Heterogeneity in Perceptions of National Economic Conditions

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Empirical findings concerning economic voting differ according to the level of analysis employed. A widely accepted explanation for the inconsistency between macro- and micro-level evidence of economic voting is the high degree of random variation that plagues survey data. According to this explanation, aggregation purges individual-level "noise" from mass opinions on policy issues and outcomes. Building on the research of Bartels (1996), we debate the validity of this explanation by demonstrating that public evaluations of the national economy vary systematically with information, media exposure, political attitudes, personal experiences, and demographic characteristics. Furthermore, we show that these sources of subjective heterogeneity produce systematic biases when national economic evaluations are aggregated. These findings challenge a widely accepted notion that because "error" in individual-level measures (or expressions) of preferences is random, the aggregation of these individual measures ensures that they correctly represent the collective preference.

Empirical findings concerning the influence of the economy on political behavior differ depending on the level of analysis employed. Using aggregate-level data, numerous studies have established a statistical relationship between economic conditions and election outcomes or executive popularity (e.g., Kramer 1971; MacKuen, Erikson, and Stimson 1992). On the basis of the macro-level evidence alone one would have little reason to doubt that the economy matters. In contrast, individual-level studies using survey data have produced only mixed evidence that voters consider economic conditions when evaluating the incumbent government and its leaders (e.g., Fiorina 1978, 1981; Kinder and Kiewiet 1979, 1981). Moreover, the strongest survey evidence of economic voting suggests that voters primarily care about national economic conditions not their personal financial situation. This finding contradicts the egocentric theory posited by early macro-level research that national economic indicators matter because they are correlated with personal financial circumstances.

The micro-macro dichotomy in economic voting research reflects a similar dichotomy in research on voter sophistication and representation. Aggregate-level studies tend to indicate that voters are reasonably well informed about the economy and make forward-looking, rather sophisticated voting decisions (e.g., Alesina, Londregan, and Rosenthal 1993; Suzuki and Chappell 1996; Palmer and Whitten 1999). These studies infer that mass political decisions conform to rational expectations, or at least limited information rationality (e.g., MacKuen, Erikson, and Stimson 1992). In contrast to this macro-level image of the voter, individual-level survey research has shown that the public in general has low levels of political sophistication, lacking much knowledge of and interest in politics (e.g.,

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Neuman 1986). Converse (1970) characterized citizens as having "non-attitudes" on many policy issues. Due to citizens' low levels of sophistication, survey measures of policy preferences are often characterized as "noisy," containing considerable variation that is meaningless (i.e., independent of policy concerns).

A widely accepted explanation for the inconsistency between aggregate-level and individual-level findings is the high degree of "noise" or random variation associated with survey data (e.g., Wittman 1989; Converse 1990; Page and Shapiro 1992). Aggregation of individual responses presumably "cancels out" the random variation, thereby leaving only the underlying meaningful (or rational) component of public opinion. A growing literature exploits this characteristic of aggregated opinion data to demonstrate the extent to which political outcomes are responsive to public opinion. Stimson, MacKuen, and Erikson (1995), for instance, show that policy activity by American government institutions—House, Senate, Presidency, and Supreme Court—responds to aggregate-level changes in the public's policy preferences.

This argument presumes, however, that individual errors in measures of public opinion are "truly" random. As Bartels (1996) points out, if these individual errors are systematic, aggregation will not produce unbiased aggregate measures of public sentiment. Rather these aggregate measures will include systematic variation with factors unrelated to objective economic performance, such as partisanship and personal experiences. In a related context, Bartels (1996) demonstrates that disparities in political information systematically affect vote choice such that aggregate deviations from "fully informed" voting are not idiosyncratic and, in fact, tend to favor incumbents and Democrats.[1]

[1]The case for aggregation has also been made using the logic of the Condorcet jury theorem. The Condorcet jury theorem states that even when a bare majority of a population can identify the correct choice, the probability that simple pair-wise comparisons result in a social choice that reflects the best collective alternative approaches 1 as the jury (sample) size approaches infinity. The analogy in the present context is that only a bare majority of the electorate needs to be attentive to macro-economic performance for the collective economic assessment to reflect the actual state of the national economy. Moreover, the accuracy of this collective assessment improves as the sample used to derive this "social choice" rises. This argument is persuasive since it virtually assures that aggregate economic evaluations are "correct" as long as the individual-level "error" is random and idiosyncratic, as many believe, and people have slightly better than even chances of recognizing the objective performance of the economy. But if the random error assumption is violated, then the result does not hold. In this case, the systematic factors that influence economic evaluations at the individual level disproportionately exaggerate either "optimistic" or "pessimistic" assessments. Our argument here is that such systematic factors actually do exist, thereby undermining the attractive features of aggregation identified by the Condorcet jury theorem.

In a similar fashion, we argue here that individual error terms in national economic evaluations are not random. As a result, aggregate deviations of individual-level economic evaluations from objective economic conditions are not idiosyncratic but rather reflect the systematic effects of respondent characteristics (i.e., subjective variation). The politically attentive segments of the population, for example, may exaggerate the performance of the macro-economy consistent with their partisan predispositions (Zaller 1992). Hence, aggregated evaluations of economic performance might reflect the systematic impacts of partisanship and attentiveness as well as the latent objective evaluation.

We hypothesize that this poses a serious problem on the grounds that subjective variation in economic evaluations represents a substantial portion of total variation. As a result, systematic "noise" at the individual level causes measures of economic evaluations derived by aggregating survey responses to deviate widely from objective economic performance. We also hypothesize that the magnitude and direction of the systematic bias is not constant across time and elections. Because the systematic bias is not constant, we cannot generalize about the nature of the distortion in aggregate measures of economic perceptions. Hence, systematic biases aggregated to the national level cannot be easily accounted (corrected) for in aggregate-level models. The implication here is that ignoring the individual-level "noise" when conducting aggregate-level analyses of economic voting could produce misleading conclusions.

To better understand heterogeneity in evaluations of the national economy, we conduct an extensive analysis of economic perceptions in the United States to determine to what extent individual-level "noise" distorts aggregate measures and whether the magnitude of systematic variation differs across elections from 1980 to 1998. Specifically, we investigate the sources of heterogeneity in economic perceptions and seek to identify to what extent aggregate movements in economic perceptions are driven endogenously by individual-level characteristics.

Theoretical Argument

Most of the literature on economic voting recognizes that voters are not fully informed about the economy. In this section, we explore the process of mass opinion formation under limited information and suggest what compensatory strategies voters adopt. We also develop a theoretical explanation for why deviations from full information have important implications for models of economic voting.

Suppose that an individual's evaluation is a stochastic variable,

$$Y = Y_O + Y_S + \epsilon,$$

where Y_O is the latent objective evaluation (i.e., variation due to economic policy preferences), Y_S captures systematic differences due to information and subjective factors (e.g., partisan rationalization), and ϵ is the stochastic component. In this formal definition, individual-level evaluations contain two forms of "noise": subjective considerations and random fluctuations. Both forms of "noise" constitute sources of nonattitudes.

Some recent research debates the relevance of nonattitudes and low levels of information by arguing that citizens can employ heuristics to behave as if fully informed when voting (e.g., McKelvey and Ordeshook 1986; Lupia 1992, 1994) and to infer their own preferences on specific policies (e.g., Brady and Sniderman 1985; Sniderman, Brody, and Tetlock 1991). In essence, such research contends that heuristics can reduce the influence of subjective considerations and random fluctuations on public attitudes about government policy and performance. Heuristic models of this nature suggest that information-gathering shortcuts reduce the magnitude of Y_S.

Additionally, aggregate-level analyses of public opinion presume that aggregation eliminates the "noise" contained in mass opinion (e.g., Page and Shapiro 1992; Stimson, MacKuen, and Erikson 1995). More formally, aggregate-level analyses implicitly assume that $Y_S = 0$ and that the stochastic component has zero mean in the equation above. Given these assumptions, the mean of Y across individuals represents a "clean" aggregate-level measure of public opinion that is not plagued by the nonattitudes and "noisy" variation of individual-level measures. Hence, the use of mean evaluations by aggregate-level studies "solves" the statistical problems raised by survey research.

We debate this conclusion by positing that individual evaluations of the economy contain subjective sources of systematic variation and hence aggregation does not eliminate these distortions (i.e., $Y_S \neq 0$). This hypothesis is consistent with the central theme of Kramer's (1983) theory about why individual-level evidence of egocentric ("pocketbook") economic voting contrasts with the strong relationship between objective economic conditions and election outcomes at the macro-level. Kramer argues that the dichotomy in evidence is an artifact of measurement error that contaminates individual-level evaluations of personal financial situation. According to Kramer, only government-induced changes in personal finances matter to the economic voting relationship while other sources of systematic variation, such as partisan rationalization and life-cycle effects, are meaningless noise. This theory counters the explanation of Kinder and Kiewiet (1979, 1981) that voters behave in a sociotropic manner by focusing on national economic performance.

We extend Kramer's theory about evaluations of personal financial situation to evaluations of national economic performance. This extension builds upon Kramer's contention that "we are ultimately interested only in how real economic outcomes affect voting decisions and not in economic rhetoric or perceptual imagery" (1983, 95). The crucial issue for the present essay is whether evaluations of the national economy are largely objective or plagued by subjective considerations. We build upon recent research efforts, summarized below, that identify how subjective considerations matter in the formation of public opinion (i.e., the factors shaping Y_S). Four distinct sources of subjective heterogeneity in evaluations of the national economy can be identified in the literature: information and media exposure, political attitudes, personal experiences, and socioeconomic characteristics.

Information. In the context of voting behavior, Bartels (1996) debates the assumption that $Y_S = 0$ by demonstrating that voters' decision calculus differs with their level of information. Bartels finds that poorly informed voters do not behave as if they were fully informed. Rather, actual and "fully informed" vote probabilities for American presidential elections from 1972 to 1992, in which low-cost cues and voting heuristics were presumably abundant, differ by ten percentage points, on average. The fact that this informational difference is systematic—favoring incumbent presidents and Democratic candidates—rather than random implies that aggregate outcomes are unlikely to conform to the "complete information majority preferred alternative," as suggested by Lupia (1992).

Expanding on Bartels' analysis, Althaus (1998) simulated "fully informed" collective preferences from survey data and found that group differences in information (at the individual level) can cause significant distortions in aggregated measures of public opinion on a range of policy issues. Similarly, Hetherington (1996) demonstrates that American voters in 1992 evaluated the national economy differently depending on their level of media usage, though this result does not extend to the 1984 and 1988 presidential elections. Hetherington's research provides conditional evidence that Bartels' findings for voting behavior—an expression of preference on government policy—extends to evaluations of policy outcomes. In sum, citizens in aggregate do not behave as if they are fully informed, and, more generally, aggregation

does not eliminate the distortion of systematic subjective differences in public opinion.

The research of Bartels, Althaus, and Hetherington reveals the existence of systematic informational differences in public opinion. Similarly, we expect national economic evaluations to vary with factors that influence the collection and subjective interpretation of information about the political economy. To the extent that well-informed opinions differ from poorly informed ones, evaluations of the national economy—past, present, and future—should vary systematically with the extent to which individuals can be characterized as "informed" about the political economy. Certainly, persons with greater access to and incentive to obtain information about the economy should have more accurate, or at least more consistent, economic evaluations. Hence, we expect citizens to perceive economic performance differently depending on their levels of education and political sophistication. We hold a similar expectation for mass media exposure based on the assumption that media usage distinguishes among citizens in terms of their access to information on economic performance. As mentioned earlier, Hetherington (1996) finds that the 1992 American electorate's perceptions of economic performance varied according to levels of media exposure (also see Nadeau et al. 1999). We label this set of theoretical expectations the *information* hypothesis.[2]

Group self-interest. People incur costs collecting and processing information in terms of time and effort expended. As suggested above, some individuals face lower costs due to their higher levels of sophistication and mass media attention. Although we expect such individuals, on average, to be more knowledgeable about the national economy, we do not believe that people gather information and read/watch the national news simply to have better-informed opinions. Individuals generally learn about national economic conditions as a byproduct of activities engaged in for other purposes (e.g., entertainment, business). In turn, individuals who derive greater benefits from having economic information (e.g., those with greater investments in stocks) tend to have a better understanding of national economic conditions.

Similarly, MacKuen and Mouw (1995) find that citizens' reactions to economic indicators vary with their social status and situation in the economic structure. This finding is consistent with the notion that self-interested citizens seek out information that reflects their particular economic circumstances (e.g., employment status, occupation, amount of debt). Homeowners, for example, can be expected to pay closer attention to interest rates, and people out of work or in marginal occupations can be expected to pay greater attention to the unemployment rate. Thus, economic self-interest, as reflected in demographic characteristics, constitutes a source of heterogeneity in evaluations of national economic performance. We label this the *group self-interest* hypothesis.

Personal financial experience. Even if individuals are exposed to the same amount of information about objective economic conditions, their subjective interpretations of those conditions may differ. Public opinion scholars theorize that individuals use heuristics to filter the available information and to simplify analysis of the information that they choose to receive (e.g., Sniderman, Brody, and Tetlock 1991; Zaller 1992). One subjective heuristic often referenced in this literature is the individual's personal experience. For example, those experiencing personal financial troubles (e.g., unemployed, recently laid off) should perceive national economic conditions more negatively (Funk and Garcia-Monet 1997). Reliance on personal experience as a heuristic, though, should vary with political sophistication. As Conover, Feldman, and Knight argue, the " . . . well-informed tend to ignore their own personal economic experiences while the uninformed draw heavily upon them" (1986, 583). Hence, we expect political sophistication to weaken the effect of personal financial situation on national economic evaluations. We label these theoretical expectations the *personal financial experience* hypothesis.

Political attitudes. Previous research has recognized that partisan predispositions influence economic perceptions, at least for egocentric or "pocketbook" assessments (e.g., Markus 1988; Wlezien, Franklin, and Twiggs 1997). Due to partisan and ideological biases, some voters negatively or positively evaluate economic performance, regardless of objective changes in national economic conditions. These biases may stem from short-run overall (dis)satisfaction with government policies or more persistent partisan attachments. Hence, we posit that individuals with stronger attachments to the incumbent (president's) party perceive the national economy more positively.

Zaller (1992) theorizes that individuals with strong political predispositions interpret new information so that it reinforces previously held attitudes, thereby augmenting rather than tempering the differences between their beliefs and those of individuals with opposing political predispositions. In the present context, Zaller's polarization argument suggests that partisan biases produce greater heterogeneity in economic perceptions among

[2]Note that the focus here is on the existence of a systematic effect rather than its direction.

better-informed persons than among poorly informed persons. Thus, we posit that the effect of government party attachment increases in magnitude with political sophistication, thereby magnifying the subjective heterogeneity attributable to partisan preferences. We label the set of theoretical expectations associated with partisan preferences the *political attitudes* hypothesis.

Our first set of theoretical expectations specifies that individuals' assessments of the national economy vary independently of objective economic conditions due to differences in political sophistication, media exposure, partisan attachments, personal financial experiences, and demographic characteristics. We can summarize the hypotheses that compose our individual-level model of subjective heterogeneity in economic evaluations as follows:

- More sophisticated, better-informed citizens evaluate the national economy differently than less sophisticated, poorly informed citizens.
- Economic self-interest and partisan preferences bias evaluations of national economic performance. Citizens with stronger attachments to the incumbent party and more favorable personal financial experiences evaluate the economy more positively. Similarly, citizens' economic perceptions vary with their socioeconomic situation.
- Partisan biases in national economic evaluations are augmented for citizens who are better informed about politics. On the other hand, political sophistication weakens the effect of personal financial situation on economic perceptions.

A second theoretical proposition is that aggregation *does not* minimize (or "cancel out") these individual-level distortions in economic evaluations. In other words, we posit that aggregate (or mean) economic evaluations would differ in the absence of subjective heterogeneity at the individual level.

Data and Methodology

Our statistical investigation proceeds in two stages. The first stage considers whether the four sources of subjective heterogeneity posited in the previous section account for significant variation in retrospective and prospective perceptions of the national economy. This analysis estimates individual-level ordered probit models of economic evaluations using survey data from the American National Election Study (ANES) of the 1992 presidential election.

The primary purpose of the first stage is to evaluate the null hypothesis that national economic evaluations do not vary systematically with information, political attitudes, personal financial situation, and group self-interest, and hence are purely objective. Evidence to the contrary would demonstrate that individual-level "noise" in economic evaluations is systematic rather than random. Such a finding would refute the presumption that aggregation solves the statistical problems posed by nonattitudes and thereby produces a "clean" measure of the public's objective evaluation of the economy.

The existence of systematic differences due to information and subjective factors, however, does not necessarily imply significant distortion of aggregate measures of public economic perceptions. In other words, refuting the presumption that aggregation eliminates the problem of nonattitudes is hollow if the magnitude of the aggregation bias is trivial. Thus, the second stage of our statistical investigation evaluates the null hypothesis that aggregation minimizes the distortions from information and subjective factors. According to this second null hypothesis, aggregation across survey respondents largely "cancels out" the "noise" in each attitudinal response, and hence evidence of subjective heterogeneity at the individual level is largely inconsequential to aggregate-level studies of economic voting and representation.

The second stage evaluates the second null hypothesis by constructing purged aggregate-level measures of retrospective and prospective economic evaluations and then comparing them to actual survey responses (also aggregated to the national level). In order to construct the purged measures, we first replicated the first-stage ordered probit analyses for every possible ANES survey year from 1980 to 1998, including pilot studies in 1991, 1993, and 1995. We then employed the parameter estimates from these models to remove the effects of information and subjective factors, thereby deriving purged economic evaluations for every survey respondent. Comparing the purged and actual evaluations, aggregated across the respondents in each survey year, enables us to characterize the overall magnitude of aggregate-level distortion and how it varies across elections. The Statistical Appendix provides a formal specification of the method for calculating these purged measures.

The dependent variables in the ordered probit models are standard measures of national economic evaluations with three or five response categories. The corresponding survey questions ask respondents to compare current economic conditions to those in the past year (retrospective) and those expected during the next year (prospective). Responses to these questions have been coded so that they range from (much) "worse" to (much)

"better." Given that the economic evaluations are ordered categorical variables, ordered probit is a more appropriate econometric method than linear regression. Ordered probit, like linear regression, assumes a particular ordering of the responses along a single dimension but, unlike linear regression, does not impose the assumption that all adjacent responses are equidistant apart.[3]

Are Evaluations of the National Economy Purely Objective?

If evaluations of the economy are purely objective, they are not a function of information, media exposure, political attitudes, personal financial experiences, and socioeconomic characteristics. Thus, the first stage of our statistical investigation focuses on whether the variables measuring the hypothesized sources of subjective heterogeneity prove significant in ordered probit models of national economic evaluations. Table 1 presents ordered probit models of retrospective and prospective evaluations estimated with 1992 ANES survey data. Note that the variables are organized into the four categories of subjective heterogeneity specified earlier. The Statistical Appendix discusses the measurement of the regressors in these ordered probit models.

The chi-squared statistics of overall model fit in Table 1 decisively reject the null hypothesis that national economic evaluations (NEE) are purely objective. Clearly, information and subjective factors produce systematic variation across individuals in their retrospective and prospective evaluations. On the basis of their statistical significance, party identification and personal financial situation (PFS) influence both retrospective and prospective evaluations of the national economy.[4] Information differences also have relevance with *Political Sophistication* proving significant at the 1 percent level in the retrospective model and *Media Usage* achieving the 1 percent significance level in the prospective model.

As in the binomial probit model, the marginal effects of regressors on response probabilities are not equal to the ordered probit coefficients. Additionally, the marginal effects on the probabilities for mid-range responses (e.g., "same") do not necessarily have the same signs as the coefficients. Thus, to better understand the estimated substantive impacts, we illustrate how typical respondents' economic evaluations vary with information and subjective considerations. For retrospective evaluations, a typical respondent has an initial .046 probability of stating that national economic conditions are "better" (somewhat or much) today than in the past year. For prospective evaluations, a typical respondent has an initial .318 probability of stating that national economic conditions will get "better" during the next year.[5] Using the ordered probit coefficients from Table 1, we can characterize the magnitudes of the regressors' estimated effects for typical respondents.

Personal financial experience has the strongest estimated effects on assessments of the American economy. For typical respondents, a one-unit improvement in their PFS (e.g., from "same" to "somewhat better") increases their predicted probability of a positive retrospective evaluation by 3.8 percentage points and their likelihood of a positive prospective evaluation by 9.7 percentage points. Over the entire range of personal financial evaluations (i.e., from "much worse" to "much better"), a typical respondent's predicted probability of positively evaluating the national economy increases by 13.2 percentage points in the retrospective context and 35.7 percentage points in the prospective context. The strong impact of PFS on NEE might not surprise some readers, especially since such a relationship is consistent with a "pocketbook" explanation of economic voting. However, this

[3] The ordered probit model is a generalization of the binomial probit model that allows for more than two observed outcomes. We presume here that survey responses on the national economy are derived from latent economic evaluations expressed as continuous random variables. The stochastic components of latent evaluations are assumed to be normally distributed with a mean of zero and variance of one (if homoskedastic). The probability of obtaining a particular survey response corresponds to the probability that the latent evaluation is within a particular range and hence is a function of the standard normal cumulative distribution. See Greene (1997, 926–930) for a more detailed exposition.

[4] Even though models of political behavior and public opinion generally treat partisanship and pocketbook evaluations as exogenous, some research suggests the existence of a reciprocal relationship with assessments of the national economy (e.g., Fiorina 1981). If a reciprocal relationship does exist, failing to model party identification and PFS as endogenous might produce spurious "evidence" of subjective heterogeneity. To evaluate this possibility, we employed ANES data from the 1990–1992 and 1992–1997 panel studies to re-estimate the models in Table 1 with "lagged" measures of party identification and PFS. We constructed the lagged measures with questions asked in the panel wave prior to the one in which the NEE question appeared. Hence the lagged measures are exogenous by construction. This auxiliary analysis (available from the authors) essentially replicates the results in Table 1, thereby confirming the significance of partisanship and personal financial experience as sources of subjective heterogeneity.

[5] The typical respondent's initial probabilities of responding "better" to the retrospective and prospective questions correspond to the sample frequencies and hence reflect the evaluations of the "average" respondent in the 1992 ANES. When calculating the marginal probability effect of a nonbinary variable, we assume that typical respondents initially have the variable's mean value. For binary variables, we assume that typical respondents have the modal characteristic.

TABLE 1 Ordered Probit Models of National Economic Evaluations in 1992

	Retrospective		*Prospective*	
Explanatory Variables	**Coefficient**	**T-statistic**	**Coefficient**	**T-statistic**
Political Attitudes				
Party Identification	−.026	−.86	−.038	−1.21
Party Identification*Political Sophistication	.054**	4.78	.035**	2.95
Predicted Presidential Winner	.099**	3.54	—	
Predicted Presidential Winner*Election Certainty	.271**	3.82	—	
Partisan Consistency of Predicted Winner	—		.058**	4.04
Consistency of Predicted Winner*Election Certainty	—		.019	.56
Personal Financial Experience				
Retrospective Personal Financial Situation	.309**	6.59	—	
Retrospective PFS*Political Sophistication	−.024	−1.28	—	
Prospective Personal Financial Situation	—		.259**	3.85
Prospective PFS*Political Sophistication	—		.031	1.20
Information				
Media Usage	−.042	−1.21	.104**	2.87
Political Sophistication	−.165**	−3.17	−.139*	−1.96
Education	.019	1.05	−.031	−1.60
Group Self-Interest				
Family Income	−.019	−.78	.006	.24
Professional	−.02	−.26	−.01	−.23
Manual Worker	−.22	−1.56	−.14	−.89
Union Membership	−.11	−1.72	−.15*	−2.24
Age	.0013	.91	.0020	1.31
Race (Black)	−.13	−1.76	−.04	−.57
Female	−.23**	−4.87	.04	.74
Constant	.16	1.01	.17	.83
μ_1	.99**	33.23	1.43**	41.21
μ_2	2.20**	42.55	—	
μ_3	3.26**	26.46	—	
χ_1 statistic of overall model fit	443.8**		194.4**	
% Predicted Correctly	45.7		51.9	
% Error Reduction	11.8		5.0	
N	2455		2345	

Notes: The *Retrospective* dependent variable contains five categories ranging from "much worse" to "much better" response to the ANES question on national economic situation over the past year. The *Prospective* dependent variable contains three categories ranging from "worse" to "better" responses to the ANES question on national economic situation during next year. The naïve models that everyone gives the modal *Retrospective* response of "much worse" and the modal *Prospective* response of "same" correctly predict 38.4 percent and 49.3 percent of the cases, respectively.

**p < .01; *p < .05

finding contradicts research demonstrating that people do not generally attribute personal experiences to government policy and political events (e.g., Brody and Sniderman 1977; Sears et al. 1980). Furthermore, the results do not indicate that reliance on personal financial experiences as a heuristic for judging national economic performance decreases with the person's level of political sophistication.[6]

Political attitudes also strongly influence assessments of the national economy. First, we find that expectations

[6] We also considered whether the impact of personal financial experience varies with mass media exposure. Consistent with Mutz (1994), we found that media exposure politicizes personal financial experiences so that they exert greater influence on assessments of the national economy. Interactions between PFS and media usage proved statistically significant at the 5 percent level. The estimated effect of a one-unit increase in PFS on the probability of a positive retrospective evaluation increases from 2.0 percentage points for the lowest level of media usage to 4.3 percentage points for the highest level of media usage. Similarly for prospective NEE, the estimated marginal effect of PFS increases from 8.0 to 17.7 percentage points over the entire range of media usage.

about the presidential election outcome shape NEE. The retrospective model in Table 1 includes the *Predicted Presidential Winner* variable that assumes a value of 1 if the respondent predicts a Bush victory, –1 if she predicts a Clinton victory, and 0 if she has no prediction. *Election Certainty* is a binary variable that indicates whether the respondent expects a landslide victory and cares about who wins the election. *Predicted Presidential Winner* and the interaction between this variable and *Election Certainty* both achieve statistical significance at the 1 percent level. The *Predicted Presidential Winner* coefficient estimates that typical respondents who predicted a Bush victory were 1.9 percentage points more likely to respond "better" when retrospectively evaluating the economy than were those who predicted a Clinton victory. Moreover, the coefficient of the interaction term estimates that this probability difference increases to 7.4 percentage points amongst typical respondents who expected a landslide election outcome and cared "a good deal" about who won.

Similarly, the prospective model in Table 1 includes the *Partisan Consistency* variable, which measures the consistency between respondents' partisanship and predicted presidential winner. According to our estimates, the probability of a "better" prospective evaluation of the economy is greater amongst partisans who predicted that their party's presidential candidate would win the election. Typical respondents with "weak" party attachments, for instance, were 8.6 percentage points more likely to positively evaluate the future economy if they believed that their party's presidential candidate would win rather than lose to the opposing party's candidate in 1992. In sum, people appear to rationalize their NEE according to their expectations about the presidential election outcome—adjusting retrospective evaluations so that they more closely conform to the incumbent party's fortunes and becoming more optimistic or pessimistic about the future depending on their party's prospects.

Second, partisanship exerts considerable influence over assessments of the American economy, though its effect is contingent on political sophistication. Contrary to our theoretical expectations, party identification does not positively influence NEE for all persons in 1992. Stronger identification with the Republican (incumbent) party only improves NEE among those respondents who exhibit some general knowledge of American politics (i.e., greater than "very low"). Among typical respondents with "very low" political sophistication, changes in partisanship have essentially no effect on their likelihood of positively evaluating the economy. However, among typical respondents with "average" political sophistication, an increase in party identification from weak Democrat to weak Republican increases the predicted probability of positively evaluating the national economy by 3.2 percentage points in the retrospective context and by 4.6 percentage points in the prospective context. The estimated effect of partisanship is even greater among typical respondents with "very high" political sophistication for whom the same increase in party identification increases the likelihood of a positive retrospective evaluation by 4.3 percentage points and the likelihood of a positive prospective evaluation by 12.2 percentage points.

This finding might surprise those readers who expected partisanship, as a heuristic, to have the strongest positive impact on the economic assessments of citizens who are poorly informed, rather than well informed, about politics. Consistent with Zaller's (1992) argument, though, our results indicate that political sophistication has a polarizing effect on the economic perceptions of persons with strong political predispositions. While poorly informed partisans have relatively similar attitudes about the economy, well-informed partisans hold strongly contrasting views of past economic performance and the future economy that reflect their political preferences. This pattern of partisan rationalization clearly undermines the image of NEE as objectively determined.

Table 1 also reveals evidence of systematic variation in assessments of the national economy due to information, though these variables exert more modest influence than political attitudes and personal financial experience. Among typical respondents, a one-unit increase in political sophistication produces a 1.4 percentage point decrease in the likelihood of responding "better" to a retrospective question about the economy.[7] In contrast, a one-unit increase in mass media exposure increases the predicted probability of an optimistic evaluation of future economic conditions by 3.8 percentage points.[8]

Overall, group self-interest characteristics contribute the least to systematic variation in NEE, only accounting for two ordered probit coefficients that are statistically significant at the 5 percent level. The magnitudes of the probability effects for gender and union membership are also quite modest. Among typical respondents, women are 1.8 percentage points less likely than men to give a

[7] If *Political Sophistication* is excluded from the retrospective model, *Media Usage* has a larger negative coefficient that achieves statistical significance at the 5 percent level. Hence, the information results in Table 1 are generally consistent with Hetherington's (1996) study.

[8] Over the entire range of values for *Political Sophistication* and *Media Usage*, the predicted probability of a positive retrospective evaluation decreases by 6.6 percentage points and the likelihood of a positive prospective evaluation increases by 14.8 percentage points.

positive retrospective evaluation of the economy, and union membership decreases the predicted probability of a positive prospective evaluation by 5.1 percentage points.

In discussing the ordered probit results, we have highlighted the existence of subjective heterogeneity in NEE and distinguished among the different sources of this systematic variation in terms of the strength of their influence. We can more concisely distinguish among the different sources of systematic variation by comparing the joint significance of the variables in the four heterogeneity categories: political attitudes, personal financial experience, information, and group self-interest (see Table 1 for the grouping of variables in these categories). More specifically, we calculated Likelihood Ratio (LR) statistics for each category. For the retrospective model, we obtained the following LR statistics with their significance reported in parentheses: 176.0 (<.0001) for political attitudes, 138.7 (<.0001) for personal financial experience, 12.1 (.0024) for information, and 33.2 (<.0001) for group self-interest. For the prospective model, we obtained 34.3 (<.0001) for political attitudes, 123.0 (<.0001) for personal financial experience, 10.9 (.0043) for information, and 15.0 (.0591) for group self-interest.

These LR statistics indicate whether a particular source of subjective considerations produces systematic variation in assessments of the national economy. Also, comparisons of LR statistics' significance across categories characterize the relative strength of different sources of subjective heterogeneity in NEE. Political attitudes and personal financial experience prove to have the greatest influence with large, highly significant LR statistics. The most important implication of these statistics, though, is that all four hypothesized sources of heterogeneity are in fact significant determinants of both retrospective and prospective NEE.[9]

In sum, our individual-level results provide strong empirical support for the argument that public assessments of economic performance tend to be shaped by information differences as well as a variety of political and socioeconomic factors. We now explore whether this systematic variation at the individual level has implications for aggregate-level measures of public economic perceptions.

Does Individual-Level "Noise" Distort Aggregate-Level Evaluations of the Economy?

As stated earlier, evidence of systematic variation at the individual level does not necessarily imply that information differences and subjective considerations distort aggregate-level measures of NEE. It is possible that aggregation largely purges the individual-level "noise" in NEE so that information and subjective factors pose trivial problems for aggregate-level analyses of economic voting and representation. We investigate this question in the second stage of our analysis by using ordered probit models to purge the effects of information and subjective considerations from survey respondents' assessments of the national economy. We then compare aggregate measures of actual and purged evaluations in order to characterize the extent of the distortion. Our hypothesis is that the raw and purged series diverge significantly from one and other, i.e., aggregation does not "cancel out" the individual-level "noise" in NEE. This analysis was conducted with ANES data from 1980 to 1998 and is described in greater detail in the Statistical Appendix. This analysis also includes several off-election-year observations derived with 1991, 1993, and 1995 ANES data. The inclusion of these observations allows us to discern whether distortions due to subjective heterogeneity occur during nonelection as well as election periods.

Figure 1 plots mean probabilities of a "better" response to the standard retrospective ANES question on national economic conditions.[10] Figure 2 does the same for prospective evaluations of the economy. The "raw" measure is simply the percentage of respondents in each survey who answered "better" (somewhat or much). We constructed the purged measures by using the coefficients from ordered probit models to separately remove the effects of three sources of subjective heterogeneity: political attitudes, personal financial experience, and

[9] In auxiliary analyses, we found that this result for 1992 generalizes to the 1980–1998 period. Using the ordered probit models estimated for the second stage of our analysis (described in the next section), we calculated LR statistics for the four heterogeneity categories for every ANES survey from 1980 to 1998. All of the LR statistics for personal financial experience proved significant at better than the 1 percent level. Similarly, the LR statistics for political attitudes were all significant at better than the 1 percent level except those for the 1995 retrospective and 1994 prospective equations. The information LR statistics achieved the 5 percent significance level for the 1988, 1990, 1994, 1996, and 1998 retrospective models and the 1980, 1982, 1984, and 1998 prospective models. Finally, the group self-interest LR statistics were significant at the 5 percent level for the 1980 and 1995 retrospective models and the 1984, 1986, and 1998 prospective models.

[10] Time-series analyses of presidential approval often include aggregate measures of public attitudes constructed from survey data, such as the difference between, or the ratio of, the percentage of positive economic evaluations and the percentage of negative economic evaluations from surveys on consumer sentiment (Clarke and Stewart 1994; Norpoth 1996).

FIGURE 1 Distortion of Aggregate-Level Measure of Retrospective National Economic Evaluations, U.S. 1980–1998

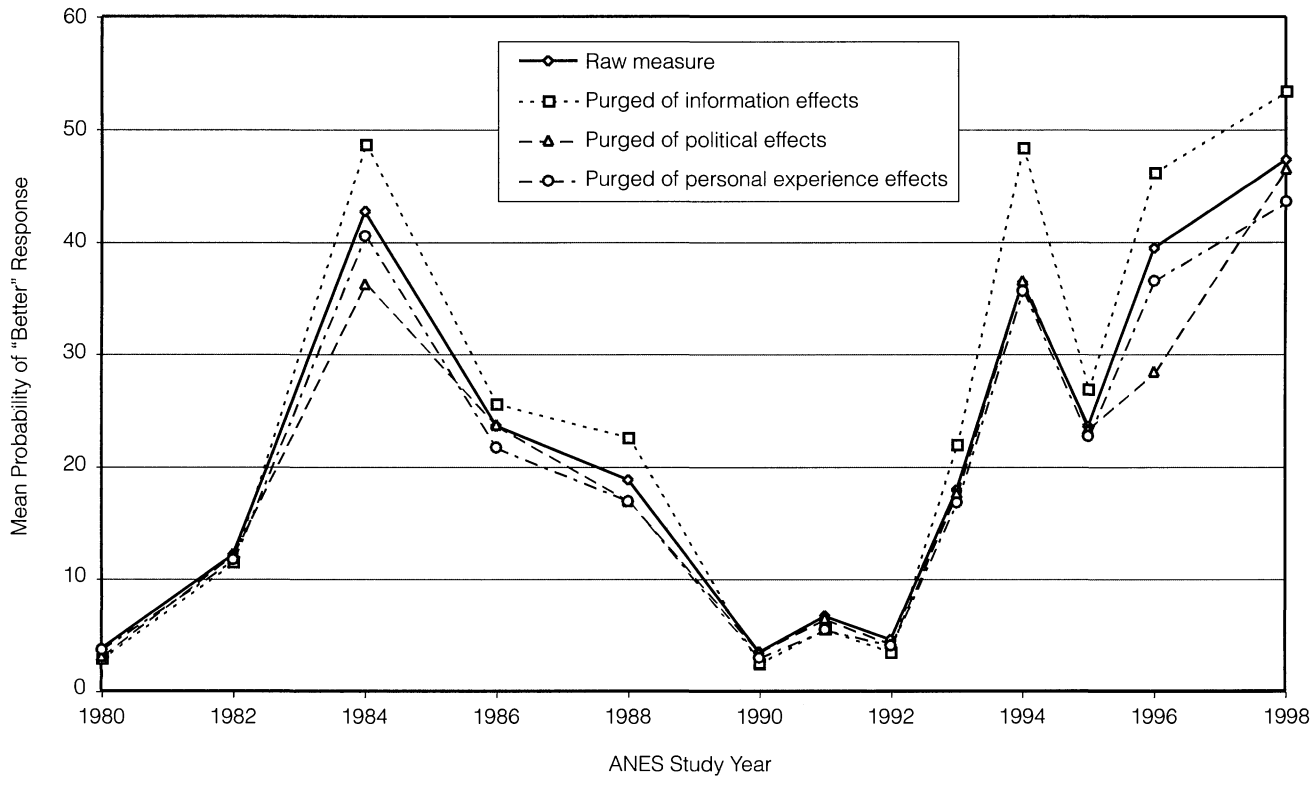


FIGURE 2 Distortion of Aggregate-Level Measure of Prospective National Economic Evaluations, U.S. 1980–1998

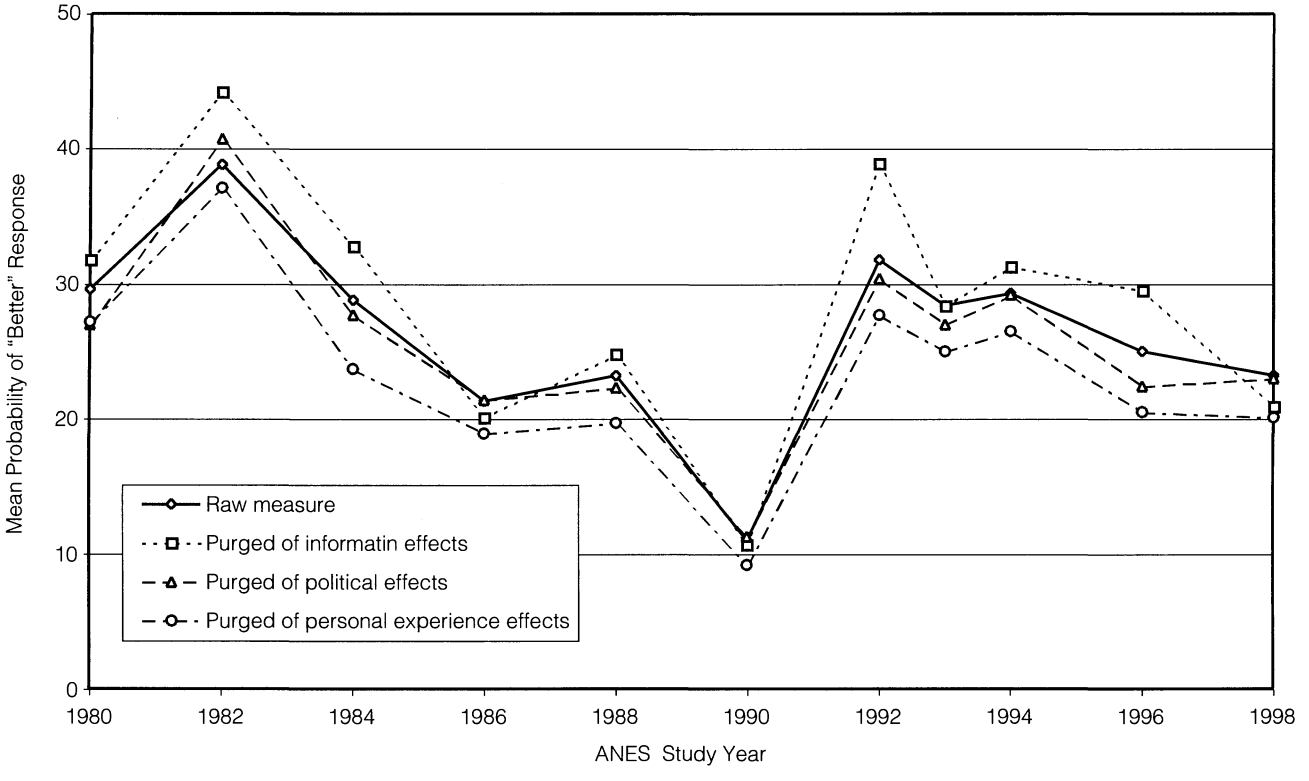
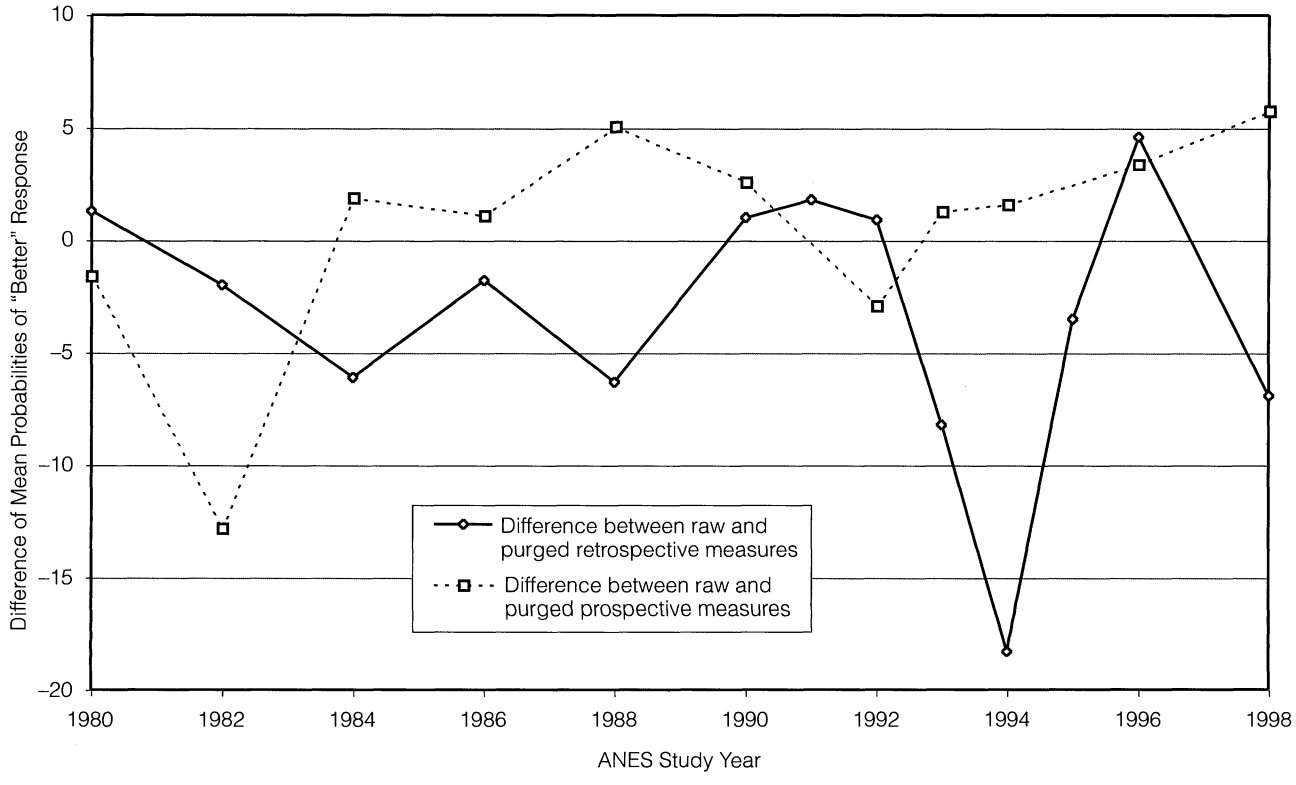


FIGURE 3 Total Distortion of Aggregate-Level Measures of Retrospective and Prospective National Economic Evaluations, U.S. 1980–1998



information.[11] The purged measures represent the mean probability of a "better" response if all survey participants had common "objective" or neutral values for the denoted subset of regressors. More specifically, the measure purged of political effects approximates the mean probability of a positive evaluation if all survey respondents were pure independents, did not approve or disapprove of the president, and could not predict a presidential winner. Similarly, the measure purged of personal experience effects corresponds to all survey respondents having experienced and expected no change in their personal financial situation. And the measure purged of information effects estimates the mean probability of a "better" response if all survey respondents had the highest levels of political information and media usage.[12]

Figure 3 plots the differences between the raw aggregate measures and measures purged of all four sources of subjective heterogeneity including group self-interest. By plotting the "total" aggregate-level distortion, Figure 3 illustrates the combined effect of information and subjective factors at the aggregate level. A positive value in Figure 3 indicates that the combined effect of subjective heterogeneity produces a more positive aggregate evaluation of the economy, while a negative value indicates that heterogeneity causes the raw measure to understate the public's satisfaction with economic performance.[13]

To the extent that the purged measures diverge from the raw measures in Figures 1 and 2 and the total distortion in Figure 3 differs from zero, individual-level "noise" distorts aggregate-level measures of NEE.[14] Several com-

[11]Ordered probit models were estimated separately for each survey year using the regressor specifications in Table 1. For mid-term elections and nonelection years, the specifications do not include the four *Predicted Winner* variables since respondents in those surveys were not asked about the next presidential election. These ordered probit results are available from the authors upon request.

[12]We implicitly assume here that respondents with the highest levels of information and media usage approximate fully informed individuals. And hence they serve as a reference group for which an absence of information is *not* affecting economic evaluations.

[13] We have some reservations about calculating the "total" effect of subjective heterogeneity since it requires us to include the effects of group self-interest. Demographic characteristics do not have obvious "objective" or neutral values. For instance, we have no basis for arguing that the economic evaluations of women are more "objective" than those of men, or vice versa. In constructing Figure 3, we set education, family income, and age to their median values and the demographic dummy variables to zero.

[14] The discrepancies between raw and purged measures of NEE are based on ANES surveys, which are typically conducted during

mon patterns emerge in Figures 1–3. First, aggregation does not "cancel out" the systematic variation in NEE produced by political attitudes, personal financial experience, information, and group self-interest. Moreover, as Figure 3 demonstrates, the magnitude and direction of the net (total) distortion varies considerably from year to year. Second, the impacts of the different sources of heterogeneity vary over time with the greatest divergence between the raw and separate purged measures occurring in 1984, 1994, and 1996, as illustrated in Figures 1 and 2. Third, well-informed respondents tend to evaluate the economy more optimistically than respondents with low levels of political sophistication and media exposure do. Consequently, the fact that the electorate falls short of being fully informed generally depresses aggregate measures of NEE. This general pattern conflicts with Hetherington's (1996) finding that greater media usage produced more negative assessments of the economy in 1992, though Hetherington acknowledges that this relationship did not generalize to 1984 and 1988. Fourth, political attitudes and personal experiences generally inflate aggregate evaluations of the economy. In other words, respondents are less likely, on average, to positively evaluate the economy if they lack partisan attachments, hold neutral political stances, and have experienced (or expect) no change in their financial circumstances. Finally, the distortions (discrepancies between raw and purged measures) in 1991, 1993, and 1995 are similar in magnitude to the distortions in adjacent election years. This pattern suggests that aggregation biases are not specific to election years and hence reinforces our claim that these biases have important implications for time-series models of presidential popularity that include aggregated assessments of the national economy.

The ordered probit models applied in constructing the purged measures in Figures 1 and 2 can also be used to characterize temporal changes in the amount of individual-level "noise" in NEE. Figure 4 plots mean absolute differences between raw and purged predicted probabilities of a "better" response to the standard retrospective ANES question on national economic conditions. Figure 5 does the same for prospective assessments of the economy. The raw predicted probabilities were calculated with all of the variables in the ordered probit models, while the purged predicted probabilities were calculated with particular subsets of these variables excluded. As in Figures 1 and 2, we constructed three purged probabilities by separately excluding the effects of political attitudes, personal financial experience, and information. For example, purging political effects from the 1996 retrospective equation (i.e., treating all survey respondents as independents who neither approve nor disapprove of the president and are unable to predict a presidential winner) changes the predicted probability of a better NEE response by almost 14 percent points on average. Hence, the mean absolute differences represent the magnitude of individual-level "noise" in NEE attributable to each of these sources of subjective heterogeneity.[15]

While Figures 1 and 2 characterize the extent of aggregation bias due to partisan preferences, information, and personal financial experiences, Figures 4 and 5 characterize the potential impact of these three sources of systematic measurement error on individual-level analyses of political behavior and public opinion. Figures 4 and 5 illustrate that political attitudes, information, and personal financial experiences strongly influence retrospective and prospective evaluations of the economy. Clearly, the results for 1992, presented in Table 1, generalize to the entire 1980–1998 period. Furthermore, while the effects of political attitudes, information, and personal financial experiences on prospective evaluations in 1992 are similar in magnitude to those in other survey years, these factors' effects on retrospective evaluations in 1992 are modest compared to those in most of the other

election years. However, many aggregate-level economic voting analyses (such as those of presidential popularity) employ Gallup data that include off-election time periods. It is certainly possible that the partisan and media effects found in surveys conducted during election years are significantly attenuated during periods in which no elections occur. We evaluate this possibility in two ways. First, we analyzed several off-election-year ANES surveys, which produced results analogous to those in Table 1. The distortions in these years are plotted in Figures 1–5. Second, we estimated a retrospective model similar to that estimated in Table 1 but employing data from the May 1997 Gallup survey. Unfortunately, data limitations prevented us from replicating this analysis for a sequence of off-election-year Gallup surveys. Very few of the off-election-year surveys that we identified included enough variables to approximate the models in Table 1. The ordered probit results for the 1997 Gallup survey are (** $p < .01$ and * $p < .05$; t-statistics in parentheses):

$$\begin{aligned}\text{National Economic Evaluations} = {} & \underset{(-3.62)^{**}}{-.33}\left(\text{Party Identification}\right) + \underset{(3.49)^{**}}{.048}\left(\text{Party Identification} \times \text{Education}\right) \\ & + \underset{(1.64)}{.30}\left(\text{Retrospective Personal Finances}\right) + \underset{(.67)}{.019}\left(\text{Retrospective Finances} \times \text{Education}\right) \\ & + \underset{(.13)}{.01}\,(\text{Education}) + \underset{(4.17)^{**}}{.11}\,(\text{Income}) + \underset{(5.43)^{**}}{.012}\,(\text{Age}) \underset{(-3.50)^{**}}{-.49}\,(\text{Black}) \underset{(4.46)^{**}}{-.33}\,(\text{Female}) \\ & -.044\mu_1 + 1.37\mu_2 + 2.99\mu_3\end{aligned}$$

Chi-Squared = 236.7**; N = 927.

[15]For the purposes of the present essay, the crucial question is whether systematic variation exists rather than whether the different sources of subjective heterogeneity have positive or negative impacts on NEE.

FIGURE 4 Magnitude of Individual-Level "Noise" in Retrospective National Economic Evaluations, U.S. 1980–1998

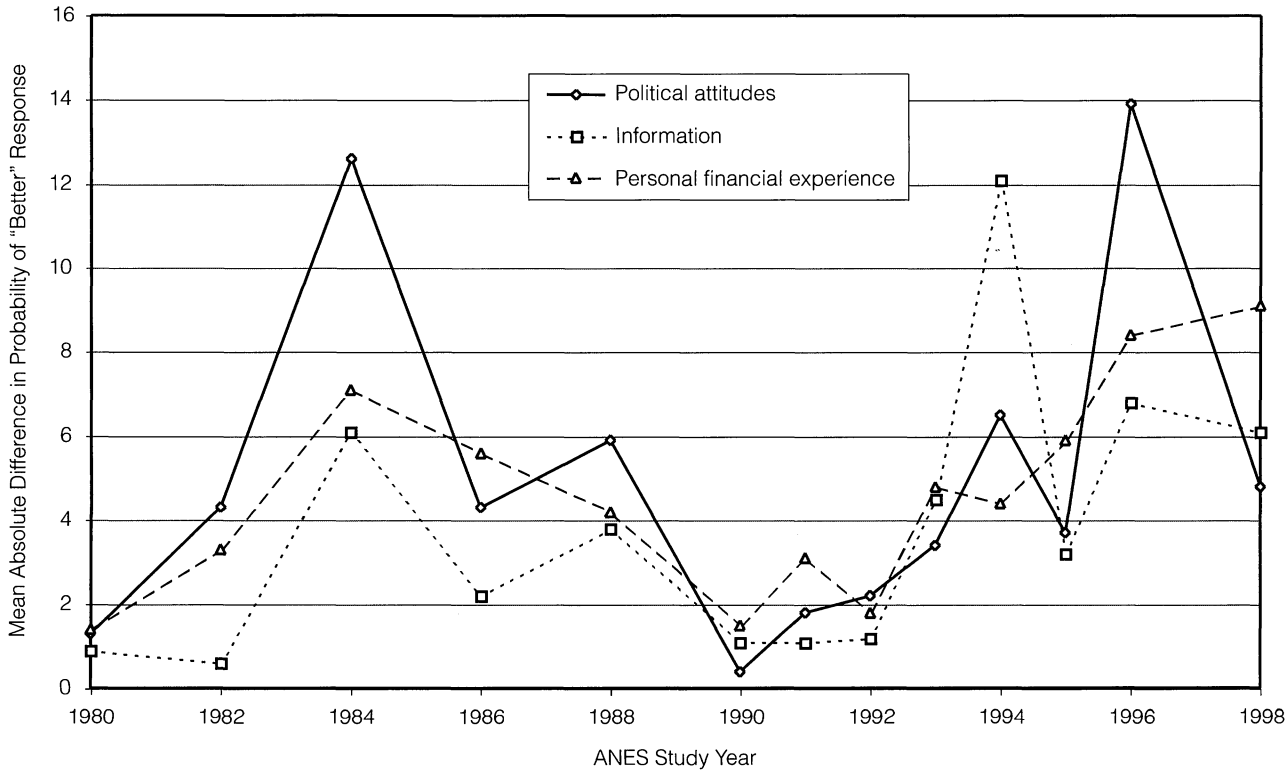
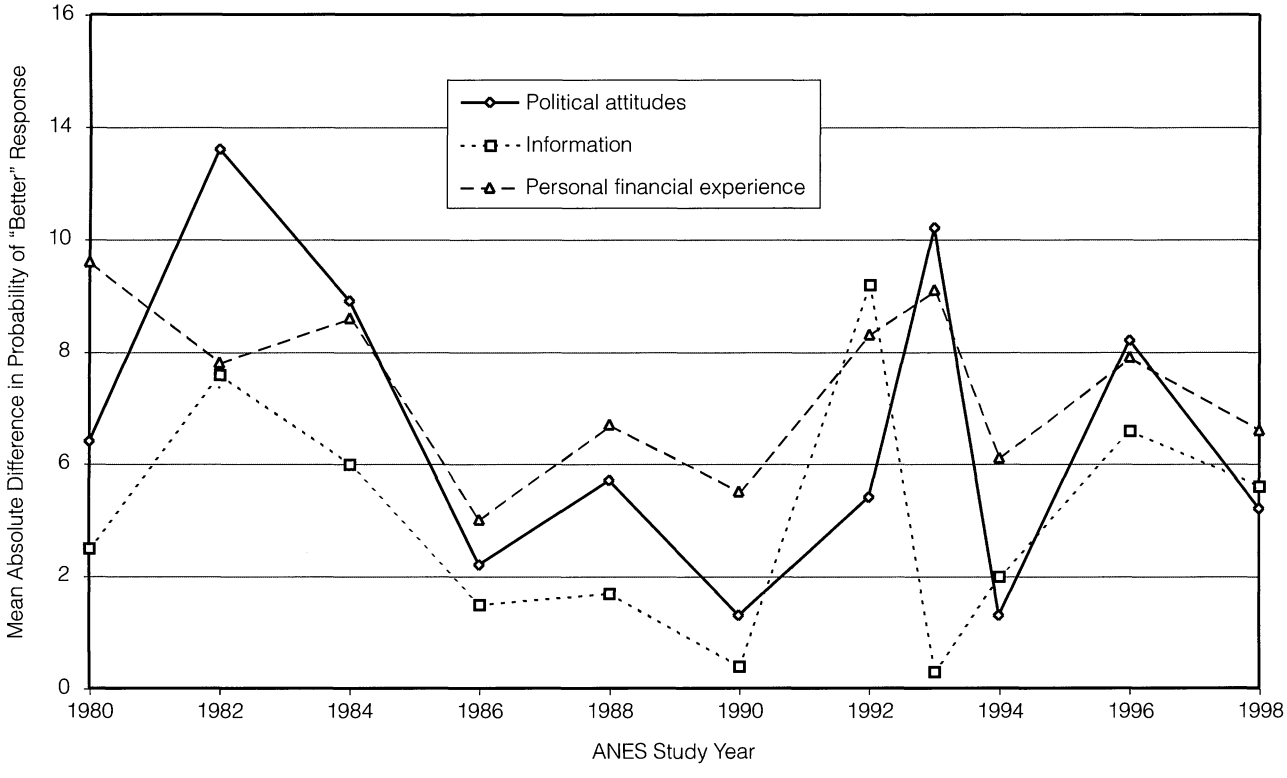


FIGURE 5 Magnitude of Individual-Level "Noise" in Prospective National Economic Evaluations, U.S. 1980–1998



years. Hence, the results in Table 1 for 1992 do not exaggerate the extent of systematic variation in NEE more generally.

While Figures 4 and 5 do not reveal any monotonic temporal trends, several patterns do emerge.[16] Overall, greater amounts of systematic variation or "noise" occur in presidential election years, even though 1982 for prospective evaluations and 1994 and 1998 for retrospective evaluations are notable exceptions. Among the different sources of subjective heterogeneity, political attitudes generally have the strongest impact on NEE, both retrospectively and prospectively. Consistent with Bartels' (1996) study of voting and Althaus' (1998) findings regarding collective policy preferences, Figures 4 and 5 indicate that poorly informed citizens do not assess the national economy as if fully informed. To the extent that economic performance matters politically, this result implies that poorly informed citizens do not vote and evaluate the president as if fully informed. Finally, a review of Figure 4 suggests that the magnitude of "noise" tends to rise during periods of relative economic prosperity (e.g., 1984 and 1996) but diminish during periods of poor economic performance (e.g., 1990 and 1992). In fact the magnitude of "noise" in retrospective evaluations is positively correlated with growth in real gross domestic product. The correlation coefficient is .645 for "noise" attributed to political attitudes, .617 for information, and .617 for personal financial experience.[17] This statistical relationship suggests that during periods of economic downturn, aggregate retrospective economic evaluations are relatively free of measurement bias. But in good times, the magnitude of "noise" in aggregate retrospective series rises considerably. This pattern suggests that citizens might be more attentive to economic performance and evaluate it more seriously (objectively) when economic conditions are poor than when they are good.

[16]A scholarly debate exists about the effect of survey design on assessments of the national economy (e.g., Sears and Lau 1983; Lewis-Beck 1985). This research speaks to the present analysis by raising the possibility that the personal experience distortions plotted in Figures 4 and 5 are attributable to survey design. We evaluated this possibility by calculating the correlation between the magnitude of the personal experience distortion and the natural logarithm of the number of survey questions between the pocketbook and sociotropic economic evaluation questions. If survey design matters, these correlation coefficients should be negative, indicating that the distortion increases in magnitude as the two questions become more proximate. We found, however, that the opposite holds for our estimates. The correlation coefficients are .311 for retrospective evaluations and .123 for prospective evaluations.

[17]No such relationship exists for prospective economic evaluations.

Does Measurement Matter?

Figures 4 and 5 demonstrate that the magnitudes of the individual-level effects of information and subjective factors are substantial and display considerable variation over time. Figures 1–3 demonstrate that these individual-level distortions do not cancel out in aggregate.[18] Identification of the biases in NEE is important because they can alter statistical inferences drawn from aggregate-level models of economic voting that include aggregated NEE as an independent variable. Aggregation bias is particularly problematic in economic models of political behavior and public opinion that exclude control variables, such as partisanship and information, which have direct effects on the dependent variable as well as being sources of subjective heterogeneity in NEE. Furthermore, the fact that the magnitude and direction of the aggregation bias varies from year to year, as demonstrated in Figure 3, implies that failing to account for it might bias estimates of other explanatory variables' effects.

Additionally, temporal variation in the sources of subjective heterogeneity in NEE further complicates the statistical inference problem due to aggregation bias. Variation over time in the aggregate-level distortions plotted in Figures 1 and 2 and the individual-level effects plotted in Figures 4 and 5 reflects temporal variation in the statistical significance of different sources of subjective heterogeneity. This temporal variation complicates the statistical inference problem since we cannot generalize about which factors account for the measurement bias and hence cannot easily qualify the findings of aggregate-level economic voting models by applying "universal" assumptions about the nature of the bias.

[18]Given Figures 1–3, an obvious question is whether differences in measurement influence the relationship between presidential approval and assessments of the national economy. Replicating recent aggregate-level economic voting studies is beyond the scope of this essay. But we did separately regress the raw aggregate retrospective NEE series and the aggregate retrospective NEE series purged of all subjective heterogeneity on aggregated presidential job approval (constructed from the 1980–1998 ANES surveys). The results of these two bivariate regressions are (*p < .05; t-statistics in parentheses):

Presidential Approval = 48.8 + .411 (Raw Retrospective NEE), $R^2 = .418$
(10.95)* (2.54)*

Presidential Approval = 50.7 + .281 (Purged Retrospective NEE), $R^2 = .288$
(10.57)* (1.91)

A comparison of these regressions reveals that measurement does matter for the strength of the aggregate-level evidence of economic voting. The estimated economic voting relationship is over 45 percent stronger when the raw NEE series is used (as reflected in the larger coefficient and R^2).

Conclusion

It is widely accepted that aggregation of individual-level economic evaluations produces a good measure of citizens' average perception of economic performance because individual-level "noise"—or measurement error—in public opinion is largely, if not entirely, random and hence "cancels out" when aggregated. For this reason, some argue, macro-level models of economic voting tend to perform better than their micro-level counterparts. In this essay, we explore the validity of two assumptions underlying this argument: (1) that the "noise" in individual economic evaluations truly is random and (2) that this "noise" essentially cancels out in aggregate.

In the first stage of our analysis, we estimated individual-level models of both prospective and retrospective economic evaluations in the United States. These results confirm what most believe: voters' impressions of economic performance only approximate objective economic conditions. But contrary to what some might believe, distorted individual-level perceptions of economic performance are not plagued by only random measurement error. Rather, our analysis provides fairly conclusive evidence that how people view economic performance is shaped by their political predispositions, personal financial experiences, socioeconomic situation, and level of understanding about the political economy.

To the extent that perceptions of the economy reflect information differences and subjective considerations, aggregation of individual-level evaluations incorporates systematic biases. The second stage of our analysis characterized the magnitude of these biases by comparing raw aggregate measures of public economic perceptions with aggregate measures purged of systematic "noise." This demonstration illustrates the significant differences between raw aggregate measures (analogous to those employed in aggregate-level studies of economic voting) and aggregate measures purged of subjective heterogeneity due to political attitudes, personal financial experiences, information, and group self-interests. Hence, our analysis indicates that public perceptions of economic performance deviate from actual economic conditions because the systematic effects of subjective considerations at the individual level are manifested in the aggregated evaluation series. Moreover, the measurement bias in aggregate economic evaluations is not constant over time, varying in magnitude and direction from election to election.

We believe these findings pose serious problems for the reliability of aggregate-level studies of economic voting. Our findings indicate that from election to election, individual-level models of economic evaluations vary considerably in terms of the relative importance of different sources of subjective heterogeneity. Information differences among the electorate tended to depress national retrospective economic evaluations in 1994 and 1996, but there was no information effect in 1992. By contrast, political attitudes had little effect on retrospective evaluations in 1992 and 1994 but contributed greatly to distortion in 1996. Furthermore, the combined effect of the different sources of subjective heterogeneity (i.e., total aggregation bias) varies considerably over time in magnitude and direction.

Temporal variation in the systematic "noise" in NEE seriously complicates efforts to model differences between perceived and actual economic performance (e.g., Haller and Norpoth 1994). Any model that assumes constant distortion effects would produce biased estimates. Similarly, individual-level distortions in economic perceptions potentially confound inferences drawn from aggregate-level models of economic voting that employ aggregated economic evaluations since such models implicitly assume constant effects for the sources of subjective heterogeneity. Aggregate-level models that control for partisanship, for example, only capture part of the partisan distortion found in our analysis since the magnitude and direction of the partisan distortion varies from year to year. The dilemma here for aggregate-level models is that subjective heterogeneity at the individual level produces time-varying nonrandom measurement error at the aggregate level. If the measurement bias in aggregated economic evaluations is correlated with the model's error term, statistical inferences drawn from the aggregate-level analysis of economic voting are potentially misleading due to inconsistent parameter estimates.

Our findings have important implications for the inferences frequently drawn from economic voting models. Citizens do not judge the government's economic performance exclusively on its objective economic record. As one might imagine other factors, such as information levels or partisanship, shape evaluations of the economy. This matters because, depending on the year, the individual-level biases identified in our analysis can produce, for the incumbent government, systematic advantages or disadvantages in economic perceptions. Our concern, particularly at the aggregate level, is that these advantages (or disadvantages) associated with systematic biases in economic evaluations are confounded, in both estimation and theoretical inference, with objective assessments of economic performance. Thus, our results question the extent to which the relationship between economic evaluations and vote choice represents a simple democratic

accountability model. Accountability might be compromised by the influence of subjective considerations on public evaluations of policy outcomes.

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Statistical Appendix

This appendix provides further details on two aspects of the statistical analyses presented above. First, it discusses the coding of the ordered probit regressors in Table 1. Second, it explains the calculation of the series plotted in Figures 1–5.

The ordered probit regressors in Tables 1 were constructed with survey data from the ANES. Missing values were set to the sample means in order to avoid losing observations.

Party Identification measures the strength of the respondent's partisan attachment, ranging from 0 for strong Democrats to 6 for strong Republicans. *Predicted Presidential Winner* denotes the respondent's predicted presidential winner, coded 1 for George Bush, –1 for Bill Clinton, and 0 otherwise. *(Partisan) Consistency of Predicted Winner* measures the consistency between the respondent's party identification and predicted presidential winner. It is the product of *Predicted Presidential Winner* and party identification coded from –3 for strong Democrat to 3 for strong Republican. *Election Certainty* is a binary variable coded 1 for respondents who state that they "care a good deal" about whom wins the presidential election and expect their predicted presidential winner to "win by quite a bit."

Retrospective Personal Financial Situation measures respondents' evaluations of their personal financial situations compared to a year ago. *Prospective Personal Financial Situation* measures respondents' expectations about their future personal financial situations a year ahead. The coding of both variables ranges from 0 for "much worse" to 4 for "much better."

Media Usage measures the respondent's level of exposure to political information in the mass media. *Media Usage* is the sum of *Television News* and *Newspaper Usage* (both divided by seven) and *Campaign Media* (divided by four). *Television News* and *Newspaper Usage* are the numbers of days per week (0–7) that the respondent watches the national news on television and reads a newspaper, respectively. *Campaign Media* is the number of media sources—radio, newspapers, magazines, and television—from which the respondent learned about the election campaign. Hence, *Media Usage* ranges from 0 to 3. *Political Sophistication* is the interviewer's evaluation of the respondent's general level of information about politics, ranging from 0 for "very low" to 4 for "very high." *Education* is a categorical measure of the respondent's education level, ranging from 0 for 8 grades or less to 5 for BA level degree or better.

The ordered probit models in Table 1 also include several measures of group self-interest. *Family Income* is a categorical measure of household income. *Family Income* is coded from 0 for incomes in the 0–16 percentile to 4 for incomes in the 96–100 percentile. *Professional* and *Manual Worker* are binary variables denoting whether the respondent is employed in a professional or manual labor occupation, respectively. *Union Membership* is a binary variable coded 1 if the respondent or a family member belongs to a labor union. *Age* is the respondent's age in years. *Race (Black)* is a binary variable coded 1 for African-American respondents. *Female* is a binary variable coded 1 for women.

The initial step in constructing the purged measures in Figures 1 and 2 was to estimate ordered probit models of retrospective and prospective national economic evaluations with ANES data for each of the ten election years from 1980 to 1998.[19] Separate ordered probit models were also estimated using ANES data from the 1991, 1993, and 1995 pilot studies.[20] To simplify the calculation of the purged measures, we recoded *Party Identification, Evaluation of Presidential Performance, Retrospective Personal Financial Situation,* and *Prospective Personal Financial Situation* so that zero corresponds to a neutral position. *Predicted Winner* and *Partisan Consistency of Predicted Winner* are already coded as such. We also recoded *Political Sophistication* and *Media Usage* so that zero corresponds to the highest level of information or media exposure. Using these recoded variables, we estimated ordered probit models with the regressor specifications in Table 1.[21]

Let the vector of regressors in the ordered probit models be $x' = [x_2' \; x_3' \; x_4' \; x_1']$, where x_1 contains the demo-

[19]In most surveys, the ANES questions on national economic conditions present a five-category response set ranging from "much worse" to "much better." However, the prospective evaluation is often a three-category response ranging from "worse" to "better." This difference, though, only alters the procedure for calculating the purged measures in minor self-evident ways.

[20]Only the 1993 ANES included a prospective question on the national economy.

[21]Respondents in the 1991, 1993, and 1995 surveys were part of panel studies. Hence their media usage, political sophistication, and demographic characteristics were measured in the ANES survey from the prior year. The same holds for retrospective PFS in 1995. Otherwise, party identification and PFS were measured in the same survey as NEE. The regressor specifications for 1991 and 1993 were exactly the same as those for all election years from 1980 to 1998. However, we modified the 1995 retrospective model slightly by excluding the political sophistication interactions with party identification and PFS. This decision was dictated by the relatively small sample size (N = 237).

TABLE A1 Descriptive Statistics

Explanatory Variables	Mean	Std. Dev.	Minimum	Maximum
Party Identification	2.71	2.01	0	6
Predicted Presidential Winner	−.26	.90	−1	1
Predicted Presidential Winner*Election Certainty	−.09	.34	−1	1
Partisan Consistency of Predicted Winner	.70	1.80	−6	6
Consistency of Predicted Winner*Election Certainty	.14	.76	−6	6
Retrospective Personal Financial Situation	1.90	1.10	0	4
Prospective Personal Financial Situation	2.31	.82	0	4
Media Usage	1.47	.72	0	3
Political Sophistication	2.37	1.04	0	4
Education	2.92	1.61	2.92	1.61
Family Income	1.94	1.09	1.94	1.09
Professional	.273		.273	
Manual Worker	.024		.024	
Union Membership	.164		.164	
Age	45.5	17.5	45.5	17.5
Race (Black)	.128		.128	
Female	.531		.531	

Note: Standard deviations are not reported for binary explanatory variables. The sample size is 2455.

graphic characters and a constant, x_2 is the set of political variables, x_3 includes *Media Usage* and *Political Sophistication*, and x_4 includes *Retrospective PFS* and *Retrospective PFS*Political Sophistication* (or *Prospective PFS* and *Prospective PFS*Political Sophistication*). We used the ordered probit coefficients from each estimated model, $b' = [b_2' \;\; b_3' \;\; b_4' \;\; b_1']$, to calculate four predicted z-score values: $z = b'x$, $z_2 = b_1'x_1 + b_3'x_3 + b_4'x_4$, $z_3 = b_1'x_1 + b_2'x_2 + b_4'x_4$, and $z_4 = b_1'x_1 + b_2'x_2 + b_3'x_3$. These z-scores were then used to calculate predicted probabilities of a "better" response. For the five-category survey question, these predicted probabilities were calculated as follows: $\hat{p} = 1 - \Phi(\hat{\mu}_2 - z)$, where $\hat{p}_2$, $\hat{p}_3$, and $\hat{p}_4$ were calculated in the same manner replacing z with z_2, z_3, and z_4, respectively. The "raw" predicted probability is $\hat{p}$, while the other variables are predicted probabilities purged of the effects of political attitudes, information, and personal financial experiences, respectively. Purged probabilities of a "better" evaluation were then calculated as follows for each respondent: $p_2^* = P - (\hat{p} - \hat{p}_2)$, $p_3^* = P - (\hat{p} - \hat{p}_3)$, and $p_4^* = P - (\hat{p} - \hat{p}_4)$, where P is the proportion of survey respondents who positively evaluated the national economy. Given that P is constant across respondents in a particular survey, the means of these purged probabilities are the mean differences between raw and purged predicted probabilities of a "better" evaluation among survey respondents subtracted from the survey frequency of a "better" evaluation.

Figures 1 and 2 plot the mean purged probabilities and P, expressed as percentages, for retrospective and prospective evaluations. Differences between raw and purged predicted probabilities of a "better" evaluation represent the "noise" in respondents' assessments of the national economy attributable to their political attitudes, level of political information, and personal financial experiences. Figures 4 and 5 plot the mean absolute differences between raw and purged predicted probabilities of a "better" evaluation for each of these sources of systematic variation (i.e., the means of $|\hat{p} - \hat{p}_2|$, $|\hat{p} - \hat{p}_3|$, and $|\hat{p} - \hat{p}_4|$).

Finally, Figure 3 plots the total distortion from all four sources of subjective heterogeneity including group self-interest. More formally, the total distortion equals $(\hat{p} - \hat{p}_T)$ where $\hat{p}_T = 1 - \Phi(\mu_2 - z_T)$, $z_T = b_1'x_1^*$, and x_1^* is x_1 with education, family income, and age set to their median values and the demographic dummy variables set to zero.

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