conservatism and four forms of civic engagement to provide a basis for analyses of the changing effect in the second half. Table 2 shows summary statistics of four forms of civic engagement, and political and economic variables from the third quarter of 1973 to the second quarter of 1994 (what these political and economic variables mean is explained in the second half of this section). The analysis starts with verifying stationarity of each time-series by the Augmented Dickey-Fuller test, and then the multivariate Granger causal relationship is examined using vector autoregression (VAR).

Table 2: Summary Statistics for Civic Engagement, Political, and Economic Variables, Q3 1973-Q2 1994

Variable	N	Mean	Std Dev	Minimum	Maximum
Civic Engagement[a]	84	11.42	1.55	7.43	14.66
Partisan Activity[a]	84	5.94	1.20	3.48	9.34
Communal Participation[a]	84	10.01	1.55	6.25	13.96
Public Expression[a]	84	16.44	1.71	11.60	18.95
Conservatism[b]	84	40.41	4.61	31.98	50.91
Household Income[a]	84	23.93	1.61	20.92	26.67
% College Graduaten[a]	84	38.07	4.88	28.39	44.04
% Full-time Worker[a]	84	48.03	2.40	42.67	53.74

Source: [a]The Roper Social and Political Trends Data, and [b]James Stimson's website.

4.1 ADF Tests

In essence, the Dickey-Fuller test for determining whether a time series is integrated involves the regression of first differences of the series on its lagged levels. If the series is stationary, the regression coefficient associated with the lagged levels will be negative and significant. The ADF test includes a number of lags of the first differences on the right-hand side of the regression equation and is appropriate if the resulting coefficients are significant (Engle and Granger 1987). Critical values for these tests are greater than normal, due to nonstandard distributions, and are reported by MacKinnon (1991).

The data-dependent general-to-specific criterion is used to choose the optimum lag structure for the error process of the Dickey-Fuller equation as advocated by Ng and Perron (1995) and Perron (1997). Under this process, the specific order is chosen out of the general order (I considered here 11 lags based on the Schwert's rule of thumb: $m = Int\{12(T/100)^{\frac{1}{4}}\}$) on the basis of the standard t-tests of significance for the lag terms.

Table 3: Augmented Dickey Fuller Tests for a Unit Root

Regression: $\Delta z_t = \alpha_0 + \alpha_1 t + \alpha_2 z_{t-1} + \sum_{i=1}^{m} \beta_i \Delta z_{t-i} + \epsilon_t$

	ADF	Lag order(m)
Civic Engagement	-1.009	9
Partisan Activity	-1.950	8
Communal Participation	- .663	10
Public Expression	- .933	9
Conservatism	-2.440	8
Household Income	- .832	8
% College Graduaten	-2.148	0
% Full-time Worker	-2.498	0

An asterisk indicates significance (rejection of the unit root null) at the 5 per cent level.

The results in Table 3 suggest that all of the variables are nonstationary. Therefore, I take the first difference of them.

4.2 The VAR Model

I examine the relationship between the variables using Vector Autoregression (VAR) methodology. VAR (Freeman, Williams and Lin 1989; Simms 1980) helps to evaluate the causal directions of the relationships between conservatism and four forms of civic engagement. I select VAR because I want to examine the determinants of civic engagement without making the variables *a priori* exogenous.

VAR is a multivariate extension of the Granger (1969) approach to causal inference. Each dependent variable is regressed on lagged values of itself and other dependent variables in the system. VAR provides an excellent control for history, by taking into account several lags of all of the endogenous variables in the system.

I determine lag lengths empirically using methods based on Simms (1980). Table 4 shows the process. The likelihood ratios(LR) are calculated to test if there is a difference in log-likelihood between the pair of different lag specifications (up to 11 lags). The results suggests that the appropriate lag length is 3 for partisan activity, and 2 for others.

VAR evaluates relationships by conducting joint hypothesis tests for the blocks of lags associated with each variable. In sum, the VAR model is essentially a series of regression equations where each endogenous variable in the system is set equal to lagged values of itself and all of the other variables in the system. The VAR model has many parameters, and they may be difficult to interpret due to complex interactions and feedback between the variables in the model. As a result, the dynamic properties of a VAR are often summarized using various types of structural analysis. One of main types of structural analysis summaries is Granger causality tests.

4.3 Granger Causality

First, to examine the causal relationships between the variables, I perform Granger tests(Freeman 1983; Freeman, Williams and Lin 1989). There are two main interests. The first is a test of whether four forms of civic engagement Granger cause conservatism, and the second is a test of whether conservatism Granger causes four forms of civic engagement. For the first Granger test, if the null is rejected, we infer that civic engagement Granger causes conservatism. Under the second Granger test, if the null is rejected, we infer that conservatism Granger causes civic engagement.

The results appear in Table 5. Each cell in the table represents an estimated equation. The p values associated with each equation appear in the cells of the table. The first test

Table 4: Likelihood Ratio Tests for Lag Order

Pair for Comparison	LR	Pair for Comparison	LR
Civic Engagement		Partisan Activity	
Lag = 1 vs. Lag = 2	47.955*	Lag = 1 vs. Lag = 2	44.352*
Lag = 2 vs. Lag = 3	45.059*	Lag = 2 vs. Lag = 3	42.272*
Lag = 3 vs. Lag = 4	31.557	Lag = 3 vs. Lag = 4	38.457*
Lag = 4 vs. Lag = 5	21.280	Lag = 4 vs. Lag = 5	25.108
Lag = 5 vs. Lag = 6	15.398	Lag = 5 vs. Lag = 6	31.486
Lag = 6 vs. Lag = 7	24.632	Lag = 6 vs. Lag = 7	32.084
Lag = 7 vs. Lag = 8	23.372	Lag = 7 vs. Lag = 8	32.106
Lag = 8 vs. Lag = 9	20.689	Lag = 8 vs. Lag = 9	27.547
Lag = 9 vs. Lag = 10	15.975	Lag = 9 vs. Lag = 10	22.025
Lag = 10 vs. Lag = 11	9.215	Lag = 10 vs. Lag = 11	27.203
Communal Participation		Public Expression	
Lag = 1 vs. Lag = 2	50.026*	Lag = 1 vs. Lag = 2	51.320*
Lag = 2 vs. Lag = 3	48.771*	Lag = 2 vs. Lag = 3	49.983*
Lag = 3 vs. Lag = 4	33.918	Lag = 3 vs. Lag = 4	33.785
Lag = 4 vs. Lag = 5	23.070	Lag = 4 vs. Lag = 5	26.830
Lag = 5 vs. Lag = 6	19.363	Lag = 5 vs. Lag = 6	13.977
Lag = 6 vs. Lag = 7	26.483	Lag = 6 vs. Lag = 7	30.990
Lag = 7 vs. Lag = 8	30.290	Lag = 7 vs. Lag = 8	29.844
Lag = 8 vs. Lag = 9	26.227	Lag = 8 vs. Lag = 9	24.408
Lag = 9 vs. Lag = 10	24.606	Lag = 9 vs. Lag = 10	21.156
Lag = 10 vs. Lag = 11	15.706	Lag = 10 vs. Lag = 11	20.404

An asterisk indicates significance (rejection of no difference) at the 5 percent level.
$LR = (T-k)(log|D_R| - log|D_U|) \sim \chi^2(q)$, where D_R is the matrix of cross products of residuals when the model is restricted; D_U is the same matrix for the unrestricted model; k is the total number of regression coefficients estimated divided by the number of equations; q is the number of restrictions.

Table 5: Direction of Granger Causality

Independent variable	Civic Engagement	Conservatism
Civic Engagement	-	.338
Conservatism	.007	-

Note. Each variable was lagged 3 months. OLS estimates. The numbers are block F-test p-values.

Independent variable	Partisan Activity	Conservatism
Partisan Activity	-	.911
Conservatism	.050	-

Note. Each variable was lagged 4 months. OLS estimates. The numbers are block F-test p-values.

Independent variable	Communal Participation	Conservatism
Communal Participation	-	.289
Conservatism	.008	-

Note. Each variable was lagged 3 months. OLS estimates. The numbers are block F-test p-values.

Independent variable	Public Expression	Conservatism
Public Expression	-	.116
Conservatism	.007	-

Note. Each variable was lagged 3 months. OLS estimates. The numbers are block F-test p-values.

is for whether civic engagement has any effect on conservatism. I estimate with a p value of .338 for "civic engagement," .911 for "partisan activity, " .289 for "communal participation," and .116 for "public expression." Thus I can infer that exogenous shocks to all of four forms of civic engagement will not affect the movement of conservatism over time.

I also test whether government conservatism affects the movement of for forms of civic engagement over time, and estimate with statistically significant p-values that conservatism do affect all of four forms of civic engagement. The statistical evidence demonstrates that civic engagement is Granger caused by conservatism. While movement in conservatism over time will cause shifts in civic engagement, shocks to civic engagement will leave conservatism unchanged. Thus, I can straightforwardly model civic engagement with a simple recursive system in the following analysis.

4.4 ARFIMA model

How does civic engagement respond to changes in the political climate? To answer this question, I consider the following statistical model.

$$CE_t = \beta_1 + \beta_2 C_t + \beta_3 I_t + \beta_4 E_t + \beta_5 J_t + u_t$$

where $t =$ 1973 Q3, 1973 Q4, ..., 1994 Q2, $CE =$ civic engagement; $C =$ conservatism ; $I =$ mean household income in CPI adjusted dollars; $E =$ the percentage of college graduates; and $J =$ the percentage of full-time workers. Mean household income in CPI adjusted dollars, the percentage of college graduates, and the percentage of full-time workers are included in the model as control variables(The summary statistics are shown in 2). They

correspond to money, ability, and time resources suggested in previous studies such as Rosenstone and Hansen (1993); Verba, Schlozman and Brady (1995); Putnam (2000); Knack (2002); and Keele (2005). Data on them are also available from the Roper Social and Political Trends Data, 1973-1994. [5]

I use the ARFIMA (autoregressive fractionally integrated moving average) model, originally developed by Hosking (1981) and Granger and Joyeux (1980), to analyze my time series data. By ARFIMA modeling, I can remove the part of the series that can be explained by itself. ARFIMA modeling allows time series to be fractionally integrated ($0 < I < 1$) while in ARIMA modeling, researchers have to decide whether their data were generated by an $I = 0$ (stationary) or an $I = 1$ (nonstationary, i.e., unit-root) process. The ARFIMA model is more realistic than the ARIMA model in that it does not impose on researchers the dichotomy between stationary and nonstationary time series. The detailed description and significance of the concept of fractional dynamics is given in Appendix I.

I estimate ARFIMA(p, d, q) using the modified profile likelihood (MPL) function.[6] Table 6 presents the estimates of the univariate models. The ARFIMA model estimate is $(3, d, 2)$ with $d = .167$ for civic engagement, $(0, d, 0)$ with $d = .896$ for partisan activity, $(3, d, 2)$ with $d = .156$ for communal participation, $(3, d, 2)$ with $d = .104$ for public expression, $(4, d, 0)$ with $d = 0.266$ for conservatism, $(2, d, 2)$ with $d = 1.141$ for mean household income, $(1, d, 1)$ with $d = .449$ for the percentage of college graduates, and

[5] They are originally monthly time series with missing values for October and November. I transformed them into quarterly time series, estimating the missing values with Stimson's method.

[6] The modified profile likelihood is a procedure to reduce the number of independent parameters by writing some parameters as functions of other parameters, based directly on a probability distribution. See Cox and Reid (1987) for more detail.

$(1, d, 0)$ with $d = -.064$ for the percentage of full-time workers.[7]

Table 6: ARFIMA Model Estimates and t-ratios

	d (SE)	t-ratio for $d = 0$	t-ratio for $d = 1$	ARMA (p, q)
Civic Engagement[a]	.167	1.27	-6.36	(3, 2)
	(.131)			
Partisan Activity[b]	.896	8.00	-.93	(0, 0)
	(.112)			
Communal Participation[a]	.156	1.20	-6.49	(3, 2)
	(.130)			
Public Expression[a]	.104	1.29	-11.20	(3, 2)
	(.080)			
Conservatism[a]	.266	1.67	-4.63	(4, 0)
	(.160)			
Household Income[b]	1.141	13.58	1.67	(2, 2)
	(.084)			
% College Graduate[a]	.449	4.33	-5.30	(1, 1)
	(.104)			
% Full-time Worker[a]	.935	9.26	-.64	(0, 0)
	(.101)[b]			

Note: The Schwarz Information Criterion (SIC)was used to select the best model from ARFIMA$(0, d, 0)$ to ARFIMA$(4, d, 4)$.
[a] Identified and estimated from levels.
[b] Identified and estimated from first-differenced series due to nonstationarity.

I transform my time series into the white noise residuals of their respective ARFIMA models to purge autocorrelation and insure stationarity before examining the relationship among the series. To see how the effect of conservatism on civic engagement changes

[7] I use OX to estimate d . OX is part of the PcGive 9.0 package and is available from `http://www.nuff.ox.ac.uk/Users/Doornik/index.html`. I start from levels and estimate all (p, d, q) models from $(0, d, 0)$ to $(4, d, 4)$ so that there are up to four AR and four MA components. In the OX routine, stationarity with $d \in (-5, 0.4999]$ is required for all time series. Therefore if d is very close to the upper bound, we need to take the first difference so that $d - 1 \in (-5, 0.4999]$. In this case, because the estimate is not d but $d - 1$, I need to add 1 to the estimate to obtain d. I estimate d by taking the first difference of partisan activity and mean household income.

each quarter, I introduce a time-varying parameter to my model. Time varying parameter models assume that a regression parameter suspected of instability is a function of time. Among classes of such models, I use the Legendre polynomial model developed in Hinich and Roll (1981). Hinich and Roll suggest using the mutually orthogonal Legendre polynomials $P_j(z(t))$. In this method, the coefficient associated with conservatism in my model can be expressed by:

$$\beta_2(t) = \sum_{j=0}^{n} \beta_{2,j} P_j(z(t))$$

where t is rescaled time and $\beta_{2,j}$ $(j = 1, 2, ..., n)$ are constants to be estimated. Each polynomial represents the pattern of possible change in a parameter. For example, the second order polynomial express the convex or concave pattern of the change in a parameter over time. The order of polynomial is determined by theory or empirical measures such as R^2, SEE, and BIC. In this analysis, SEE is used to determine the order of polynomials, that is, I choose the model with the smallest SEE value as the best model among all possible polynomial models (from zero-order to fifth order) for respective dependent variables. Technical details and the estimation procedures for this model are given in Appendix II.

Table 7 shows the results of my multivariate model of civic engagement. For civic engagement and public expression, a zero-order polynomial model is chosen as the best model, and the coefficient associated with conservatism ($\beta_{2,0}$) is not statistically significant at the 5 percent level, which means that the effect of conservatism on civic engagement and public expression is not significant and not changing over time. For partisan activity and

communal participation, a second-order polynomial model is selected as the best model, and some coefficients associated with conservatism are statistically significant at the 5 or 10 percent level, which suggests that the effect of conservatism on partisan activity and communal participation changes quadratically over time. The statistical significance of the effect of mean household income on all forms of civic engagement shows that when household income increases, citizens are more likely to be involved in civic activities. The percentage of college graduates has a significant impact only on partisan activity, which indicates that as the number of college graduates grows, people become more active in working for their party.

Because of parameter instability, the statistical significance of the effect of conservatism on civic engagement has to be examined throughout the historical period of interest. For a second-order Legendre polynomial solution, the estimated effect

$$\hat{\beta}_2(t) = \sum_{j=0}^{2} \hat{\beta}_{2,j} P_j(z(t))$$

is a function of time and can be plotted to show the trajectory of the estimated effect over the course of history. The variance of the effect at any point of time is

$$Var(\hat{\beta}_2(t)) = \sum_{j=0}^{2} P_j(z(t))^2 Var(\hat{\beta}_{2,j}) + 2 \sum_{0 \le h \le k \le 2} P_h(z(t)) P_k(z(t)) Cov(\hat{\beta}_{2,h} \hat{\beta}_{2,k})$$

Figures 6 and 7 show the time path and the 95% confidence limits of the effect of conservatism on partisan activity and communal participation, respectively, represented by the

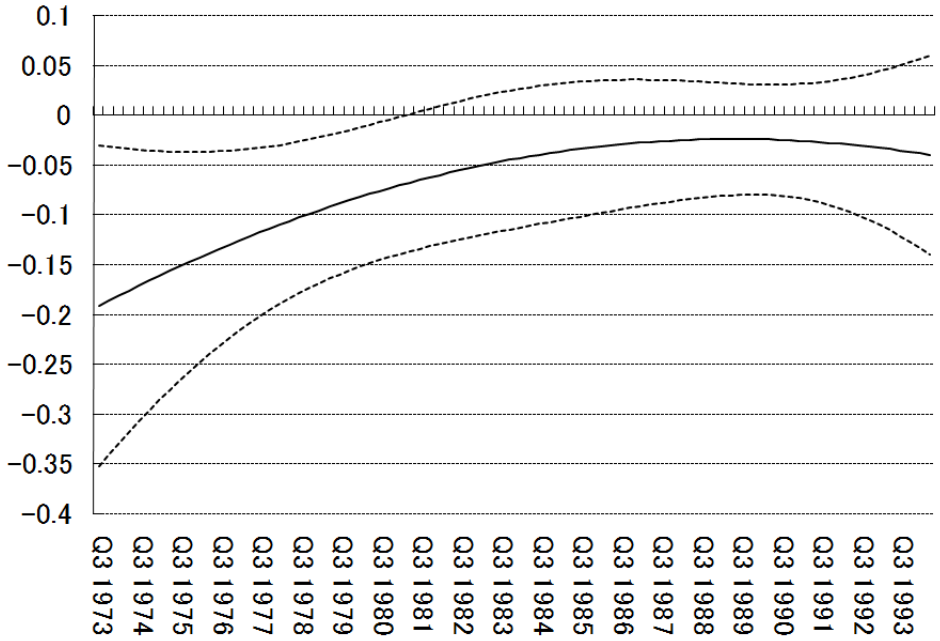
Table 7: Hinich-Roll Time-Varying Parameter Regression Results

Dependent variable:		Civic Engagement	Partisan Activity	Communal Participation	Public Expression
Independent variables		Estimate			
Constant	β_1	-.049	-.073	-.027	-.052
		(.183)	(.230)	(.498)	(.209)
Conservatism	$\beta_{2,0}$	.000	-.068	.012	.002
		(.992)	(<u>.009</u>)	(.492)	(.925)
	$\beta_{2,1}$	-	.076	.038	-
			(<u>.080</u>)	(.185)	
	$\beta_{2,2}$	-	-.048	-.081	-
			(.325)	(<u>.014</u>)	
Household Income	β_3	.233	.443	.263	.245
		(<u>.012</u>)	(<u>.004</u>)	(<u>.009</u>)	(<u>.020</u>)
% College Graduates	β_4	.105	.223	.043	.083
		(.110)	(<u>.037</u>)	(.541)	(.265)
% Full-time Workers	β_5	.012	-.023	-.010	.039
		(.665)	(.621)	(.740)	(.232)
$Adj - R^2$		.116	.212	.115	.105
SEE		.324	.522	.350	.367
N		83	83	83	83

Note: SEE is used to determine the order of polynomials for each model.
p values in parentheses.
Underlines indicate level of significance at least .100.

second-order solution.

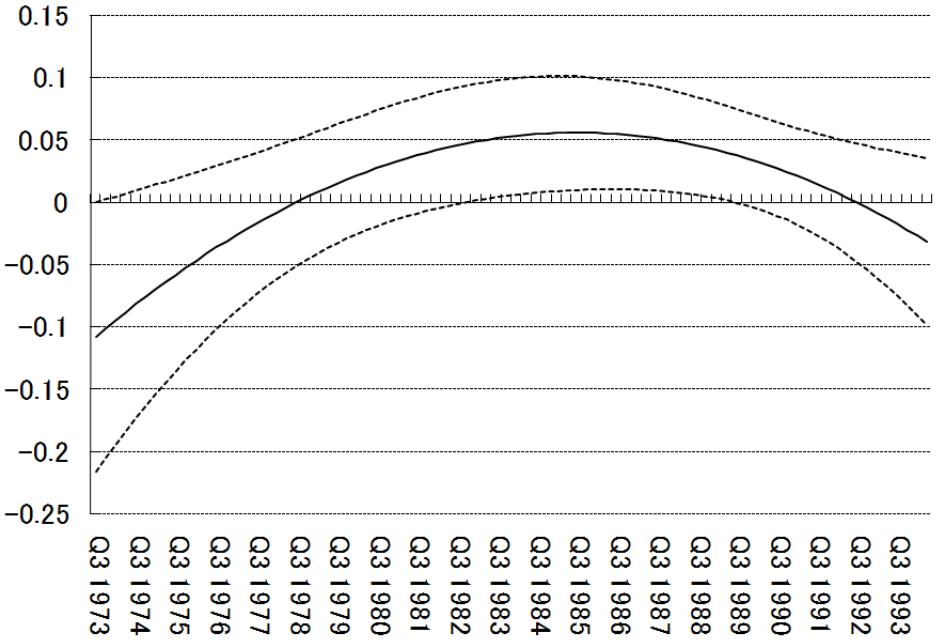
Figure 6: Effect of Conservatism on Partisan Activity: Hinich-Roll Time Varying Parameter Estimates



As seen in Figure 6, the second-order model for the effect of conservatism on partisan activity is consistent with my theoretical expectations as a negative effect exists in the 1970s (more precisely, 1973 Q3 - 1981 Q1) but it vanishes after the early 1980s. The negative effect in the 1970s reflects the liberal activism at that time, but conservatives became more politically active in the 1980s because of the rise of the community issues.

As seen in Figure 7, the second-order model for the effect of conservatism on communal participation is also consistent with my theoretical expectations as a positive effect is observed in the 1980s (more precisely, 1982 Q4 - 1989 Q2). The positive effect in the 1980s is due to the emphasis of the conservative (religious) leaders on the community and family values. Through the 1980s, a shift in the political climate toward a conservative

Figure 7: Effect of Conservatism on Communal Participation: Hinich-Roll Time Varying Parameter Estimates



direction leads to more participation in community activity, but that relationship no longer exists in the 1990s. Given the fact that the level of communal participation declined in the 1970s, but levelled off in the 1980s, and then declined again in the 1990s (Figure 3), it is possible to argue that the rise of conservatism among citizens in the 1980s put the brakes on the declining communal participation.

5 Conclusion

The decline in civic engagement is a pervasive feature of the American political landscape. It implies that the quality of civil society and democracy is in question. What can we do about it? Previous studies have shown that as the resources required for civic participation

decline, citizens are unable to join the civic life of their communities, but it is difficult or even unrealistic to provide every citizen with enough resources. What I have shown in this paper is the impact of a political climate of an era on the level of civic engagement. Some kinds of public mood encourage citizens to take part in their communities while others do not. Putnam (2000) refers to the Progressive Era (1900-1915) as an example of practical civic enthusiasm which contains many useful suggestions for us to solve the problem. In the Progressive Era, people obviously had fewer resources in terms of time, education, and money than these days, but they were successful in producing an extraordinary burst of social inventiveness and political reform. Together with the results of my analysis, this reminds us of the importance of the public mood in contemplating possible therapies.

Appendix I: A Transfer Function Model Using Fractional Integration Technique

In analyzing time series data, Box and Jenkins ARIMA techniques (Box and Jenkins 1970) have been used to purge autocorrelation from which researchers may suffer with familiar OLS regression procedures. However, ARIMA techniques are restrictive in that they require researchers to decide whether their data were generated by an $I = 0$ (stationary) or an $I = 1$ (nonstationary, i.e., unit-root) process. Based on this decision, researchers have to either difference their data (if it is nonstationary) or leave it in level form (if it is stationary). This decision has serious analytic and theoretical consequences.

Theoretically, classifying a variable as stationary implies that its value at previous periods is forgotten at a consistent rate as it tends toward some long-term mean. But, classifying a variable as having a unit-root implies that it has the properties of a "random walk". Such a series has "perfect memory" in the sense that its value at any time t is the same as its value at the precious period, $t - 1$, plus any shock incurred at time t .

Analytically, treating it as a unit-root process leads the researcher to transform it through the process of "first differencing", i.e., generating a new series based on differences between the value of the series at consecutive time points. However, this transformation is significant because it prohibits the researcher from identifying any long-term relationships that might exist between the differenced variable and other variables in the model. On the other hand, leaving a variable in level form avoids this problem but can have negative consequences if the data generating process possesses some degree of long-memory. Especially, spurious regression, finding a significant relationship between variables when none truly exists, is a likely result when variables with some degree of persistence are left in level form.

The concept of fractional dynamics enables researchers to avoid this restrictive stationary versus nonstationary dichotomy (for political application, see Box-Steffensmeier and Smith (1998); Lebo, Walker and Clarke (2000); Box-Steffensmeier and Tomlison (2000), Clarke and Lebo (2003)). In this concept, researchers do not have to have the assumption that time series variables must be either stationary process or random walks. It allows time series to be fractionally integrated ($0 < I < 1$). In ARIMA notation, the data generating process of series X can be written as follows:

$$\phi(L)(1 - L)^d X_t = \theta(L)\varepsilon_t \qquad \text{and} \qquad \varepsilon_t \sim N(0, \sigma^2)$$

where L is a backshift operator such that $L^k \varepsilon_t = \varepsilon_{t-k}$, $\phi(L)$ represents a stationary autoregressive process, $\theta(L)$ represents a stationary moving-average process, and the degree of integration of X is measured by the fractional differencing parameter, d.

Appendix II: Hinich-Roll Time Varying Parameter Regression

For time-series regression

$$Y_t = \beta_1 + \beta_2 X_{2t} + \beta_k X_{kt} + u_t, \qquad t = 1, 2, ..., T$$

Hinich and Roll (1981) suggest that a time-varying parameter, β_i , can be specified as

$$\beta_i(t) = \sum_{j=0}^{n} \beta_{i,j} P_j(z(t))$$

where $P_j(z(t))$ are the Legendre polynomials (see Table 8; n is the highest order of the polynomials; and $\beta_{i,j}$, $(j = 1, 2, ..., n)$ are fixed parameters. The reason for using the Legendre polynomials in this specification is that they are mutually orthogonal in the interval [-1, 1] and therefore without the high collinearity. To ensure orthogonality, t, $(t = 1, 2, .., T)$ has to be rescaled into $z(t) = [2(t-1)/(T-1)] - 1 \in [-1, 1]$. For example, for the period (1973 Q3 -1994 Q2 with $T = 84$) used to estimate my model, $z(t) = [2(t-1)/(84-1)] - 1$. With β_i modelled as such $\beta_i X_{it}$, in the regression becomes

$$\beta_i X_{it} = [\sum_{j=0}^{n} \beta_{i,j} P(z)] X_{it} = \sum_{j=0}^{n} \beta_{i,j} [P(z) X_{it}]$$

Since $P(z)X_{it}$ can be evaluated with empirical data, the regression is still linear in the parameters ($\beta_{i,j}$) and hence can be estimated by usual methods.

Table 8: Legendre Orthogonal Polynomials

$P_0(z) = 1$
$P_1(z) = z$
$P_2(z) = (3z^2 - 1)/2$
$P_3(z) = (5z^3 - 3z)/2$
$P_4(z) = (35z^4 - 30z^2 + 3)/8$
$P_5(z) = (63z^5 - 70z^3 + 15z)/8$

Source: Calculated from Rodrigue's Formula:
$P_n(z) = (-1)^n/2^2 n!)(d^n/dz^n)\{(1 - z^2)^n\}$.
See Beyer (1984, p.372).

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