When Is Myopic Retrospection Rational?

Christopher H. Achen
Politics Department
Princeton University
Princeton, NJ 08544

achen@princeton.edu

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Abstract

Since the 1930s, political scientists have marshalled a great deal of statistical evidence in support of a proposition long familiar to politicians: Hard times hurt incumbents. In nearly all these studies, voters' retrospections are myopic: Only the most recent year or two seem to matter, and only *changes* in the economy (not levels) are influential. The usual view is that this behavior is irrational, or at best, a very imperfect cognitive shortcut, although standard political economy models make stylized assumptions under which myopia is rational. This paper does three things: First, it generalizes slightly the conventional political economy models, showing that their accordance with myopic reality is not robust: Adding just a little realism makes them predict bizarre voter behavior. Second, the paper presents a new model for voter thinking that does robustly imply the myopic voter behavior that scholars usually observe under ordinary economic conditions. Third, the model also predicts that voters will be less myopic when the economy is highly volatile. The paper verifies that prediction in a study of the brutally volatile economic circumstances of Montana wheat–growing counties in the 1930s.

Introduction[1]

Politicians in democracies have long believed that the voters punish failure and reward success, especially in the management of the economy. Moreover, this "retrospective voting" is seen as myopic: Only recent events matter. Thus president James Buchanan blamed his party's dismal showing in the 1858 Pennsylvania midterm election on the poor economy resulting from the Panic of 1857 (Huston 1987, 166-168). In 1879, British prime minister Benjamin Disraeli correctly predicted his incumbent party's election loss due to the dismal British harvest of the previous summer (Monypenny and Buckle 1929, 1347). Foreign policy, military operations, or personal scandals are also thought to matter: Lincoln's re-election in 1864 was widely thought at the time to have depended on the recent successes of Union forces at Atlanta, Mobile Bay, and Cedar Creek (Dudley 1932, 515; Nichols 1961, 150-151). Thus few late nineteenth century political observers would have regarded the theory of retrospective voting as new. But of course, any one election outcome is subject to multiple interpretations, and incumbents claiming that "it wasn't my fault" are particularly suspect. Firmer arguments awaited better data and statistical tools.

Following Ogburn and Talbot (1929), Gosnell and his coauthors were the most sophisticated and persistent scholars to take up the challenge (Gosnell and Gill 1935; Gosnell and Schmidt 1936; Gosnell and Pearson 1939; Gosnell and Coleman 1940; Gosnell and Cohen 1940; Gosnell 1942). In analytically skillful, thoroughly politically informed studies of Chicago, Iowa, Pennsylvania, and Wisconsin, they demonstrated that voters' recent economic circumstances indeed had powerful influences on the vote. However, Gosnell and his colleagues never forcefully raised issues of democratic theory or voter rationality. Instead, they focused on the empirical evidence, using statistical tools that would not come into general social science use until the 1960s. Writing during and just after the Great Depression had led to the Roosevelt realignment, Gosnell was probably thought to be employing obscurantist research techniques to state the obvious. In any case, no one followed up at the same level of persuasiveness for decades. (See the review of efforts before and after Gosnell in Kramer 1971.) The scholars who followed Gosnell cited his work only in part, or more often not at all.

Kramer (1971) revived the topic for political scientists, employing newly available computing power and connecting the argument explicitly to the debate over voter rationality.

[1]The work reported here was assisted by research support and a sabbatical leave from Princeton University. I am indebted to Larry Bartels for many enlightening conversations on this and related topics, as well as for assistance with data sources. Phil Shively also helped me think about the topic, and he suggested the Disraeli reference in the first paragraph. Mark Beissinger supplied timely logistical help. I also thank my former teacher, Jerry Kramer, for introducing me to serious econometric thinking backed by his deep substantive understanding of politics. My gratitude extends to all these colleagues and institutions, but remaining errors are my own.

Using national–level returns over a series of elections, Kramer arrived at a principal result much like Gosnell's: Changes in the economy matter to election outcomes. Moreover, with better data and more powerful tools, he was able to advance the subject in two ways. First, Kramer demonstrated that it was personal income, not unemployment or inflation, that was the key variable. Second, Gosnell and his co-workers had used four–year economic changes in their studies of Wisconsin and Pennsylvania and one–year changes in corn prices in Iowa, but they did not test the alternate lags against each other nor remark on the distinction. Kramer assumed that voters estimate future income based only on the income change since the previous year—"a reasonable and convenient hypothesis" that subsequent empirical work has strongly supported, modified only by occasional evidence that voters put a little weight on the change two years back (for example, Bartels 2010, 103-104).[2]

Kramer (1971, 134, 140) summarized his findings by saying that "election outcomes are in substantial part responsive to objective changes occurring under the incumbent party; they are not 'irrational,' or random, or solely the product of past loyalties and habits, or of campaign rhetoric and merchandising." Thus, he said, the behavior of the voters was plausibly rational in the sense argued by Key (1966): It is reasonable to reject the incumbent if performance in office has been poor. A vast subsequent literature, such as Fiorina (1981), has extended the empirical evidence and strengthened the theoretical foundations, arriving at very similar findings and conclusions (for reviews, see Bartels and Zaller 2001 and Hibbs 2004). The principal exception to the consensus about myopia is Hibbs (2000), who argues for a geometric lag with a quarterly discount rate of .95, implying that all years in a presidential term get substantial weight in voters' economic retrospections.[3]

Two objections can be raised to interpreting myopic retrospective voting as rational behavior. The first is that administrations often can do very little about the economy (and even less about the weather needed for good harvests). Speaking of the 1858 Pennsylvania midterm results, President Buchanan said, "The administration are as responsible for the motions of the Comet as for the low price of iron" (Huston 1987, 167). On this view, voting against the incumbent when times are bad is akin to kicking the dog after a bad day at work. It is emotional, not rational.

Skepticism about the rationality of myopic retrospection is not new. One of the articles cited by Kramer made precisely that argument, using a sophisticated understanding of voter

[2] Though he does not say so, it seems likely that a profoundly talented researcher like Kramer already knew that myopic retrospection was the best fit to the data.

[3] Hibbs reports that the hypothesis of perfectly equal weighting cannot be rejected at conventional significance levels. In slightly different versions of Hibbs' model, Bartels and Zaller (2001, 15) find discount rates of .7 or .8. Note, however, that Hibbs's model uses quarterly data. Temporally disaggregated data may have different and more complex dynamics than more aggregated versions (Rossana and Seater 1995). Thus it is less easy than one might expect to compare Hibbs's findings to the rest of the retrospective voting literature, where annual data are standard.

behavior close to that of *The American Voter* (Campbell *et al.* 1960), but anticipating that classic by more than a decade. Beginning by noting that there is no "objective connection between changing or continuing administrations and health of the nation's economy," the authors remark that:

> Most persons respond more forcefully to resentment or contentment than to reason. Resentment usually prevails when times are bad and incomes are low. As a result, existing administrations are almost always voted out of office. Conversely, when times are good and there are two chickens in every pot, a rosy glow of contentment suffuses the voter and the President or his party is generally reelected (Pearson and Myers 1948, 4210, 4213).

Thus elections tell us how the voters have felt lately, not how they are thinking about the future.

Even if rational choice arguments are stretched shamelessly, so that the voters should rationally replace the incumbents just on the off chance that the administration could have done *something* to help make it rain on the crops, a second issue remains—the myopia. Bartels (2010, 99-104) points out that short-term retrospective voting is both firmly supported by the data and seemingly quite irrational. In contrast to Kramer (1971), he asks why the voters should let the incumbents get away with murder for two years and then monitor them only in the final year or two of their term. In effect, myopia is no more appealing in the voting booth than it is at sporting events: If you can't see very far, you miss a lot. A rational voter, as Bartels forcefully argues, should punish incumbents for their performance over their term of office, not just for what they have done lately. Otherwise, the myopia can be exploited, as Tufte (1978) suggested: Administrations can pay off their interest groups shamelessly for two years, then change course as the election approaches. The voters forget all about the initial two years and most of the third year, and then re-elect their abusers when the fourth year improves.

Concerns about the rationality of myopia have typically been sidestepped in the theoretical literature. For example, Alesina and Rosenthal (1995, 173, 192-193) assume that incumbent competence follows an MA(1) time series process (a moving average of order one), with a time unit of two years. That is, incumbent party performance in the past two years is predictive of future performance, but there is nothing anyone could learn about future competence from performance three or more years back, even if the same incumbent is in office throughout. Moreover, the voters learn the exact value of the president's competence in all preceding two–year periods, which sounds like a wonderful world for those of us undergoing the 2012 presidential campaign with its bitter debate on that very subject.

Alesina and Roubini (1997, 33) also make the Alesina–Rosenthal assumption about

incumbent competence. Duch and Stevenson (2008, 133) follow suit, though they are agnostic about how long a "period" lasts. In practice, they test the model using survey data with one–year retrospections, implicitly assuming that the president's performance even 15 months ago tells the voter nothing about his abilities (Duch and Stevenson 2008, 200-204).

In all these models, voters know the exact one–period–lagged value of competence to use in their forecasts. They also know that competence is MA(1). Hence they look back at most two years, roughly as the empirical evidence suggests. Under the assumptions, this myopic behavior exploits all the available information and is fully rational.

Theoretical approaches of this kind solve the problem of irrational voter myopia by assuming it away. For example, if voters can learn nothing about Franklin Roosevelt's competence from his brilliant First Hundred Days in 1933, or from any aspect of what he did in 1933 and 1934, and if last period's competence is always known, then, for certain, myopic retrospection in 1936 is rational.[4] Models of this kind may be serviceable when the question of interest lies elsewhere and when its answers are not affected by the assumptions about what the voters know, but they are not much use for adjudicating between Kramer and Bartels.

This scholarly void suggests the following question: If one maintained the rational choice perspective, but took a somewhat more plausible approach to what the voters know, when would myopic voting be "rational" in the sense that economists use the term? That is, are there less restrictive models of the behavior of politicians and the information sets of voters for which short-term retrospection is, at least sometimes, optimal information processing—the best that rational voters could do? Under what conditions will rational voters take a longer view? This paper attempts to sort out the circumstances under which Kramer or Bartels is the more appropriate viewpoint on rational voter retrospection.

Incumbent Competence and Other Economic Forces

Persson and Tabellini (1990, 81) write:

> Competence—though random—is partially lasting: If yesterday's policy-maker was particularly able, chances are that he will also be able tomorrow, either because the external environment changes slowly, or because his ability to deal with different problems is positively, if not perfectly, correlated.

[4] In fact, the voters do seem to have ignored their income gains in Roosevelt's first three years (Achen and Bartels 2004, using state–level data from 37 non–Southern states). But that leaves open the question of whether they were rational to do so.

They then assume an MA(1) model for competence, with lag coefficient $\rho = 1$. Alesina and Roubini (1997, 59-60) choose the same lag parameter, as do Duch and Stevenson (2008, 133). Alesina and Rosenthal (1995, 192) also adopt an MA(1) structure but with slightly more generality, allowing $\rho \neq 1$. In the latter case, letting c_t denote incumbent competence in period t:

$$c_t = \delta_t + \rho\delta_{t-1} \tag{1}$$

where δ_t has mean zero and variance ω^2 at all time periods and is uncorrelated over time. For substantive meaningfulness in accord with Persson and Tabellini's remarks, we assume $0 < \rho < 1$, so that competence is positively correlated over time. Thus positive values of δ_t contribute to above–average competence, while negative values reduce it. The voter is assumed to know ρ, but not the δ_t. Thus competence is exogenous in these models: The voter is attempting to select good incumbents, not to enforce a contract or to act as a principal to control an agent. (It is unclear how a disparate electorate of 150 million could coordinate on enforcement.) Moreover, bygones are bygones: The past is relevant only insofar as it predicts the future.

Equation (1) leads to voter myopia, but it is not a very plausible model of incumbent competence for reasons already mentioned.[5] A small generalization in the interests of political realism would simply add a constant, reflecting the finding that American political parties and administrations differ in the growth rates they provide (Bartels 2008, chap. 2)[6]:

$$c_t = \theta + \delta_t + \rho\delta_{t-1} \tag{2}$$

Here θ takes a constant value ("average competence") for those years in which the incumbent is in office. Unlike the previous zero–mean MA(1) assumption, this alternate MA(1) structure allows for the case in which expected competence c_t is consistently positive or negative over a presidential term, as in ratings of "presidential greatness," begun by Arthur M. Schlesinger, Sr. (1948). In consequence, voters could learn something from each of the prior years in an incumbent's term, not just the most recent one or two.

Now denote the true log of income at time t by y_t^*, and assume that average annual growth is α, which is known to the voter.[7] Then, following standard political economy

[5] Alesina and Rosenthal (1995, 192-193) argue that an MA(1) model for competence is plausible because economists often find that economic growth evolves according to an MA(1) process. In their model, there is no other way to get the growth rate to have an MA(1) structure except to assume that competence is MA(1).

[6] An alternate and probably better time series generalization might be an AR(1) (autoregressive of order one) process for c_t, but we choose to modify the standard assumption in a minimal way in light of how little anyone knows about the time series properties of presidential competence. However, see the Summary and Conclusion of this paper.

[7] Readers less familiar with the political economy literature may wish to be reminded that for small changes in y_t^*, the difference in the natural logs of income, α, will be very nearly the same as the percent

assumptions that log income is an integrated moving average of order 1, 1—IMA(1,1)—we assume that the growth rate can be raised or lowered by incumbent competence in the following way[8]:

$$\begin{aligned} y_t^* &= y_{t-1}^* + \alpha + \theta + c_t \\ &= y_{t-1}^* + \alpha + \theta + \delta_t + \rho\delta_{t-1} \end{aligned} \tag{3}$$

Next, again in the interests of political realism, assume that the voter does not observe y_t^*, and thus cannot infer θ or c_t directly. She sees only a noisy version of y_t^*, denoted by y_t , primarily because the effects of incumbent competence are obscured by all the other economic forces in the economy. Additional difficulties in judging competence may be introduced by the differing circumstances of the voter's industry or by her inability to sort out the various economic measures and reports. Thus the voter sees overall changes in the economy, but cannot tell how much of those changes is due to incumbent performance. Denote the sum of these other economic forces and perception errors by e_t ,and assume that e_t has mean zero, variance τ^2, and is distributed jointly independently over time and jointly independent of δ_t at all lags. Then:

$$y_t = y_t^* + e_t \tag{4}$$

By substitution of $y_{t-1} - e_{t-1}$ for y_{t-1}^*, it follows that:

$$y_t = y_{t-1} + \alpha + \theta + w_t \tag{5}$$

with $w_t = \delta_t + \rho\delta_{t-1} + e_t - e_{t-1}$. Since w_t is a sum of two independent MA(1) processes, w_t is MA(1) itself (for example, Hamilton 1994, 106-107). Hence for some white noise process ϵ_t, the sequence w_t may be written as:

$$w_t = \epsilon_t - \gamma\epsilon_{t-1} \tag{6}$$

where ϵ_t has mean zero and variance σ^2.

The next step is to solve for γ in terms of the underlying parameters. To do so, equate the variance of w_t in Equation (6) to the variance of w_t when it is written as

increase in income, due to standard properties of the natural log. For larger changes in income, the two measures diverge. Since raw percent changes have poorer statistical properties, the use of α as a measure of the growth rate is standard.

[8] Of course, "competency" may concern foreign policy, domestic policymaking, the president's personal morality, and many topics other than the economic growth rate. Thus politically adept readers may choose to think of $y_t^* - y_{t-1}^* - \alpha$ as a clumsy notation for "how things are going for the president generally." The resulting mathematics would be the same.

$\delta_t + \rho\delta_{t-1} + e_t - e_{t-1}$. Then do the same thing for the lag-1 autocovariances. The result is the following two equations:

$$(1+\gamma^2)\sigma^2 = (1+\rho^2)\omega^2 + 2\tau^2 \tag{7}$$

$$\gamma\sigma^2 = \tau^2 - \rho\omega^2 \tag{8}$$

Solving for γ yields a quadratic equation whose solution is:

$$\gamma = \frac{c \pm \sqrt{c^2 - 4}}{2} \tag{9}$$

with

$$c = \frac{(1+\rho^2)\omega^2 + 2\tau^2}{\tau^2 - \rho\omega^2} \tag{10}$$

Equation (9) obviously has real roots when and only when $|c| > 2$. With a little arithmetic, it may be shown that under the present assumptions, the two roots of Equation (9) are always real for any permissible parameter values, and that the relevant one (with the negative sign on the radical) is bounded in absolute value between zero and unity.[9] There are two cases of the relevant root, the first empirically plausible and the second not[10]:

1. The voter's perceived variation in growth rates is dominated by variation in the rest of the economy and the voter's perceptual errors, not by variation in incumbent competence ($\tau^2 > \rho\omega^2$). Then $c > 2$, and it follows that $0 < \delta < 1$. From Equation (9), the derivative of γ with respect to c is $\frac{1}{2}[1 - c/(c^2-4)^{\frac{1}{2}}]$, which is strictly negative for $c > 2$. Hence δ declines toward zero as c increases, a fact to be needed later.

2. The voter's perceived variation in growth rates is dominated by variation in incumbent competence, not by other forces in the economy ($\rho\omega^2 > \tau^2$). Then $c < -2$, and it follows that $-1 < \delta < 0$, so that innovations in the economy would be negatively correlated. We set this case aside due to its combination of unrealistic assumptions and unobserved implications.

In either case, we have, using standard lag operator notation (Hamilton 1994, chap. 2):

$$y_t - y_{t-1} - \alpha - \theta = (1 - \gamma L)\epsilon_t \tag{11}$$

[9] For more on setting aside noninvertible representations, see Hamilton (1994, 64-67).

[10] A third, knife–edge case, $\tau^2 = \rho\omega^2$, occurs when w_t is MA(0), so that there is nothing whatsoever to learn from the past about incumbent competence. This possibility occurs on a set of measure zero and we put it aside.

Now suppose that the election takes place at the end of period $t-1$. The voter wishes to forecast economic growth in the next period if the incumbent is re-elected.[11] Denoting economic growth by $g_t = y_t - y_{t-1}$, we have from Equation (11):

$$\frac{g_t}{1-\gamma L} - \frac{\alpha}{1-\gamma} = \frac{\theta}{1-\gamma} + \epsilon_t \tag{12}$$

and thus (assuming incumbents have been in office four periods, and ignoring the truncation after lag 4):

$$\sum_{k=0}^{4} g_{t-k}\gamma^k = \frac{\alpha}{1-\gamma} + \frac{\theta}{1-\gamma} + \epsilon_t \tag{13}$$

or:

$$g_t = \frac{\alpha}{1-\gamma} + \frac{\theta}{1-\gamma} - \sum_{k=1}^{4} g_{t-k}\gamma^k + \epsilon_t \tag{14}$$

Now the expected value of ϵ_t is zero, and the baseline estimate of $\alpha+\theta$ is just $\sum_{k=1}^{4}(g_{t-k})/4$, the mean growth rate over the incumbent's term.[12] Hence the forecast of income growth g_t under the incumbent, based on what the voter knows at the end of pre–election time $t-1$, is a term proportional to the average of the last four periods' growth rates under the incumbent, plus a moving average of the same prior growth rates, with geometrically declining *negative* weights:

$$\hat{g}_t = \sum_{k=1}^{\infty} \frac{\frac{1}{4} - (1-\gamma)\gamma^k}{1-\gamma} g_{t-k} \tag{15}$$

The Incumbent, the Challenger, and the Vote

The same kind of calculation is needed for the challenger, but it is much simpler. The voter has no experience with the challenger, and thus the expected competence is zero. Hence expected growth in the next period under the challenger is just α. It follows that the expected difference in growth between incumbent and challenger is:

$$\hat{g}_t = -\alpha + \sum_{k=1}^{\infty} \frac{\frac{1}{4} - (1-\gamma)\gamma^k}{1-\gamma} g_{t-k} \tag{16}$$

The voter chooses the incumbent if $\hat{g}_t \geq 0$, and otherwise votes for the challenger. Under the assumption that the voters believe that most of the variance in growth rates is due to

[11] More conventionally, the voter wants to maximize a discounted sum of future benefits over the incumbent's new term. We focus here on the one–period–ahead forecast, leaving the analysis of discounting to a future draft.

[12] This estimate is not quite optimal, since one can adjust the estimate of θ using the estimated dynamics of δ_t. This point will be addressed in a subsequent draft.

forces other than incumbent competence, so that $0 < \gamma < 1$, the weights are actually larger the farther back the voter looks. A particularly bad instance is $\gamma = .5$, which generates lag coefficients of 0, .25, .375, and .4375. The immediately preceding year gets no weight at all.

These difficulties are not due to the addition of the constant term for competence. In its absence, matters get worse: All lag coefficients are then negative, which is bizarre.

The underlying problem here is that this class of models assumes that incumbent competence directly affects the level of the economy y_t^*, not the growth rate. It is not hard to show that these models behave strangely when applied to growth rates precisely because they behave perfectly sensibly when applied to levels of the economy. In fact, they imply a simple geometric lag on prior levels y_{t-k} as the best predictor of the next period's level y_t. Unfortunately, the empirical literature demonstrates that past levels of the economy are not the right variables for predicting voter behavior. Instead, growth rates are.

Thus once the simplest steps toward realistic assumptions are taken, the standard political economy models no longer imply myopic retrospection on economic growth. They generate instead quite counterintuitive implications about how voters should respond to growth rates, and the voters do something quite different.

Hence a choice presents itself: Either the current political economy models of pocketbook voting are sensible, but they require very odd behavior by voters, and the voters are irrational; or else the current rational–choice political economy models are far from how voters think, and a different model would generate more accurate predictions. The next section pursues the second possibility.

A Model More Responsive to the Evidence

Suppose that the voters believe that competence affects *growth rates*, not income as in Equation (3). Then, maintaining the simplest MA(1) assumptions and letting g_t^* be the unobserved true growth rate:

$$g_t^* = g_{t-1}^* + \delta_t + \rho\delta_{t-1} \tag{17}$$

Note that the mean growth rate α gets subtracted out from both sides of the equation in this formulation. We also omit the parameter θ; that is, we are setting aside temporarily the possibility that an administration might have an expected growth rate persistently higher or lower than α. As before, $var(\delta_t) = \omega^2$.

We make the same assumption as previously about voter perceptions: The value of g_t^* is observed with random measurement error with mean zero and variance τ^2, due to the large number of forces in the economy unrelated to incumbent competence as well as to

voter misperceptions:

$$g_t = g_t^* + e_t \tag{18}$$

Substituting as in the previous section gives:

$$g_t = g_{t-1} + w_t \tag{19}$$

where as before, $w_t = \delta_t + \rho\delta_{t-1} + e_t - e_{t-1}$. Equations (6-10) then follow again under this alternate interpretation of the parameters. Also as before, we assume that the variance ω^2 of each period's change in incumbent competence is dominated by the variance of changes in the rest of the economy plus misperceptions ($\tau^2 > \rho\omega^2$). Hence in parallel with Equation (11) above, there exists a white noise process ϵ_t and a parameter γ ($0 < \gamma < 1$) such that:

$$g_t - g_{t-1} = (1 - \gamma L)\epsilon_t \tag{20}$$

and thus:

$$\frac{g_t}{1 - \gamma L} - \frac{g_{t-1}}{1 - \gamma L} = \epsilon_t \tag{21}$$

Multiplying out gives:

$$(g_t + \gamma g_{t-1} + \gamma^2 g_{t-2} + ...) - (g_{t-1} + \gamma g_{t-2} + \gamma^2 g_{t-3} + ...) = \epsilon_t \tag{22}$$

Then, rearranging terms, taking expectations, ignoring the truncation of lags 5 and greater, and noting that the expectation of ϵ_t is zero, it follows that the best forecast of g_t is:

$$\hat{g}_t = (1 - \gamma) \sum_{k=1}^{4} \gamma^{k-1} g_{t-k} \tag{23}$$

This is, of course, a weighted average of past values of growth, with positive, geometrically declining weights, as in Hibbs (2000).

As is well known, when γ is near one, geometric weights decline slowly, so that recent years are essentially averaged in determining the growth forecast. This is the Bartels case. On the other hand, when γ is positive but near zero, the weights decline rapidly, so that only the most recent year matters much. This is the myopic Kramer case. Instances with intermediate values of γ would fall closer to Hibbs (2000) empirical findings. In sum, in this model of how voters are thinking, either Bartels or Kramer or Hibbs can be essentially correct about what constitutes rational behavior: It depends on the parameters.[13]

We know that myopia is endemic, so that the voters typically act as if γ were small.

[13] Adding a constant term to competence in Equation (17), which seems sensible, would add $\frac{1}{4}$ to all the lag coefficients, moving the findings closer to Bartels.

Yet this model implies that for rational voters, myopia need not be universal. When would γ be large, making rational voters less myopic? Consider the effect of volatile economic times unrelated to incumbent competence, so that τ^2 increases. Partial differentiation of Equation (10) demonstrates that under the conditions of this model, increases in the variance of τ^2 reduce c:

$$\begin{aligned} \frac{\partial c}{\partial \tau^2} &= \frac{-(1+\rho^2)\omega^2 - 2\rho\omega^2}{(\tau^2 - \rho\omega^2)^2} \\ &< 0 \end{aligned} \tag{24}$$

since $\rho > 0$. Now we have already seen that $\partial\gamma/\partial c < 0$. Hence by the chain rule, $\partial\gamma/\partial\tau^2 > 0$. That is, large variation in economic outcomes, if attributed by the voters to economic forces other than the incumbent, will increase the value of γ. It is easily shown from Equations (9) and (10) that in the limit as $\tau^2 \to \infty$, then $c \to 2$, and hence $\gamma \to 1$, which is the equal–weighting case. Thus Equation (23) implies that when there is sufficiently large variation in the economy (mostly) not attributed to the incumbent, all years of the incumbent's term will be weighted nearly equally in forming voter judgments about competence. That is, equal weighting of all years will be rational. This non–obvious implication of the new model raises a question: Does equal weighting of past years increase in reality when the model says that rational voters would choose to do so? A full–fledged test of this implication, as well as of the model generally, would require a major research effort, but the next section gives some initial evidence.

Are the Voters Always Myopic?

Empirical studies of voter lag structures have nearly unanimously agreed that the voters are myopic. However, their evidence has been based almost entirely on American and European experience in the postwar period and before the Great Recession that began in late 2008. Most of that intermediate era was characterized by relatively steady growth. In the 60 years from 1948 to 2007, occasional recessions occurred in the U.S., but national real personal income losses never exceeded -4%. Most years were characterized by modest gains in real income of several percentage points, never reaching 6%.[14] Of course, individual areas underwent somewhat more volatile periods. For most voters, though, this was a relatively stable economic environment.

The Great Depression was quite different. Real personal income per capita dropped

[14]The per capita disposable personal income figures in chained 2005 dollars are taken from the data in the U.S. Bureau of Economic Statistics Table 7.1, revised July 27, 2012, available at: http://www.bea.gov/iTable/iTable.cfm?ReqID=9&step=1 and accessed August 14, 2012. The percentage change calculations were done by the present author.

8% nationwide in 1930, another 6% in 1931, and then plunged a dramatic 14% in 1932. Then on the rebound, real personal income rose 8% in each of 1934 and 1935, then fully 11% in 1936. Individual states dropped and rose even more dramatically. Particularly in farming states, in that era of severe droughts and no farm price supports, income could be extremely volatile from one year to the next. Some farm state incomes dropping as much as 20% or more in a single year (Achen and Bartels 2010). Thus the Depression was a far more variable economic era than the postwar period. How did the voters react?

Because farming areas had the greatest income volatility, they are the place to study voters facing high–variance economic outcomes. Survey research was not perfected until after World War II, so that only aggregate voting data are available from the Depression era. County–level vote returns exist, but not county–level personal income data. However, crop production figures by county are known, as are crop prices. Hence to assess economic retrospections in this period, one must look at a state with a fairly large number of counties, most of them focused on a single crop, so that that crop's harvests and prices are the principal driver of personal income. Studying a single state eliminates issues of divergent state political histories and cultures, as well as differences in state office holders and election contests. Finally, if most of the state's counties are lightly populated, issues of voter heterogeneity are minimized.

Montana is a state meeting all these requirements. Apart from a few mining and lumbering counties and a handful of small cities, the state was heavily reliant on farming and ranching, especially wheat growing, in the Depression period (Malone *et al.* 1976, 241-247). Montana has 56 counties, of which 31 produced more than 100 bushels of wheat per capita in the good harvest year of 1927. Across these counties in 1927, there were 16 acres under wheat cultivation for every man, woman, and child.[15] These 31 wheat–growing counties are the units of observation for the subsequent analysis of voter decisionmaking in periods of economic volatility.

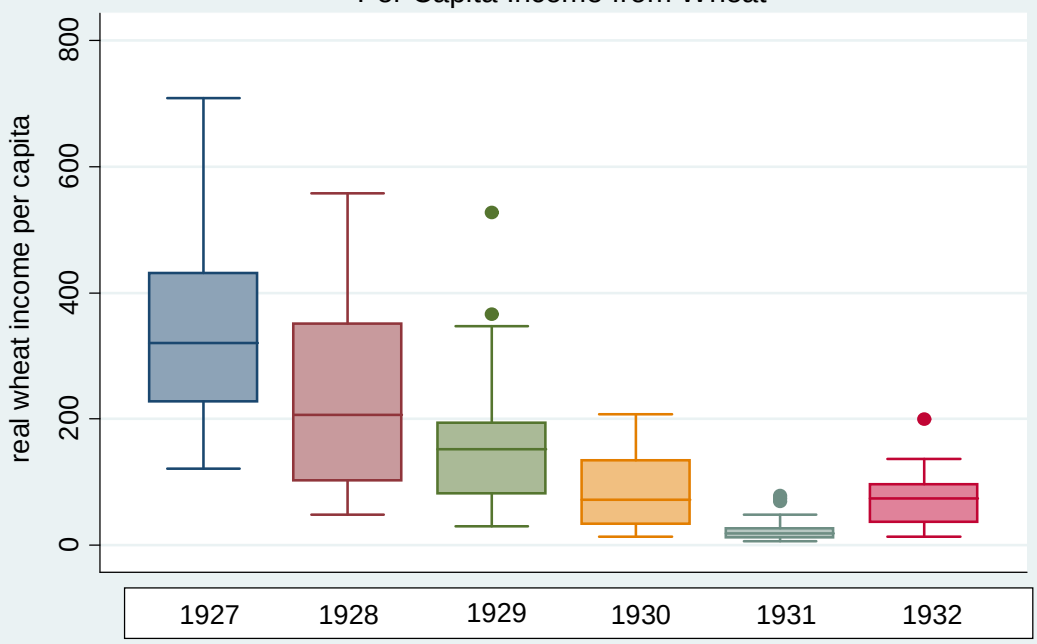
Figure 1 shows the income per capita from wheat for the wheat–growing counties just

[15] All Montana agricultural production data are taken from the USDA National Agricultural Statistics Service: http://www.nass.usda.gov/QuickStats/Create_County_Indv.jsp#top

Wheat production was defined as "all wheat" raised under "all practices." Montana wheat prices are taken from: http://www.nass.usda.gov/Statistics_by_State/Montana/Publications/economic/prices/allwhtpr.htm In each year, the September price was used. Accessed March 20, 2005.

Population figures are from the U.S. Census decennial county figures, with linear interpolation between censuses. Five counties reported no 1920 population; in those instances, the 1930 figures were used for 1927-1929. The percent Catholic is the number of Catholics divided by the 1930 Census population. If the interpolated 1926 county population base is used instead, that estimate correlates with the one used at .993. The more reliable 1930 population estimate was therefore chosen as the denominator. The number of Catholics per county was taken from the U.S. Census Bureau 1926 Census of Religious Bodies, downloaded from the Association of Religion Data Archives, www.TheARDA.com, accessed August 12, 2012. The percent in each county voting "no" on a 1928 initiative to prohibit liquor sales (Waldron and Wilson 1978, 119) was also tried as an explanatory variable, but it was never demonstrably consequential or statistically significant, and so it was dropped.

Figure 1. Montana Wheat-Growing Counties 1927-1932



before and during the Herbert Hoover administration.[16] As the Figure makes clear, the first two years under Hoover (1929 and 1930) were miserable, and 1931 was catastrophic due to severe drought. Privation was widespread and extreme (USDA 1932, 172-173; Malone *et al.* 1976, 292-293).[17] However, better weather brought improvement in 1932, just in time for the presidential election: On average, these counties' real wheat incomes per capita nearly quadrupled in 1932, and no county gained less than 60% from 1931—astonishing figures by current standards.

If growth in real income since the previous year is the voter's decision variable, Hoover should have gained dramatically from his average county vote of 61% in 1928. Roosevelt should have been crushed. Instead, Hoover's 1932 vote went into free fall: His average loss across these counties was 25 percentage points. He carried all these 31 counties in 1928, and he lost all but one in 1932 (Waldron and Wilson 1978, 115, 128). Even if we take into account the wheat income loss from 1930 to 1931, which averaged -61% across these counties, and even if we weight 1931 income changes the same as 1932's, myopic retrospection cannot be saved. The average percent change in income remains dramatically positive: In 1932, the average wheat–growing county was up a spectacular 28% from its real wheat income per capita of two years before. But they voted against the incumbent in dramatic fashion. No two–year retrospection accounts for the vote returns.

The poor performance of myopic retrospection in Depression–era Montana is confirmed when the lag weights on past changes in wheat income are estimated. Table 1 shows the estimates under four different specifications. (Several others were tried, with gratifyingly similar results.) The dependent variable is the change in the Republican vote from 1928 to 1932, and the key explanatory variables are the four years of lagged changes in real wheat income per capita. The control variables are the economic retrospections in 1928 and the percent Catholic, which were important in the 1928 election and thus modify the base from which vote changes are computed.

While the number of observations and the limitations of the economic data make it impossible to estimate each lag with precision, there is certainly no evidence for strong myopia. To the contrary, the voters' weights appear roughly equal across the four years of the Hoover presidency and (with appropriately reversed sign) on the income changes in the year before Hoover took office as well.[18] The fourth column of Table 1 constrains all the lag weights to be the same, just as the new model of this paper suggest they should be

[16] Wheat income per capita is computed in the obvious way: Production is multiplied by price and divided by population.

[17] The author's father and paternal grandparents lived in one of these counties in this period.

[18] This is a differences–in–differences design, so that control variables influencing the 1928 election should have reversed signs. Thus income gains in 1928 have a negative coefficient. Similarly, because Al Smith, the Democrats' nominee for president in 1928, was a Catholic, his appeal to his co-religionists reduced the GOP vote in 1928. Hence the Catholic coefficient is positive in these regressions.

Table 1: Effects of Changes in Wheat Income on Hoover's Vote in 1932 in Montana Wheat-Growing Counties

Regression coefficient estimates (with standard errors in parentheses) for Hoover's percentage point vote change from 1928 to 1932. Explanatory economic variables are the differences in log wheat income between the indicated years.

	No Lag Constraints	**Lags 2-4 Set Equal**	**Lags 1-4 Set Equal**	**All Lag Coefficients Equal**
1931-1932	2.72 (3.28)	3.00 (2.75)	---	---
1930-1931	4.71 (3.21)	---	---	---
1929-1930	3.97 (4.97)	---	---	---
1928-1929	4.15 (3.71)	---	---	---
1928-1931	---	4.91* (2.42)	---	---
1928-1932	---	---	4.56* (2.41)	---
(1928-1932) - (1928-1927)	---	---	---	4.43* (1.12)
1927-28 (control)	-3.66 (2.77)	- 3.63 (2.64)	-4.30 (2.59)	---
Percent Catholic 1926 (control)	.313* (.144)	.324* (.132)	.331* (.133)	.329* (.129)
Intercept	-24.17* (5.45)	-23.49* (4.23)	-26.61* (3.28)	-26.78* (1.74)
Regression std. error	3.73	3.59	3.61	3.55
Adjusted R^2	.40	.45	.44	.46
N	31 counties			

* = significant at .05 in one-sided test

under the horrifying economic volatility of that period. That specification produces the best fit.

Before concluding the discussion of the Montana results, we address an alternative explanation—the possibility that these counties are always non–myopic for reasons unrelated to economic volatility. A good "placebo test" for these counties is the 1933-1936 period, Franklin D. Roosevelt's first term, in which these counties enjoyed more uniform annual harvests and wheat income. If the model is correct, these same counties should exhibit the conventional myopia in that election. They do: Only the income gain in 1936 is substantial, correctly signed, and statistically significant in predicting the 1936 Roosevelt vote.[19] Thus only the high volatility in income from 1929 to 1932 leads to a longer time perspective by the voters in these counties, just as the model suggests it should.

Needless to say, one study of a particular state can be no more than suggestive. But the Montana results do raise the possibility that voters are not always myopic, and that their behavior under extreme duress should become part of the collection of stylized facts about voters that good theorizing must explain.

Summary and Conclusion

Voters' retrospections about the incumbent are typically myopic: They look back only a year or two in judging performance. Previous work in the political economy of pocketbook voting has demonstrated, to no one's surprise, that one can imagine assumptions under which myopia is "rational" in the narrow sense in which economists use the term. These conventional IMA(0,1,1) models specify that incumbent competence influences the *level* of the economy (or the level of other policy outcomes). What this paper has shown is that very minor modifications of those assumptions, for example that the voters cannot always perceive incumbent competence perfectly, produce rational retrospective weights on prior years that are not purely myopic, not intuitive, and not close to what voters actually do.

A simple alternate model, in which voters believe that competence influences the *growth rate* of the economy (or other measures of *change* in policy outcomes), implies that retrospections about the level of the economy are IMA(0,2,1) instead of the customary (0,1,1) assumption. This model generates more empirically accurate implications, namely that rational retrospective voting will put geometrically declining weights on the incumbent's performance in prior years. For particular choices of the lag parameter, this specification can produce something very close to pure myopia, something very close to weighting all prior incumbent years equally, or something in between. The lag parameter, in turn, de-

[19] With the change in wheat income in 1932 controlled, the lag coefficients are 3.00 (with a standard error of 1.37), .05, -2.01 (with a standard error of 2.6), and .44. Achen and Bartels (2004) also find myopia in the 1936 election, using state–level changes in personal income data.

pends on the state of the world the voters face: It is a standard implication of rational expectations models that optimal forecasting weights depend on the time series properties of what one is forecasting. In this particular model, both myopia and equal–weighting are "rational" for particular economic and political circumstances.

Another implication of the new model is that the voters will generally tend to myopia, but not always. In relatively stable economic circumstances, such as those of the postwar era in the U.S., myopia will rule. But as the world becomes dramatically more variable, as it did on Depression–era farms in many parts of the United States, the model implies that all years should be weighted more nearly equally. This paper studied wheat farmers in Montana during the Hoover administration, providing evidence that their retrospections seem to have been far from myopic—more nearly an equal weighting of all years of Hoover's term. Thus sometimes, at least, the voters appear to act as Bartels (2010, 99-104) believes they should, even though that behavior is rare. Thus at minimum, it seems wise to make allowance for the possibility that myopic retrospection is not *quod ubique, quod semper, quod ab omnibus.*

As usual, rational choice models are to be used, not believed. Human beings are at best occasionally and approximately rational, and psychology is a better guide than economics to actual causal effects among voters. The voters probably are just kicking the dog. If they get angry enough, they may even kick him two or three years later if that is the first chance they get.[20] But in ordinary times, their myopia will harm their judgments. Kramer's assumptions predict the voters' customary behavior correctly, but Bartels' critique of the voters' good sense also holds.

Yet if rational choice models should not be oversold, neither need they be abandoned. Sometimes they work well in spite of their assumptions, particularly when those assumptions have been chosen with an eye toward distilling political reality rather than violating it. The goal of wise rationality modeling is not complete empirical verisimilitude nor faithfulness to the notions about politics held in other disciplines, but rather politically informed rule–of–thumb guidance about where to look for particular effects (comparative statics). Note, too, that it does not matter for these purposes whether the actual economy matches some model of the economy that a theorist assumes that voters are using, which it probably does not. If the model is a rough approximation of some aspect of what the voters believe (or what the media and political parties convince the voters to believe), then we can use it to make predictions about voter behavior, however foolish those beliefs and that behavior might be.[21] Of course, predictions may succeed or fail. In the end, empirical reality will

[20] It is suggestive that the estimated Montana lag coefficient on 1931 is much larger than that on 1932, though the standard errors discourage speculation.

[21] In rational expectations theory, voters will eventually correct bad models of the economy. They may be waiting on the economists, who continue to struggle to learn the best predictors of various economic

discipline theoretical flights of fancy.

In that spirit, it would not be wise to adopt uncritically this paper's geometrically declining lag coefficients. For example, if competence is AR(1) (autoregressive of lag 1), which is probably more sensible than the analytically convenient MA(1) assumption that has dominated the literature, the model of this paper will result in an ARMA(1,2) lag structure for w_t in Equation (19). (On aggregation rules for ARMA processes, see, for example, Mills 1990, 222-223.) If we went a little further, keeping the AR(1) competence assumption but letting the other forces in the economy have the conventional MA(1) structure, then w_t will be ARMA(1,3). The implied lag structures on past growth then can exhibit a great variety of patterns, so that in effect, all four lag coefficients are free to take on any values. Other plausible ARMA structures either for competence or for the rest of the economy would imply a similar theoretical agnosticism.

Paldam (1991) has emphasized how much estimated economic lag coefficients vary across different elections and different countries. Why do the voters think differently in different circumstances? This paper has made one set of suggestions fitting within the political economy tradition. Other hypotheses less tied to economic thinking also come to mind: Dramatic events may be remembered better, or they may cause changes in party identification. Institutional factors and political party systems matter as well: When clarity of responsibility is absent in coalition governments, or when there is no credible alternative to the incumbents, voters will not act like American voters of recent years (Powell and Whitten 1993; Anderson 2007, 284).

Thus the comparative politics and political economy literatures have much to teach each other. The problem they both address is important. Sorting out the causal mechanisms in voters' retrospections, along with those retrospections' dependence on the political and economic system, is essential to understanding how democracies work in practice rather than in their national–day rhetoric.

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indicators (for example, Stock and Watson 2003).

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