

Economic Indicators and Satisfaction with Democracy: A Cross-National Analysis

Abstract

INTRODUCTION: Many studies have shown the importance of the economy for political support and voting behaviour. The current study applies approaches from economic voting to estimate when economic indicators have the strongest effects on satisfaction with democracy.

METHODS: This correlational cross-sectional time-series study aggregates over 3.2 million survey respondents in 147 countries between 1973 and 2016. The study uses bivariate analysis, data visualisation, and multilevel models to estimate ranges and approximate thresholds.

RESULTS: Positive effects are evident with unemployment below about 6% or inflation between about 1.1% and 2.5%. Negative effects occur with government debts above roughly 61.9% of GDP or income inequality above about 47.5 using Gini coefficients. The study develops similar estimates for twelve economic indicators.

DISCUSSION: The findings are approximations despite the apparent precision. Economic, political, and social contexts invariably affect the ranges and thresholds specific to each country. This paper seeks general patterns as a starting point for further research.

Keywords

satisfaction with democracy, economic performance, government finances, monetary policy, international trade

1. Introduction

A substantial body of literature finds that economic conditions affect public satisfaction with the way democracy is working (Bermeo & Bartels, 2014; Friedrichsen & Zahn, 2014; Halla, Schneider, & Wagner, 2013; Kestilä-Kekkonen & Söderlund, 2015; Meer & Hakhverdian, 2017; Quaranta & Martini, 2016). Economic conditions often maintain significance after controlling for electoral systems, institutional configurations, the quality of government, and supporting election winners, but these political system factors still matter (Bernauer & Vatter, 2012; Clarke, Dutt, & Kornberg, 1993; Quaranta & Martini, 2016; Wagner, Schneider, & Halla, 2009). Satisfaction with democracy correlates with other measures of political support, but there are disagreements regarding what exactly it measures (Canache, Mondak, & Seligson, 2001). It is being used here not to measure support for the principle of democracy, but rather how the overall democratic system is functioning in practice (Linde & Ekman, 2003).

A related body of research investigates determinants of economic voting. One of the main findings in this area is that poor economic performance before elections can result in a negative backlash against incumbents (Paldam, 1981; Remmer, 2012). This is probably why management of the economy or public finances are often highlighted during election campaigns (Anderson & Hecht, 2014). Findings regarding economic voting also maintain

significance after controlling for political contexts (Hodgson & Maloney, 2012; Lewis-Beck & Stegmaier, 2000, 2013). The same economic conditions associated with reducing incumbent chances of winning elections also decrease public satisfaction with how democracy is working. In other words, citizens are more likely to vote for an opposition party if they are dissatisfied with how the current democratically elected government is running the economy.

The economy thus affects both satisfaction with democracy and voting behaviour, but some economic voting studies have developed more precise estimates of how economic indicators affect political support. For example, Wilkin, Haller, and Norpoth (1997) suggest that a decrease of about 1.0% to 1.4% in GDP is associated with a loss of about 1.4% to 1.7% of the vote for incumbent parties. Hodgson and Maloney (2012) find that each 1% rise in consumer price levels caused about 0.21% swing in vote share away from government in subsequent elections, while each 1% rise in unemployment caused about a 0.42% swing away from government (Hodgson & Maloney, 2012). Looking into the long-term survival of democracies, Przeworski, Alvarez, Cheibub, and Limongi (1996) determined that per capita incomes above approximately \$6000 and average annual economic growth over about 5% were associated with longer democratic survival. The concept of thresholds and ranges thus exists in the economic voting and democratic survival literature. This study adapts these approaches to estimate when economic indicators are most likely to affect satisfaction with democracy.

This study takes a broad comparative approach and is intended to be a starting point for further research. Regional differences and unique national contexts are likely to be important but would draw upon different theoretical frameworks and require different methodologies. The remainder of this introduction explains twelve key economic indicators supported in the literature both theoretically and empirically. The next section then describes data sources, variables, and methods, which include bivariate analyses, data visualizations, and multilevel models. The following results section then presents figures and tables using both country-year and respondent level data. The final section discusses potential implications of the findings and avenues for further research.

1.1. Economic conditions and political support

Economic conditions can affect individual standards of living. If enough people in a society are impacted by the economy, then national level effects on political support should become evident. The unemployment rate is perhaps one of the strongest economic indicators, affecting both voting behaviour and democratic satisfaction. It can matter more than economic growth, inflation, and GDP per capita (Friedrichsen & Zahn, 2014). Being unemployed reduces individual level satisfaction with democracy (Anderson & Singer, 2008; Bernauer & Vatter, 2012), while national unemployment rates have similar effects at the aggregate level (Clarke et al., 1993). Unemployment is closely linked to economic growth and these indicators affect both political support (Lewis-Beck & Stegmaier, 2013) and satisfaction with democracy (Armingeon & Guthmann, 2014; Friedrichsen & Zahn, 2014; Han & Chang, 2016; Kestilä-Kekkonen & Söderlund, 2015).

Inflation and interest rates can both affect standards of living, which could then impact public satisfaction with how democracy is working (Armingeon & Guthmann, 2014; Clarke et al., 1993; Diaz-Serrano & Rodríguez-Pose, 2012). When inflation gets too high and exceeds wage growth, people tend to have less money to spend, which could lead to inflation being associated with lower democratic satisfaction (Clarke et al., 1993). However, findings suggest further inquiry into the effects of inflation is needed (Halla et al., 2013). It is possible that inflation within a certain range may be optimal, meaning a rate that is neither deflationary nor

hyperinflation. The real interest rate is the interest rate adjusted for inflation. High real interest rates can similarly reduce money available for consumption, which could then reduce satisfaction with democracy (Armingeon & Guthmann, 2014). Inflation and interest rates can thus both impact citizens' standards of living, who may blame the incumbent government and express greater dissatisfaction with their democratic system.

The distribution of income both between and within societies can be important. Countries with higher per capita incomes can generally afford better quality public services and infrastructure (Kestilä-Kekkonen & Söderlund, 2015; Quaranta & Martini, 2017), which could boost satisfaction with democracy. People in richer countries can also usually afford better standards of living, but richer people in rich countries tend to show higher levels of satisfaction than poorer people in the same countries (Anderson & Guillory, 1997; Bernauer & Vatter, 2012; Kornberg & Clarke, 1994; Waldron-Moore, 1999; Wells & Krieckhaus, 2006). Principles of fairness are important for democracy and it has been long assumed that unjust procedures and outcomes are associated with popular dissatisfaction (Anderson & Singer, 2008). Economically disadvantaged groups are often more affected by economic downturns and more likely to support violent protests (Córdova & Seligson, 2010). We can thus expect high levels of income inequality to undermine political support (Anderson & Singer, 2008; Muller, 1988; Soci, Maccagnan, & Mantovani, 2014).

Government finances such as budget balances, total debt, and its share of consumption could affect satisfaction with democracy. Running large prolonged deficits can increase the risk of defaulting on debts and international organisations may impose austerity measures, which could be perceived as an erosion of democratic legitimacy and reduce satisfaction with democracy (Armingeon, Guthmann, & Weisstanner, 2016). Dissatisfaction may increase when citizens realize that deficits and debts reduce the ability of national institutions to effectively implement economic policies or support public welfare (Armingeon & Guthmann, 2014). Large public debts may be viewed as unfairly burdening future generations, or citizens may support a smaller limited government and view sustained deficits as how governments grow. Large deficits or debts can increase the cost of borrowing or cause government shutdowns as representatives fight over budget reduction measures. Shutdowns and budget cuts are likely to decrease the quality or availability of public services, which could decrease satisfaction with democracy. Deficits may cause some people to distrust government with the management of public finances, but reducing deficits can shrink funding for services, increase unemployment, or lower economic growth. Fixing budget shortfalls can necessitate increasing taxes, which citizens tend to dislike and can hinder economic activity or growth. When government consumption grows in proportion to the rest of the economy, through higher taxes or expenditures, this tends to leave less money for individuals and businesses to drive economic growth. Governments thus face ongoing challenges of balancing social service needs with demands for economic performance (Lühiste, 2014). Gross national savings (GNS) includes a component of government savings, but it also includes business and individual savings. It thus provides an overall measure of the national financial situation or the savings of a nation. Countries with higher savings should find it easier to borrow money internally rather than rely on international markets to cover deficits. Holding other factors constant, countries with lower debt burdens, balanced budgets, lower government consumption, and higher national savings should have less reasons for citizens to be dissatisfied with how democracy is working.

International balances of trade and trade volumes are potential sources of dissatisfaction with democracy (Remmer, 2012). Higher trade volumes, which combines both exports and imports, suggest a country is well integrated into the international economy. This means its citizens are

likely to benefit from the advantages of the division of labour, economies of scale, and the availability of goods and services. Participating in trade allows countries to benefit from their comparative advantages and raise standards of living, but trade volume does not allow us to distinguish between the effects of trade deficits or surpluses. Trade deficits can benefit the public via lower consumer prices but sustaining trade deficits over long periods essentially means the country is exporting wealth.

2. Data and Methods

This study uses two versions of the dependent variable, satisfaction with democracy: a scale at the country-year level and a dichotomised survey item at the respondent level. Data comes from 3.2 million respondents in 143 countries between 1973 and 2016. Survey methods and design differ slightly between sources, but they all aim to take nationally representative random samples of adult populations. Appendix 2 duplicates the models in this paper by survey source as a robustness check to help account for different survey designs, survey items, and sampling methods. Table 1 summarises the original survey sources used in this study. It uses acronyms for Consolidation of Democracy in Central and Eastern Europe (CDCEE), Comparative Study of Electoral Systems (CSES), and International Social Survey Programme (ISSP).

Table 1: Summary of dependent variable sources with year spans

Afrobarometer (1999-2015)	Eurobarometer: Central and Eastern (1990-1997)
AmericasBarometer (2004-2014)	Eurobarometer: Standard and Special (1962-2016)
Arab Barometer (2006-2014)	European Social Survey (2002-2015)
AsiaBarometer (2003-2007)	European Values Study (1981-2009)
Asian Barometer Survey (2001-2010)	ISSP (1985-2016)
Australian Election Study (1987-2016)	Latinobarómetro (1995-2015)
CDCEE (1990-2001)	New Europe Barometer (1991-2005)
CSES (1996-2013)	Voice of the People Series (2000-2012)
Eurobarometer: Candidate Countries (2000-2004)	World Values Survey (1981-2014)

2.1. Dependent Variable

Using multiple survey sources requires harmonizing different answer scales. Fortunately, satisfaction with democracy is one of the most consistent items across different surveys. About 63% of surveys in this study ask the following typical question: *Overall, how satisfied are you with the way democracy works in this country? Not at all satisfied, not very satisfied, fairly satisfied, or very satisfied.* There are minor variations in the question wording, such as whether it specifies ‘the country’, ‘your country’, or names the country. Another 15% of surveys use similar questions but a slightly different set of answers, with the following being the most common variation: *very dissatisfied, somewhat dissatisfied, somewhat satisfied, very satisfied.* The remaining 22% of surveys also have similar questions, but use three, five, six, ten, or eleven-point answer scales.

Two dependent variables were constructed for this study, one for country-year analysis and one for respondent-level analysis. To create the country-year variable, different survey items were rescaled to range from 0 to 100, where 0 represents the lowest level of satisfaction and 100 represents the highest. This approach enables meaningful comparisons between different survey sources without losing data. The rescaled answers from all respondents were then

averaged within each country-survey observation, keeping all answers from one survey together rather than splitting them if national surveys span multiple years. These aggregated country-survey scores were then averaged by country-year to create this version of the dependent variable. The two-step averaging process was necessary because of the national surveys that span multiple years and because different sources sometimes conduct surveys within the same country within the same year. When surveys span multiple years, there are often a relatively small number of respondents in one or more of the years. Creating country-year scores using a small portion of respondents can drastically skew the resulting scores and widen confidence intervals, making them unreliable and not representative of the wider population. However, when multiple sources conduct surveys within the same country-year, which often occurs, the existence of overlapping scores prevents time-series regression modelling. That is why respondent answers are first rescaled, then averaged within country-survey observations, and finally averaged by country-year. This data can then be merged with other datasets using the same level of analysis once the country-year observations are unique.

The second dependent variable in this study is used for respondent-level analysis. It was created by dichotomising other answer scales into 0 and 1, where 0 represents being dissatisfied and 1 represents being satisfied with the way democracy works. Indifferent answers and scale midpoints were recoded as dissatisfied, which means that the variable more accurately measures satisfaction than it measures dissatisfaction. Some variation was lost recoding the variable in this manner, but the dichotomisation is necessary for making meaningful comparisons.

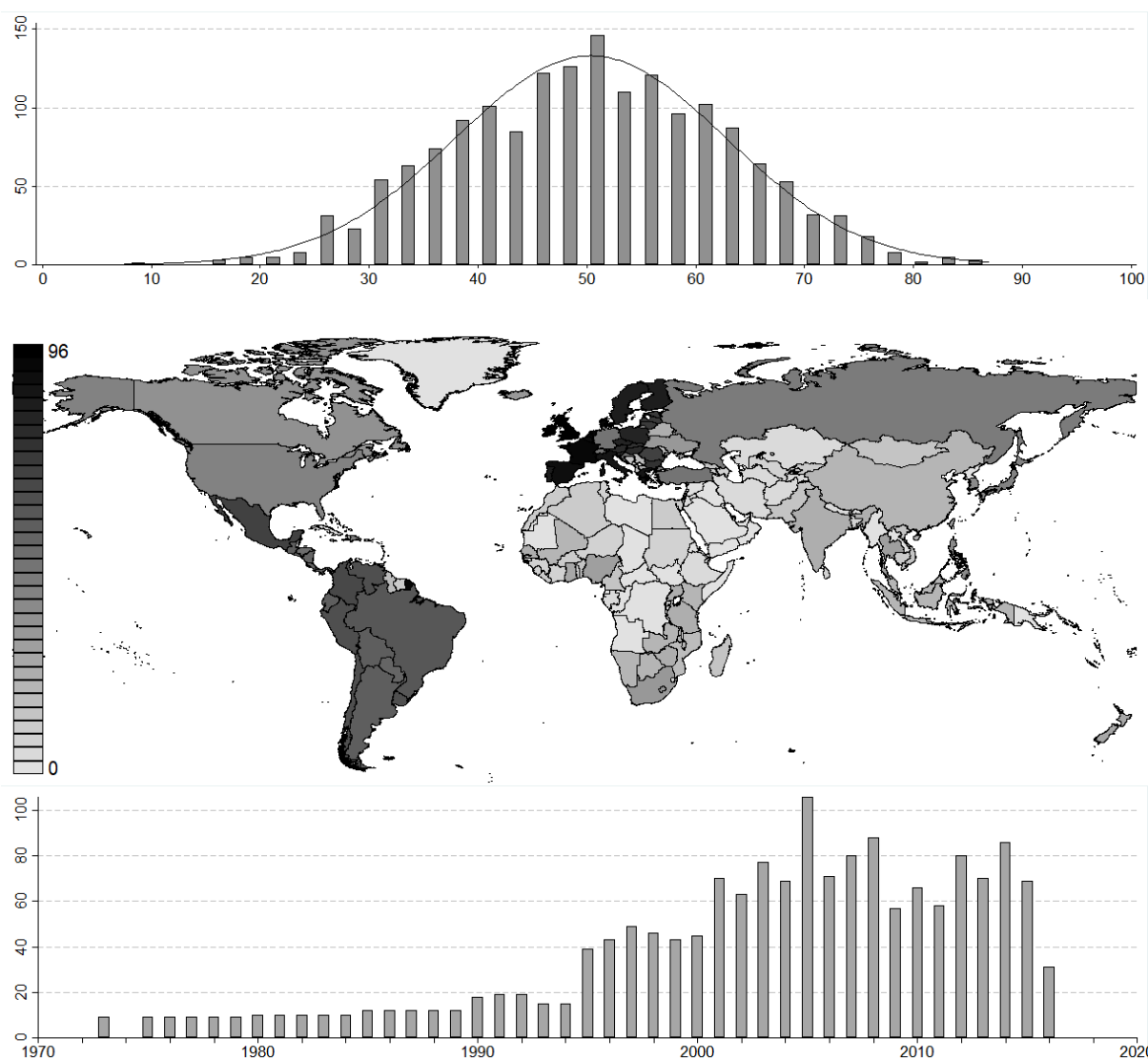


Figure 1: Satisfaction with democracy histogram displays country-year scores with normal curve. Heat map shows number of yearly scores per country, darker countries indicate more scores. Bar chart shows number of country scores per year.

Figure 1 displays country-year dependent variables scores in three ways: a histogram showing the distribution with a normal curve, a heat map showing the density of scores by country, and a bar chart showing the total number of country scores per year. This study is looking for broad comparative patterns, but different survey designs and sampling methods mean we must still be cautious when interpreting results. Merged satisfaction with democracy data should be suitable for analysing general patterns in aggregate, but perhaps not as reliable when making specific comparisons between different survey sources or answer scales. Future research projects using different methods and perhaps limiting the analysis to selected sources could make more granular comparisons between specific countries.

2.2. Independent Variables

The twelve independent economic indicators in this study include trade volume, government debt, real interest rate, GDP growth, income inequality, government consumption, unemployment, inflation, balance of trade, government budget balance, gross national savings,

and GDP per capita. All national level variables except income inequality were retrieved via the Quality of Government dataset, which merges country-year indicators from many sources (Teorell et al., 2017). Original values were transformed into centiles for some analyses because they range widely in terms of skewness, kurtosis, mean scores, and standard deviations. Creating centiles made them into ordinal variables with integer values ranging from 1 to 100, with about 1% of original values in each centile. Doing this enabled more meaningful comparisons between variables, provided better data visualisations, made results easier to interpret, and reduced the effects of outlier cases without throwing data away.

Six of the economic indicators come from the World Development Indicators database (World Bank, 2017). Total government debt represents outstanding financial obligations to others as a percentage of GDP. This variable was supplemented with additional sources to reduce missing data (IMF, 2017; Schwab & Sala-i-Martin, 2015). Trade volume represents the sum of exports and imports as a percentage of GDP. Balance of trade as a percentage of GDP was calculated by subtracting imports from exports. GDP growth is the annual percentage change in value of GDP based on constant local currency, and was supplemented with data for the same variable from the International Monetary Fund (IMF, 2017). Inflation represents the annual percentage change for the cost of a fixed basket of goods and services, while the real interest rate represents the interest rate after adjusting for inflation.

Three economic indicators come from the World Economic Outlook database (IMF, 2017). Government budget balance represents government revenues minus expenditures as a percentage of gross domestic product (GDP). Gross national savings represents the total personal, business, and government savings as a percentage of GDP. Unemployment represents either the unemployed as a percentage of the labour force or as a percentage of people available and willing to work.

The three remaining economic indicators come from other sources. GDP per capita comes from the United Nations Statistical Division and is in current United States dollars (National Accounts Section, 2017). Income inequality is measured using the Gini coefficient with data from the United Nations University (UNU-WIDER, 2017) supplemented with data from additional sources (Deininger & Squire, 1996; LIS, 2016; World Bank, 2017). Government consumption comes from the Groningen Growth and Development Centre (2013) and represents government consumption as a per capita share of GDP using purchasing power parity (PPP) rates.

2.3. Control Variables

The study includes nine additional control variables: five at the country level and four at the respondent level. Three binary political system variables were created by combining sources to minimise missing data. These include variables representing federal versus other forms of government (Norris, 2009; Persson & Tabellini, 2005; Wig, Hegre, & Regan, 2015), majoritarian or plurality versus other forms of electoral system (Beck, Clarke, Groff, Keefer, & Walsh, 2001; Bormann & Golder, 2013; IDEA, 2016; Norris, 2009; Persson & Tabellini, 2005; Wig et al., 2015), and presidential versus other forms of executive government (Beck et al., 2001; Gerring & Thacker, 2008). A variable for the level of democracy ranges from 0 for least democratic to 10 for most democratic. It was created by averaging Freedom House's Civil Liberties and Political Rights scores, transforming them to range from 0 to 10, averaging these scores into the Revised Combined Polity Score, with Polity scores imputed if missing (Freedom House, 2017; Marshall, Gurr, & Jaggers, 2015; Teorell et al., 2017). A standardized control of corruption variable from the World Bank's Worldwide Governance Indicators

measures the extent to which public power is used for private gain (Kaufmann, Kraay, & Mastruzzi, 2011; Teorell et al., 2017). Finally, four demographic control variables are used. These include age in three categories (under 30, 20 to 50, and over 50), gender (male and female), income (lower, middle, higher), and education (primary or lower, secondary or vocational, and tertiary or higher).

2.4. Methods

Multilevel models are recommended given the structure of the data (Wells & Krieckhaus, 2006), but these methods are supplemented with scatter plots, bar charts, and linear regressions. The methods move from simple bivariate analysis to data visualizations before confirming economic indicator ranges using multilevel models. Analysis methods start at the country-year level, but ranges are confirmed at the respondent level. In additions, models in Appendix 2 duplicate the results with models limited to each survey source with sufficient data and variation. Some methods use centile versions of economic indicators, and are noted as such, but binary variables are used to represent positive or negative ranges. These ranges were determined by analysing results from data visualizations and focusing on the ranges with the strongest magnitude effects. Binary variables were then crated to represent the value ranges with potentially positive or negative effects on satisfaction with democracy. These range and threshold variables were constructed using the original economic indicator values rather than the centile versions of these variables.

The first three methods are useful for determining the direction, significance, availability, and magnitude of economic indicator effects on satisfaction with democracy. The first method uses scatter plots with linear fit lines to determine whether economic indicators have overall positive or negative effects. The scatter points represent country-year scores and linear fit lines are displayed with 99% confidence intervals. The second method uses pairwise correlations between country-year scores and each economic indicator. This determines if relationships are significant and displays the availability of matching data points. The third method uses bivariate linear regressions with robust standard errors to show the relative strength or magnitude of different economic indicators. These three methods are a helpful starting point, but they cannot tell us which values ranges or thresholds may have the strongest effects.

The next set of methods focus on data visualization to help determine potential value ranges with significant negative or positive effects. The main method displayed in the results involves graphing coefficients from ninety multilevel bivariate models per economic indicator. The independent variables in these models are binary and include the five percentiles both above and below each percentile point. This means that bars represent coefficients for variables representing about 11% of original independent variable values centred around each percentile. Additional data visualisation methods are summarised in Appendix 1. The height or depth (if negative) of the bars represent the size of the coefficients, meaning taller bars represent stronger effect sizes. Bars are shaded depending on the significance level of coefficients, with darker shades representing higher levels of significance. This enables us to visualize the direction, strength, and significance of economic indicator effects at different values. However, these visualizations do not control for other factors such as the political system, corruption, level of democracy, respondent demographics, or other aspects of the economy.

The last set of methods use multilevel multivariate models to test the strength and significance of positive and negative value ranges. There are not enough matching data points when including all independent variables within one model. Three models were therefore constructed based on the availability of data to ensure sufficient country-year variation. The

same models were used at the country-year and respondent levels, but respondent-level models also control for basic demographics. Economic indicator ranges were verified using additional robustness confirmation models, revealing comparable results whether using linear or multilevel models, separate or combined cross-national surveys, and a range of additional control variables. Appendix 2 additionally duplicates the positive and negative range models with respondent data from each source, helping to control for differing survey designs and sampling methods between the sources. The different robustness checks and confirmation models consistently showed similar results, maintaining similar effect magnitudes, significance levels, and coefficient directions across numerous iterations of each model.

3. Results

The aim of this paper is to estimate the ranges of values for economic indicators that have strongest significant effects on satisfaction with democracy. Results thus move from exploratory bivariate analysis and data visualization to multilevel models for confirmation and robustness checks. The first set of bivariate analysis results help determine the direction and strength of the relationships for each economic indicator. The second set of data visualization results help determine which ranges might have the strongest positive and negative effects. The third set of multilevel model results test the ranges while controlling for other factors such as the political system, level of democracy, control of corruption, and respondent demographics. The findings should be interpreted as general trends, since modifying the ranges slightly in both directions will often still produce significant results. The ranges and thresholds are based on analysing millions of respondents from thousands of country-survey observations spanning decades, but they are still estimates.

3.1. Bivariate Analysis

The scatter plots in Figure 2 use centile versions of each economic indicator and display black linear fitted lines with grey 99% confidence intervals. These plots visualize the relationship between each economic indicator and country-year satisfaction with democracy scores. These relationships are in the expected directions, but scatter plots do not provide information about the significance or strength of relationships. We will next investigate the significance, availability, and explanatory strength of the different economic indicators.

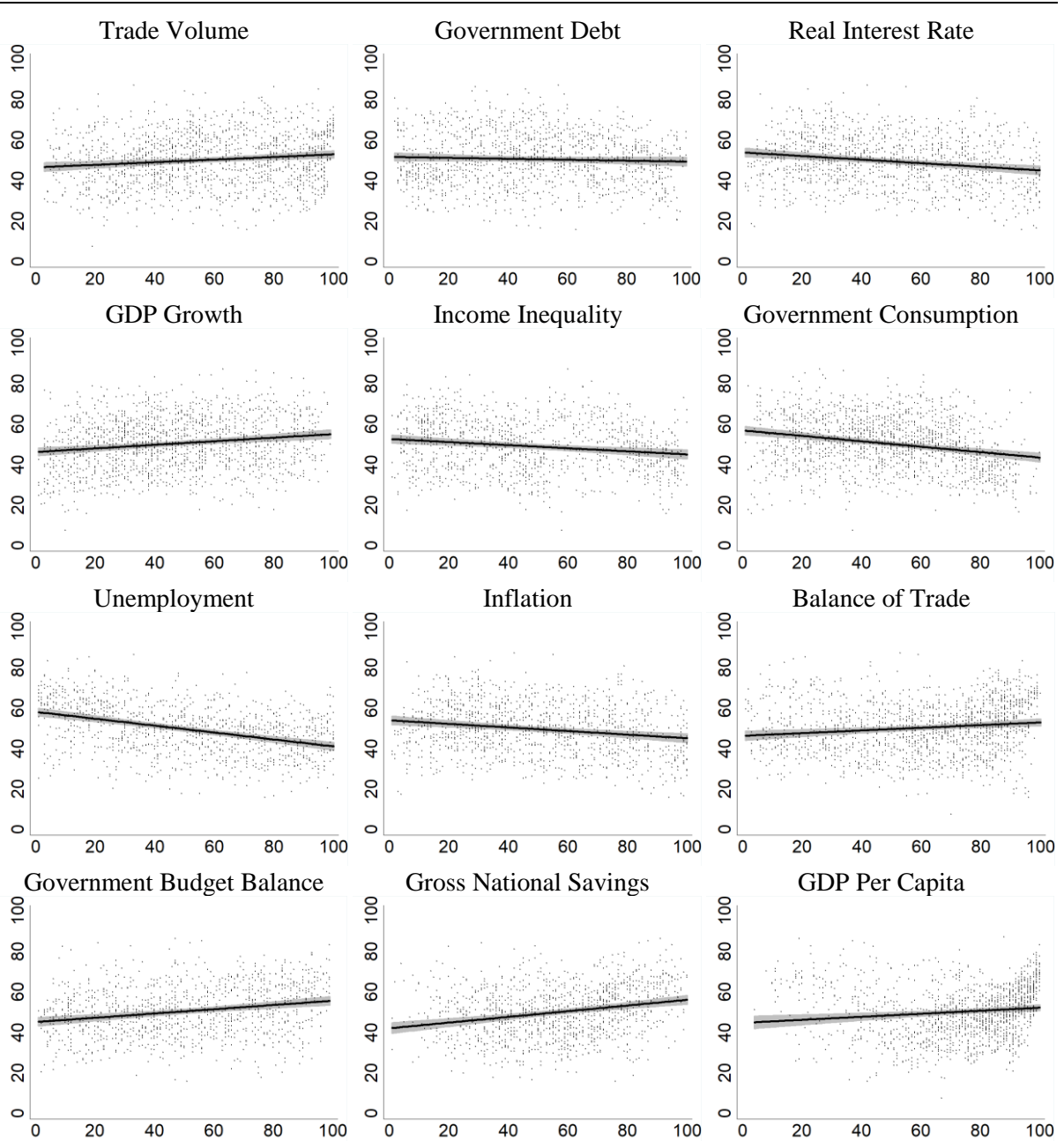


Figure 2: Scatter plots and linear fit lines with 99% confidence intervals. Horizontal axes represent economic indicator centiles. Vertical axes represent country-year satisfaction with democracy scores.

The pairwise correlations and linear regressions in Table 2 compare economic indicators against country-year satisfaction with democracy scores. They all obtain significance, but government debt does so with a lower threshold ($p < 0.1$). Based on R-squared values, government debt also has low effect magnitude. The variable was retained because further analysis using value ranges will reveal if certain levels of government debt have stronger effects. Government consumption, government debt, real interest rate, income inequality, unemployment rate, and inflation rate all show negative effects on satisfaction with democracy. Government budget balance, gross national savings, GDP per capita, GDP growth, trade volume, and balance of trade meanwhile show positive effects. Based on coefficients and R-squared values, gross national savings shows the strongest positive effects and unemployment shows the strongest negative effects. Trade volume, balance of trade, and GDP per capita all have relatively low magnitude or effect sizes, but as with government debt we will examine if

specific values of these indicators have better explanatory strength. We will next use data visualization methods to help determine potential ranges of these indicators with stronger positive and negative effects on satisfaction with democracy.

Table 2: Pairwise correlations and linear regressions for satisfaction with democracy

	Pairwise Correlations			Linear Regressions			
	C	P	O	C	SE	P	R2
Trade Volume	0.133	0.000	1,456	0.064	0.013	0.000	0.018
Government Debt	-0.050	0.072	1,302	-0.023	0.012	0.000	0.003
Real Interest Rate	-0.188	0.000	1,172	-0.088	0.014	0.000	0.035
GDP Growth	0.171	0.000	1,481	0.088	0.014	0.000	0.029
Income Inequality	-0.170	0.000	1,125	-0.076	0.013	0.000	0.029
Government Consumption	-0.247	0.000	1,479	-0.134	0.015	0.000	0.061
Unemployment	-0.403	0.000	1,103	-0.170	0.012	0.000	0.163
Inflation	-0.232	0.000	1,378	-0.116	0.014	0.000	0.054
Balance of Trade	0.139	0.000	1,456	0.067	0.013	0.000	0.019
Government Budget Balance	0.227	0.000	1,136	0.105	0.013	0.000	0.052
Gross National Savings	0.247	0.000	1,218	0.141	0.016	0.000	0.061
GDP Per Capita	0.127	0.000	1,475	0.075	0.019	0.000	0.016

Dependent variable is country-year satisfaction with democracy score. Independent variables are in centiles. The first three columns show correlation coefficients (C), significance p-values (P), and number of country-year observations (O). The last four columns show regression coefficients (C), robust standard errors (SE), significance p-values (P), and R-squared measures (R2).

3.2. Data Visualisation

Figure 3 displays results that visually summarise ninety bivariate multilevel regressions for each economic indicator. The variables used in these regressions were created by combining eleven centiles around a central point. Bars at each point along the horizontal axes represents a regression using that centile combined with five centiles both above and below that point. The taller the bar the stronger the relationship, extending upwards represents positive effects and down represents for negative effects. The darker the bar the more significant the relationship for the approximate decile centred at that point. Charts omit the first and last five bars because these regressions are based on five or fewer centiles, making them less reliable. The charts displayed here and in Appendix 1 were used to create binary variables estimating economic indicator ranges with positive or negative effects. Ranges were selected that demonstrated the strongest effects or magnitudes sizes as long as they were also significant.

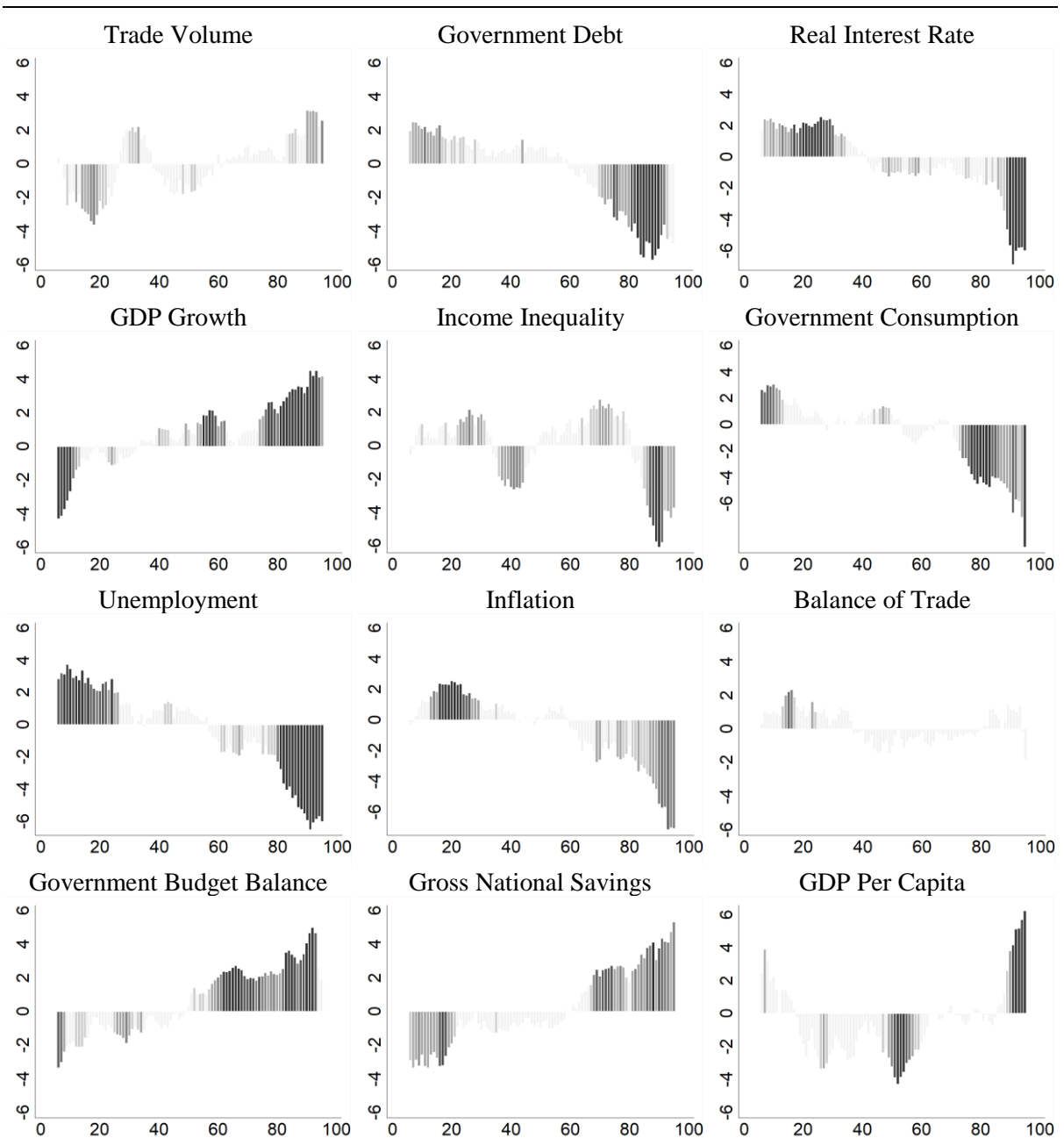


Figure 3: Each bar represents the coefficient from a multilevel bivariate random-intercept model with robust standard errors. Dependent variables are country-year satisfaction with democracy scores. Binary independent variables combine values from five centiles above and below each point. Taller bars represent stronger effect sizes. Darker bars represent higher levels of significance.

To create the binary range variables, the centile points in Figure 3 were referenced for their original values. Range variables were then created by recoding original values. The ranges estimate when economic indicators begin to have the strongest significant effects on satisfaction with democracy. As the figures above show, higher or lower values often have even stronger and more significant effects for some indicators. Starting with trade volume, positive effects are evident above about 129% of GDP and negative effects below about 51.4% of GDP. Percentages over 100% are possible because trade volume represents the sum of both imports and exports. Next, government debt is strongly and positively associated with democratic satisfaction when it is below about 42.5% of GDP and starts to produce strong negative effects above about 61.9% of GDP. The effects are especially strong and negative

when total government debt exceeds approximately 80% of GDP. The real interest rate produces positive effects below about 3.6% and starts to produce increasingly strong negative effects above about 4.9%, with the strongest and most significant negative effects occurring above 14.2%. Annual GDP growth above approximately 2.7% has positive effects on satisfaction with democracy, but the strongest consistent effects occur above 5.4%. GDP growth rates below about 0.5% are associated with negative effects, but the strongest consistent effects occur below -0.5%. Income inequality displays the strongest positive effects with Gini coefficients between 25.9 and 33, with lower values not consistently obtaining significance. Gini coefficients above approximately 47.5 have negative effects on satisfaction with democracy, but the strongest negative effects occur above about 50.7. Government consumption has positive effects when it is approximately 0.094% to 0.141% of GDP per capita, but shows increasingly negative effects above about 0.207%. Figure 3 does not display the first five centiles of government consumption, but excluding the lowest values from the positive range increases the magnitude of the relationship. Unemployment rates below about 6% produce positive effects and rates exceeding about 8.4% start to have negative effects, but the strongest negative effects are evident when unemployment exceeds about 14%. Inflation produces positive effects between about 1.1% and 2.5%. Deflation or very low inflation can produce some negative effects, but they are often not significant. Inflation effects start becoming negative above about 6.8% and consistently stronger and more significant above about 13.3%. Balance of trade demonstrates weak effects overall, but some positive effects are evident when imports exceed exports by between approximately 5% to 27%. Some negative effects do occur when imports exceed exports by less than about 4.8% of GDP, but the relationship is weak. Government budget balance deficits of around 2.5% or less can have positive effects, but the strongest positive effects occur with budget surpluses of 0.5% or more. Government deficits over about 3.5% of GDP show negative effects, with deficits greater than 7.9% producing increasingly stronger negative effects. Gross national savings displays increasingly positive effects above about 22.7% of GDP and consistently negative effects below 15.7%. Finally, GDP per capita produces increasingly strong positive effects above about \$27,462 and negative effects below about \$5,031.

3.3. Multilevel Models

The next set of results analyses economic indicators using two types of multilevel models: random-intercept models with county-year scores and mixed-effects models with dichotomized survey responses. There are two sets of each type of model, analysing first positive and then negative range estimates. Including all variables in one model reduces the number of available observations and the variation necessary for reliable analysis. Economic indicators were therefore divided into three groups based on data availability and the avoidance of multicollinearity.

Table 3: Positive effect ranges for country-year satisfaction with democracy

	Model P1			Model P2			Model P3		
	C	SE	P	C	SE	P	C	SE	P
Trade Volume > 129%	2.38	0.90	0.008						
Government Debt < 42.5%	1.70	0.79	0.031						
Interest Rate < 3.6%	2.14	0.64	0.001						
GDP Growth > 2.7%	2.70	0.57	0.000						
Income Inequality 25.9 to 33				2.18	0.73	0.003			
Gov. Consumption 0.94 to 0.14				2.39	1.10	0.030			
Unemployment < 6%				4.25	0.92	0.000			
Inflation Rate 1.1% to 2.5%				0.84	0.62	0.173			
Balance of Trade -27 to -5%							2.71	1.04	0.009
Budget Balance > -2.5%							2.49	0.78	0.001
National Savings > 22.7%							2.71	0.95	0.004
GDP Per Capita > \$27,462							1.98	1.16	0.089
Federal	1.55	0.97	0.110	2.58	1.11	0.020	1.15	0.89	0.195
Majoritarian	3.75	1.56	0.016	5.72	2.83	0.044	3.96	1.55	0.011
Presidential	3.61	1.79	0.043	3.89	2.18	0.074	4.17	1.82	0.022
Control of Corruption	5.49	1.04	0.000	8.16	1.28	0.000	6.85	1.15	0.000
Level of Democracy	-0.49	0.44	0.264	-1.10	0.57	0.055	-0.86	0.48	0.071
Country-Years	893			742			1,034		
Countries	116			78			126		
Wald Chi2	118.9			133.1			81		
Degrees of Freedom	9			9			9		
Log pseudolikelihood	-3083.5			-2564.7			-3596.2		

Two-level random-intercept models using satisfaction with democracy scores as dependent variable and positive economic indicator ranges as independent variables. Displays regression coefficients (C), robust standard errors (SE), and significance p-values (P).

Table 3 specifies indicator ranges as above (>) or below (<) specified values, or between two values. Most ranges examined for positive effects maintain strong magnitudes or effects sizes and are significant at the country-year level. The inflation rate range shows the smallest magnitude relationship and fails to obtain significance. Unemployment demonstrates the largest effect magnitude and obtains a high level of significance. The other range variables have moderately strong effects and obtain significance, although GDP per capita is only weakly significant. The finding suggest that satisfaction with democracy tends to be higher with government debt below 42.5% of GDP, real interest rates below 3.6%, GDP growth above 2.7%, income inequality (Gini coefficients) between 25.9 and 33, government consumption between 0.94% and 0.14% of GDP per capita, unemployment below 6%, inflation between 1.1% and 2.5%, imports 5% to 27% of GDP higher than exports, government budget balance deficits below 2.5% of GDP, gross national savings above 22.7% of GDP, and GDP per capita above \$27,462. These ranges are estimates and must be interpreted with caution.

Table 4: Positive effect ranges for respondent satisfaction with democracy

	Model P4			Model P5			Model P6		
	C	SE	P	C	SE	P	C	SE	P
Trade Volume > 129%	0.03	0.02	0.161						
Government Debt < 42.5%	0.04	0.01	0.007						
Interest Rate < 3.6%	0.02	0.01	0.094						
GDP Growth > 2.7%	0.05	0.01	0.000						
Income Inequality 25.9 to 33				0.03	0.02	0.054			
Gov. Consumption 0.94 to 0.14				0.01	0.02	0.624			
Unemployment < 6%				0.07	0.02	0.000			
Inflation Rate 1.1% to 2.5%				0.01	0.01	0.463			
Balance of Trade -27 to -5%							0.02	0.02	0.219
Budget Balance > -2.5%							0.05	0.02	0.000
National Savings > 22.7%							0.05	0.02	0.003
GDP Per Capita > \$27,462							-0.01	0.03	0.714
Federal	0.03	0.02	0.133	0.04	0.02	0.118	0.01	0.02	0.483
Majoritarian	-0.02	0.03	0.389	-0.03	0.03	0.274	-0.03	0.02	0.292
Presidential	0.06	0.03	0.049	0.05	0.04	0.198	0.02	0.04	0.486
Control of Corruption	0.16	0.04	0.000	0.22	0.05	0.000	0.20	0.04	0.000
Level of Democracy	0.01	0.01	0.577	-0.01	0.02	0.442	-0.00	0.02	0.797
Age Category	0.01	0.00	0.054	0.00	0.00	0.202	0.01	0.00	0.017
Female Gender	-0.01	0.00	0.001	-0.02	0.00	0.000	-0.01	0.00	0.000
Education Level	-0.01	0.01	0.306	0.01	0.01	0.071	-0.01	0.01	0.319
Income Group	0.03	0.00	0.000	0.03	0.00	0.000	0.03	0.00	0.000
Respondents	848,384			643,744			1,019,788		
Countries	116			78			126		
Wald Chi2	253.8			581.0			247.1		
Degrees of Freedom	13			13			13		
Log pseudolikelihood	-571,517.3			-424,303.5			-682,350.7		

Mixed-effects models using dichotomized respondent satisfaction with democracy as dependent variable and positive economic indicator ranges as independent variables. Displays regression coefficients (C), robust standard errors (SE), and significance p-values (P).

Table 4 examines the same positive effect ranges, but this time using respondent-level satisfaction with democracy. The positive ranges for GDP growth, unemployment, and budget balance demonstrate relatively strong effects and are highly significant. The ranges for trade volume, government consumption, inflation rate, balance of trade, and GDP per capita fail to obtain significance using respondent level models. In general, more of the control variables show significant effect in the country-year models than the respondent models. For the demographic controls, gender and income show consistent significant effects, with income showing the strongest magnitudes. Age and education are less frequently significant and demonstrate weaker effect sizes. We next look at the negative ranges first with country-year and then respondent models.

Table 5: Negative effect ranges for country-year satisfaction with democracy

	Model N1			Model N2			Model N3		
	C	SE	P	C	SE	P	C	SE	P
Trade Volume < 51.4%	-1.01	1.06	0.338						
Government Debt > 61.9%	-2.94	1.02	0.004						
Interest Rate > 4.9%	-2.25	0.64	0.000						
GDP Growth < 0.5%	-4.37	0.68	0.000						
Income Inequality > 47.5				-1.96	0.97	0.044			
Gov. Consumption > 0.207				-4.51	1.84	0.014			
Unemployment > 8.4%				-4.86	0.84	0.000			
Inflation Rate > 6.8%				-2.82	1.00	0.005			
Balance of Trade > -4.8%							-3.78	1.03	0.000
Budget Balance < -3.5%							-2.54	0.72	0.000
National Savings < 15.7%							-2.40	0.94	0.010
GDP Per Capita < \$5,031							-3.81	1.24	0.002
Federal	1.74	0.98	0.077	1.81	1.01	0.072	1.79	0.92	0.051
Majoritarian	3.24	1.61	0.044	4.57	2.45	0.062	3.40	1.52	0.025
Presidential	3.12	1.73	0.072	2.81	1.99	0.159	3.90	2.05	0.057
Control of Corruption	5.26	1.07	0.000	7.38	1.20	0.000	6.63	1.22	0.000
Level of Democracy	-0.61	0.43	0.154	-1.29	0.53	0.015	-1.09	0.45	0.016
Country-Years	893			742			1,034		
Countries	116			78			126		
Wald Chi2	144.5			163.8			91.2		
Degrees of Freedom	9			9			9		
Log pseudolikelihood	-3,072.8			-2,546.9			-3,586.0		

Two-level random-intercept models using country-year satisfaction with democracy scores as dependent variable and negative economic indicator ranges as independent variables. Displays regression coefficients (C), robust standard errors (SE), and significance p-values (P).

Table 5 shows negative effects on country-year satisfaction with democracy scores. The trade volume range is the only one that fails to obtain significance and it also shows the weakest effect magnitude. The other range variables are relatively stronger and obtain significance. The findings suggest that satisfaction with democracy will tend to be lower if government debt is above about 61.9% of GDP, the real interest rate is over about 4.9%, GDP growth is below 0.5%, income inequality (Gini coefficient) is above about 47.5, government consumption is above around 0.207% of GDP per capita, unemployment is over about 8.4%, inflation is above approximately 6.8%, imports are no more than about 4.8% of GDP higher than exports, budget balance deficits are greater than about 3.5% of GDP, gross national savings are below about 15.7% of GDP, and GDP per capita is below about \$5,031.

Table 6: Negative effect ranges for respondent satisfaction with democracy

	Model N4			Model N5			Model N6		
	C	SE	P	C	SE	P	C	SE	P
Trade Volume < 51.4%	-0.05	0.02	0.047						
Government Debt > 61.9%	-0.06	0.02	0.004						
Interest Rate > 4.9%	-0.02	0.01	0.121						
GDP Growth < 0.5%	-0.06	0.02	0.002						
Income Inequality > 47.5				-0.03	0.02	0.191			
Gov. Consumption > 0.207				-0.09	0.02	0.000			
Unemployment > 8.4%				-0.08	0.02	0.000			
Inflation Rate > 6.8%				-0.03	0.01	0.010			
Balance of Trade > -4.8%							-0.03	0.02	0.127
Budget Balance < -3.5%							-0.06	0.02	0.000
National Savings < 15.7%							-0.04	0.02	0.038
GDP Per Capita < \$5,031							-0.09	0.02	0.000
Federal	0.02	0.02	0.322	0.03	0.02	0.281	0.02	0.02	0.291
Majoritarian	-0.05	0.03	0.125	-0.02	0.03	0.514	-0.04	0.03	0.143
Presidential	0.05	0.03	0.087	0.01	0.03	0.670	0.01	0.04	0.901
Control of Corruption	0.16	0.04	0.000	0.22	0.05	0.000	0.21	0.04	0.000
Level of Democracy	0.00	0.01	0.795	-0.01	0.02	0.394	0.00	0.01	0.771
Age Category	0.01	0.00	0.047	0.00	0.00	0.207	0.01	0.00	0.031
Female Gender	-0.01	0.00	0.001	-0.01	0.00	0.000	-0.01	0.00	0.000
Education Level	0.00	0.01	0.340	0.01	0.01	0.091	-0.01	0.01	0.306
Income Group	0.03	0.00	0.000	0.03	0.00	0.000	0.03	0.00	0.000
Respondents	848,384			643,744			1,019,788		
Countries	116			78			126		
Wald Chi2	218.8			435.1			214.2		
Degrees of Freedom	13			13			13		
Log pseudolikelihood	-571,382.3			-423,391.0			-681636.5		

Mixed-effects models using dichotomized respondent satisfaction with democracy as dependent variable and negative economic indicator ranges as independent variables. Displays regression coefficients (C), robust standard errors (SE), and significance p-values (P).

Table 6 provides results for negative ranges using respondent level satisfaction with democracy. Government consumption, unemployment, budget balance, and GDP per capita display stronger effect sizes and the highest levels of significance. Government debt, GDP growth, and the inflation rate ranges show moderately strong effects and significance levels. Once again, fewer of the range variables obtained significance at the respondent level than at the country-year level. However, these non-significant results are still important because they help us determine which economic indicators may have weaker effects than others. More of the respondent demographic obtained significance, but the effect magnitudes are smaller than in the models testing positive ranges. Of the national level control variables used in all models, control of corruption displays the strongest magnitude sizes and the highest levels of

significance. The political and electoral system variables as well as the level of democracy variable rarely obtained significance.

4. Discussion

The substantial literatures examining political support and economic voting both demonstrate the importance of the economic indicators used in this study (Bauer, 2018; Graham & Sukhtankar, 2004; Hodgson & Maloney, 2012; Lewis-Beck & Stegmaier, 2000, 2013; Quaranta & Martini, 2016, 2017; Wilkin et al., 1997). The aim here was to estimate economic indicator value ranges with the strongest significant effects on public satisfaction with democracy. Of the factors examined, the unemployment rate has the most explanatory power. Keeping unemployment below about 6% of the workforce appears to be where the biggest positive effects occur.

The negative effects for GDP per capita below about \$5,031 align with previous research showing comparably low per capita incomes to be associated with democratic regime failure (Przeworski & Limongi, 1993). Countries around this lower income range are likely to have considerably lower standards of living and often fragile democratic traditions. GDP growth has a relatively consistent linear relationship with democratic satisfaction, but the strongest jump in satisfaction levels occur around the point where GDP growth moves from negative to positive.

Income distributions within countries appear to matter, as satisfaction with democracy declines with higher levels of income inequality. Many people living in highly inequitable societies may feel that democracy is working for the few and failing the majority. This study used the Gini coefficient because it is the most widely available measure of economic inequality, but there are better measures of this concept that could be used in smaller studies.

Findings suggest that too little trade is bad for democratic satisfaction and being a wealthy net importing nation tends to be associated with greater satisfaction. This suggests that countries that export more than they import experience negative effects on satisfaction. A possible explanation is that these countries are more exposed to international economic factors beyond the control of national governments, which could be reflected in lower democratic satisfaction levels. Importing countries may also have cheaper consumer prices, which could increase satisfaction.

Satisfaction with democracy tends to be higher when government debt is sustainable, government budgets are balanced, government consumption is moderate, and the national economy saves more than it spends. High government debt and budget deficits restrict policy options and make countries more vulnerable to changes in international economic or financial conditions, which could be reflected in lower satisfaction with democracy (Armingeon & Guthmann, 2014; Remmer, 2012). Sustainable debt and deficit levels give governments more options for countering economic downturns and financial crises, meaning citizens are less likely to endure austerity measures or budget cuts. Similarly, when gross national savings are higher than governments, individuals, and businesses are better able to weather economic downturns because there is more money available for internal borrowing without turning to international markets. Incumbent governments could therefore improve their chances of re-election if they keep total debts low, balance their budgets, and foster conditions under which the national economy thrives and saves more than it spends.

Findings show that low interest rates and minimal inflation produce strong positive effects. Inflation has a range above and below which it tends to be associated with negative effects. This is probably because deflation (negative inflation) means prices are falling, which incentivises consumers to postpone spending, decreasing demand, leading to further deflation, and potentially a recession and higher unemployment. Deflation also increases the real interest rate, which means people with outstanding loans will have less disposable income. High interest rates also mean businesses repaying loans have less money available for spending and hiring new employees. At the other end of the spectrum, high levels of inflation mean goods and services are getting more expensive for everyone. These aspects of the economy that can affect standards of living are likely to also affect political support measures such as satisfaction with democracy.

This study attempted to estimate the ranges of key economic indicators that affect satisfaction with democracy positively or negatively. The ranges are estimates rather than definitive values. However, knowing approximately when economic indicators may affect satisfaction with democracy and how they may do so is better than just knowing there is a relationship of some kind. The estimated values ranges could be useful for making decisions, setting economic priorities, or measuring risks. Future research will hopefully refine or confirm the ranges using different methods and additional data sources. Additional research could also analyse the ranges against more dependent variables, such as trust in government or voting in elections, control for other factors, or examine the effects of other economic indicators.

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