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# *The Public as Thermostat: Dynamics of Preferences for Spending\**

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*Theory:* Democratic accountability requires that the public be reasonably well-informed about what policymakers actually do. Such a public would adjust its preferences for “more” or “less” policy in response to policy outputs themselves. In effect, the public would behave like a thermostat; when the actual policy “temperature” differs from the preferred policy temperature, the public would send a signal to adjust policy accordingly, and once sufficiently adjusted, the signal would stop.

*Hypotheses:* In domains where policy is clearly defined and salient to the public, changes in the public’s preferences for more policy activity are negatively related to changes in policy.

*Methods:* A thermostatic model of American public preferences for spending on defense and a set of five social programs is developed and then tested using time series regression analysis.

*Results:* Changes in public preferences for more spending reflect changes in both the preferred levels of spending and spending decisions themselves. Most importantly, changes in preferences are negatively related to spending decisions, whereby the public adjusts its preferences for more spending downward (upward) when appropriations increase (decrease). Thus, consistent with the Eastonian model, policy outputs do “feed back” on public inputs, at least in the defense spending domain and across a set of social spending domains.

Democratic accountability requires that the public be reasonably well-informed about policy, that the public adjusts its preferences for “more” or “less” policy activity in response to what policymakers actually do. The integrity of representation rests on this expectation; after all, if the

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public did not notice and respond to changes in policy, then politicians would have little incentive to represent what the public wants. Ultimately, a responsive public provides guidance to electorally-motivated politicians and a basis for removing politicians who defy the public's will.

If the public is responsive to what policymakers do, it would effectively function like a thermostat—a public thermostat. For expository purposes, the public can be viewed as a collection of individuals distributed along a dimension of preference for policy activity, say, spending on defense. This characterization is not meant to imply that individuals have specific preferred levels of spending in mind, which would border on the absurd; rather, it is intended to reflect the fact that some people want more than others (Jacoby 1994; Erikson and Tedin 1995). Let the *public* preference be represented by the median along the dimension, which implies a certain “ideal” level of defense spending.

If the level of policy differs from the level the public prefers, the public favors a corresponding change in policy, either more or less. If the preferred level is greater than policy itself, the public favors more spending than currently is being undertaken. If policymakers respond, and provide more (but not too much) for defense, then the new policy position would more closely correspond to the preferred level of spending. If the public is indeed responsive to what policymakers do, then the public would not favor as much more activity on defense. It might still favor more, on balance, but not as substantially as in the prior period; if policymakers overshoot the public's preferred level of spending, it would favor less. In effect, the public would behave like a thermostat, where a departure from the favored policy temperature (which itself can change) produces a signal to adjust policy accordingly, and once sufficiently adjusted, the signal stops. This conceptualization of public preferences has deep roots in political science, including Easton's (1965) depiction of a political system and Deutsch's (1963) models of “control.”

Such a mechanical conception of the American public (and policymakers' behavior) may seem far too stylized, particularly given the traditional conception of public opinion (Campbell, et al. 1960; Converse 1964; Kinder 1983). The “thermostatic” model of public preferences is even more demanding of the public than the rather sophisticated characterization offered by Page and Shapiro in *The Rational Public* (1992). Page and Shapiro portray a public composed of individuals whose preferences are fairly stable over time, particularly in the short-run. They also show that public opinion often changes very deliberately, in understandable ways, and that opinion change is effectively parallel across various subcategories of the American public. In effect, people march together in the same liberal or conservative direction on particular issues, implying that people gener-

ally react to new information in the same way (also see Stimson 1989; Ferejohn and Kuklinski 1990; Sniderman, Brody, and Tetlock 1991; Lupia 1994).

Stimson's (1991) study of a wide range of public opinion data further reveals that public preferences for policy in various domains are closely connected over time. Simply, preferences across a range of issues tend to move in the same liberal or conservative direction, producing what Stimson has called "policy sentiment" or "mood." That preferences for policy generally move in the same liberal or conservative direction denotes an underlying structure to those preferences. Also, there is some suggestion in Durr's (1993) analysis of Policy Sentiment that the general movement in those public preferences is thermostatic, reflecting policy itself, though this characterization does not follow from the research—it is not clear, after all, what Stimson's measure actually represents.<sup>1</sup> Quite simply, we do not know whether the public adjusts its preferences for more (less) policy activity in response to what policymakers do.

To study the interrelationship between policy and opinion over time, we need to examine policy domains where activity is clearly defined and occurs periodically and where reliable time series of public preferences across a wide range of programs are available. The United States federal budget constitutes one set of such policy domains. All budgets register policy commitment clearly, in terms of the money actually appropriated for something, and at the federal level, budgets occur annually, providing reliable time series of policy commitment. There also are annual surveys (since 1973) that sample opinion about federal spending in various specific categories. These opinion data capture relative preferences for spending—whether the public wants "more" or "less" than is currently in place. Using these data, we can see whether the public adjusts its preferences for more spending in response to policy itself.

Even where policy is clearly defined, as in spending decisions, public responsiveness to policy may vary across policy domains, reflecting the availability of information about policy in the particular domains. For the public to be responsive to policy, people must acquire and process reasonably accurate information. Thus, public responsiveness to policy is most likely in certain policy domains where information is readily available (at least) in mass media reporting. In other policy domains where information about particular programs is less available, public responsiveness is likely to be less specific; in some domains the public may be entirely unresponsive

<sup>1</sup>Several other studies are suggestive of such public responsiveness (Stoll 1990; Page and Shapiro 1992; Wlezien and Goggin 1993).

to policy. Ultimately, however, whether and how the public responds to policy across various domains are empirical questions.

### **Measuring Public Preferences for Spending**

Various survey organizations have sampled the American public about preferences for spending. The questions have been asked in various ways, although respondents are always asked about their relative preferences, i.e., whether we are spending "too little," whether spending should "be increased," or whether we should "do more." In effect, the responses to the items are anchored to the actual (or perceived) level of current spending, the policy status quo. Several organizations use the same question wording:

Are we spending too much, too little, or about the right amount on <the military, armaments, and defense>?

In most surveys, respondents are asked about spending in various categories, including big cities, education, the environment, health, national defense, and welfare.<sup>2</sup> The General Social Survey (GSS) has asked this battery of items since 1973 (until 1991), with the exception of 1979 and 1981. Fortunately, Roper asked the same questions in those years.<sup>3</sup> From these

<sup>2</sup>The exact wording for the other categories is:

Solving the problems of the big cities?

Improving the nation's education system?

Improving and protecting the environment?

Improving and protecting the nation's health?

Welfare?

Other categories have been used by different survey organizations during the same period, including the condition of blacks, crime, drug addiction, foreign aid, and space exploration. These categories are not included in the analysis. Some categories, such as drug addiction and the condition of blacks do not neatly correspond with appropriations and outlays. Other categories, such as crime, foreign aid, and space exploration, are not included for two related reasons: (1) preferences for spending on these programs share little common variance with preferences for social and defense programs, perhaps understandably (see Jacoby 1994); and (2) it is difficult to identify instruments for the public's preferred levels of spending in the particular domains. Nevertheless, selected results pertaining to preferences for spending on crime, foreign aid, and space exploration are briefly mentioned in the concluding section of the paper.

<sup>3</sup>The Roper poll is conducted in December, well after the GSS (February-April), which is of some potential relevance to this analysis. Other research shows that most of the public responsiveness to defense appropriations that is captured in the GSS in March, already is reflected in the Roper poll conducted during the preceding December (Wlezien 1995). The defense spending question was asked by Gallup prior to the Roper poll in 1979 and 1981, and that data is used in this analysis. Unfortunately, Gallup did not ask about spending for the various social programs encompassed by this analysis. Since there is seemingly no other source of data about preferences for social spending during the early part of those years it

data, six annual time series of public preferences for spending can be constructed that cover 1973–91.

Responses to the question provide only very general information about preferences and actually conceal the intensity of preferences for more or less, since between 25 and 50% of the respondents express the opinion that we are spending “about the right amount,” depending on the spending category and year. Simply, the median voter often lies within the middle category, indicating satisfaction with current spending levels. As with most survey items, however, the middling response encompasses variation in satisfaction, from those who are close to favoring less, to those who are close to favoring more. The most useful way to reflect the median preference is to create a measure of net support for spending from the other two categories; that is, by subtracting the percentage of people who think we are spending “too much” from the percentage of people who think we are spending “too little.” While imperfect, the measure does serve to indicate the degree to which the public wants more (less) spending over time.<sup>4</sup>

Preferences for spending in the various social categories generally move together over time (Stimson 1991). Plotting the measures of net support for the six spending categories illustrates a close connection over time between public preferences for more spending on big cities, education, the environment, health, and welfare (see Figure 1).<sup>5</sup> Notice also that preferences for defense spending are negatively related to preferences for social spending over time, suggesting that preferences for the two sets of programs are interdependent, i.e., a guns-butter trade-off. Preferences for defense spending, however, are much more variable than preferences for social spending, consistent with Page and Shapiro (1992). This differential variation is quite telling, as will become evident shortly.

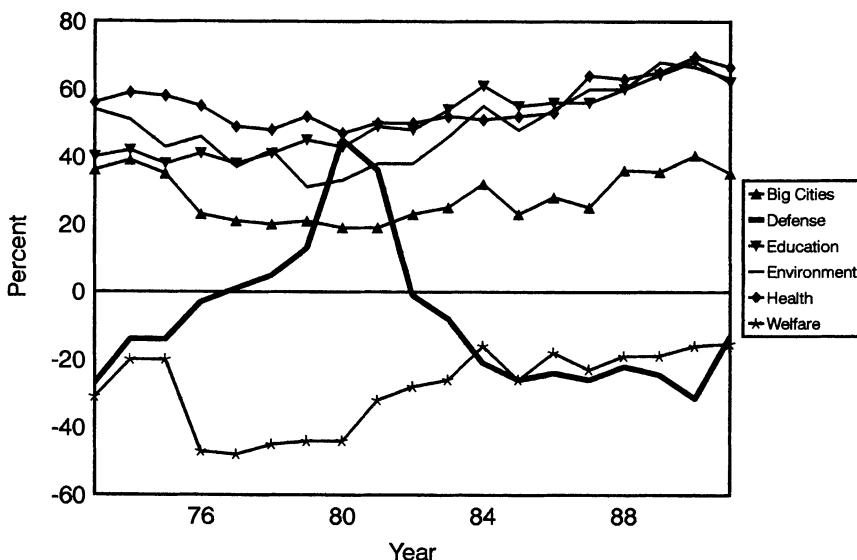
### A Model of Public Preferences for Spending

As is implied by the thermostatic model, the public’s preference for more (less) policy—its relative preference,  $R$ —represents the difference

is necessary to rely on the Roper data. To the extent the public reacts as quickly to appropriations for social programs, using the Roper data in 1979 and 1981 makes it slightly more difficult to find public adjustment of social spending preferences in response to shifts in policy.

<sup>4</sup>Note that the percentages of people who think we are spending “too little” and “too much” virtually mirror each other over time.

<sup>5</sup>The average net support for spending in the social categories closely tracks Stimson’s measure of policy sentiment (pearson’s  $r = .97$ ), implying that the measure reflects, or is driven by, preferences for more spending and, by definition, largely captures a relative public preference for policy.

**Figure 1. Net Support for Spending, Various Items**

between the public's preferred level of policy ( $P^*$ ) and policy ( $P$ ) itself. This characterization implies that  $R$  is integrated, whereby the influences on  $R$  in year  $t$  become incorporated into future values. Thus, the general model can be summarized as follows:

$$\Delta R_t = \Delta P^*_t - \Delta P_b \quad (1)$$

where  $R$  can change because either  $P^*$  or  $P$  changes; an increase in  $P^*$  positively influences  $R$  and an increase in  $P$  negatively influences  $R$ .

Turning specifically to the budgetary context, this general model implies that for each spending category  $i$ :

$$\Delta R_{it} = \tau_{1i} \Delta P^*_{it} + \tau_{2i} \Delta P_{it} + e_{it} \quad (2)$$

where  $e_{it}$  represents the error term. Since, in theory,  $R_i$  represents the difference between  $P_i^*$  and  $P_i$ , one might expect  $\tau_{1i}$  to be "1" and  $\tau_{2i}$  to be "-1." These expectations reflect two assumptions: (1) that the measures of  $R_i$ ,  $P_i^*$ , and  $P_i$  share a common metric; and (2) that the parameters  $\tau_{1i}$  and  $\tau_{2i}$  are equivalent across the spending categories  $i$ . However,  $R_i$ ,  $P_i^*$ , and  $P_i$  do

not share a common metric (indeed, we do not even observe  $P^*$ ) and whether the parameters  $\tau_{1i}$  and  $\tau_{2i}$  are equivalent across the spending categories can be tested directly. Thus, all that can be hypothesized is that  $\tau_{1i}$  will be positive and  $\tau_{2i}$  will be negative.

Although the survey questions ask specifically about spending, the budgetary commitment to programs is primarily evident in the budget authority specified in appropriations, not the actual spending that results from appropriations decisions (Ellwood 1986). The public, therefore, may respond to appropriations decisions themselves, as reflected in the news media (perhaps much in the same way the public's assessments of the economy follow economic news; see Brody 1991; MacKuen, Erikson, and Stimson 1992; Sanders, Marsh, and Ward 1993) or as communicated in other ways (Stimson 1989; Ferejohn and Kuklinski 1990). Alternatively, the public may respond to spending, as money makes its way into localities and people's pockets. This distinction in the focus of public responsiveness is not trivial, for it relates directly to an important area of research on public opinion, indeed, research on decision theory in general (see, e.g., Nisbett and Ross 1980). Of course, this issue can be settled empirically; in the analysis that follows, the feedback of appropriations on preferences is considered first.

Finding reliable measures of appropriations for the particular categories of spending is not entirely straightforward. With the exception of defense, such data generally are not available in any organized way prior to the Budget Act of 1974. Even notwithstanding the availability of data, judgment is required to determine whether a particular type of spending, say housing assistance, is spending on "welfare" or "big cities" or something else. Perhaps the most reliable data on appropriations, based on fairly reasonable classifications, are those corresponding to the budget "functions" specified in the Budget Act. In fact, the budget functions neatly match the spending preference items in the case of health, education, and the environment. Identifying appropriations for welfare and big cities is less clear, although it seems that appropriations for "Income Security" correspond with welfare, and appropriations for "Community and Regional Development" pertain to big cities.<sup>6</sup> These appropriations data are available only since 1976, limiting the analysis to the period between 1977 and 1991.

Measures of the percentage change in real dollar-valued (in 1982 dol-

<sup>6</sup>Appropriations for "disaster relief and insurance" were excluded from appropriations for big cities. Three subcategories of "Income Security" were excluded from appropriations for welfare: "general retirement and disability insurance," "federal employee retirement and disability," and "unemployment compensation."

lars) appropriations are used.<sup>7</sup> If there is negative feedback of appropriations on the public's relative preferences for spending, changes in net support will be negatively related to changes in appropriations. Such an estimated connection between appropriations and public preferences cannot be an artifact of simultaneity; after all, any positive feedback of appropriations on net support only serves to bias the analysis against finding thermodynamic public behavior.<sup>8</sup>

The foregoing model implies that public preferences for more (less) spending reflect both the public's preferred level of spending and policy itself. Of course, shifts in public support for more spending might primarily reflect shifts in policy; that is, the preferred level of spending in each category may remain largely unchanged while spending itself changes over time, producing ebbs and flows in the support for more spending. Public preferences for more spending also may reflect shifts in the preferred levels of spending over time, and there is reason to think they do. Since we do not directly observe the preferred levels of spending, however, it is necessary to rely on instruments.

With respect to defense, the preferred level of spending appears to follow the flow of United States-Soviet relations (Abolfathi 1980); as the Soviet threat increases, the preferred level of defense spending is expected to increase. Although little reliable data directly captures the Soviet threat, an indication is provided by responses to a like/dislike item in the GSS and in certain surveys conducted by the American Institute of Public Opinion (AIPO) (Niemi, Mueller, and Smith 1989). The item registers the like/dislike of "Russia" on a ten-point scale ranging from -5 to 5. A measure of net dislike of the Soviet Union can be created by subtracting the percentage of people that likes Russia from the percentage that dislikes the nation. While imperfect, in that it does not incorporate information about national security in general, the measure does effectively capture the apparent threat from the Soviet Union, the primary source of threat to the United States over the period (Wlezien 1995).<sup>9</sup>

<sup>7</sup>Using the first differences of real dollar-valued appropriations instead of percentage change measures does not change any of the substantive results. Real dollar values of appropriations were calculated by dividing current dollar values into the gross national product price deflator (1982 = 1.00), drawn from *The National Income and Product Accounts*. Appropriations data were distilled from the *Budget of the United States Government, Fiscal Year 1993* (Supplement, February, 1992).

<sup>8</sup>Therefore, accounting for such simultaneity between appropriations and net support, which is not straightforward, can only strengthen the negative, feedback relationship between them.

<sup>9</sup>Neither the GSS or AIPO asked the question in 1978, so the value for that particular year is the average score for 1977 and 1979—excluding the year makes almost no difference in the analyses.

The influences on the preferred levels of social spending are much less apparent. Recent research (Durr 1993) on the determinants of Stimson's measure of policy sentiment, however, indicates that the "mood" of the electorate is closely related to economic expectations. As economic expectations become more optimistic the public tends to become more liberal, and vice versa. The finding implies that as economic expectations become more optimistic, the preferred levels of spending for social programs should increase. Following Durr (1993), economic expectations are measured using the long-term business conditions component of the University of Michigan's Index of Consumer Sentiment.<sup>10</sup>

The evident parallelism of preferences for more spending across categories of social spending shown in Figure 1 implies that: (1) the preferred levels of spending in the various social categories move together, as the foregoing discussion suggests; and/or (2) budgetary policies for the social programs move together over time, causing ebbs and flows in relative preferences for spending across the various categories. Additionally, the evident inverse relationship between the preference for more defense spending and preferences for social spending shown in Figure 1 implies that: (1) the preferred levels of defense and social spending are inversely related; and/or (2) budgetary policies for defense and social programs are inversely related. In effect, a guns-butter trade-off may be evident in the public's preferred levels of spending and/or policy itself. Given the focus of this research, we must account explicitly for any parallelism in the preferred levels of social spending across categories and interdependence between the preferred levels of social and defense spending. These possibilities can be assessed empirically.

### An Analysis of Public Preferences for Spending

The public's relative preferences for spending in the various categories are captured by the measures of net support for spending. Differenced measures are used as dependent variables because there is a theoretical expectation outlined above (and borne out in separate analyses) that the influences on relative preferences become integrated into future values. In effect, preferences remain unchanged unless something happens to change them, such as an increase in net dislike of the Soviet Union or business expectations.

<sup>10</sup>The business expectations component is based on the question: "Looking ahead, which would you say is more likely—that in the country as a whole we'll have continuous good times during the next five years or so, or that we'll have periods of widespread unemployment or depression, or what?" Since the public preference data used to calculate net support are drawn mostly from the GSS, which is conducted in February-April, the measure of business expectations in the first quarter of each year is used.

**Table 1. Defense Spending Preference Regression**

Independent Variable	Net Support for Defense Spending, (differenced)
Intercept	11.53** (2.40)
Net Dislike of the Soviet Union, (differenced)	.66** (.12)
Net Dislike of the Soviet Union, <sub>-1</sub> (differenced)	.60** (.13)
Defense Appropriations,	-2.70** (.41)
R-squared	.84
Adjusted R-squared	.80
Standard error of the regression	6.84
Durbin-Watson	1.72
Box-Ljung (3 df)	.33
<i>N</i> = 15; ** <i>p</i> < .01 (2-tailed)	

*Note:* Results were generated using the OLS regression procedure in MicroCrunch. Standard errors are in parentheses.

The variables that are original to this analysis are defined as follows:  
 Net Dislike of the Soviet Union, (differenced) = the first difference of Net Dislike of the Soviet Union,, where Net Dislike of the Soviet Union, represents the percentage of people who dislike the Soviet Union minus the percentage of people who like the Soviet Union.  
 Net dislike of the Soviet Union,<sub>11</sub> (differenced) = the lagged value of Net Dislike of the Soviet Union (differenced).

Defense Appropriations, = the percentage change in total appropriations for defense (in 1982 dollars) in fiscal year *t*.

The functional form relating net dislike to net support for defense spending already has been determined (Wlezien 1995). The corresponding specification relating business expectations to net support for spending in the various social categories is based on empirical analysis. The five categories—big cities, education, environment, health, and welfare—are pooled together on the expectation that spending preferences in the separate categories are structurally similar. The results of separately estimating the models of defense and social spending preferences are presented in Tables 1 and 2, respectively.<sup>11</sup>

The results in Table 1 indicate that the model of public preferences for

<sup>11</sup>Results of analyses using cointegration methodology, specifically, the Engle and Granger two-step method (following Durr 1992), do not differ meaningfully from those presented herein (also see Wlezien 1995). These results will be made available upon request.

**Table 2. Pooled Preference Regressions for the Five Categories of Social Spending, 1977–1991**

Independent Variable	Net Support for Spending <sub>jt</sub> (differenced)	
Intercept	1.68** (.51)	1.76** (.52)
Business Expectations, (differenced)	.12*** (.03)	.13** (.03)
Business Expectations <sub>t-1</sub> (differenced)	-.08*** (.03)	-.08** (.03)
Appropriations <sub>jt</sub>	-.03 (.02)	—
Big Cities	—	-.01
Appropriations, Education Appropriations,	—	(.03) -.04 (.05)
Environment	—	-.01
Appropriations, Health Appropriations,	—	(.08) -.06 (.13)
Welfare Appropriations,	—	-.14* (.06)
R-squared	.21	.24
Adjusted R-squared	.17	.16
Standard error of the regression	4.58	4.64
Rho	-.31	-.23
Box-Ljung (3 df) <sup>c</sup>	2.57	3.68

N = 75, \*\*p < .01; \*p < .05 (2-tailed)

Note. Results were generated using the GLS-ARMA pooled regression procedure in MicroCrunch. Standard errors are in parentheses.

<sup>a</sup>The estimated coefficients for the separate categories of spending preferences are not significantly different ( $F_{4,67} = 1.34$ ; pr. = .21).

<sup>b</sup>The estimated coefficients for the separate categories of spending preferences are not significantly different ( $F_{4,67} = .03$ ; pr. = .99).

<sup>c</sup>The number of degrees of freedom equals the number of lags (4) minus 1, for the estimated parameter rho.

The variables that are original to this analysis are defined as follows:

Business Expectations<sub>t</sub> (differenced) = the first difference of Business Expectations<sub>t</sub>, where Business Expectations<sub>t</sub> represents the long-term business conditions component of the Index of Consumer Sentiment (ICS) during the first quarter of year  $t$ .

Business Expectations<sub>t-1</sub> (differenced) = the lagged value of Business Expectations<sub>t</sub> (differenced).

Appropriations<sub>jt</sub> = the percentage change in appropriations (in 1982 dollars) for each social program  $j$  in fiscal year  $t$ .

defense spending performs quite well. Net support follows the relations between the United States and Soviet Union over time, as captured by the measures of net dislike. Most importantly, however, the analysis reveals substantial feedback of appropriations on preferences for spending. As indicated by the reliable, negative coefficient for defense appropriations, the public generally becomes less (more) supportive of more defense spending as appropriations increase (decrease), *ceteris paribus*. This feedback of appropriations on preferences is remarkably robust: the pattern holds even when the measures of net dislike are excluded from the model (pearson's  $r = -.56$ ;  $pr. = .03$ ). When the years (1981–82) during which appropriations increases were greatest are excluded from the analysis, the coefficient only drops slightly and remains highly reliable ( $b = -2.46$ ;  $s.e. = .67$ ).<sup>12</sup> These results imply that the public actually behaves like a thermostat, adjusting its preferences for defense spending in response to appropriations decisions themselves.<sup>13</sup>

The results of the pooled analysis of preferences for social spending reveal a different pattern of public responsiveness. Before turning to these results, notice that an increase (decrease) in economic optimism leads to public support for higher (lower) social spending, consistent with Durr (1993). The estimated effect of current changes in business expectations on net support in year  $t$  is virtually equivalent across categories of social spending, as is implied by the theoretical model. The negative coefficient for lagged changes in business expectations, however, indicates that the current influence of business expectations on net support does not fully carry over into future years. The pattern is generalizable across the five categories of spending (see Table 2). Thus, based on this analysis, the positive effect of business expectations on spending preferences is largely short-lived.

The first column of Table 2 shows that public preferences for spending in the social spending categories do not generally reflect appropriations in those categories; the coefficient for appropriations is correctly (negatively)

<sup>12</sup>When the model is estimated for the period including 1974–76, for which measures of defense appropriations and opinion also are available, the estimated coefficient for appropriations is slightly smaller but remains equally as reliable ( $b = -2.26$ ;  $s.e. = .36$ ).

<sup>13</sup>This finding contrasts with Hartley and Russett (1992), who show that the public does not adjust its relative preferences in response to policy. Hartley and Russett did not find negative feedback for at least two reasons: (1) they did not consider public responsiveness to appropriations for fiscal year  $t$ ; and (2) they combined all data about public preferences for defense spending collected over the course of each year into a single measure (Wlezien 1995). The effects of combining data as they did actually are quite confounding, since the bulk of public responsiveness to defense appropriations for year  $t$  already is evident in preferences registered at the end of year  $t-1$ , just after those appropriations decisions are made (see note 3). By implication, analysis that averages preferences over the course of a year will mask feedback (and exaggerate representation), highlighting the importance of measurement in the study of interrelationships between opinion and policy.

signed, but far too unreliable to credit.<sup>14</sup> The results of estimating the model using separate measures of appropriations for each of the spending categories suggest that public responsiveness varies slightly across categories of social spending (see the second estimated model in Table 2). Although four of the five (negatively-signed) coefficients are not significantly different from 0, the coefficient for welfare appropriations does meet conventional levels of statistical significance. This result implies that there may be something unique about the welfare spending domain, but it nevertheless is quite clear that the public generally is not responsive to appropriations for the particular social programs. The finding contrasts with the evident public responsiveness to appropriations for defense shown in Table 1.

That the public is *not* responsive to appropriations for particular social programs is *not* entirely surprising. After all, there is reason to think that specific information about appropriations for those programs is not regularly and widely available to the public. Thus, it may be that the public acquires only general information about social appropriations, e.g., that Reagan cut "social programs." The public still may respond to appropriations for social programs, but in a general way, with support for more (less) spending across social programs in response to cuts (increases) in appropriations for the set of programs taken together.<sup>15</sup> In order to test this possibility, a measure of the percentage change in total social appropriations was created and substituted for the measure of appropriations change in the particular social categories. The results of estimating the model are contained in Table 3.

These results suggest that the public does adjust its preferences for more (less) spending in the particular categories in response to what policymakers appropriate for social programs taken together. The coefficient for social appropriations is negative and quite reliable ( $p < .01$ , two-tailed) and does not differ meaningfully across the five categories of spending preferences ( $F_{4,67} = .34$ ;  $pr. = .81$ ).<sup>16</sup> It appears, therefore, that the public

<sup>14</sup>The negative first-order autoregressive parameter in the models of social spending preferences (see Table 2) appears to reflect measurement error—incorporating the lagged difference of net support into the models captures most of the evident autocorrelation.

<sup>15</sup>Or, put differently, the particular social programs may be "substitutable" in the public's mind. Such a pattern would be consistent with the supposition that the separate programs represent different means to the same end for policymakers (Hicks and Swank, 1992). Also see Jankowski and Wlezien (1993).

<sup>16</sup>The estimate is quite robust: the coefficient only drops slightly ( $b = -.15$ ;  $s.e. = .05$ ) when the measures of business expectations are excluded from the model and the effect holds when each year is excluded from the analysis, with replacement. Note also that the public's preference for welfare appropriations is more responsive to the percentage change in total social appropriations ( $b = -.21$ ;  $s.e. = .08$ ) than to appropriations for welfare (see Table 2).

**Table 3. Total Social Appropriations and Preferences for Social Spending, 1977–1991**

Independent Variable	Net Support for Spending <sub>jt</sub> (differenced)
Intercept	1.96** (.45)
Business Expectations, (differenced)	.15** (.03)
Business Expectations <sub>tl</sub> (differenced)	−.07* (.03)
Social Appropriations <sub>t</sub>	−.18*** <sup>a</sup> (.04)
R-squared	.36
Adjusted R-squared	.33
Standard error of the regression	4.13
Rho	−.27
Box-Ljung (3 df)	3.66
N = 75, **p < .01; *p < .05 (2-tailed)	

Note. Results were generated using the GLS-ARMA pooled regression procedure in MicroCrunch. Standard errors are in parentheses.

<sup>a</sup>The estimated coefficients for the separate categories of spending preferences are not significantly different ( $F_{4,67} = .34$ ; pr. = .81).

The variable that is original to this analysis is defined as follows:

Social Appropriations<sub>t</sub> = the percentage change in total appropriations for the environment, big cities, health, welfare, and education (in 1982 dollars) in fiscal year  $t$ .

responds to appropriations for social programs in a more general way than to appropriations for defense, consistent with the conjecture that there seems to be less available information about budgeting for particular social programs.<sup>17</sup>

Comparing the results for defense and social spending preferences also reveals that the public is much less responsive to social appropriations than to defense appropriations. That is, the estimated public responsiveness to a 1% change in appropriations for the set of social programs ( $b = -.18$ ) is substantially smaller than the responsiveness to an equal change in defense appropriations ( $b = -2.70$ ). This difference in the responsiveness to appropriations actually is in fitting with the differential variation in defense and

<sup>17</sup>Separate analyses reveal that the public is not independently responsive to changes in appropriations requests or actual outlays for defense and social programs; yet other analyses indicate that the public is not responding solely to the (dichotomous) direction of appropriations change. Thus, it appears that the public updates its preferences based on the most recent information about appropriations decisions themselves.

social spending preferences shown earlier (see Figure 1). Put simply, public preferences for social spending are much more stable and change very deliberately over time.<sup>18</sup> Ultimately, however, there is no escaping the conclusion that the public, as an aggregate, is reasonably well-informed about what policymakers do over time, at least in the defense spending domain and across a set of social spending domains. Otherwise, the public could not behave like a thermostat.

### A Guns-Butter Trade-Off?

Recall that preferences for defense and social spending are inversely related, which implies an effective guns-butter trade-off in the public's preferred levels of spending (and/or policy itself). Thus, preferences for defense and social spending might be interdependent. In order to directly test this possibility, the predicted differences in the preferred levels of defense and social spending were generated (based on the results in Tables 1 and 3) and incorporated into the models of social and defense spending preferences, respectively. The predicted difference in the preferred level of defense spending represents the difference in net support for defense spending predicted by the current and lagged differences in net dislike. The predicted difference in the preferred level of social spending represents the difference in net support for social spending predicted by the current and lagged differences in business expectations. The results of these analyses are described in Table 4.

The results show an effective guns-butter trade-off in public preferences, but that the trade-off is unidirectional—from guns to butter, not the other way around. As is evident from the statistically significant, negative coefficient, when the public's preferred level of defense spending increases (because of an increase in the perceived Soviet threat) net support for social spending decreases; when the preferred level of defense spending decreases net support for social spending increases. The estimated trade-off holds generally across the five categories of spending preferences ( $F_{4,66} = .43$ ;  $pr. = .74$ ) and, when the variable is included in the model, the coefficients for social appropriations and the measures of business expectations remain largely unchanged and the fit of the model improves considerably (see Ta-

<sup>18</sup>In effect, the public acquires much less information about budgeting for social programs even when taken together. Moreover, the acquisition of information about social appropriations appears to be at least partially structured by individuals' attentiveness to politics, i.e., responsiveness to social appropriations varies by education, being more pronounced among the better educated. The responsiveness to defense appropriations holds generally across categories of education.

**Table 4. An Assessment of the Interdependence Between Defense and Social Spending Preferences**

Independent Variable	Net Support for Defense Spending, <sub>i</sub> (differenced)	Net Suport for Social Spending, <sub>ji</sub> (differenced)
Intercept	11.51** (2.52)	1.38** (.45)
Net Dislike of the Soviet Union, <sub>i</sub> (differenced)	.65** (.13)	—
Net Dislike of the Soviet Union, <sub>i-1</sub> (differenced)	.61** (.15)	—
Defense Appropriations, <sub>i</sub>	-2.71** (.43)	—
Predicted Difference in the Preferred Level of Social Spending, <sub>i</sub>	-.10 (.86)	—
Business Expectations, <sub>i</sub> (differenced)	—	.17** (.03)
Business Expectations, <sub>i-1</sub> (differenced)	—	-.07** (.02)
Social Appropriations, <sub>i</sub>	—	-.17** (.04)
Predicted Difference in the Preferred Level of Defense Spending, <sub>i</sub>	—	-.10** <sup>a</sup> (.03)
R-squared	.84	.45
Adjusted R-squared	.78	.41
Standard error of the regression	7.17	3.86
Rho	—	-.37
Durbin-Watson	1.73	—
Box-Ljung (3 df)	.30	3.19
Number of Cases	15	75

\*\* $p < .01$  (2-tailed)

Note: Results were generated using the OLS regression procedure and the GLS-ARMA pooled regression procedure in MicroCrunch for defense and social spending preferences, respectively. Standard errors are in parentheses.

<sup>a</sup>The estimated coefficients for the separate categories of spending preferences are not significantly different ( $F_{4,66} = .43$ ; pr. = .74).

The variables that are original to this analysis are defined as follows:

Predicted Difference in the Preferred Level of Defense Spending,<sub>i</sub> = the difference in the Net Support for Defense Spending,<sub>i</sub> predicted by Net Dislike of the Soviet Union<sub>i</sub> (differenced) and Net Dislike of the Soviet Union<sub>i-1</sub> (differenced), based on the estimated model in Table 1.

Predicted Difference in the Preferred Level of Social Spending,<sub>ji</sub> = the difference in the Net Support for Social Spending,<sub>ji</sub> predicted by Business Expectations,<sub>i</sub> (differenced) and Business Expectations<sub>i-1</sub> (differenced), based on the estimated model in Table 3.

bles 3 and 4).<sup>19</sup> This result implies that the public's preferred level of social spending depends on the perceived "need" for defense spending.

Changes in the public's preferred level of social spending (resulting from changes in economic expectations) do not produce any trade-off in the public's preferred level of defense spending—the coefficient is statistically insignificant by any standard. Taken together, these results suggest an intuitively satisfying finding: national defense is primary in the evaluations of the American public. Indeed, the public seems to have a level of spending in mind that it allocates to defense and nondefense programs based on the need for defense spending, producing the strong, negative relationship between net support for defense and social spending demonstrated above.<sup>20</sup>

The foregoing analyses indicate that the public's preferred levels of defense and social spending change over time in understandable ways, and this change in the preferred levels of spending finds expression in preferences for more spending. Apart from these variable components of the preferred levels of spending, there appear to be constant components, as indicated by the positive intercepts in Tables 1 and 4. Put simply, the public's preferred levels of defense and social spending tend to increase over time, *ceteris paribus*; the intercepts, taken together with the coefficients for the measures of appropriations, imply that the amount of appropriations (in real dollars) the public wants increases by about 4 to 8% on an annual basis.<sup>21</sup> This is a striking finding with potentially important consequences, particularly since the estimate exceeds the average annual growth in the real gross national product. Indeed, the finding may make the historical growth in actual spending more understandable.

### Discussion

Based on the foregoing analyses, the thermostatic model of public preferences works quite well. We observe that the signals the public sends to

<sup>19</sup>The estimated trade-off ( $b = - .10$ ) between the public's preferred levels of defense and social spending shown in Table 4 is consistent with the differential public responsiveness to changes in defense and social appropriations.

<sup>20</sup>Spending preferences also may vary inversely due to the quite opposite budgetary priorities Republican and Democratic presidents may reflect, which, because of feedback, would cause the net support for defense and social spending to diverge over time. Note that the public responsiveness to appropriations demonstrated above does not uniquely reflect responsiveness to the party of the president, based on separate analyses. Of course, in those domains where information about policy is less readily available or salient to the public, such direct cue-taking is more likely (see, e.g., Franklin, Marsh, and Wlezien 1994).

<sup>21</sup>Technically, the estimated annual increase in preferences for defense spending is 4.3 (11.53/2.70) %; the estimated annual increase in preferences for social spending is 8.1 (1.38/.17) %. Although there is reason to think that the tendency for the public to want more real spending over time is due to "income effects" (Kreps 1990), the possibility is not explicitly considered here.

policymakers, in the form of preferences for “more” or “less” spending, react to changes in policy. Consistent with the Eastonian model, there is negative feedback of spending decisions on the public’s relative preferences, whereby the public adjusts its preferences for more spending downward when appropriations increase, and vice versa. This does not mean that the public’s relative preferences for spending solely reflect shifts in policy, that the public’s favored policy temperature remains fixed while policy changes, producing ebbs and flows in preferences. After all, though we cannot directly observe how much spending the public wants, the public’s preferred levels of spending do change over time in understandable ways. Most importantly, when controlling for this change in preferences, the thermostatic model works.<sup>22</sup>

What perhaps is most striking is that the public responds to appropriations, which are policy decisions, not to the more tangible outlays that result from appropriations. Of course, such public responsiveness must reflect information communicated by the mass media (see, e.g., Brody’s analysis of how “rally” events influence presidential approval) or in other ways. Regardless of how information is mediated, the information the public receives about certain policy domains is quite accurate, on balance. Otherwise, the public could not behave like a thermostat.<sup>23</sup>

That the model works in important policy domains is satisfying, for it indicates that the spending preference “signals” the public sends to policymakers are quite meaningful. Policymakers, however, may not closely follow these signals; although there is evidence that policymakers represent public preferences in policy (Bartels 1991; Page and Shapiro 1992; Hartley and Russett 1992), the representation of preferences is not perfectly coordinated with the process of feedback. That is, the public’s preferences for policy have exhibited a certain cyclical over time, drifting in a “conservative” direction through the 1970s and then in a distinctly “liberal” direc-

<sup>22</sup>Separate analyses show that the model of social spending preferences developed here accounts for preferences across a range of policy domains, as reflected in Stimson’s measure of policy sentiment. Thus, it appears that the instruments for the preferred level of social spending accurately tap the public’s preferred level of policy activity across a variety of domains and that appropriations (at least partially) capture the general flow of policy in these domains (Wlezien 1993). Also see note 5.

<sup>23</sup>The thermostatic model does not work equally as well in other spending domains, specifically, crime, foreign aid, and space exploration, taken either separately or together—there is some suggestion that the public responds to appropriations relating to crime, though the effect is not highly reliable ( $b = -.09$ ;  $s.e. = .08$ ). Thus, it appears that the public does not acquire and process much information about policy decisions in these domains, which is not entirely surprising. After all, spending on foreign aid, space, and even crime is much less important to the American public than spending on defense and social programs (see Abramowitz 1994; Jacoby 1994).

tion throughout the 1980s (see Figure 1). This result implies that policy only partially reflects public preferences; if policymakers were solely responsive to those preferences, we would not observe such pronounced cyclicality—rather, preferences would tend to equilibrate quickly over time.

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