Political Science Research and Methods (2025), 1–17
doi:10.1017/psrm.2025.10024

ORIGINAL ARTICLE

What moves (spending) mood? The nature and origins of parallel public preferences

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(Received 21 April 2024; revised 1 November 2024; accepted 28 January 2025)

Abstract
While research shows that public preferences across policy domains tend to move in parallel, the mechanisms behind this dynamic remain unclear. We examine four explanations: (1) alignment in preferred policy levels; (2) parallel policy movement combined with domain-specific thermostatic feedback; (3) feedback to global policy across domains; and (4) responsiveness to presidential partisanship. These mechanisms matter for how we interpret public opinion change and policy responsiveness. We develop and test a theoretical model using data on four social spending domains in the USA. Our findings suggest that spending mood reflects both parallelism in preferred policy levels and responsiveness to overall social spending and presidential party affiliation.

Keywords: feedback; policy; public opinion; responsiveness; thermostatic model; time series

1. Introduction

At the heart of representative democracy lies the relationship between citizens and policymakers (Dahl, 1971; Manin, 1995). In theory, citizens relay their preferences to electorally minded policymakers who, in turn, translate them into policy. Scholars commonly consider the connection on specific issues, but foundational research by Stimson (1991) shows that public preferences on different issues tend to move in parallel over time, forming what he referred to as a policy "mood." Yet, the degree to which the issues sync together varies across domains and countries (Bartle et al., 2011, 2019, 2020; Van Hauwaert and English, 2019; Romero-Vidal, 2020; Van Hauwaert, 2023; Van Hauwaert and Vegetti, 2025). Research in the tradition of Page and Shapiro (1992) suggests such variation cannot be merely explained by distinct opinion dynamics across societal groups (see also Soroka and Wlezien, 2010; Enns and Wlezien, 2011; Romero-Vidal and Van Hauwaert, 2022). Taken together, these findings point to a fundamental but unresolved question: what is the origin of parallel movement in preferences? *What moves mood?*

We set out to answer this question by examining four separate but complementary mechanisms. First, we may see parallel movement in relative policy preferences because the public's preferred levels of policy have changed similarly across domains. Second, relative preferences may move in parallel because they are responding, thermostatically, to parallel movement in policy across domains. Third, relative preferences in different domains may respond in a parallel way to general policy trends for the

domains taken together. Fourth, public preferences may respond in parallel not to policy in particular domains or across domains but, rather, to governing parties, thermostatically lowering (raising) preferences when, for example, a Democrat (Republican) is in the White House. Identifying which of these mechanisms are at work will help us further understand the dynamics of public opinion and, more specifically, how citizens respond to their environments. This has direct implications for democratic representation itself.

In this study, we develop our theoretical account of mood and provide an empirical test, focusing on social spending domains in the United States of America (USA). Reliable time series of both preferences for spending and budgetary policy permit a systematic analysis between 1973 and 2019. We find evidence that shared overtime variation in public preferences for social spending about equally reflects parallelism in the underlying preferred levels of policy and in the responsiveness to social spending. At the same time, we reject pervasive thermostatic response to parallel movement in policy across different domains. Finally, partisan control of the White House produces common "thermostatic" preference change but does not drive responsiveness to spending. These findings map nicely onto previous scholarship and yet mark a significant advance in our knowledge. While not the last word on the subject, our analysis reshapes our interpretation of opinion change and its consequences.

2. Public opinion and policy mood

Since the beginning of polling, survey organizations have gauged public opinion on policy issues. Traditionally, scholars viewed aggregate opinion as specific to a policy area, be it welfare, health, or education (Geer, 1996). Stimson (1991) challenged this wisdom in his now classic, *Public Opinion in America*. Building on Almond's (1950) earlier conceptualization of foreign policy mood, he posited that a river of policy sentiment flows through time, encompassing a wide range of issues. Parallelism is the defining feature, where publics behave in systematic, seemingly coherent ways across issue domains. His analysis bears out the patterned mood he imagined, a major contribution made possible by Stimson's ingenuity in combining time series of public opinion data and creating methodological tools to analyze them.

It may be tempting, based on this work, to conclude that the public does not have preferences for policy in different areas but has a single, very general preference for government activity instead. Although some scholars have made this claim (e.g., Hill and Hinton-Anderson, 1995), it is not quite right. Stimson (2004) himself showed that opinions on some issues, like abortion, are largely unrelated to opinions on others. Even the issues that do load on a single, overarching public mood do so to varying degrees. Given the potential consequences for policy representation and elections (Wlezien, 2004; 2017a; Grossmann and Wlezien, 2024), this warrants further investigation. After all, the factors that explain why opinion flows together may also explain why parallelism varies across issues.

We furthermore note that the idea of parallel opinion movement is firmly entrenched in American scholarship (Durr, 1993; Erikson et al., 1993; Jacoby, 1994; Ellis and Faricy, 2011; Brulle et al., 2012; Enns, 2014; Faricy and Ellis, 2014; Caughey and Warshaw, 2016). Evidence of equivalence with several alternative operationalizations of public opinion only adds to its validity (e.g., Kim and Fording, 1998; Stevenson, 2001; Enns and Kellstedt, 2008; Lax and Phillips, 2009), as do recent applications beyond the American context. Indeed, we see similar patterns in Great Britain (Bartle et al., 2011, 2019), France (Stimson et al., 2012), Italy (Bellucci and Pellegata, 2017), Japan (Ohmura, 2018), Russia (Matovski, 2018), Scotland (McGann et al., 2019), Spain (Bartle et al., 2020), Mexico (Baker, 2015), the Netherlands (McGann et al., 2023), and Uruguay (Álvarez et al., 2022). Thus, mood is not a uniquely American concept but, perhaps, a more general feature of modern representative democracy.

It is also worth noting that much research demonstrates parallel publics in policy mood across subgroups of society. Page and Shapiro (1992) first demonstrated that when one group of Americans, say, high-income earners, shifts its preferences in a conservative direction, low (and middle) income earners typically do so as well, even if the levels of preferences among these groups differ (see also

Soroka and Wlezien, 2008; Ura and Ellis, 2008). This holds for other societal divisions, such as education (Enns and Kellstedt, 2008), ideology (Page and Jacobs, 2009; Ellis and Stimson, 2012; Ura and Ellis, 2012), and gender (Kellstedt et al., 2010; Eichenberg and Stoll, 2012), both in Anglo-Saxon countries (Soroka and Wlezien, 2010; Enns and Wlezien, 2011) and across Europe (Romero-Vidal and Van Hauwaert, 2022, 2025). Altogether, an extensive literature demonstrates a striking structure to public preferences for policy.

3. Absolute preferences, relative preferences and the thermostatic model

Surveys almost never ask people about their absolute policy preferences, i.e., their preferred levels of policy, but ask about their relative preferences instead. Are governments doing too much? Should spending be decreased? Expressed public opinion thus registers preferences for policy change. In theory, these preferences (R) tap the difference between the public's preferred level of policy (P^*) and policy (P) itself:

$$R_t = P_t^* - P_t, \tag{1}$$

where the subscripted t indicates time.[1] This is the well-known thermostatic model (Wlezien, 1995) that applies across both space and time, though the latter is of special interest given our focus on the structure of policy mood.

Now, the equation makes clear that measured relative preferences are not the same as absolute preferences, and the degree to which they differ can vary across domains. That said, given available data, we rarely observe P^* and must rely on proxies. In his original study, Wlezien (1995), following Durr (1993), proxied P^* with the University of Michigan's Index of Consumer Sentiment. Other proxies include unemployment (Wlezien and Soroka, 2012), the misery index (Franklin and Wlezien, 1997; Wlezien, 2004), support for government action (Wlezien and Soroka, 2012), public consumption (Bartle et al., 2011), and GDP and the Gini coefficient (Wlezien and Soroka, 2021).

By implication, the three variables in the previous equation are not measured using the same metric, so it is necessary to rewrite the equation as follows:

$$R_t = a_o + B_1 U_t + B_2 P_t + e_t, \tag{2}$$

where a_o and e_t represent the intercept and error term, respectively, and U is a set of exogenous proxies for P^*. Thus far we have (implicitly) modeled preferences in a single domain, but we are interested in a set of domains j, and so adjust our equation as follows:

$$R_{jt} = a_{oj} + B_{1j} U_{jt} + B_{2j} P_{jt} + e_{jt}. \tag{3}$$

This simple extension of the model highlights the primary mechanisms of parallel preference change, or "policy mood," namely, preferred policy (U_j) and policy (P_j) itself. Let us now consider these different components in more detail, beginning with the former.

3.1 Parallel (underlying) preferred levels of policy

Parallel relative preferences could reflect parallel movement in the underlying preferred levels of policy across domains j. For example, people's preferences for welfare may increase alongside increases in support for health and education owing to the pro-cyclical effects of an expanding economy

[1]This theorization supposes that the public's (underlying) preferred level of policy is integrated, whereby the effects on current values become incorporated into future values, i.e., preferences do not change unless something changes them. The same is true for policy. Given this and the expectation that policy follows preferences, there is reason to suppose that relative preferences are stationary, that is, a linear combination of two co-integrated variables, where P follows P^* over time. This is supported by previous research (Soroka and Wlezien, 2010, 2022) and diagnostic analyses below, which implies that the equations we estimate are balanced, i.e., stationary on both sides (Enns and Wlezien, 2017).

(Durr, 1993). As the economy increases (decreases), people may want to spend larger (smaller) amounts on a variety of government programs (Stevenson, 2001).[2]

If this mechanism is at work, we will observe that social preferences respond equally to a common U_t, referring back to equation (3). Specifically, the coefficients B_{1J} relating U_t and R_{jt} would be similar across domains; if there is perfect parallelism, the coefficients will be identical. There are, of course, reasons to expect U_{jt} to vary across domains and for the responsiveness to a common U_t to vary, which could help explain the variation in the inter-correlations among R_{jt} over time. We can assess this empirically.

3.2 Public responsiveness to parallel policy

Parallel relative preferences also could reflect public responsiveness to parallel movement in policy. Perhaps policymakers increase policy on welfare alongside increases on health and education, so that we observe a common policy trend. This could result in part from changes in the party control of government, which may independently impact preferences, as we have raised and consider more fully below.

If this mechanism is at work, we will observe two things. First, there will be a high degree of parallelism among policies in different domains (P_{jt}). Second, preferences will respond equally to P_{jt}, referring back to equation (3). Specifically, the coefficients B_{2J} relating P_{jt} and R_{jt} would be similar across domains; if there is perfect parallelism, the ebb and flow of P_{jt} will be identical and the estimated effects (B_{2J}) on R_{jt} will be as well. There are, of course, reasons to expect P_{jt} to vary across domains and for the responsiveness to parallel P_{jt} to vary, which also could help explain the variation in the inter-correlations among R_{jt} over time. We can directly assess this, as well.

3.3 Parallel public responsiveness to global policy

Parallel relative preferences could reflect public responsiveness even if policy in different domains does *not* change in unison. Perhaps welfare policy does not shift alongside policy for health and education, but the public responds similarly in different domains to the global shift in policy *across* domains. Here, different policy domains are effectively substitutable to the public (see also Hicks and Swank, 1992; Jankowski and Wlezien, 1993). Such "global" responsiveness may still vary across domains, but when publics do respond to policy, it represents a generalized feedback of policy flows in the different domains taken together.

This may be especially true in less publicly salient policy areas. Almost by definition, policymakers and media outlets spend less time on such issues and so there is less available information about related policy decisions and outputs (Franklin and Wlezien, 1997; Soroka, 2003). When issues are not salient, and information environments are opaque, people may be more likely to recognize general policy patterns and use these to update their preferences.

The two forms of public responsiveness—domain-specific and global—we have theorized may both be at work. To assess the structure, we must include the separate signals in our preference models, as follows:

$$R_{jt} = a_{0j} + B_{1j}U_{jt} + B_{2j}P_{jt} + B_{3j}\bar{P}_t + e_{jt} \quad (4)$$

where $\bar{P}_t$ represents the sum of policy across domains j.

As in the initial model, the coefficient B_{2j} captures domain-specific thermostatic feedback, but here the coefficient B_{3j} taps global thermostatic feedback. If public responsiveness is domain-specific, B_{2j} would be less than 0 and B_{3j} would be equal to 0, indicating that the public reacts only to policy within each domain. If responsiveness is global, by contrast, B_{2j} would equal 0 and B_{3j} would be less than 0,

[2]We might observe a similar pattern in responses to changing "need" for defense spending, i.e., a guns-butter trade-off (Wlezien, 1995).

as the public would use information about policy across all domains, not just within each domain. At the same time, responsiveness is also global when both B_{2j} and B_{3j} are less than zero and significantly different from each other. In this scenario, citizens use information about policy within *and* across domains to form their opinions, essentially combining specific and global policy signals. Again, the B_{2j}'s would account for parallelism only to the extent policy (P_j) in different domains flows together (and the coefficients converge). The B_{3j}'s would account for parallelism to the extent they are the same across domains. We can assess this empirically.

3.4 Parallel public responsiveiness to partisan control of government

Of course, people may respond not to policy in particular domains or globally across domains, but to the partisan orientation of political actors. For instance, in the USA, people may cue off the party of the president, adjusting preferences for more social spending downward (upward) when a Democrat (Republican) is in office under the assumption that such spending is increasing (decreasing). This is how some scholars interpret the thermostatic model to work, at least in policy areas subject to consistent partisan conflict and cueing (Atkinson et al., 2021). While early research found no such effects (Wlezien, 1995), more recent work does (Soroka and Wlezien, 2022; Romero-Vidal and Van Hauwaert, 2025), implying that partisan cueing increased—and emerged—over time.

There is reason to think this tendency may be more likely in lower salience domains, where information about policy is less readily available to the public. But it may happen in more salient domains, particularly where party control is decisive for policymaking, i.e., where the added information from policy decisions and outputs is minimal (Caughey and Warshaw, 2018).[3] We can directly assess whether party control helps account for the public's thermostatic responsiveness to policy across spending domains.

4. Public spending mood: An illustration

Our theorization not only identifies the origins of policy mood but provides an account of parallel policy preferences. Our analysis focuses on a set of spending domains for which we have regular survey data over a long period of time within the USA. These series have been frequently studied because they afford dynamic analysis of preferences and can be directly matched up with policy. Spending preferences also closely track Stimson's policy mood (Enns and Kellstedt, 2008). So, while our analysis will necessarily be incomplete, as mood is broader both in conceptualization and measurement, it informs our understanding of mood. There also are benefits to focusing on the same items over the same period, as we can avoid the complications that result from changing the number and, especially, types of issues. Indeed, the dimensionality of mood can change as the issues themselves change, e.g., as social and cultural issues increase relative to more traditional economic ones.

The General Social Survey (GSS) regularly asks the American public about their preferences for spending. They use the same, now-familiar question wording:

Are we spending too much, too little, or about the right amount on [welfare]?

The question has been asked 31 times between 1973 and 2019, which allows us to construct regular time series of preferences.[4] Though respondents are asked about various categories, we focus on education, the environment, health, and welfare because these preferences demonstrate patterned movement over time (Wlezien, 1995, 2004; Soroka and Wlezien, 2010). For each domain, we create

[3] Also keep in mind that our measures of spending may only imperfectly capture relevant policy actions that are driven—and predicted—by party control.

[4] The GSS has asked these questions in February–March annually until 1994 (except 1979, 1981, and 1992) and in even numbered years ever since. Due to the COVID-19 pandemic, the 2020 GSS was postponed until late 2020 and into 2021. We exclude this latter observation.

Table 1. Mean net preferences across years, different domains (1973–2019)

	Years	Mean	Std. dev.	Factor	Uniqueness
Education	31	59.131	10.203	0.635	0.572
Environment	31	53.689	8.546	0.847	0.276
Health	31	60.292	8.434	0.735	0.426
Welfare	31	−25.652	12.299	0.699	0.490
				Eigenvalue = 2.149	

Note: Results pertain to the raw spending preference series, and the factor analysis is based on the principal factor method.

measures of *net support* by taking the percentage of respondents who say we are spending "too little" and subtracting it from them the percentage of respondents who say we are spending "too much." This is by no means a perfect measure, but it allows us to capture variation in public support for "more" or "less" spending over time, i.e., both direction and magnitude.[5]

Before moving on, we note that these questions do not impose a budget constraint. People can express preferences in particular domains without consequence for spending in other domains or taxes, i.e., *unconstrained* preferences. Forcing people to take constraints into account, however defined, may not only change preferences (Hansen, 1998) but could dampen the common variation we observe (Wlezien, 2017b).[6] In addition, the apparent economic effects could be associated with preferences for—and the actual size of—the overall budgetary pie. All of this said, imposing a budget constraint on respondents presumably would not increase the observed parallelism and could decrease it.

Figure 1 plots spending preferences for the four domains between 1973 and 2019 in the left frame. Here we observe differences in the level of net support, particularly between welfare and the other social domains.[7] Table 1 reports descriptives by domain. Welfare (and to a lesser extent education) preferences tend to be more variable, per their larger standard deviation(s). This may partly be explained by the greater responsiveness of welfare preferences to spending (Wlezien, 1995, 2004), but also by the sensitivity of welfare opinions to other information (Page and Shapiro, 1983; Shapiro and Young, 1989, 1992; Soroka and Wlezien, 2022).[8]

More importantly for our purposes, net preferences in different social domains covary over time. When support for more spending increases in one area, it tends to increase in the others. An average pairwise correlation of 0.55 indicates that while social spending preferences track together, they do not move in perfect sync, i.e., public opinion in the different domains exhibits *considerable* independent movement.

The factor analysis of preferences in Table 1 nicely captures this pattern. Each item loads positively onto a single factor that accounts for slightly more than 50% of the variance in spending preferences across the four social domains.[9] This confirms our priors regarding parallelism, or common variance, in social spending preferences over time. Nonetheless, the results in Table 1 indicate substantial domain-specific movement. Based on the uniqueness estimates in the final column, between 28% (in the case of the environment) and 57% (in the case of education) of the variance in preferences remains unique to the domain. Although some of the uniqueness may be due to sampling error, much owes

[5]The individual preference series closely correlate with Stimson's 1952–2020 annual mood measure: environment (0.76), education (0.69), health (0.57) and welfare (0.74). The analysis is based on data available here: https://stimson.web.unc.edu/wp-content/uploads/sites/9919/2021/06/Mood5220.xlsx [accessed 19 July 2022].

[6]Note that people appear to make trade-offs in their expressed relative preferences for defense and non-defense spending (Wlezien, 1995, 2004; Soroka and Wlezien, 2010).

[7]This difference may partially reflect question wording, as we know that using "assistance to the poor" instead of "welfare" makes a substantial difference (Rasinski, 1989).

[8]The variance in preferences for education largely reflects their upward trend over time.

[9]Despite a hint of a second dimension, its Eigenvalue (0.087) suggests that it matters little. The corresponding second factor loadings are 0.159, −0.082, −0.182, and 0.147, respectively.

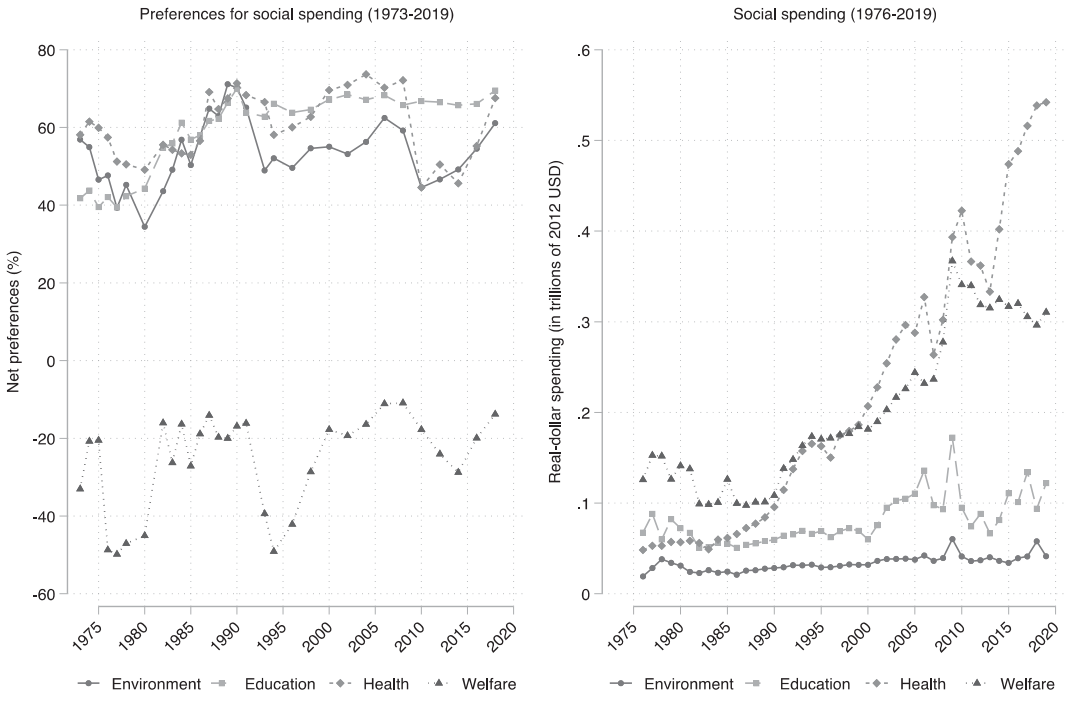

Figure 1. Net preferences for social spending and levels of social spending, different domains.

to other domain-specific features.[10] It may be that the underlying causes of policy preferences vary somewhat across domains, and that responsiveness to policy does as well, as we have discussed. Let us now see what the analysis reveals.

5. What moves spending mood? Testing four mechanisms

Recall that we are interested, to begin with, in estimating a model following equation (4). We have preference measures (R_t) in our four domains but need measures of our two spending variables (P_{jt} and $\bar{P}_t$) along with a set of predictors (U_{jt}) of underlying absolute preferences. To (partly) capture the latter, we use real GDP (in trillions of chained 2012 USD) following Wlezien and Soroka (2021).[11] They found that it structures welfare spending preferences over time, both the trend and the variation around it.

To measure spending within and across domains, we use budget authority figures specified in appropriations bills. These better capture policy decisions than the outlays that result and, most

[10]Given the frequencies and sample sizes of the polls, the observed variance due to sampling error can be computed (Heise, 1969). To estimate the error variance, it was necessary to transform net support into a proportions measure, specifically, the number of people saying that we are spending "too little" divided by the number (N) of people saying that we are spending either "too little" or "too much." The estimated error variance for this measure is the average yearly error variance, which is equal to $p(1-p)/N$. The corresponding error variance for net support is simply the proportionate amount of the total variance, e.g., where error variance is approximately 2.5% of the total variance in the proportions measure, on average, the estimated error variance for net support is 2.5% of the total variance in net support, which is 6% of the mean uniqueness in Table 1. Note that *at least some* of the error variance may be common across domains, as variation in the percentage of, say, high (low) income (education) respondents influences preferences in different domains in similar ways, so even the 6% estimate is an upper bound.

[11]Our GDP measure is collected from the Federal Reserve Bank of St. Louis at https://fred.stlouisfed.org/series/GDPCA [accessed 5 March 2022].

Table 2. Mean spending in policy domains, real-dollar values in trillions of chained 2012 USD (1976–2019)

	Years	Mean	Std. dev.
Education	44	0.0807498	0.0263255
Environment	44	0.0337135	0.0082602
Health	44	0.2195925	0.1549339
Welfare	44	0.2007410	0.0837030
Average	***44***	***0.1336992***	***0.1183653***

importantly, drive media coverage and thermostatic public responsiveness. We use data for functions specified in the Budget Act, which closely match our four social spending categories.[12] We use real-dollar valued appropriations (in trillions of chained 2012 USD) for fiscal years 1976–2019.[13] Mean values in Table 2 indicate that health and welfare are clearly the largest spending domains; they exhibit the most variance over time as well. This also can be seen in the second frame of Figure 1, where spending in all domains has increased, though to differing degrees. Largely because of this trend, spending in the different areas tends to be highly correlated (average Pearson's $r = 0.73$).[14]

To measure *total* social spending, we construct a variable that sums domain-specific spending across our four social domains, for which descriptive statistics are reported in the final row of Table 2. With the two measures we can compare responsiveness to spending within each domain and more global responsiveness to total social spending. If responsiveness is domain-specific, people would adjust preferences based only on spending within the domain. If responsiveness is global, they would react only to total social spending. Of course, people may not respond to spending at any level, in which case we would observe that neither measure matters for preferences.

5.1 Preferred levels of policy, parallel policy or global policy?

We estimate models where preferences in year t are expected to respond to spending in that fiscal year, following previous research. To avoid spurious regressions, we must ensure stationarity on both sides of the equation. As previous research suggests (see footnote 1), there is reason to suppose that preferences are stationary and also that spending and our economic variables are cointegrated, and so the combination is stationary. Diagnosis of the preferences variable is complicated by missing data (see footnote 4), but there is support for the hypothesis of stationarity, particularly for the environment, health, and welfare; for education, the results are less clear (see Supplementary Material, Section A).

The results for education are not surprising given the analysis that follows, which shows that preferences in that domain do not respond to economic conditions or spending in the area or the other social domains. The results of cointegration tests for the spending and GDP variables are clearer in each of the other domains. Even as education preferences may be an exception, we begin by assuming equation balance in all four domains, and regress preference levels in the four domains on GDP and

[12]They match perfectly for the environment and health. For education, we exclude appropriations related to "Training and employment." For welfare, we rely on the appropriations in the category "Income Security," excluding "general retirement and disability insurance," "federal employee retirement and disability." and "unemployment compensation." Refer to Appendix A in Wlezien (2004) for operational definitions. A factor analysis of our four domain-specific spending variables returns two unique factors. The first factor accounts for nearly all common variance (Eigenvalue = 3.24), which is driven substantially by the overtime increase in spending in each area.

[13]Real dollar values were calculated by dividing current dollar values by the gross national product implicit price deflator in decimal form (2012 = 1.00) from the *National Income and Product Accounts*, available at https://fred.stlouisfed.org/series/GNPDEF [accessed 29 April 2023]. We exclude appropriations after 2019 to get an accurate account of social spending before any extraordinary changes related to the COVID-19 pandemic.

[14]Focusing on differences in spending, the average correlation drops to 0.33.

Table 3. Pooled model of net preferences across domains, 1976–2019

	Net preferences	
Net preferences$_{t-1}$	0.738*	0.663*
	(0.042)	(0.044)
Domain-specific spending$_t$	−2.705	−4.084
	(5.691)	(5.450)
Total social spending$_t$	−24.33*	−21.05*
	(4.698)	(4.561)
GDP$_t$	1.837*	1.771*
	(0.310)	(0.297)
Democratic president$_t$	–	−3.069*
	–	(0.747)
Intercept	1.476	4.893*
	(1.594)	(1.736)
Observations	176	176
R^2 (within)	0.781	0.801
σ_u	10.947	14.027
σ_e	4.472	4.275
ρ(fov)	0.857	0.915

Note: Standard errors in parentheses. Both spending and GDP are in trillions. Results are from a pooled OLS regression model with domain-specific fixed effects. *$p < 0.05$.

the two measures of spending, then add the party of the president, and report results excluding education from our (pooled) regressions in Supplementary Material, Section C. Equations include domain fixed effects and a lagged preference variable to account for dynamics (and autocorrelation).[15]

Following our initial evidence that preferences between domains share a common structure, we estimate a pooled model combining the four domains for the period 1976–2019. Table 3 summarizes the results from two analyses that follow from equation (4), first without the party of the president and second with that variable. To be clear, Table 3 reports the results of preference regressions that include domain-specific spending (P_{jt}) and total spending across all social domains taken together ($\bar{P}_t$), along with our measure of GDP (U_t).

The positive, statistically significant coefficients for real GDP indicate that more (less) favorable economic conditions lead to increased public support for more (less) social spending. This well-known "pro-cyclical" pattern (Durr, 1993; Stevenson, 2001; Wlezien and Soroka, 2021) implies that the public's underlying preferred levels of social spending change—seemingly quite dramatically—in response to the state of the economy, our main proxy.

Those preferences also reflect spending itself. The thermostatic response is generally global, not domain-specific: while the coefficients for both spending measures are, appropriately, negatively signed, only total social spending is significant. While this does not rule out domain-specific thermostatic responsiveness in particular areas, most notably welfare, it does imply that domain-specific responsiveness does not account for parallel opinion flows. The parallelism in preferences we observe thus appears to reflect similar responsiveness across domains to economic conditions and total social spending. In sum, regarding the three mechanisms we raised above, the results imply that two predominate: parallel (underlying) preferred levels of spending and parallel responsiveness to total social spending.

5.2 Policy or party control?

Although guided by equation (4), we also need to consider the possibility that people respond not to policy but cue off party control of the presidency instead. If party control is driving thermostatic public response, people's preferences for more spending will decline under Democrats and increase

[15]Estimating models using the raw data, excluding missing values instead of linearly interpolating them, makes little substantive difference (see Supplementary Materials, Section B).

under Republicans. To the extent the party of the president drives policy change, the variable will also (correspondingly) diminish the direct estimated effect of spending policy. Of course, the president's party may produce positive feedback instead, e.g., leading people to favor more (less) spending under Democrats (Republicans). We settle this empirically by inserting a dummy variable for the party of the president, where "0" = Republican and "1" = Democrat, into the equation.

Is the observed responsiveness to global policy just masking public cueing off of party control? Results in the second column of Table 3 indicate not. Although the negative, statistically significant coefficient (−3.069) for the party of the president indicates that the public responds "thermostatically" to that control, it does not meaningfully dampen the response to spending policy itself. The coefficient for total social spending increases only slightly, from −24.33 to −21.05, and remains equally reliable. Party control, thus, appears to matter but does not drive the public's thermostatic response to spending policy. It still appears to help account for the parallelism in public preferences over time, as people adjust based on which party holds the White House. Note that the estimate may not entirely reflect direct public responsiveness to the president's party, as it may be that the public reacts to relevant legislative and executive actions that are associated with the president's party but not captured by our measure of spending.

5.3 Do results vary by domain?

Given our focus, it is important to consider variation across domains.[16] For ease of presentation, we report results of regression models in each of the four spending areas. Do note that our key inferences broadly hold if we estimate a single equation with interaction terms between the spending area and our variables of interest (see Supplementary Material, Section G). These results further confirm our initial observations regarding economic conditions—they systematically move preferences pro-cyclically in the different domains. The coefficients for GDP are all positively signed, though the estimated effect is difficult to distinguish from zero in the case of education.[17] The pattern helps explain the spending preference mood we observe; that the size of the coefficients varies across domains helps explain why preferences in the different domains do not move in perfect unison.

Results in Table 4 also show a patterned global thermostatic response to total social spending in the different domains.[18] To begin with, notice that each of the four total social spending coefficients is negatively signed. The estimates for environment and health are significantly different from 0, which implies that in those domains the public is responding to total social spending. For welfare and education, the coefficients are not statistically significant, but still predict a (weaker, less reliable) thermostatic public response to spending in all social domains. That is, we expect a *degree* of parallelism across the social domains based on the ebb and flow of total social spending.

Also note there are hints of domain-specific responsiveness in the welfare spending domain.[19] This is of consequence given that welfare spending accounts for nearly 40% of total social spending. The

[16]Results in Table 3 (and subsequent Tables) are robust to both time and model specification; that is, they are not substantively or significantly different when focusing only on those years in which the GSS was fielded (see Supplementary Materials, Section B). Similarly, our results remain substantively similar when excluding the party of the president variable in the models from Tables 4–6 (see Supplementary Materials, Section F).

[17]For welfare, note that including the Gini coefficient into the equation, following Wlezien and Soroka (2021), substantially increases the size and significance of the GDP coefficient ($b = 4.378$, S.E. = 1.859), but is not itself statistically significant.

[18]We also estimate the separate regressions in a Seemingly Unrelated Regression (SUR) model. This type of model accounts for the potential correlation in the error terms across domains and may provide more accurate estimations. Results remain largely unchanged using SUR; see Supplementary Materials, Section D, for more details.

[19]When we distinguish between domain-specific spending and net social spending, the coefficient for spending on welfare is −38.467 (S.E. = 43.642) and that for spending in the other social domains is −9.916 (S.E. = 23.596). The evidence of specific responsiveness is clearer when dropping other social spending, and the welfare coefficient is −44.65 (S.E. = 15.92). Welfare spending predicts very similar preference flows to spending in the other domains because of the very high correlation (0.99) between the two. Similar analysis of health opinion hints at emerging domain-specificity there as well (see, e.g., Morgan and

Table 4. Models of net preferences by domain, 1976–2019

	Net preferences			
	Education	Environment	Health	Welfare
Net preferences$_{t-1}$	0.811	0.623	0.683	0.452
	(0.073)	(0.081)	(0.070)	(0.128)
Total social spending$_t$	−7.019	−24.63	−31.64	−19.13
	(5.383)	(7.399)	(7.105)	(12.53)
GDP$_t$	0.608	1.797	2.146	2.276
	(0.428)	(0.491)	(0.463)	(0.834)
Democratic president$_t$	−0.701	−3.947	−3.347	−7.331
	(0.681)	(1.214)	(1.204)	(2.729)
Intercept	9.024	13.71	11.96	−27.34
	(2.747)	(4.172)	(4.442)	(6.396)
Observations	44	44	44	44
R^2	0.940	0.827	0.858	0.758
Adjusted R^2	0.934	0.809	0.843	0.733
Root MSE	2.130	3.527	3.480	6.253
Durbin's *h* statistic	0.252	0.047	0.450	2.150

Note: Results are from paneled OLS regression models. Standard errors in parentheses. Both spending and GDP are in trillions.

same is not true for education (but see footnote 19). This absence of reliable thermostatic feedback in that domain should not surprise us, as previous research shows it is not evident in all areas and the effect varies even where it is (Soroka and Wlezien, 2010).

The effects of party of the president in Table 4 largely parallel what we see for GDP. That is, the corresponding coefficients are negative in each domain and statistically significant for the environment, health, and welfare. They are also largely indistinguishable from each other. Here, again, education does not reliably fit the pattern—though negative, the coefficient (−0.701) is substantially smaller in absolute terms and not statistically significant.

While results are not uniform across domains, they nevertheless imply that responsiveness in the non-education domains is substantially global. That is, people adjust their preferences within domains in response to spending across the social spending domains. This is especially true for the environment and health and to a lesser degree welfare. For education, there are only hints of thermostatic response. The pattern of results thus partially confirms what we found in the pooled analysis in Table 3, and—together with the effects of GDP and party of the president—helps explain the parallelism in public preferences. That responsiveness to global policy differs across domains helps clarify why preferences are not perfectly parallel, even more so than the variation in the effects of GDP and presidential party.

5.4 The structure of social spending mood

Let us now consider how much variation in spending preferences in the different domains is common, and how much each factor contributes to social spending mood. We first reestimate the model in Table 3 without the measure of domain-specific spending, which is implied by the results of that analysis showing that the coefficient is not statistically significant. Although, as we have seen, this model will conceal differences in global responsiveness to total social spending, it nevertheless provides an indication of how much is explained by the variation in GDP, spending, and party of the president (and lagged preferences).

Kang, 2015). Considering the model's linear trend increases the size (in absolute terms) and statistical significance (.04) of the spending coefficient for education. Estimating models for only those observations where preferences are not missing produces larger and more reliable spending coefficients in every domain.

Table 5. Pooled models with total social spending, 1976–2019

	Net preferences	
Net preferences$_{t-1}$	0.668	–
	(0.044)	–
Total social spending$_t$	−21.96	−37.32
	(4.392)	(6.609)
GDP$_t$	1.758	3.430
	(0.296)	(0.426)
Democratic president$_t$	−3.034	−7.710
	(0.745)	(1.050)
Intercept	4.780	20.06
	(1.727)	(2.181)
Observations	176	176
R^2 (within)	0.801	0.521
σ_u	13.984	42.016
σ_e	4.269	6.598
ρ(fov)	0.915	0.976

Note: Results are from pooled OLS regression models with domain-specific fixed effects. Standard errors in parentheses. Both spending and GDP are in trillions. *$p < 0.05$.

The results are shown in the first column of Table 5. Not surprisingly, they are quite similar to what we saw in Table 3. Perhaps most importantly, both models account for about 80% of the within-domain variance, i.e., the temporal variation, across domains. This is telling about the structure to these preferences—most is common—but it overstates what GDP, total social spending, and the party of the president contribute, as the model includes lagged preferences, which inflates the explained variance because it captures the effects of other (omitted) variables.

5.5 Assessing contributions to social spending mood

One simple, albeit conservative way to isolate the contribution of our independent variables is to reestimate the model dropping lagged preferences. The results of doing so are summarized in the second column of Table 5. They indicate that the three variables account for about 50% of the over-time variance in preferences across the four domains. This is substantially less than in the first column and implies that GDP, total social spending, and the party of the president "explain" about half of preference change across the four domains.

However, just as the results in the first column overstate the influence of the variables, the results in the second column understate their influence, as part of their effects will persist through time and thus be captured in lagged preferences. We can to some extent capture these effects using distributed lag models, that is, by incorporating an additional lag of each independent variable into the second equation in Table 5. Doing this increases the explained variance to nearly 58%.[20] This almost exactly matches the estimated mood in social spending preferences from the factor analysis in Table 1.

How much does each of the variables contribute to the social spending mood? Does GDP matter more? Or spending? Although the coefficients in Table 5 are not directly comparable, the standardized coefficients offer some information, and these are fairly equal and opposite—−0.36 and −0.26 based on results in the second column (for party of the president, it is −0.10). While this may tell us something about the similarity of effects, their *contributions* to social spending mood remain unclear. We can attempt to estimate these using the explained variance by excluding each variable (with replacement) from the models. The problem is that the effects of the two variables hold only when included together, per the thermostatic model itself (see equations 1–4).[21] About all we can say

[20] For detailed results, see Supplementary Materials, Section E.

[21] When social spending is excluded from the first model in Table 5, the coefficient for GDP drops to 0.354 (S.E. = 0.098). When GDP is excluded, the coefficient for spending literally flips positive, with an estimate of 2.781 (S.E. = 1.524). This

Table 6. Models of aggregated social preferences, 1976–2019

	Average social preferences	Spending mood
Net aggregated preferences$_{t-1}$	0.560	0.587
	(0.080)	(0.074)
Total social spending$_t$	−24.44	−3.049
	(5.621)	(0.689)
GDP$_t$	2.028	0.238
	(0.396)	(0.0473)
Democratic president$_t$	−3.790	−0.463
	(1.013)	(0.119)
Intercept	7.251	−0.995
	(2.532)	(0.246)
Observations	44	44
R^2	0.895	0.890
Adjusted R^2	0.885	0.879
Root MSE	2.652	0.325

Note: Results are from OLS regression models. Standard errors in parentheses. Both spending and GDP are in trillions.

from this analysis is that all variables contribute substantially, where there is some reason to suppose that spending and GDP matter a little more.

This has important implications for what social spending mood actually represents. It is more than just a homeostatic process, in which the public prefers a fixed spending amount and the variation in support for more or less spending only reflects spending. Rather, given the (substantial) trend in GDP over time, the public's underlying preferred levels of social spending have increased significantly. This is clear from the positive pairwise correlation of 0.95 between real GDP and total social spending over time.[22] As we have seen, the party of the president remains an important driver of spending preferences and provides an additional thermostatic effect beyond what we see in actual budgetary policy.

5.6 From domain-specific preferences to aggregate preferences

As a final step, we model aggregate *social* preferences as a function of GDP, total social spending, and the party of the president in Table 6. This allows us to examine how well the by-domain results we see in Tables 4 and 5 apply to social spending preferences more generally. We do this by using two dependent variables—first average social preferences across domains and then the social mood (the first factor) predicted using the analysis in Table 1.

The results look different because of the different dependent variables, but they are substantively quite similar. In fact, they effectively summarize the results in the different domains, as GDP has substantial pro-cyclical effects, while social spending and the party of the president have thermostatic effects. The three variables (together with lagged aggregated preferences) account for almost 90% of the variance in aggregate social spending preferences over time.[23] The pairwise correlation of 0.90 between the predicted values of the second equation in Table 6 and the measured social spending mood further confirms the fit. And, as we suggested above when describing results in Table 5, all variables appear to contribute substantially, though spending and GDP matter slightly more.[24]

underscores how relative preferences represent the *combination* of policy and (proxies for) the public's underlying preferred levels of spending over time, the effects of which must be estimated jointly, as the theoretical model(s) implies.

[22]Note that the effects of GDP are not driven solely by the variable's trend; when added to the model (both in Tables 3 and 5), the coefficient for linear trend is 0.11 (S.E. = 0.28).

[23]When excluding lagged preferences, the adjusted R^2s for the models in Table 6 are 0.746 and 0.692, respectively.

[24]When we focus on the first equation in Table 6 with average preferences and excluding the lagged value, the standardized coefficients are 1.76 for GDP, −1.25 for spending and −0.50 for party of the president. Not surprisingly, this difference largely reflects the substantial trend in economic output over time; when including a simple counter variable, the beta for GDP drops

6. Discussion

Foundational research on policy preferences argues that preferences in different policy domains move in parallel through time. When preferences change in one domain, they tend to change in other domains (Stimson, 1991; Wlezien, 1995). Our results of spending preferences match the findings in these earlier works in two respects. First, we find considerable parallelism between preferences across four social spending domains—education, the environment, health, and welfare. Second, the patterned movement in preferences does not constitute a single, general preference for government activity. That is, even though preferences in different spending domains move in parallel, their movement is not entirely common. On average, nearly half of the variance of preference movement is unique to the domains, and this has implications for analysis of representation in the spending domains (Wlezien, 2004; Soroka and Wlezien, 2010).

But our study goes beyond earlier works by addressing a more fundamental question: what are the origins of this parallel preference structure? Differently put, what moves mood, particularly for spending? Building on the thermostatic model and largely in line with our theoretical expectations, we find initial support for the proposition that the public's underlying preferred levels of spending move together and that people's preferences in different domains respond similarly to total social spending. Specifically, we find evidence across domains that GDP moves preferences pro-cyclically. While the size of the effect varies across the domains, the public's underlying preferred spending levels change commonly in response to economic conditions, which supports previous research on broader policy mood (Durr, 1993; Stevenson, 2001). We also find evidence of parallel thermostatic responsiveness to total social spending, particularly in the environment and health domains. There is some hint of domain-specific responsiveness in welfare, which helps produce parallelism because welfare spending is a large part of total social spending and is highly correlated with spending in the other social domains (see footnote 19).

The two factors—GDP and social spending—account for much of the observed covariation in spending preferences and their impacts appear to be similar. This is important for how we interpret mood, as preference change combines innovations in *both* the underlying preferred levels of spending *and* spending itself. It is not that the public has specific amounts in mind. Rather, the amount with which the average voter is indifferent changes over time, i.e., it is not a constant and the variation closely tracks economic conditions. Given the trend in GDP, the public's underlying preferences for social spending have increased substantially. And, as we have seen, to the extent social spending has not increased correspondingly, the public has sent signals to change spending accordingly. The thermostatic model works even as the public's (underlying) preferred policy "temperature" has changed (dramatically) over time (see also Wlezien and Soroka, 2021).

Lastly, we find that partisan control of the presidency matters. It acts as an *additional* thermostatic force *above and beyond* that reflected in spending, and also helps produce the mood we observe in the social spending domains, though seemingly to a lesser degree than GDP and spending itself. Whether it helps explain broader patterns across other spending and non-spending domains remains to be seen.

While we think that we have moved things forward, there remains a rich agenda for future research on the structure and determinants of public policy mood in the USA and other countries. This is interesting and important unto itself, but also because it informs our understanding of policy actions, election outcomes, democratic representation, and the other aspects of political life for which public preferences matter.

Supplementary material. The supplementary material for this article can be found at https://doi.org/10.1017/psrm.2025.10024. To obtain replication material for this article, https://doi.org/10.7910/DVN/N3RKRZ.

to 0.28 while those for the other variables remain essentially the same—1.17 and −0.53. When we add lagged preferences back in, the ordering remains the same, but the difference is reduced: 1.02, −0.82, and 0.24.

Acknowledgements. A very early version of this paper was presented at the 2018 ECPR Joint Sessions in Nicosia as part of the "Macro Opinion in Comparative Perspective" workshop. We would like to thank John Bartle and Tim Hellwig for organizing this workshop and all the panel participants for their constructive comments. We also would like to thank Xavier Romero-Vidal for his continuous support and insights, as well as our editor, Sara Hobolt, for her support and guidance. Last but not least, we are grateful for the invaluable comments and feedback we received from the various anonymous reviewers, probably at the expense of other academic tasks that are more easily and explicitly validated in academia.

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Cite this article: Van Hauwaert SM, Wlezien C and Carlin RE (2025) What moves (spending) mood? The nature and origins of parallel public preferences. *Political Science Research and Methods*, 1–17. https://doi.org/10.1017/psrm.2025.10024