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Does stock market performance affect the government satisfaction rating in the UK?

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Abstract In this study, we attempt to answer the question of whether stock market performance affects the government satisfaction rating in the long run in a sample period spanning 1984:Q1 to 2013:Q2 in the UK. We examine both the equilibrium relationship and the causality relationship between stock market performance and government satisfaction rating. The results indicate that the voters are sensitive to the economic shocks and hold responsible for the government. The empirical results confirm the responsibility hypothesis.

Keywords Stock market · Government satisfaction rating · Co-integration and asymmetric causality

JEL Classification C18 · E31 · G12

1 Introduction

The economics and election nexus play a substantial role in the design of politicians' own policies. Before declaring their own party programs, politicians want to know the influence of these programs on voter behavior. Politicians who notice the sensitiveness

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of voters to economic change form their policies accordingly. For this purpose, the economic voting theory is analyzed from different perspectives. There is a significant amount of literature investigating the relationship between economics and elections (Nannestad and Paldam 1994; Lewis-Beck and Stegmaier 2013). Even if a tentative consensus is reached, information on the magnitude and direction of this relationship is still contradictory. There may be some factors to explain why the research on this case obtained varied results. All countries have their own cultural, political, economical and religious backgrounds. Under these circumstances, the voters consider their own country's background and decide which parties they support. Hence, voter behavior in any country may be observed differently in another country. The researchers working on economic voting have referred to distinct econometric methodologies, time periods, sample sizes and variables. As Gronke and Newman (2003) have discussed, researchers tried to determine the relationship between economics and elections using more sophisticated econometric techniques, different model specifications, functional forms, longer time series and rich data sets. In addition to these, shocks and structural breaks can be the underlying cause of the relationship between economics and elections in only one period holding to the other periods. As such, the results of the studies can differ quite drastically from each other. Some studies in the literature related to the economics and elections nexus focus on a particular economic variable due to the significance of that economic variable on voter behavior. Recent studies show that the stock market index is included in the vote and popularity functions (Gwilym and Buckle 1994; Hudson et al. 1998; Schwartz et al. 2008; Fauvelle-Aymar and Stegmaier 2013).

Linkage between stock market and election has been analyzed within two frameworks, economic voting and political business cycles. In the economic voting literature, stock exchange has been formed as an independent variable in models. In other words, scholars who concentrate on economic voting theory in terms of stock market attend to specify sensibility of voter behavior to the changing in the stock exchange market. As for political business cycle literature, the stock exchange has been used as a dependent variable in order to determine the fluctuations in its results from some factors such as election time, electoral system and parties' ideologies (Thompson and Ioannidis 1987; Manning 1989; Gwilym and Buckle 1994; Vuchelen 2003).

In this study, we try to explain whether voter behavior depends on stock market performance rather than focusing on stock market fluctuations, boom and boost namely. Political business cycle is not relevant to the current analysis, and therefore it is not considered further. Whether stock market performance might theoretically change presidential approval is discussed by Fauvelle-Aymar and Stegmaier (2013). They indicate,

> … market figures are reported more frequently than other macroeconomic indicators, and the media interpret the market's direction in terms of the nation's economic health and what it means for American's pocketbook." "… responsibility for stock market performance can be assigned to the President. … since the government has policy instruments to steer the economy.

In this context, the London Stock Exchange (LSE), which is among the largest stock markets in the world, might play an important role in voter behavior. We applied

the LSE market indicators to reveal the relationship between stock exchange and government satisfaction rating and considered the responsibility hypothesis as the following: *The voters hold the government responsible for the changing economy (responsibility hypothesis).*

The responsibility hypothesis explains whether the voters hold the government responsible for economic events. If the performance of the economy goes well, the voter supports the incumbent party (Nannestad and Paldam 1994) or vice versa. This is called classic reward–punishment paradigm of economic voting in the literature. Responsibility hypothesis initiates the economic voting literature (Lewis-Beck and Paldam 2000), and other hypotheses (e.g. Kick-the-Rascals-Out- Asymmetry or grievance asymmetry (Mueller 1970), sociotropic and egotropic hypothesis (Kinder and Kiewiet 1979), culture hypothesis (Miller and Listhaug 1984) and so on) contribute to progression of the economic voting literature (Nadeau et al. 2010).

This article contributes to the general literature on economic voting in the following ways as: It is the first study dealing with the relationship between the stock exchange and government satisfaction rating in the UK. Although the UK is one of the leading stock markets, it is surprising that economic voting literature has largely ignored this possible relationship. We particularly prefer the UK since elections are held regularly; it has consistent time series data; there are no military interventions; there are no party closures or frequent changes in election laws (Akarca and Tansel 2007); and it has a developed financial market and reliable political environment. According to Nannestad and Paldam (1994) "the responsibility pattern only appears to make sense for governments that can actually rule as government normally can in US and UK." There are also some studies investigated in this context for other developed countries (Fauvelle-Aymar and Stegmaier 2013; Schwartz et al. 2008; Chong et al. 2011). Different from these studies, we applied an up-to-date econometric approach by taking into account structural breaks in an effort to reveal if our results correspond with others under these circumstances. There is no study to date, to the best of our knowledge, evaluating the vote and popularity function within the concept of long-run equilibrium with structural break. Furthermore, this study is the first to investigate how positive and negative shocks in the economic variables affect the government satisfaction rating and the sensibility of voters to the shocks.

This paper is structured as follows: Section 2 provides a review of the literature; Sect. 3 outlines the data; Sect. 4 shows the methodology and discusses the empirical results; and finally, Sect. 5 concludes.

2 Literature review

Since Gerald Kramer's (1971) profound work on economic voting, the literature related to economic voting has progressed from different perspectives and is still dynamically in progress. One of the reasons why research is so abundant with respect to economic voting may be that economic voting is a field of study for economists, political scientists, sociologists and econometricians. In other words, since economic voting is at a junction of distinct fields, the literature reaches enormous dimensions. Summing up the economic voting literature looks like an attempt to do the impossible. Fortunately,

there are some substantial surveys of literature on voting and popularity functions, which are termed VP-functions (Nannestad and Paldam 1994; Gronke and Newman 2003; Lewis-Beck and Stegmaier 2013).

Researchers have used a variety of macroeconomic variables in aggregate vote functions (Geys and Vermeir 2008; Schwartz et al. 2008; Chong et al. 2011; Fauvelle-Aymar and Stegmaier 2013; Wisniewski 2009). These variables are important guidelines for politicians, since they can observe the factors affecting the voters' decisions. Politicians may find out what the voters are thinking about, and therefore how they are inclined to vote and respond to campaign stimuli (Berlemann and Enkelmann 2014).

One of these factors to be considered in vote-popularity functions is stock market. In a few recent studies, we might observe that this relationship has been tested within the framework in VP-functions. Schwartz et al. (2008) is one of the first researchers that handled the political advantage of a volatile market. They utilized the Chicago Board Options Exchange's (CBOE) Volatility Index (VIX)[1] as proxy variable of market volatility and found that the expected volatility of the market is highly related to Presidential approval in the USA. Their primary contribution is to introduce the VIX index in the VP-function as a measure of uncertainty (Schwartz et al. 2008).

Chong et al. (2011) indicated how market volatility affects presidential job approval ratings in the USA. Unlike Schwartz et al. (2008), they distinguished the economic and non-economic components of market volatility and used Eta® model variables.[2] Their results indicate that there is not aggregated market volatility but rather disaggregated market volatility that has a causal effect on presidential job approval ratings (Chong et al. 2011).

One of the latest research studies on the relationship between presidential approval and stock exchange was conducted by Fauvelle-Aymar and Stegmaier (2013). They indicated that approval is highly sensitive to the stock market's acceleration or deceleration. That is, falling in the stock market index reduces presidential approval whereas acceleration in the index increases US presidential approval (Fauvelle-Aymar and Stegmaier 2013). As well as these studies, there are also a few studies showing that voter's preferences related to parties could change according to their patrimony such as ownership of home, apartment, business, farm, stock, saving. (Lewis-Beck and Nadeau 2011). Lewis-Beck and Nadeau (2011) called this patrimonial economic voting and indicated, "A citizen's standing in the economic structure shapes policy preference and, in turn, party preferences." They found out having more patrimony directs voters to favor conservative (Nadeau et al. 2010; Lewis-Beck and Nadeau 2011; Stubager et al. 2013). In addition, there are some scholars discussed the UK stock market and elections. Thompson and Ionnidis's (1987) early study demonstrated that there is limited evidence that the UK stock market responds to voter opinion polls. Gwilym and

[1] The Chicago Board Options Exchange's (CBOE) Volatility Index (VIX) is called investor fear gauge, and it is calculated based on S&P 500 index by Black and Scholes (1973), Schwartz et al. (2008).

[2] Eta® model includes 18 economic factor: FTSE 100 index, gold index, corporate bond (BAA) yield, consumer price index, short-term government bond yield, intermediate-term government bond yield, long-term government bond yield, Tokyo Stock Exchange index, the Euro exchange rate, agricultural exports, housing starts, monetary base, M2 money supply, corporate cash flow, unemployment rate, auto sales, new durable goods orders, and energy prices. It is developed by the Center for Computationally Advanced Statistical Techniques (Chong et al. 2011).

Buckle (1994) indicated that there is a relationship between opinion polls and FTSE 100 share index for the 1992 UK election. Hudson et al. (1998) determined that the literature on the UK stock market shows that results are mixed regarding the question of whether the market is responding to opinion polls (Hudson et al. 1998).

3 Data

The quarterly data used in this study cover the period from 1984:Q1 to 2013Q2 for the UK. The variables in this study include government satisfaction rating (GSR), the financial times stock exchange (FTSE) 100 index, consumer price index (CPI), unemployment rate (UN), and gross domestic product per head (GDP). GSR is a dependent variable; FTSE, UR, CPI and GDP are independent economic variables. Government satisfaction rating is provided from the Ipsos MORI Research Company. The question asked to the people is: "Are you satisfied or dissatisfied with the way the Government is running the country?" We use satisfaction rating in percentages, and GSR is used as a proxy of prime minister approval rating. An increasing in GSR rating might induce an increase in votes in favor of the government. The FTSE 100 index is obtained from the National Statistics Office of the UK. Because the FTSE 100 index is one of the most used indicators of the UK stock market, we applied the FTSE100 as a proxy of the UK stock market.[3] CPI and UN are retrieved from the Federal Reserve Bank of St. Louis (2015). The UN is a seasonally adjusted data set. For GDP, data used the chained volume measures.[4] All the variables are expressed in natural logarithm form in the empirical analysis and correlate in the expected direction with the dependent variable of government satisfaction ratings.

4 Empirical results

We applied the unit root, co-integration and asymmetric causality approach in order to test our hypothesis. Though our data set contains long time period, starting to the analysis by ruling out structural break in the series may be induce misleading results. As such, we applied unit root and co-integration tests with structural break. Additionally, we also refer the asymmetric causality test in an effort to separate the impact of shocks in the variables into positive and negative.

4.1 Unit root test

In the first step, we used the unit root test with structural break based on Zivot and Andrews (1992) statistics in order to determine the integrated order of the series. The conventional unit root test, which is not considered the structural break, such as

[3] "FTSE 100 =1000 at end of Dec 1983" (ons.gov.uk).

[4] "With chained volume measures, instead of updating the base year every 5 years, it is updated every year, meaning that, in practice, every series to be presented in real terms is estimated both in current prices and prices of the previous year " (ons.gov.uk).

Table 1 Unit root test

Variables	*t*-Statistic	Breakpoint	Break date
Levels			
CPI	−3.4010	33(λ :0.27)	1992Q1
FTSE	−4.479	73(λ:0.61)	2002Q1
GDP	−4.5056	97(λ:0.82)	2008Q1
GSR	−4.551	53(λ:0.44)	1997Q1
UR	−4.518	97(λ:0.82)	2008Q1
First differences			
ΔCPI	−8.9363	65(λ:0.55)	2000Q1
ΔFTSE	−10.366	76(λ:0.64)	2002Q4
ΔGDP	−11.229	75 (λ:0.62)	2002Q3
ΔGSR	−10.830	44(λ:0.37)	1994Q4
ΔUR	−5.4618	35(λ:0.29)	1992Q3

ZA critical values for break in level model are −4.58, −4.80, −5.34 at 10, 5 and 1 % levels

augmented Dickey Fuller (ADF) and Phillips Peron (PP), may not capture accurate integration degree of series. In order to eliminate this trouble, we conducted Zivot-Andrews (ZA) unit root test. It is important to know whether the series have I(1), because the Westernlund and Edgerton (2006) co-integration method needs to be series I(1). ZA unit root test with structural break takes the break fraction to be endogenous unlike the Perron (1989) approach that is taken the break fraction to be exogenous. Table 1 summarizes break in level results of the ZA unit root test.

Considering the critical values of the test statistics, the null hypothesis of a structural unit root cannot be rejected for the series at the 5 % significant level.[5] All series are integrated to an order of one.

4.2 Co-integration test

In the second step, because it is guaranteed that all the variables have I(1), we can employ the Westerlund and Edgerton (2006) co-integration test procedure. The conventional co-integration tests, i.e. Johansen (1991), Johansen and Johansen and Juselius (1990) and Pesaran et al. (2001), rule out the structural break in the series. So, "the conventional tests may incorrectly accept the null hypothesis of no co-integration when there is a break under the alternative hypothesis" (Westerlund and Edgerton 2006). To ease this problem, we applied WE test for co-integration with structural breaks. There are some advantages of WE such as the null hypothesis of no co-integration allows for deterministic trends and structural change and complies with heteroskedastic and serially correlated errors (Westerlund and Edgerton 2006). The test results are demonstrated in Table 2.

[5] When we use the breakpoint dates obtaining endogenously in ZA approach in Chow test (1960) as an exogenously we verify that the all the breakpoint dates provided from ZA refer the structural change in the specified breakpoints. Chow test *F*-Statistics for CPI, FTSE, GDP, GSR and UR are 105.1544 (0.000), 55.562 (0.000), 41.5664(0.000) , 24.727 (0.000) and 5.417 (0.021), respectively. *P* values are in the paranthesis.

Table 2 Co-integration test

	t-Stat.	Break date
t_s	−4.944	58(1998Q2)
ϕ_s	−79.558	

Critical value 10 %: −2.75

Table 3 Long-run coefficient test

Variables	FMOLS	CCR
C	41.540 (0.000)	40.332 (0.000)
CDU	0.887 (0.000)	0.896 (0.000)
FTSE	0.543 (0.061)	0.50 (0.075)
CPI	0.032 (0.011)	0.32 (0.010)
UR	−0.76 (0.003)	−0.07 (0.003)
GDP	−4.91 (0.000)	−4.74 (0.000)

The calculated t_s and ϕ_s statistics are more negative than the critical value of −2.75 at 10 % level. The null hypothesis of no co-integration with structural break cannot be accepted when GSR is the dependent variable. That is, there is a long-run relationship among variables for the UK.

4.3 Long-run co-integration coefficient test

Since the variables are co-integrated, the long-run model can be estimated. To estimate long-run estimators, we use fully modified ordinary least squares (FMOLS) developed by Phillips and Hansen (1990) and canonical co-integrating regression (CCR) developed by Park (1992). The FMOLS method has some advantages, such as producing reliable estimates for a small sample size, correcting for endogeneity and serial correlation and asymptotically eliminating sample bias (Khundrakpam and Ranjan 2010). Canonical co-integrating regression (CCR) is a procedure developed by Park (1992) for statistical inference in co-integrating regressions formulated with the transformed data. CCR is a nonparametric method for the estimation of and testing of co-integration vectors in models with integrated processes or with order one (Park 1992). Table 3 presents long-run estimator test results.

In order to estimate the long-run coefficient, we consider the break date (1998Q2)[6] provided from the WE co-integration test result and called the variable, "CDU." This known point in the co-integration test means that the co-integration vector is time-variant, whereas the standard test for co-integration is time-invariant under the alternative hypothesis (Gregory and Hansen 1996). C represents the intercept before the break, the coefficient of CDU represents the change in the intercept at the time of the shift and coefficients of remaining variables indicate the slope parameters. The slope coefficients are in expected direction and statistically significant for FTSE and UR vari-

[6] One of the reasons why 1998Q2 is determined by WE test may be the dot-com bubble case. It is called also "stock market boom" in the USA. Between 1990 and the peak in mid-2000, US equity prices increase nearly fivefold. The stock market boom in the rest of the world is quite impressive by historical standards (Kraay and Ventura, 2007). The other one may be the Asian financial crisis.

ables. However, the signs of GDP and CPI did not correspond with our expectations.[7] A one-percentage point increase in FTSE generates a 0.5 percentage point increase in government satisfaction rating in the long run. Furthermore, a one-percentage point decrease in UR generates a 0.76 percentage point decrease in government satisfaction rating in the long run.

4.4 Asymmetric causality test

Asymmetric causality test improved by Hatemi-J (2012) allows for asymmetry in the causality testing by using the cumulative sums of positive and negative shocks. It is assumed that the impact of a positive shock is the same as the impact of a negative shock in the previous conventional causality tests such as Granger (1969), Toda and Yamamato (1995) (Hatemi-J 2012). Hatemi-J said, "In the existing literature, there is no separation between the causal impact of positive and negative shocks." Supposing that we investigate the casual relationship between two integrated variables y_{1t} and y_{2t} defined as the following random walk process (Hatemi-J 2012): $y_{1t} = y_{1t-1} + \varepsilon_{1i} + y_{10} + \sum_{i=1}^{t} \varepsilon_{1i}$ and $y_{2t} = y_{2t-1} + \varepsilon_{2i} + y_{20} + \sum_{i=1}^{t} \varepsilon_{2i}$ where t = 1,2,…T, the constants $y_{1,0}$ and $y_{2,0}$ are initial values; ε_{1i} and ε_{2i} white noise disturbance terms. Positive and negative shocks are defined as the following: $\varepsilon_{1i}^{+} = \max(\varepsilon_{1i}, 0)$, $\varepsilon_{2i}^{+} = \max(\varepsilon_{2i}, 0)$, $\varepsilon_{1i}^{-} = \min(\varepsilon_{1i}, 0)$ and $\varepsilon_{2i}^{-} = \min(\varepsilon_{2i}, 0)$, respectively. Therefore, one can express $\varepsilon_{1i} = \varepsilon_{1i}^{+} + \varepsilon_{1i}^{-}$ and $\varepsilon_{2i} = \varepsilon_{2i}^{+} + \varepsilon_{2i}^{-}$. It follows that $y_{1t} = y_{1t-1} + \varepsilon_{1t} = y_{1,0} + \sum_{i=1}^{t} \varepsilon_{1i} + \sum_{i=1}^{t} \varepsilon_{1i}^{-}$ and $y_{2t} = y_{2t-1} + \varepsilon_{2t} = y_{2,0} + \sum_{i=1}^{t} \varepsilon_{2i} + \sum_{i=1}^{t} \varepsilon_{2i}^{-}$. Finally, the positive and negative shocks of each variable can be defined in a cumulative form as $y_{1t}^{+} = \sum_{i=1}^{t} \varepsilon_{1i}^{+}$, $y_{1t}^{-} = \sum_{i=1}^{t} \varepsilon_{1i}^{-}$, $y_{2t}^{+} = \sum_{i=1}^{t} \varepsilon_{2i}^{+}$ and $y_{2t}^{-} = \sum_{i=1}^{t} \varepsilon_{2i}^{-}$. The next step is to test the causal relationship between these variables by using the following vector autoregressive model of order p, VAR (p)[8]: $y_t^{+} = v + A_1 y_{t-1}^{+} + \cdots + A_p y_{t-1}^{+} + u_t^{+}$, where y_t^{+} is the 2×1 vector of variables, v is the vector of intercepts, and u_t^{+} is the vector of error terms. The matrix A_r is a 2×2 matrix of parameters for lag order $r (r = 1, \ldots p)$. In order to determine the optimal lag order (p), he suggests the following information criterion[9]: $HJC = \ln(|\hat{\Omega}_j|) + j(\frac{n^2 \ln T + 2n^2 \ln(\ln T)}{2T})$, $j = 0, \ldots, p$ where $|\hat{\Omega}_j|$ is the determinant of estimated variance–covariance matrix of error terms in the VAR model based on lag order j, n is the equation number of VAR model and T is the number of observations. After selecting the optimal lag order, the following hypothesis is tested: H_o= the row w, column k element in A_r equals zero for $r = 1, \ldots, p$. This method

[7] It is accepted in the economic voting literature that FTSE and GDP act in the same direction with the presidential approval rating whereas CPI and UR act in the opposite direction. This means increasing (decreasing) the FTSE or GDP increases (decreases) the presidential approval rating. However, increasing (or decreasing) CPI or UR decreases (increases) the presidential approval rating. By and large, theoretically and empirically, the effects of GDP and FTSE are expected to be positive and that of CPI and UR are to be negative.

[8] Hatemi-J assumed that $y_t^{+} = (y_{1t}^{+}, y_{2t}^{+})$ in his paper. He also remarked that for negative shocks, the vector $y_t^{-} = (y_{1t}^{-}, y_{2t}^{-})$ is used. Other combinations are also possible.

[9] Hatemi-J indicates that this information criterion is robust to autoregressive conditional heteroskedasticity (ARCH).

Table 4 Asymmetric causality test results

Null hypothesis	Test value	p values	Results
$gsr^{+} \neq\rangle ur^{+}$	3.238	0.356	None
$ur^{+} \neq\rangle gsr^{+}$	1.996	0.573	
$gsr^{+} \neq\rangle ftse^{+}$	5.699	0.127	Uni-directional
$ftse^{+} \neq\rangle gsr^{+}$	8.166	0.043	
$gsr^{+} \neq\rangle cpi^{+}$	3.239	0.198	Uni-directional
$cpi^{+} \neq\rangle gsr^{+}$	12.605	0.002	
$gsr^{+} \neq\rangle gdp^{+}$	22.322	0.000	Uni-directional
$gdp^{+} \neq\rangle gsr^{+}$	2.806	0.423	
$gsr^{-} \neq\rangle ur^{-}$	3.743	0.291	None
$ur^{-} \neq\rangle gsr^{-}$	1.827	0.609	
$gsr^{-} \neq\rangle ftse^{-}$	5.459	0.141	Uni-directional
$ftse^{-} \neq\rangle gsr^{-}$	8.865	0.031	
$gsr^{-} \neq\rangle cpi^{-}$	4.352	0.113	Uni-directional
$cpi^{-} \neq\rangle gsr^{-}$	12.025	0.002	
$gsr^{-} \neq\rangle gdp^{-}$	21.965	0.000	Uni-directional
$gdp^{-} \neq\rangle gsr^{-}$	2.791	0.425	

provides valid inference even if the variables are non-normally distributed with potential ARCH volatility. To remedy ARCH problem bootstrap critical values are produced (Hatemi-J 2012). The results of asymmetric causality test are presented in Table 4.

Based on these results, there is no causality relationship between GSR shocks and UR shocks. Either positive or negative cumulative UR and GSR shocks do not affect the government satisfaction rating or the unemployment rate, respectively. The null hypothesis that positive cumulative FTSE shocks do not Granger cause the positive cumulative GSR shocks can be rejected at a 5 % significance level. Furthermore, negative cumulative FTSE shocks do Granger cause the negative cumulative GSR shocks at a 5 % level. This means that positive and negative FTSE shocks influence the government satisfaction rating. The results are compatible with our anticipations. Voters in the UK are sensitive to either positive or negative cumulative shocks in FTSE. There is unidirectional causality from positive cumulative GSR shocks to positive cumulative GDP shocks and from negative cumulative GSR shocks to negative cumulative GDP shocks. This means that positive and negative GSR shocks are Granger cause the positive and negative GDP shocks, respectively. Finally, there is unidirectional causality from positive cumulative CPI shocks to positive cumulative GSR shocks and from negative cumulative CPI shocks to negative cumulative GSR shocks.

5 Summary and concluding remarks

The empirical results confirm that the *responsibility hypothesis* is found in the long-run estimation. Accordingly, variables FTSE and UR are in an expected direction and statistically significant. These results show that an individual's sensibility on the UR and FTSE exists in the long run. It means voters in the UK hold the government responsible

for change in the UR and FTSE. Asymmetric causality test results reveal that positive and negative FTSE shocks influence the government satisfaction ratings in the UK. These findings are in line with the findings of Fauvelle-Aymar and Stegmaier (2013), indicating that approval is sensitive to the stock market's acceleration or deceleration. Nadeau et al. (2010) also showed that stockholding and stock market changes affected approval as well. Furthermore, Schwartz et al. (2008) found that expected volatility of the stock market is highly related to presidential approval. One interesting implication of this work is that voters are sensitive to the economic shocks and hold the government responsible. Therefore, politicians and their advisors should focus on both reducing the effects of shocks, and providing improvement in the economic variables that voters have considered.

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