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THE EFFECTS OF QUALITY OF LIFE ON NATIONAL ELECTIONS: A MULTI-COUNTRY ANALYSIS

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ABSTRACT. This paper studies the effects of several Quality of Life (QOL) indicators on the outcomes of national elections. We test the hypothesis that declines in national QOL will have a negative effect on the voting support for the governing party in the next election. For each election since 1960 in thirteen countries, we use objective measures of QOL for the previous year to estimate the voting function by using a state-of-the-art technique called Sliced Inverse Regression (Li, 1991). These objective measures include GDP per capita, food availability, inflation, crime rates, divorce rate, and percent of females in the labor force, among others. The estimated "voting function" is the best predictor of voters' behavior as a function of the changes in QOL.

The results show that changes in economic variables and food availability significantly affect election outcomes. In addition, changes in crime rates were found to be nearly as important as economic variables in influencing the election outcomes. This marks the first time that a non-economic indicator has been shown to affect elections. In contrast, measures of satisfaction with family life, such as divorce, infant mortality, and percent females in the workforce, show no effect on voting behavior, probably because voters do not hold their governments responsible for family affairs.

1. INTRODUCTION

A large part of what we know about Subjective Well-Being (SWB) is from people's *reports*, as opposed to their *behavior*. For example, the major databases collected to date consist of students' reports about their Quality of Life (QOL) (Lance, Mallard and Michaelos, 1995) and surveys of citizens' reports in response to questionnaires (Veenhoven and Ehrhardt, 1995). Veenhoven (1984, p. 65) goes so far as to say that "overall happiness can be assessed *only* by questioning people." However, government policy-makers are often interested in *behavior* that results from improvement or decline in QOL. For example, when a governing party allows national QOL to



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decline, will voters take action by voting it out of office? Mapping the behavioral consequences of QOL would help governments to anticipate reactions to alternative policies. To this end, we develop a framework to understand behavioral consequences.

Figure 1 shows a block diagram of this framework. We first distinguish between objective and subjective components of QOL (Andelman et al., 1998; Veenhoven, 1984). The first column of Figure 1 represents various objective measures, such as unemployment rate and crime rate, that may affect QOL. These objective measures affect perceived QOL (the second column) in four *domains*, such as economic concerns and family concerns (Bradburn, 1969; Andrews and Withey, 1976, p. 127). These perceived domains are then integrated into overall SWB (the third column). Finally, the last column shows how overall SWB leads to the behavioral consequences.

Much of QOL research has focused on the first three columns in Figure 1 – the *antecedents* of QOL. For example, Diener's (1984) review devotes an entire section to causes of SWB, but has no discussion of its consequences. Similarly, Lance, Mallard, and Michaelos (1995) tested causal paths between individual domain satisfaction and overall satisfaction, but collected few measures to test how life satisfaction affects subsequent behavior.

In contrast, we investigate the *consequences* of changes in QOL. If QOL is important to citizens, then we would expect that they will take some action to improve it. In Figure 1, we identify two behavioral consequences of QOL: voting and emigration. Citizens experiencing a low QOL in a country might try to influence the country's policies, by writing letters or organizing political groups, with the goal of voting the incumbent government out of office and electing a new government that will improve their QOL. Alternatively, they might emigrate to another country that can provide a higher QOL.

This paper focuses on the voting behavior of citizens since 1960 as a function of the changes in QOL in thirteen countries. Section 2 describes a theory of how voting behavior depends on national QOL. Section 3 outlines the data used, and Section 4 describes the results for the voting function.

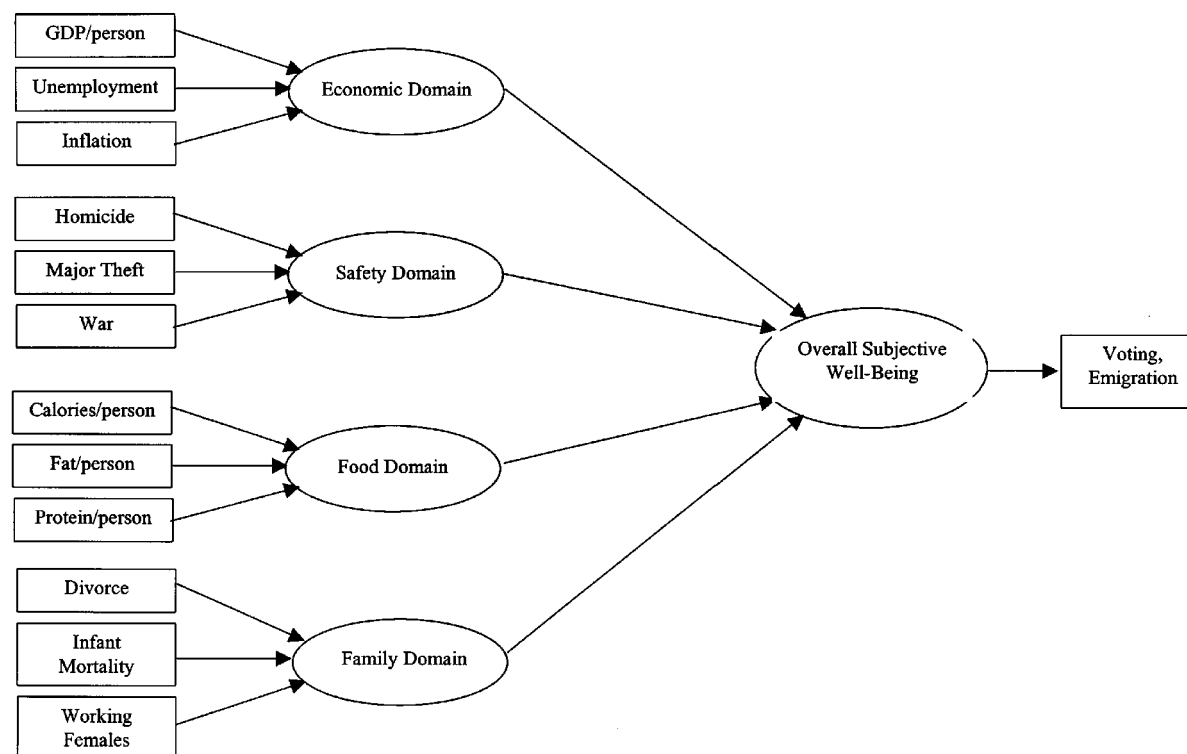


Figure 1. Outline of antecedents and behavioral consequence for four domains of quality of life.

2. VOTING BEHAVIOR

This section first describes a model of voting behavior and then states our predictions.

2.1. *A Model*

We employ the model of voting commonly used in political science (see Paldam, 1991; Beck, 1991). It assumes that voters hold the current government (or the incumbent party) responsible for their “general welfare.” Indeed, the preamble of the US Constitution says that its purpose is to “promote the general welfare” of its citizens. To ensure this, citizens can follow a deceptively simple decision rule: *if the quality of life declines during an incumbent’s administration, then the incumbent should be voted out*. This decision rule follows from either of two arguments. The first is put forward by Kramer (1971) and extended by Fair (1978), who assume that voters try to predict how each party will affect their QOL, then vote for the party that will most improve it. Their model assumes that the best prediction of a party’s future performance is the party’s past performance while in office. Hence the party with the best recent record is voted in.

At first glance this model appears far too simplistic, since voters could potentially take into account additional information such as the party platforms, or unexpected events beyond the incumbent’s control (such as an oil embargo caused by external circumstances). But Downs and Rocke (1995) argue that voters are better off by ignoring this other information, and by focusing exclusively on the changes in QOL provided by the last government. They model a voter as a player in a strategic game, and show that the rational voter would distrust party platforms and promises because the elected party often ignores party platforms and cannot be compelled to keep promises afterwards. Hence, the electorate trusts only *prior actions* of the incumbent, and punishes with only one action: voting the incumbent out. If the electorate were to give “the benefit of the doubt” and re-elect a party after QOL declines, then this action would serve as a signal to later incumbents that they need not strive to promote the general welfare.

All of this implies that voters implicitly ask a simple question of the type, “Are we better off now than 4 years ago?” This

simple model of voters' behavior is testable, and evidence from several countries (Paldam, 1991; Fair, 1978) confirms that satisfaction in the *economic domain* does follow this model: as objective economic circumstances improve, voters are more likely to vote for the incumbent party.

It is clear that previous literature has considered only variables in the economic domain (e.g., growth in GDP, inflation). In this paper, however, we test for the effects of other domains of QOL, such as crime rate and family issues, on national election outcomes.

We model the percentage of votes received by the incumbent party, V_t , as a function of changes in economic domain, safety domain, food domain and family life domain, as well as other political factors which are not directly measurable, but are captured by the votes received by the incumbents in the previous election, V_{t-1} . Specifically, this model is expressed as

$$(1) \quad V_t = g(\Delta \text{Economic}, \Delta \text{Safety}, \Delta \text{Food}, \Delta \text{Family}, V_{t-1}, \varepsilon_t),$$

where $g(\cdot)$ is an unknown function, Δ denotes the *percentage change* during the last government, and ε_t is the random normal error term.

The lagged vote V_{t-1} is included to capture other influences on the vote. For example, different countries have different political systems (e.g., presidential vs. parliamentary) and different numbers of major parties. Including the lagged vote will control for these differences between countries, so that we can study the effects of QOL. We next state the predictions based on this model.

2.2. Predictions

Table I shows the predictions for each of the four domains in the study. The first row shows the expected direction of effects for each domain, and the last row shows their expected magnitude. The direction of effects is expected to be positive for each of the domains – voters are expected to show more support for governments that improve economic conditions, public safety, food availability, and family satisfaction. Some indicators (such as unemployment rate) are negative indicators for their domain. For clarity we will reverse the signs of these indicators, so that all indicators should have positive coefficients.

TABLE I

Predicted effects for changes in 4 domains of QOL on voting support for the incumbent

	Economic	Safety	Food	Family
Predicted Direction	+	+	+	+
Relative Deprivation?	Moderate	High	Low	High
Government Responsible?	High	High	High	Zero
Predicted Magnitude	Moderate	High	Low	Zero

The predicted magnitude of effects in Table I comes from Klandermans (1989), in one of the few studies that relates political action to QOL. His analyses support the theory that people will take political action when: (1) they feel *relative deprivation* in a domain, and (2) they believe the government is *responsible* for the deprivation, and can ameliorate it. The second row of Table I evaluates relative deprivation on each of the four domains. The food domain is likely to show low deprivation because the developed nations used in this study (see Table II) are approaching satiation on this domain; for example, no famines and few cases of extreme poverty exist in these nations. In contrast, perceived deprivation for safety and family domains is expected to be higher, because all nations in the sample have been afflicted with large increases in crime and divorce rates since 1960. Perceived deprivation in the economic domain is expected to be intermediate.

The third row shows that voters assign high responsibility to the government for maintaining good economic conditions, low crime, and enough food availability. In some countries, laws explicitly state this requirement. For example, in the U.S., the Full Employment Act requires that the government act to maintain low unemployment. Similarly, many political candidates encourage the electorate to hold governments responsible for the state of the economy ("It's the economy, stupid") or for crime ("law and order candidates").

The last row of Table I integrates the previous two rows¹ to show our predictions for the magnitude of the effects for the four domains. We expect the effects of safety to be largest in magnitude, followed

TABLE II
Number of elections analyzed, by country

Country	Number of elections
United States	27
Canada	11
United Kingdom	9
Belgium	12
France	9
Portugal	8
Austria	10
Greece	8
Sweden	12
Norway	9
Japan	12
Australia	14
New Zealand	12
<i>Total</i>	<i>156</i>

by economics, food and, finally, family. Empirically, the estimated importance of the indicators of each domain may vary from these predictions due to their reliability and validity of measurement, but the predictions of Table I should hold when *multiple* indicators for each domain are used. To test these predictions, we use data on QOL and national elections across countries. We next describe this data.

3. DATA

Table II lists the thirteen countries in the sample along with the number of elections included since 1960. We selected countries with democratic systems so that the votes were recorded correctly and were not the result of duress by the government. In addition, some democracies (e.g., Switzerland, Denmark) were excluded, consistent with the results of Powell and Whitten (1993), because they tend to be governed by multi-party coalitions, where defining incumbency and responsibility is difficult. Some data were missing

because not all countries reported QOL data to the international agencies every year. Consequently, we deleted cases with any missing data. Thus, the final sample used in the analysis consists of 156 national elections across thirteen countries since 1960.

3.1. *Dependent Variable*

The election outcome is measured by the percentage of voters who voted for the incumbent party. National-level voting data were obtained from Mackie and Rose (1991), and updated from annual statistical yearbooks from each country. The incumbent was identified as the party forming the government during the period prior to the election, documented by Katz and Mair (1992) and updated by Day, German, and Campbell (1996).

3.2. *Independent Variables*

The predictor variables were various aspects of QOL during the year prior to the election. The first three variables are economic in nature, and consist of real GDP per person (measured in 1987 \$US), unemployment rate, and consumer inflation rate. These data come from the World Bank (1997).

The next three variables are from the safety domain. Homicide and major theft rates were collected from Bennett's (1991) Correlates of Crime database, and supplemented by Interpol reports of intentional homicides for all reporting countries. Safety from war was calculated as one minus the probability of dying from war or rebellion in that year. Deaths from wars for each country were computed from Eckhardt (1989) and supplemented by SIPRI (1995). Deaths from war included not only military deaths, but deaths of civilians, and not only international wars, but also civil wars.

The subsequent three variables are measures of the food domain, consisting of number of calories available to an average person per day, amount of daily protein, and amount of daily fat. These data come from the Food and Agriculture Organization (1995) database.

The last set of variables relates to the family domain: the risk of divorce among adults, women's participation in the workforce, and infant mortality. Divorce rates per thousand-population and infant mortality per thousand live births were recorded from the annual

U.N. Demographic Yearbook. The World Bank provided data on the percentage of the workforce that is female, where workforce is defined as all people in a country who earned money for their work.

Finally, we include a one period lag in the dependent variable as an independent variable because past behavior of the electorate is likely to affect the current voting outcome. Next, we apply the Sliced Inverse Regression (SIR) approach, developed by Li (1991), to these thirteen independent variables to estimate the voting function (Equation (1)).

4. ESTIMATION AND RESULTS

In this section, we first describe the application of the SIR approach to determine the best linear combination of QOL variables to predict the election outcomes even if the shape of the function $g(\cdot)$ in Equation (1) is not known *a priori*. We then discuss the findings.

4.1. Model Estimation

To determine the effects of QOL on national elections, we estimate a linear combination of changes in QOL indicators that best predicts the voting outcomes. Hence, we specify the general model in Equation (1) as follows:

$$(2) \quad V_t = g(\beta_1 \Delta E_1 + \beta_2 \Delta E_2 + \beta_3 \Delta E_3 + \beta_4 \Delta S_1 + \beta_5 \Delta S_2 + \beta_6 \Delta S_3 + \beta_7 \Delta F_1 + \beta_8 \Delta F_2 + \beta_9 \Delta SF_3 + \beta_{10} \Delta Fa_1 + \beta_{11} \Delta Fa_2 + \beta_{12} \Delta Fa_3 + \beta_{13} V_{t-1}, \varepsilon),$$

where E_i are indicators for the economic domain, S_i are indicators for the safety domain, F_i are indicators for the food domain, Fa_i are indicators for the family domain, and $i = 1, 2$, and 3 . Equation (2) is the estimation model, and β_j , $j = 1, \dots, 13$, are its parameters to be estimated by using the data set described earlier.

Equation (2) can be estimated by using standard methods like Multiple Linear Regression (MLR) or nonlinear regression. However, to apply these approaches, one has to *know* the functional form for $g(\cdot)$; for example, Paldam (1991) assumes an S-shaped probit transformation. The model in Equation (1) is silent on the shape of the function $g(\cdot)$. Hence, we employ the state-of-the-art

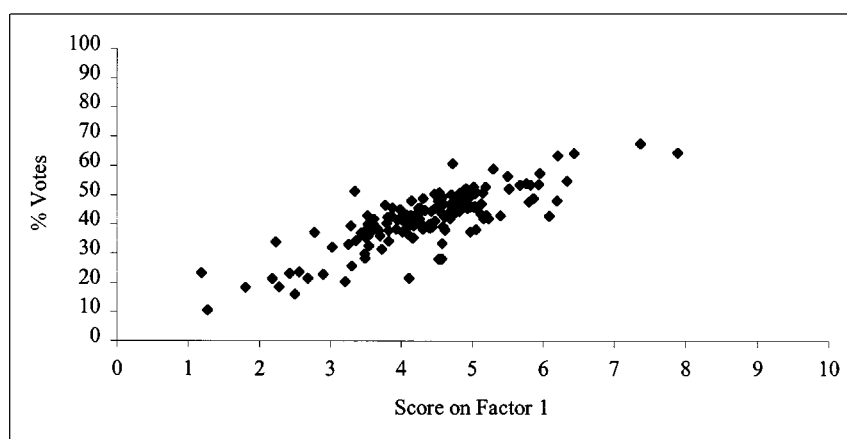


Figure 2. Voting outcomes as a function of the first factor.

approach, the SIR approach, to estimate Equation (1), and we “let the data speak” about the shape of $g(\cdot)$.

4.1.1. Best linear combination of QOL indicators

The SIR approach estimates linear combinations of several independent variables, which we call factors. These factors are estimated *without* specifying the functional form of $g(\cdot)$, unlike the usual MLR that *a priori* assumes $g(x) = a + bx$. Consequently, the SIR approach finds the best factors across a broad class of functions, $g(\cdot)$, because it is not restricted to only linear functions. See Chen and Li (1998) for details of optimality, Li (1991) for the estimation algorithm, and Naik et al. (1998) for a marketing application.

Results showed that the number of factors to be retained, according to Li's (1991) Theorem 5.1, was one ($\chi^2 = 217.43$, $p < 0.05$). By plotting the dependent variable as a function of the resulting factor scores, we can determine the shape of $g(\cdot)$. Figure 2 does this, and shows that the relationship between V_t and the factor scores is nearly linear. Hence, we can reject the hypothesis that $g(\cdot)$ is non-linear (see Paldam, 1991). Table III shows the standardized coefficients estimated from SIR.

4.2. Direction of Coefficients

Table III presents the coefficients and t-values computed from SIR. In the economic domain, higher GDP/person, lower unemployment

TABLE III
Estimates of standardized coefficients (β 's) and t-values obtained from SIR

QOL Domain	QOL indicator	SIR	
		β	t-value
Economic	GDP/person	0.215	2.88**
	Unemployment	-0.021	-1.61
	Inflation	-0.009	-0.53
	<i>Sheaf coefficient</i> [#]	0.225	
Safety	Homicide rate	-0.199	-3.79**
	Major theft rate	0.024	1.09
	War rate	-0.046	-0.85
	<i>Sheaf coefficient</i>	0.200	
Food	Fat/person	0.128	2.15*
	Protein/person	0.073	1.64
	Calories/person	-0.035	-2.23*
	<i>Sheaf coefficient</i>	0.136	
Family	Divorce rate	0.078	1.33
	Infant mortality	0.007	0.14
	Working females	0.030	0.57
	<i>Sheaf coefficient</i>	0.086	
V_{t-1}		0.939	16.4**
R^2		67%	

Notes:

All QOL indicators are measured as percent changes from the year prior to election.

[#] We calculate the sheaf coefficients by using Heise's (1972, p. 158) Equation (3), which is given by $\sqrt{\beta_1^2 + \beta_2^2 + \beta_3^2 + 2(\beta_1\beta_2r_{12} + \beta_2\beta_3r_{23} + \beta_1\beta_3r_{13})}$, where β_i are the standardized coefficients and r_{ij} are the sample correlation coefficients of variables X_i and X_j , where index $i, j = 1, 2, 3$.

* $p < 0.05$.

** $p < 0.01$.

and lower inflation all yield higher voting support, with GDP/person very significant. In the safety domain, coefficients are negative except for theft rate, which is not significant. The coefficient for homicide rate is almost as large as for GDP/person, and much larger than for other economic variables. In the food domain, protein and fat are both positive, with fat significantly so. A deviation from our predictions is the significantly negative coefficient for calories.² Finally, the coefficients for the family domain are all non-significant, as predicted by Table I.

4.3. *Magnitude of Coefficients*

In Table III, the individual estimated coefficients show considerable variation, but the total effects of economic and safety factors on voting outcome are comparable. To compute the total effect of several indicators, we apply Heise's (1972, p. 158) Equation (3) to obtain *sheaf coefficients* (the formula is given in the second note of Table III).³ The economic domain exerts the highest total effect on elections, with the importance weight of 0.225. Safety follows closely, with the importance weight of 0.200. *This is the first time that a non-economic domain has been shown to predict voter support, providing strong evidence that extant research on voting behavior (see, e.g., Beck, 1991) must extend its focus to non-economic attributes of QOL.* The total importance weight of the food domain is 0.136, which is the next important domain. Finally, the family domain is the least important, with a total importance weight of 0.086 and no indicators that significantly predict voting behavior. The pattern of these magnitudes follows closely the predictions of Table I. The only exception is that the economic domain is slightly more important than the safety domain.

To verify the robustness of these findings, we split the data set into two subsets randomly and analyzed them separately. We find that the model fits both subsets well (R^2 values of 51% and 63%), thereby enhancing our confidence in the empirical findings. We can conclude from this study that the outcome of national elections depends on several QOL indicators other than economic variables.

5. DISCUSSION

We developed a framework to study effects of QOL on national elections, and estimated the resulting model by using the state-of-the-art estimation method (SIR). Our analysis extends previous research in several ways.

First, we focus on the behavioral *consequences* of QOL, whereas most work (e.g., Lance et al., 1995; Diener, 1984; Veenhoven and Ehrhardt, 1995) focuses on its antecedents (e.g. effects of individual domain satisfaction, or personality). Both antecedents and consequences of QOL are important, and we believe that governments will be further persuaded of the benefits of studying QOL when the consequences to themselves are demonstrated.

Second, our research specifically examines *voting behavior* as a consequence of QOL. Our theory predicts that voters will reward governments that improve the country's QOL, and punish incumbents that do not. National elections from 13 countries support this theory with respect to the domains of economics, crime, and food. Voters appear to hold governments responsible for these domains. In contrast, governments appear *not* to be held responsible for success of the family domain, and no voter punishment is associated with its decline.

Third, these results extend the findings from political science (Paldam, 1991; Beck, 1991) by showing that voter support is determined not only by the economic domain, but also by the domains of safety and food. Indeed, the importance of safety was nearly as large as that of economic variables. Thus, we conclude that *QOL matters* in determining the outcomes of national elections, and governments risk a loss of power by not monitoring and controlling QOL.

Fourth, our paper introduces a flexible and general estimation technique (SIR) that improves on multiple linear regression by estimating the unspecified functional form of $g(\cdot)$ and by selecting the best linear factors.

Limitations. Our analysis has considered several predictors of national elections, but it ignores others such as party platforms and campaign spending expenditures. In the future, these variables may be included in the analysis to test whether or not voters ignore party platforms as theory predicts (e.g., Downs and Rocke, 1995).

A second limitation is that highly aggregated data were used, in the form of national voter returns. By using disaggregated data (from individual precincts or from individual voter polls), future studies would have enough data to estimate a voting function specific to each country. Finally, the present data contain only *objective* QOL measures, which prevents estimation of the full QOL model of Figure 1. Additional data on perceived satisfaction would allow estimating multiple path coefficients in Figure 1. Research efforts in this direction would contribute to the understanding of the impact of quality of life on policy-relevant issues.

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NOTES

¹ By "integration" we mean selecting the smaller of the two quantities in the second and the third rows. For example, when relative deprivation is *low* and government responsibility is *high*, then the predicted magnitude is *low*.

² When fat and protein were deleted from the list of predictors, the sign of calories became positive, as expected.

³ We are grateful to the anonymous reviewer for suggesting this approach.

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