THE VOTER TURNOUT/RELATIVE UNEMPLOYMENT RATE HYPOTHESIS*

ABSTRACT

This study proffers and investigates empirically the “Voter Turnout/Relative Unemployment Rate Hypothesis,” a hypothesis arguing that the higher the unemployment rate in a state relative to the unemployment rate in the nation as a whole, the greater the voter participation rate of eligible voters in that state, ceteris paribus. The study period involves the U.S. Presidential election-cycles for the years 2000, 2004, 2008, 2012, and 2016 and adopts a state-level panel dataset. The model, while focusing on the state unemployment rate relative to the unemployment rate in the nation as a whole as opposed simply to the level of the unemployment rate per se, also includes control variables for a number of established demographic, public choice, and economics factors. Random-Effects estimations reveal strong empirical support for the central hypothesis of the study. In other words, the voter participation rate among eligible voters is found to be an increasing function of the ratio of the percentage unemployment rate of the civilian labor force in a state relative to the national percentage unemployment rate. Robustness testing affirms the strength and consistency of the voter-turnout impact of this variable. In addition, as an alternative test of the resiliency of the hypothesis, the voter participation rate is found to be an increasing function of the difference between the percentage unemployment rate in a state and the national percentage unemployment rate. These findings also suggest that the higher the unemployment rate in a state vis-à-vis the unemployment rate in the nation as a whole, the greater the degree to which eligible voters in that state, arguably both employed eligible voters concerned with the implications of excessive high unemployment as well as resentful/angry unemployed eligible voters with their own feelings regarding the unemployment rate issue go to the polls to cast their votes.

Keywords: Relative Unemployment Rate, Voter Participation Rate, Unemployment Rate Differentials
JEL Classification: D72, J64, R12

* The author is grateful to his Research Assistant, Mr. Zachary Ehrlich, for data assembly and uploading.
RIASSUNTO

L’ipotesi sulla relazione tra il numero di elettori e il tasso di disoccupazione

Questo lavoro analizza empiricamente l’ipotesi sulla relazione tra il numero degli aventi diritto al voto e il tasso di disoccupazione relativo. Tale ipotesi afferma che più è alto il tasso di disoccupazione in uno degli stati rispetto all’intera nazione statunitense, maggiore sarà la partecipazione al voto durante una consultazione, *ceteris paribus*. Il periodo preso in considerazione comprende i cicli elettorali americani dal 2000 al 2016 e si basa sui dati relativi ai singoli stati. Il modello, oltre a focalizzarsi sul tasso di disoccupazione del singolo stato in rapporto al tasso nazionale, include anche le variabili di controllo per determinati fattori demografici, scelte pubbliche e fattori economici. Le stime con gli effetti *random* supportano l’ipotesi cardine analizzata in questo lavoro e cioè che la partecipazione al voto tra gli aventi diritto risulta essere una funzione crescente del rapporto tra il tasso di disoccupazione della forza lavoro civile in uno stato relativamente al tasso di disoccupazione nazionale. I test effettuati per verificare la robustezza del modello evidenziano la forza e la coerenza dell’impatto sugli elettori di questa variabile. Inoltre, quale test alternativo sulla robustezza dell’ipotesi, il tasso di partecipazione al voto risulta essere una funzione crescente della differenza tra il tasso percentuale di disoccupazione in uno stato e lo stesso tasso a livello nazionale. Questi risultati suggeriscono quindi che più alto è il tasso di disoccupazione in uno stato in relazione al tasso nazionale, più sarà alto il livello di aventi diritto al voto in quello stato, presumibilmente sia elettori lavoratori influenzati dai problemi causati dall’eccessiva disoccupazione, sia elettori disoccupati animati da risentimento e rabbia riguardo il problema della disoccupazione, che andranno alle urne ad esprimere il loro voto.

1. INTRODUCTION

Interestingly, for the U.S, state-level data for the unemployment rate are characterized by a very important *regional* dimension, namely, large geographic differentials. To illustrate the latter condition, consider the year 2016, when the unemployment rate ranged from a low of 2.8%, for the states of New Hampshire and South Dakota, to a high of 6.7%, for the state of New Mexico (U.S. Department of Labor, 2017). In this year of comparatively low unemployment in the U.S. for the post-Great Recession years, the highest state-level unemployment rate was 239.3% as large as the lowest. Thus, whereas the national unemployment rate averaged out at 4.85% in
2016, there was major variation among the states. Moreover, this observation of a large geographic unemployment rate differentials applies not only to the year 2016 but also to all of the years over the post WWII period (U.S. Department of Labor, 2016; 2017).

Perhaps of greater relevance from the perspectives of economic policy, political policies, and political/economic institutions, it may be useful to focus upon the interstate unemployment rate differentials that were experienced during or in close proximity to U.S. Presidential election cycles, the elections that have received extensive attention in the literature (e.g., Caporale and Poitras, 2014; Cebula and Meads, 2008; Cebula et al., 2008; Durden and Gaynor, 1987; Kahane, 2009; Mixon, 2013; Mixon and Tyrone, 2004; Niederjohn et al., 2016; Whitby, 2007). Pursuant to this perspective, for the five most recent U.S. Presidential election years, 2000, 2004, 2008, 2012, and 2016, the descriptive statistics for the state unemployment rate for the year preceding the election (URjt-1) are provided at the top of the list of variables shown in Table 1. Of potential importance would seem to be the fact that over these five election cycles, the ratio of the highest unemployment rate (11%) to the lowest (2.2%) is 5:1, i.e., the highest unemployment rate is 500% as high as the lowest. It would seem likely that, at least to some degree, the residents of those states with the much higher unemployment rates have had greater unemployment-rate related concerns than have those residing in the states having the lower rates of unemployment.

Accordingly, it is hypothesized in this study that, on the average, the higher the unemployment rate in state \( j \), relative to the average unemployment rate in the U.S. as a whole, the greater the unemployment-related concerns of the eligible voters in the state and hence the higher the voter turnout among the eligible voters in the state. This hypothesis is referred to here as the “Voter Turnout/Relative Unemployment Rate Hypothesis”. In theory, this behavior applies potentially to those voters who are unemployed, at least some of whom will likely be angry/resentful about their unemployment status, as well as to those who are currently employed but nevertheless still concerned by high unemployment rates for various possible reasons, as explained in Section 2 of this study.
This hypothesis is investigated within a context that argues that people vote in order to express their feelings; this expression of feelings is hypothesized as manifesting itself within the context of a cost-benefit framework inclusive of, i.e., reflecting expressive voting (Clark and Lee, 2014; Copeland and Laband, 2002; Barreto et al., 2004; Cebula, 2004, 2017; Lee and Clark, 2016). Consistent with Tullock (2006), this study focuses upon aggregated voting behavior, where individual idiosyncrasies will tend to cancel out each other and allow the estimation of models with greater explanatory power and greater insight. In terms of the aggregated data investigated in this study, the present analysis deals with a five-year panel dataset that includes the Presidential elections of 2000, 2004, 2008, 2012, and 2016. Aside from investigating the above identified hypothesis, this study is among the first to consider factors that may influence voter turnout during all of the five most recent Presidential election cycles. The Random-Effects estimations provide strong support for the hypothesis developed here, thereby extending the existing published literature on the issue of the impact of unemployment on voting.

2. THE MODEL

It is hypothesized in this study that the voter participation rate among eligible voters, \( VPR \), is an increasing function of the expected gross benefits \( \text{EXPGRB} \) associated with expressing feelings and interest concerning other factors through voting, \textit{ceteris paribus}, and a decreasing
function of the expected gross costs \((EXPGRC)\) associated with expressing feelings and interest involving other factors through voting, \(ceteris paribus\), so that:

\[
VPR = f(\text{EXPGRB, EXPGRC}), f_{\text{EXPGRB}} > 0, f_{\text{EXPGRC}} < 0
\]  

(1)

This study adopts the view that the \(\text{EXPGRB}\) and \(\text{EXPGRC}\) concepts necessarily require a very broad, very inclusive interpretation. In contrast to the Rational Voter Model (RVM), it is argued in the present study that in most major elections certain circumstances or factors can potentially increase or decrease the expected benefits and expected costs associated with voting, regardless of the probability of affecting an election outcome\(^1\). For example, if there is an issue which prospective eligible voters feel particularly strongly about, whether it is fundamentally economic in nature or fundamentally noneconomic in nature, or whether there is/are one or more candidates about whom prospective voters feel particularly strongly one way or another, the act of voting may provide subjective benefits to would-be voters because it has served as an \emph{emotional release} or \emph{emotional outlet}. In other words, it is hypothesized here that people use voting to express their views and/or express/vent their feelings and concerns. Thus, this study adopts a cost-benefit framework in which the probability of voting is an increasing function of the expected net benefits of voting [equation (1)] and in which expressive voting is manifested and used to assess the validity of the Voter Turnout/Relative Unemployment Rate Hypothesis.

\textit{2.1 Central Hypothesis}

The central hypothesis in this study is that the more poorly a state’s economy is performing, i.e., the higher the percentage unemployment rate in a state \((UR_j)\) relative to the average unemployment rate in the U.S. as a whole \((URUS)\), the greater the interest the eligible voters in the state may have in the outcome of a major election and hence the greater their voter participation rate. In other words, the voter participation rate in state \(j\) is an increasing function of the ratio \((UR_j/URUS)\), \(ceteris paribus\).

\(^1\) In close elections, the present model would in principle be compatible with the RVM insofar as prospective voters with strong preferences would be even more inclined to vote, i.e., even more inclined to express those feelings.
Before elaborating upon this hypothesis, it is argued here that a limiting factor with related studies that focus on the state unemployment rate *per se* is the absence of a straightforward criterion against which to measure each state’s unemployment rate to determine the existence of a relatively “excessive” state unemployment rate or a relatively “low” (“good”) state unemployment rate (Cebula, 2017). From the perspective of this study, by comparing the state unemployment rate with the unemployment rate across the U.S., potential voters have a simple, readily accessible criterion according to which they can determine whether or not the state of their residence has an excessively high unemployment rate.

In any case, according to the hypothesis proffered above, it is argued that the impact of a state’s unemployment rate on voter participation involves a comparison of how well or how poorly the state in which a prospective eligible voter resides is performing relative to the nation as a whole. Thus, it is hypothesized that when the ratio \( \frac{UR_j}{UR_{US}} > 1.0 \), then state \( j \)’s economy is performing worse than the nation as a whole (on the average). Accordingly, it is argued that such a situation would promulgate greater concerns among prospective eligible voters in the state regarding its economic performance and future economic prospects. In turn, these increased concerns would elevate the expected benefits of voting and thereby elevate voter turnout as a vehicle for expressing this greater voter concern about the state’s economy, *ceteris paribus*. On the other hand, if the ratio \( \frac{UR_j}{UR_{US}} < 1.0 \), then state \( j \)’s economy is performing better than the nation as a whole (on the average), and this circumstance reduces prospective eligible voters’ concerns about the state’s economy and its future economic prospects and hence diminishes the expected benefits of voting and hence voter turnout as a means of expressing concern about the state’s economy, *ceteris paribus*.

Interestingly, there is a scholarly literature that dates back to at least the 1970s regarding the impact of unemployment on voter turnout. For instance, a study using individual-level data by Brody and Sniderman (1977) finds that personal economic problems and challenges act to reduce voter participation. A subsequent work on this topic by Rosenstone (1982) also finds that a greater degree of unemployment acts to depress voter participation\(^2\). A follow-up study to Rosenstone (1982) by Rosenstone and Hansen (1993) extends his earlier analysis and concludes

\(^2\) Using pooled cross-section data from the 1974, 1978, and 1982 elections, Southwell (1988) similarly finds that voter turnout among the unemployed was significantly less in two out of three mid-term elections studied.
that unemployed persons are 8.5% less likely to vote in mid-term elections and 2.7% less likely to vote in Presidential elections. From the Rosenstone and Hansen (1993, p. 135) perspective, the underlying reasoning to this behavior is that

“The money, time, and energy spent combatting extreme economic diversity provide payoffs that are more immediate and valuable than the benefits that might be gained from investing in electoral politics [voting].”

In effect, it is being argued by Rosenstone and Hansen (1993) that the unemployed perceive higher net benefits for themselves in activities other than voting. Moreover, based upon two studies by Radcliff (1992; 1994), a poorly performing/weak economy seemingly discourages voter turnout among those most adversely affected in the U.S.

By contrast, the more recent studies by Burden and Wichowsky (2014) and Cebula (2017) provide a different perspective. In particular, Burden and Wichowsky (2014, p. 887) argue that a worsening economy exercises a disruptive impact that induces potential voters to voice concern and promote and support potential remedies to address those economic concerns. Their empirical findings, which analyze county-level data for the U.S., imply that worsened economic circumstances act to motivate at least certain portions of the electorate to vote to a greater degree. Similarly, using state-level data, Cebula (2017) finds that a higher unemployment rate level per se elevates the voter turnout of eligible voters.

It is important to stress that the pool of eligible voters includes involuntarily unemployed eligible voters as well as employed eligible voters. A portion of the former group might well be discouraged from voting to some degree. However, it is reasonable that, in contrast to the perspective found in Radcliff (1992; 1994) and various other prior studies, at least some proportion of this group may very well be angry/resentful about their unemployment status and therefore are more motivated and more likely to vote so as to express that anger/resentment and a concomitant desire for new elected officials and/or new public economic policies. Indeed, especially when the unemployment rate of a state is deemed as being relatively high (“too high”), there is likely to be a strong resentment of that fact by at least some portion of the unemployed population.
As for employed eligible voters, they may feel that a higher unemployment rate adversely affects their current economic conditions (income) or potentially threatens their current or future business (entrepreneurial) endeavors and/or future employment status and/or income prospects. In particular, if in fact a state’s unemployment rate is perceived by potential voters as “too high” relative to the unemployment in the nation as a whole, then currently employed would-be eligible voters may to at least some degree wish to express their dissatisfaction and concerns with the existing high unemployment rate and/or to express their preferences for change at some level(s) of government in order to improve their future employment and/or general economic prospects. Indeed, an excessive unemployment rate might well lead to a fear of either of an expected worsening of the unemployment rate or simply an expected unsatisfactorily slow rate of improvement in the unemployment rate.\(^3\)

Accordingly, it is hypothesized that the higher (lower) the unemployment rate in state \(j\) vis-à-vis the average unemployment rate in the nation \((UR_j/UR_{US})\), the greater (lower) the expected gross benefits from voting in the state as the public uses voting to express fears and concerns regarding job losses and/or to express preferences for more effective public economic policies and thus the greater (lower) the \(VPR\) in the state, \(ceteris paribus\).

### 2.2 Control Variables

This study includes control variables to reflect the potential impacts of demographic, educational, public choice, and purely economic factors on voter turnout. To start, the demographic focus involves the two largest minority groups in the U.S., Hispanics \((HISP\)) and Afro-Americans \((AFRO\)). Regarding these demographics, Barreto et al. (2004) argue that if would-be voters feel politically disenfranchised from their government because of their perceptions that government is either unresponsive to their needs or that the election process is unresponsive to their importance, voter apathy increases.

According to Barreto, et al. (2004), the Hispanic community is significantly underrepresented in elected positions across the entire political spectrum. Moreover, for the Hispanic community, consider the fact that in all of the general elections being studied here, neither the Democratic

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\(^3\) Indeed, an excessively high unemployment rate could very well generate negative expectations (fear) regarding future job mobility and employment prospects for both currently employed and unemployed residents.
Party nor Republican Party, nominated a Hispanic candidate for either the office of President or the office of Vice President. Consequently, given the fact that the expected gross benefits for voting for Hispanics were very small if not effectively zero whereas there are always non-zero costs to voting (even if only in the form of opportunity costs of time spent), it is hypothesized in this study that the greater the percentage of the population in state \( j \) that was Hispanic (\( HISP_j \)), the lower the aggregate expected net benefits from voting in state \( j \) and hence the lower the overall (aggregate) voter participation rate in the state, ceteris paribus. Similarly, Afro-Americans have typically been, except perhaps to a limited degree for the office of President in the election cycle years 2008 and 2012, very under-represented on the voting ballot across the political spectrum in all of the five general elections studied here (Whitby, 2007; Cebula et al., 2016). Hence, in principle following Barreto et al. (2004), Whitby (2007), and Cebula et al. (2016), it is expected that that the net impact of a higher percentage of the population in state \( j \) that was Afro-American (\( AFROAM_j \)) on the overall voter participation rate over the study period is a priori negative. Combining these two demographics into a single variable, \( MINORITY_j \), such that \( MINORITY_j = HISP_j + AFROAM_j \), it is herein hypothesized that the voter participation rate in state \( j \) is a decreasing function of the percentage of the state population that was either Hispanic or Afro-American, as reflected in the variable \( MINORITY_j \), ceteris paribus.

Next, the higher the level of educational attainment, the greater may be the expected gross benefits from voting, ceteris paribus. Presumably, higher levels of educational attainment may lead to the subjective evaluation that voting per se yields benefits, regardless of the election outcome. Indeed, it has been found that voting may serve to create positive feelings about fulfilling one’s “civic duty” (Campbell et al., 1960; Tollison and Willett, 1973; Tullock, 2006). In addition, as argued in Tullock (2006), that, especially for more highly educated people, voting may serve to create the feeling of helping to maintain the survival of the democratic process, as well as to help clarify the degree to which election victors and the political parties with which they are affiliated can interpret their victories as either only marginal or as a de facto “mandate” for implementing party platforms. In this study, educational attainment in each state is measured by the percentage of the population in each state age 25 and older with at least a college bachelor degree (\( BACH_j \)). It is hypothesized that the greater the percentage of the population in a state with a bachelor degree, the higher the expected gross benefits from voting in the state and, consequently, the higher the overall percentage of eligible voters in the state that will vote, ceteris paribus (Campbell et al., 1960; Tollison and Willett, 1973; Tullock, 2006).
In addition, Campbell et al. (1960) and, more recently, Tullock (2006) and Caporale and Poitras (2014), argue that it is also expected that the higher the level of family income, e.g., the higher the level of median household income \( \text{MEDHHINC}_j \), the more inclined eligible voters in the family unit are inclined to vote because they recognize the value (benefits) of doing so, ceteris paribus.

This study adopts a dummy variable, \( \text{CLOSE}_{jt} \), which is intended to reflect the relative closeness between Presidential candidates in state \( j \) in year \( t \). In particular, the binary variable \( \text{CLOSE}_{jt} = 1 \) when American Research Group Polling (2017) finds a voting margin in state \( j \) between the leading two Presidential candidates for likely voters of less than 5% (in absolute value) during the first week of the month of October of Presidential election year \( t \), whereas \( \text{CLOSE}_{jt} = 0 \) otherwise. Following the benefit-cost model (which reflects expressive voting) in equation (1) above, it is expected that the more competitive the Presidential election in any given state is, according to the polls, the greater the expected gross benefits from voting and hence the greater the voter participation rate, ceteris paribus. Accordingly, one is more likely to vote in an election where the candidates are running very closely according to the polls than in an election where the outcome is a foregone conclusion, ceteris paribus (Matsusaka, 1993; Kirchgässner and zu Himmern, 1997; Cebula and Hulse, 2007; Górecki, 2009). Stated in different terms, when in any given state the poll-forecasted outcome in a Presidential election is sufficiently close that the outcome appears uncertain, the probability that those voter-eligible persons who feel strongly about the outcome will actually vote increases because voting becomes an opportunity to express feelings when doing so is more likely to make a difference.

Another expressly public choice variable is also introduced into the model, namely, the number of emotionally charged statewide referenda and initiatives on the ballot in state \( j \). It has been observed that a greater number of statewide referenda and initiatives involving “emotionally charged” issues such as (1) abortion and (2) same-sex marriage, as well as the (3) death penalty and the (4) legalization of marijuana usage, may act to elevate voter participation since the act of voting on such issues (about which people often possess strong feelings) can be perceived as “empowering” because it can be regarded as increasing the expected gross benefits of voting, ceteris paribus (Lacey, 2005; Cebula and Meads, 2008; Hinnerich and Pettersson-Lidbom, 2014). The variable \( \text{EMCHARGED}_{jt} \) is the number of emotionally charged (as defined above by items 1 through 4) statewide referenda and initiatives on the ballot in state \( j \) in election year \( t \). It is
hypothesized that the voter participation rate is an increasing function of $EMCHARGED_{jt}$, ceteris paribus, as would be expected based on previous studies (Matsusaka, 1993; Lacey, 2005; Cebula and Meads, 2008; Hinnerich and Pettersson-Lidbom, 2014).

The variable $SANCTUARY_j$, defined in this study as the number of Sanctuary cities in state $j$, is also introduced as a control variable. The term “Sanctuary city” refers to a city that does not report the presence, identity, and number of undocumented immigrants to federal authorities. It has been found that states having a higher number of Sanctuary cities tend to be more politically active in recruiting potential voters to go to the polls by encouraging them to recognize the political power they can wield by voting, i.e., by educating them of the potential benefits of voting and often providing transportation (Congressional Research Service, 2006; Ohio Jobs and Justice PAC, 2016). Consequently, the greater the number of Sanctuary cities in a state, the greater the aggregate voter participation rate in the state, ceteris paribus.

Thus, based on the above arguments, it follows that:

$$EXPGRB_{jt} = g(UR_j/UR_{US}, MINORITY_j, BACH_j, MEDHHINC_j, CLOSE_{jt}, EMCHARGED_{jt}, SANCTUARY_j),$$

where:

$$g_{UR_j/UR_{US}} > 0, g_{MINORITY_j} < 0, g_{BACH_j} > 0, g_{MEDHHINC_j} > 0, g_{CLOSE_{jt}} > 0, g_{EMCHARGED_{jt}} > 0, g_{SANCTUARY_j} > 0 \quad (2)$$

In terms of the expected costs of voting, it is hypothesized here that the expected gross benefits of voting can be affected by certain family income considerations. In particular, Cebula and Tullock (2006), Tullock (2006), and Cebula (2008) suggest that there is a potential positive relationship between the expected gross cost of the act of voting and family income. These studies have hypothesized that, so long as educational attainment has been adequately accounted for, the higher the family income level, the higher the opportunity cost of voting may be, so that the incentive to “free-ride” may increase. Consider now the variable $INC150PLUS_j$, defined here as the percentage of the resident households in state $j$ with an annual income in excess of $150,000. It is hypothesized that, in at least some cases, higher income people (thusly identified) may be so immersed either in their work endeavors (their pursuit of earnings/income) or in their leisure endeavors, depending upon circumstances, that they find that they simply have neither the time to become well enough informed voters nor the actual time and/or interest to participate in voting. Hence, from this perspective, it is
hypothesized that the higher the value of $INCI50PLUS_j$, the higher the gross cost of voting in state $j$, *ceteris paribus*. Clearly, this hypothesis implies (other things held the same) that voter turnout is a decreasing function of the higher percentage of the households residing in state $j$ that have an annual income exceeding $150,000$.

Furthermore, regarding Sanctuary cities, not only do they tend to be more politically active in educating and recruiting potential voters to go to the polls but also they tend to be characterized by more significant efforts than in non-Sanctuary cities to provide transportation to polling booths, an activity that reduces the expected costs of voting, *ceteris paribus* (Congressional Research Service, 2006; Ohio Jobs and Justice PAC, 2016). Moreover, as argued in Rosenstone and Hansen (1993), to the extent that the voter-eligible population is unemployed, at least some portion of that demographic will find itself confronted by lower opportunity costs to voting than when they were previously employed and perhaps had difficulty getting to the polls because of that employment status. Thus, to some degree, the higher the unemployment rate in state $j$, the lower the costs of voting in the state, *ceteris paribus*.

Hence, it follows that:

$$EXPGRIC_{jt} = h(INCI50PLUS_j, SANCTUARY_j, UR_j/URUS),$$

where:

$$h_{INCI50PLUS_j} > 0, h_{SANCTUARY_j} < 0, h_{UR_j/URUS} < 0$$

(3)

### 2.3 The Model

Substituting from (2) and (3) into (1) yields the following model:

$$VPR_{jt} = f(UR_j/URUS, MINORITY_j, BACH_j, MEDHHINC_j, CLOSE_{jt}, EMCHARGED_{jt}, SANCTUARY_j, INCI50PLUS_j),$$

where:

$$f_{UR_j/URUS} > 0, f_{MINORITY_j} < 0, f_{BACH_j} > 0, f_{MEDHHINC_j} > 0, f_{CLOSE_{jt}} > 0, f_{EMCHARGED_{jt}} > 0, f_{SANCTUARY_j} > 0, f_{INCI50PLUS_j} < 0$$

(4)

This specification constitutes the framework upon which the initial empirical estimations are to be based.
3. Initial Empirical Estimation

The linear specification of the model to be estimated initially is given by:

\[ VPR_{jt} = a_0 + a_1 \left( \frac{UR_{jt-1}}{UR_{USt-1}} \right) + a_2 \text{MINORITY}_{jt-1} + a_3 \text{BACH}_{jt-1} + a_4 \text{MEDHHINC}_{jt-1} + a_5 \text{CLOSE}_{jt} + a_6 \text{EMCHARGED}_{jt} + a_7 \text{SANCTUARY}_{jt-1} + a_8 \text{INC150PLUS}_{jt-1} + \epsilon_{jt} \]  

where: \( a_0 \) is the constant, \( a_1, \ldots, a_8 \) are the coefficients, and \( \epsilon_{jt} \) is the error term. The dependent variable, \( VPR_{jt} \), represents the voter participation rate, expressed as a percentage of the population eligible to vote in state \( j \) in year \( t \). As for the explanatory variables, it is observed that: \( \frac{UR_{jt-1}}{UR_{USt-1}} \) is the ratio of the percentage unemployment rate in state \( j \) in year \( t-1 \) to the average national unemployment rate in year \( t-1 \); \( \text{MINORITY}_{jt-1} \) is the percentage of the total population in state \( j \) that was Hispanic in year \( t-1 \) plus the percentage of the total population in state \( j \) that was Afro-American in year \( t-1 \); \( \text{BACH}_{jt-1} \) is the percentage of the adult population age 25 and older in state \( j \) in year \( t-1 \) that had at least a college bachelor degree; the variable \( \text{MEDHHINC}_{jt-1} \) is the median household/family income in state \( j \) in year \( t-1 \); the binary/dummy variable \( \text{CLOSE}_{jt} \) reflects, as described above, the relative closeness between Presidential candidates in state \( j \) in year \( t \); the variable \( \text{EMCHARGED}_{jt} \) is the number of emotionally charged statewide referenda and initiatives on the ballot in state \( j \) in year \( t \); \( \text{SANCTUARY}_{jt-1} \) is the number of Sanctuary cities in state \( j \) in year \( t-1 \); and the variable \( \text{INC150PLUS}_{jt-1} \) is the percentage of households residing in state \( j \) with an annual income in excess of $150,000 in year \( t-1 \). The variables \( \frac{UR_{jt-1}}{UR_{USt-1}}, \text{MINORITY}_{jt-1}, \text{BACH}_{jt-1}, \text{MEDHHINC}_{jt-1}, \text{SANCTUARY}_{jt-1}, \) and \( \text{INC150PLUS}_{jt-1} \) are lagged in order to avoid simultaneity problems. The dummy variable \( \text{CLOSE}_{jt} \) as well as the variable \( \text{EMCHARGED}_{jt} \) both apply before Election Day and therefore do not require lagging.

The balanced regional (state-level) panel data used in this study reflect the five most recent Presidential election-year cycles, namely, those for the years 2000, 2004, 2008, 2012, and 2016. The data cover all 50 states. For the interested reader, descriptive statistics in the forms of means and standard deviations as well as maximum and minimum values for all the variables in the analysis are provided in Table 1. Data sources for the variables in this analysis are provided in

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4 These statewide ballot items must meet pre-election day deadlines in order to actually be on the ballot. Therefore, the act of voting occurs subsequent to the presence of statewide referenda and initiatives on the ballot.
Table 2. Finally, it is observed that performing the Hausman (1978) specification test revealed ($p = 0.0651$) that the study should adopt the Random-Effects Model rather than the Fixed-Effects Model.

**Table 2 - Data Sources**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>VPR$\text{j}_t$</td>
<td>Percentage of Eligible Voter Population That Voted</td>
<td>United States Election Project (2017)</td>
</tr>
<tr>
<td>$UR\text{j}_t$</td>
<td>Unemployment Rate</td>
<td></td>
</tr>
<tr>
<td>$UR\text{j}_t-1$/URU$\text{St}_t-1$</td>
<td>Unemployment Rate Ratio</td>
<td></td>
</tr>
<tr>
<td>(UR$\text{j}_t-1$ - URU$\text{St}_t-1$)</td>
<td>Unemployment Rate Difference</td>
<td></td>
</tr>
<tr>
<td>MINORITY$\text{j}_t-1$</td>
<td>Percentage of Population That Was African American + Percentage of Population That Was Hispanic</td>
<td>U.S. Census Bureau, American Community Survey (2016A)</td>
</tr>
<tr>
<td>BACH$\text{j}_t-1$</td>
<td>Percentage of Population Age 25 or More with Bachelor Degree or Higher</td>
<td>U.S. Census Bureau, American Community Survey (2016B)</td>
</tr>
<tr>
<td>CLOSE$\text{j}_t$</td>
<td>Close-Election Dummy</td>
<td></td>
</tr>
<tr>
<td>TOTALMS$\text{j}_t$</td>
<td>Total Number of Statewide Ballot Measures</td>
<td></td>
</tr>
<tr>
<td>EMCHARGED$\text{j}_t-1$</td>
<td>Number of Emotionally Charged Items on Ballot</td>
<td>American Research Group (2017)</td>
</tr>
<tr>
<td>INC150PLUS$\text{j}_t-1$</td>
<td>Percent of Households with an Annual Income of $150,000 or More</td>
<td></td>
</tr>
<tr>
<td>MEDHHINC$\text{j}_t-1$</td>
<td>Median Family/Household Income</td>
<td>U.S. Census Bureau, American Community Survey (2016C)</td>
</tr>
<tr>
<td>AGE65$\text{j}_t-1$</td>
<td>Percent of Population Age 65 and Older</td>
<td>U.S. Census Bureau, American Community Survey (2016A)</td>
</tr>
<tr>
<td>SANCTUARY$\text{j}_t-1$</td>
<td>Number of Sanctuary Cities</td>
<td></td>
</tr>
</tbody>
</table>

Before providing the estimation results, the issue of multi-collinearity is addressed. The evidence implies that, in the present analysis, multi-collinearity is not a problem. To illustrate this fact, regarding the explanatory variables shown in equation (5), the variance inflation factors (VIFs) were computed. These VIFs are provided in Table 3, where, as shown, all of the VIFs are below 4.0, which provides compelling evidence of the absence of multicollinearity (Kennedy, 2003; Lu and White, 2014; Rogerson, 2001; Wooldridge, 2010).
The voter turnout/relative unemployment rate hypothesis

Table 3 - Variance Inflation Factors (VIFs)

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>$UR_{jt}/UR_{jt}USt$</td>
<td>1.21</td>
</tr>
<tr>
<td>$CLOSE_{jt}$</td>
<td>1.03</td>
</tr>
<tr>
<td>$BACH_{jt-1}$</td>
<td>2.35</td>
</tr>
<tr>
<td>$INCI50PLUS_{jt-1}$</td>
<td>1.97</td>
</tr>
<tr>
<td>$MINORITY_{jt-1}$</td>
<td>1.26</td>
</tr>
<tr>
<td>$EMCHARGED_{jt-1}$</td>
<td>1.05</td>
</tr>
<tr>
<td>$SANCTUARY_{jt}$</td>
<td>1.49</td>
</tr>
<tr>
<td>$MEDHHINC_{jt-1}$</td>
<td>2.23</td>
</tr>
</tbody>
</table>

The Random-Effects estimation of equation (5) is found in Table 4. As shown, all eight of the estimated coefficients exhibit the expected/hypothesized signs. In addition, five of these coefficients are statistically significant at the 1% level, and one is statistically significant at the 5% level. Only the coefficients on the variables $EMCHARGED_{jt}$ and $SANCTUARY_{jt-1}$ fail to be statistically significant at the 10% level. The coefficient of determination ($R^2$) is 0.42, so that the model explains more than two-fifths of the variation of the dependent variables. The $F$-statistic is statistically significant at the 1% level, attesting to the overall dependability of the model.

Of greatest interest in this study, the voter participation rate in state $j$ in year $t$ is found to be an increasing function (at the 1% statistical significance level) of the ratio of the unemployment rate of the civilian labor force in state $j$ in year $t-1$ to the national average unemployment rate in year $t-1$. This finding is supportive of the central hypothesis in this study and may be interpreted as preliminary evidence implying that the higher the state unemployment rate relative to the national unemployment rate, the greater the degree to which eligible voters in the state exercise their right to vote, arguably because they are expressing their feelings in the forms of either resentment, anger, concerns, fears, and/or dissatisfaction regarding prevailing economic policies and conditions and also possibly because they are expressing the desire for effective changes to address those concerns, fears, and other feelings by exercising the right to vote.
Table 4 - Random-Effects Estimation Results

Dependent Variable: VPRjt

<table>
<thead>
<tr>
<th>Explanatory Variables</th>
<th>Coefficient</th>
<th>t-Statistic</th>
<th>ρ-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(URjt-1/URUST-1)</td>
<td>4.176***</td>
<td>2.66</td>
<td>0.0083</td>
</tr>
<tr>
<td>MINORITYjt-1</td>
<td>-0.144***</td>
<td>-2.82</td>
<td>0.0052</td>
</tr>
<tr>
<td>BACHjt-1</td>
<td>0.837***</td>
<td>6.45</td>
<td>0.0000</td>
</tr>
<tr>
<td>CLOSEjt</td>
<td>2.166***</td>
<td>3.40</td>
<td>0.0008</td>
</tr>
<tr>
<td>INC150PLUSjt-1</td>
<td>-0.564***</td>
<td>-5.94</td>
<td>0.0000</td>
</tr>
<tr>
<td>MEDHHINCjt-1</td>
<td>0.000009*</td>
<td>1.98</td>
<td>0.0492</td>
</tr>
<tr>
<td>EMCHARGEDjt</td>
<td>1.102</td>
<td>1.61</td>
<td>0.1088</td>
</tr>
<tr>
<td>SANCTUARYjt-1</td>
<td>0.089</td>
<td>1.15</td>
<td>0.2519</td>
</tr>
<tr>
<td>Constant</td>
<td>33.62</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F-statistic          13.19***

R²                   0.42

Hausman Test Statistic: ρ = 0.0651

***Statistically significant at the 1% level; *statistically significant at 5% level.

The results shown in Table 4 also indicate that voter turnout is, at the 1% statistical significance level, an increasing function of educational attainment (a bachelor degree or higher) and election closeness, whereas there also is evidence (at the 5% statistical significance level) that voter turnout is an increasing function of the level of household/family income. The estimation also provides empirical support (at the 1% statistical significance level) for the hypotheses that voter turnout is a decreasing function of the percent of the population that has an annual income in excess of $150,000 and the percent of the population in a state that is Hispanic or Afro-American, i.e., is classified as a minority.

4. Robustness Testing

A common exercise in empirical studies is a robustness check, wherein one investigates how certain “core” regression coefficient estimates behave when the regression specification is
modified by deleting or adding explanatory variables one at a time (Greene, 2012; Kennedy, 2003; Lu and White, 2014; Wooldridge, 2010). Accordingly, attention is now focused in the present study upon the results shown in Table 5.

**Table 5 - Robustness Checking for Equation (5) Estimation**

**PART A**

<table>
<thead>
<tr>
<th>Row Number</th>
<th>Variable Removed</th>
<th>Coefficient</th>
<th>URjt-1/URUSt-1 Coefficient</th>
<th>URjt-1/URUSt-1 t-statistic</th>
<th>Equation F-statistic</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>BACHjt-1</td>
<td>3.92**</td>
<td>2.39</td>
<td>7.71***</td>
<td>0.27</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>CLOSEjt</td>
<td>4.61***</td>
<td>2.89</td>
<td>12.82**</td>
<td>0.37</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>EMCHARGEDjt</td>
<td>4.55***</td>
<td>2.93</td>
<td>14.70***</td>
<td>0.41</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>MINORITYjt-1</td>
<td>3.34*</td>
<td>2.15</td>
<td>13.55***</td>
<td>0.33</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>SANCTUARYjt-1</td>
<td>4.24***</td>
<td>2.71</td>
<td>14.93***</td>
<td>0.42</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>INC150PLUSjt-1</td>
<td>2.72***</td>
<td>2.06</td>
<td>9.11***</td>
<td>0.37</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>MEDHHINCjt-1</td>
<td>3.49**</td>
<td>2.18</td>
<td>14.33***</td>
<td>0.40</td>
<td></td>
</tr>
</tbody>
</table>

**PART B**

<table>
<thead>
<tr>
<th>Row Number</th>
<th>Variable Added</th>
<th>Coefficient</th>
<th>URjt-1/URUSt-1 Coefficient</th>
<th>URjt-1/URUSt-1 t-statistic</th>
<th>Equation F-statistic</th>
<th>R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>AGE65PLUSjt-1</td>
<td>4.17***</td>
<td>2.69</td>
<td>11.61***</td>
<td>0.42</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>TOTALMSRSjt</td>
<td>3.86**</td>
<td>2.47</td>
<td>10.63***</td>
<td>0.42</td>
<td></td>
</tr>
</tbody>
</table>

***Statistically significant at the 1% level; **statistically significant at the 2.5% level; *statistically significant at the 5% level.

In the top part (Part A) of Table 5, the results of the Random-Effects estimation of the model for the coefficient on the \( \text{URjt-1/URUSt-1} \) variable and its \( t \)-statistic, as well as the new values for the estimation \( F \)-statistic and \( R^2 \), are provided, as one variable at a time is removed from the model [see column (a)], only in the subsequent estimation to be reinserted into the equation while a different explanatory variable is deleted.

In the first row of Table 4, the variable \( \text{BACHjt-1} \) is removed, while the remaining explanatory variables in the model are unchanged. As shown in row (1) of Table 5, the Random-Effects estimation of the model in this specification yields a positive coefficient on the key variable
URjt-1/URUSt-1 that is statistically significant at the 1% level, whereas the estimation F-statistic (row 1, column 4) remains statistically significant at the 1% level and the $R^2$ assumes a value of 0.27. In row (2) of Table 5, the variable BACHjt-1 has been returned to the estimating equation but the variable CLOSEjt has been removed. Once again, after the Random-Effects estimation of the resulting specification, the removal of variable CLOSEjt still leaves the positively signed estimated URjt-1/URUSt-1 variable coefficient (as well as the equation F-statistic) statistically significant at the 1% level, and the $R^2$ assumes a value of 0.37. Indeed, as shown in each and every row of Part A of Table 5, regardless of which one of the seven non-(URjt-1/URUSt-1) variables is deleted (one at a time) and subsequently reinserted, the relative unemployment rate variable, URjt-1/URUSt-1, remains statistically significant (at the 1% level in three cases, at the 2.5% level in two cases, and at the 5% level in the remaining two cases). In addition, in each row of Part A of Table 5, the equation F-statistic remains statistically significant (at the 1% level in all seven cases) while the $R^2$ remains consistently in the 0.27-0.42 range.

Similarly, in Part B of Table 5, two different explanatory variables are each separately added to the basic model [equation (5)] one at a time and then subsequently deleted for the Random-Effects estimation reflected in the following row. These additional variables are, as follows: AGE65PLUSjt-1 (the percent of the total population that was age 65 and older in state j in year t-1), as suggested, e.g., in Durden and Gaynor (1987) and Tullock (2006) and TOTALMSjt (the total number of statewide initiatives and referenda on the ballot in state j in year t), as suggested in Lacey (2005) and Cebula and Meads (2008). In both of these additional Random-Effects estimates, each of which had only the one specified additional variable added to it, the estimated t-statistic on the positively signed relative unemployment rate variable (URjt-1/URUSt-1) coefficient remains statistically significant, at the 1% level (after adding just AGE65PLUSjt-1) or at the 2.5% level (after adding just TOTALMSjt), whereas the accompanying estimation F-statistic remained statistically significant at the 1% level, with the $R^2$ being 0.42 in both cases. Thus, these tests, like those in Part A of Table 5, provide consistent empirical support for the robustness of the estimation finding that the voter participation rate across the last five Presidential elections was an increasing function of the relative unemployment rate variable, URjt-1/URUSt-1.
5. An Alternative Specification

Next, as a modest further test of the strength and consistency of the evidence on behalf of the Voter Turnout/Relative Unemployment Rate Hypothesis as provided in Tables 4 and 5, the model is now estimated using the difference between the percentage unemployment rate in state \( j \) in year \( t-1 \), \( URjt-1 \), and the percentage level of the national unemployment rate in year \( t-1 \), \( URUST-1 \), i.e., \((URjt-1 - URUST-1)\), rather than using the ratio variable \((URjt-1/ URUST-1)\) per se.

Thus, the model is now given by:

\[
VPRjt = b_0 + b_1 (URjt-1 - URUST-1) + b_2 MINORITYjt-1 + b_3 BACHjt-1 + b_4 MEDHHINCjt-1 + b_5 CLOSEjt + b_6 EMCHARGEDjt + b_7 SANCTUARYjt-1 + b_8 INC150PLUSjt-1 + \epsilonjt \tag{6}
\]

The VIFs for this version of the model are provided in Table 6. As shown, all of these VIFs are less than 4.0, leading to the inference that multi-collinearity is not an issue. Based on the main hypothesis of interest in this study, it is expected that the coefficient \( b_1 > 0 \).

<table>
<thead>
<tr>
<th>Variable</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>((URjt-1 - URUST-1))</td>
<td>1.25</td>
</tr>
<tr>
<td>CLOSEjt</td>
<td>1.03</td>
</tr>
<tr>
<td>BACHjt-1</td>
<td>2.35</td>
</tr>
<tr>
<td>INC150PLUSjt-1</td>
<td>2.02</td>
</tr>
<tr>
<td>MINORITYjt-1</td>
<td>1.25</td>
</tr>
<tr>
<td>EMCHARGEDjt-1</td>
<td>1.05</td>
</tr>
<tr>
<td>SANCTUARYjt</td>
<td>1.49</td>
</tr>
<tr>
<td>MEDHHINCjt-1</td>
<td>2.30</td>
</tr>
</tbody>
</table>

Estimating equation (6) by Random-Effects, as prescribed by the Hausman (1978) specification test \( p = 0.0629 \), yields the results summarized in Table 7. As in the estimate found in Table 4, all of the estimated coefficients exhibit the hypothesized signs. Of these eight estimated coefficients, five are statistically significant at the 1% level, and one is statistically significant at the 5% level. Clearly, these estimation results closely parallel those in Table 4.

Of greatest interest in this study, the voter participation rate among eligible voters is found to
be an increasing function (at the 1% statistical significance level) of the alternative relative unemployment rate measure suggested in this section of the study, namely, \((URjt-1 - URUST-1)\). This finding/result may be interpreted as providing yet further evidence on behalf of the central hypothesis in this study, namely, the Voter Turnout/Relative Unemployment Rate Hypothesis, wherein the higher the unemployment rate in a state relative to the national unemployment rate, the greater the degree to which eligible voters show up at the polls in that state to vote. Moreover, as shown in Table 8, robustness testing paralleling that undertaken for the estimation of equation (5) attests to the resilience of the findings on behalf of the hypothesis, even when it is expressed in terms of the difference between the state and national unemployment rates.

\begin{table}[h]
\centering
\begin{tabular}{lll}
\hline
Dependent Variable: & & \\
\text{VPRjt} & Coefficient & \textit{t}-Statistic & \textit{\(\rho\)}-value \\
\hline
Explanatory Variables: & & \\
\text{(URjt-1 - URUST-1)} & 0.767*** & 2.85 & 0.0047 \\
\text{MINORITYjt-1} & -0.143*** & -2.81 & 0.0054 \\
\text{BACHjt-1} & 0.838*** & 6.46 & 0.0000 \\
\text{CLOSEjt} & 2.171*** & 3.42 & 0.0007 \\
\text{INCI50PLUSjt-1} & -0.58*** & -6.05 & 0.0000 \\
\text{MEDHHINCjt-1} & 0.0001* & 2.17 & 0.0312 \\
\text{EMCHARGEDjt} & 0.976 & 1.56 & 0.1212 \\
\text{SANCTUARYjt-1} & 0.0885 & 1.14 & 0.2571 \\
\hline
\text{Constant} & 37.38 & & \\
\text{\textit{F}}-\text{statistic} & 13.35*** & & \\
\text{\(R^2\)} & 0.42 & & \\
\text{Hausman Test Statistic:} & \text{\(\rho = 0.0629\)} & & \\
\hline
\end{tabular}
\caption{Alternative Random-Effects Estimation Results}
\end{table}

\(***\)Statistically significant at the 1% level; *statistically significant at 5% level.

\(5\) Robustness testing affirms the positive sign and consistent statistical significance of the \((URjt-1 - URUST-1)\) variable. These results are available upon request.
6. CONCLUSION

This study proffers and investigates empirically the “Voter Turnout/Relative Unemployment Rate Hypothesis”, a hypothesis arguing that the higher the unemployment rate in a state relative to the unemployment rate in the nation as a whole, the greater the voter participation rate of eligible voters in that state, *ceteris paribus*. The study period involves the U.S. Presidential election cycles for the years 2000, 2004, 2008, 2012, and 2016 and adopts a state-level panel dataset. The model, while focusing on the state unemployment rate relative to the unemployment rate in the nation as a whole (as opposed simply to the level of the unemployment rate *per se* as in, e.g., the recent study by Cebula, 2017), also includes control variables for a number of established demographic, public choice, and economics factors.
The Random-Effects estimations reveal strong empirical support for the central hypothesis of the study. In other words, the voter participation rate among eligible voters is found to be an increasing function of the ratio of the percentage unemployment rate of the civilian labor force in a state relative to the national percentage unemployment rate. Robustness testing (see Table 5) affirms the strength and consistency of the voter-turnout impact of this variable. In addition, as an alternative test of the resiliency of the hypothesis, the voter participation rate is found to be an increasing function of the difference between the percentage unemployment rate in a state and the national percentage unemployment rate (see Table 7). These findings constitute an outcome suggesting that the higher the unemployment rate in a state vis-à-vis the unemployment rate in the nation as a whole, the greater the degree to which eligible voters in that state, arguably both employed eligible voters concerned with the implications of excessive high unemployment as well as resentful/angry unemployed eligible voters with their own feelings regarding the unemployment rate issue go the polls to cast their votes.

These findings would appear to reflect voters' expressing their concerns and fears regarding prevailing economic policies and conditions and/or expressing their desire for changes in those policies. The estimation results appear to imply that elected officials may in fact be held accountable for excessively high unemployment rates. Indeed, candidates for political office, whether incumbents or not, should become aware of these findings. In many cases, candidates could potentially benefit both themselves and the electorate from this information by appropriately adjusting their political campaigns, party platforms, and/or their performance and conduct both on the campaign trail and, for victors, while serving in office. Moreover, the findings of this study would appear to be potentially applicable to nations other than the U.S., where rather than “state,” the model could be applied to provinces or even metropolitan areas.

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6 In both sets of estimates, the computation of VIFs reveal that multi-collinearity is found not to be a problem.
REFERENCES


U.S. Census Bureau, American Community Survey (2016A), Table 1501, at: <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_S1501&src=pt>.

U.S. Census Bureau, American Community Survey (2016B), Table 1501, at: <https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>.


