

# A New Agenda ... Values, World Society, Modelling

<https://sites.google.com/site/gordonburtmathsocsci/home/a-new-agenda>

*A New Agenda* seeks to explore all aspects of society using all the academic disciplines paying special attention to values ... with special interest in modelling ... not disinterested in practice ... and aspiring to high academic standards.

## Commentary, June 2017

## No. 42 A

### Politics: values, society and modelling

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# UK general election 2017 (in preparation)

The UK general election, 2017: prelude and outcome

Prelude

Opinion polls, local elections and by-elections, May 2010 to June 2017

Front page headlines, April 17<sup>th</sup> 2017 to June 7<sup>th</sup> 2017

Front page headlines, June 8<sup>th</sup> 2017

The exit poll: predicting what has just happened and what is just about to be known

The result: voters, MPs, prime minister, cabinet, accord

An election: changing roles and the rules for doing so

Election discourse: truth and value

The aftermath

Front page headlines, June 9<sup>th</sup> 2017 to ...

Geography ... the contour structure for voting Conservative

The distribution of party votes: a stepped geometric series

Changes over time

UK general elections, 2015 and 2017

Volatility, 2015-2017

Political space – movement towards the two main parties, 2015-2017

A general theory and the Conservative Equations

How the distribution of political power has changed

UK general elections, 2005-2017

The UK political pendulum, 1945-2017

## Yearbook 2014

<http://www.cambridgescholars.com/values-world-society-and-modelling-yearbook-2014>

### 9 Ukraine: United or Divided? West and East; Living with Others

“Looking back on my childhood in pre-war eastern Poland ... [it was] a ‘multi-cultural’ society ... not without its tensions ... the Ukrainian peasantry were bottom of the pile ... [the landowners were] Lithuanians ... Poles occupied the middle stratum ... Eastern Ukraine was dominated by Russia and was always ... Russophile if not Russified, while western Ukraine was more influenced by Poland.” In November 2013 the Ukrainian government switched from west to east – from seeking closer links with the European Union to seeking closer links with Russia. Protests follow, riots, the President flees, Russia takes over Crimea, rebellion in eastern Ukraine ... Ukraine: united or divided? Steve Pickering colours the Ukraine map blue or red on the basis of Ukrainian or Russian language tweets in early March 2014. An analysis of presidential elections in the period 1991-2014 shows a west-east continuum of political preferences. Having identified a west-east continuum in presidential voting, it is found that this is reflected in the geography, economy, ethnicity, language and religion of Ukraine. The east-west (and north-south) dynamics of Ukraine is evident in centuries of history. A simple model of a divided society with two groups on a geographical continuum is presented. As the boundary between West and East moves farther east: the size of the West increases and the size of the East decreases; the proportion of Ukrainians in the West decreases and the proportion of Russians in the West increases; and the proportion of Ukrainians in the East decreases and the proportion of Russians in the East increases – in the model. Suppose each individual wants to be in a large state (the bigger the better) and

at the same time wants their nationality to be in the majority (the bigger the better). However these two goals are in fundamental conflict. Under certain special very strong and restrictive assumptions maximum satisfaction occurs when a boundary is at the midpoint – in the model, not in reality.

## **10 Scotland: ‘Our Values’? Independence? More Varied and Less Distinctive**

On 18 September 2014 a referendum was held on Scottish independence. It was a debate between those claiming ‘our Scottish values are exceptional’ and those claiming ‘our British values are exceptional’. The relationship with England has been central to the geo-political history of Scotland. Personal memories of and attachments to Scotland are in all our minds but what sometimes happens is that invalid extensions are made to these personal memories and attachments, giving rise to a discourse of exceptionalism. A case in point is the Scottish exceptionalism of a golfing Presbyterian east-coast lowlander. In comparison with the simplicity of group exceptionalism, scientific analysis may find that each group is more varied within itself and less distinctive from other groups than is imagined – and this is shown to be the case for Scottish exceptionalism. Scotland’s history has seen the formation of the nation, independence, union with the rest of Britain and over the last century, particularly the last half-century, measures of partial autonomy, culminating in the independence referendum of 2014. Support for political parties has fluctuated over the past couple of centuries, with increasing support for the Scottish National Party (SNP) in recent times. Opinion polls consistently indicated that the referendum voting would reject independence although in the weeks before the voting the gap narrowed. Some studies found support for alternative options to those on the ballot paper. Independence was rejected by 55% to 45%. A somewhat greater support for independence was found in local areas which had high unemployment and low Conservative support, which were in the west central area of the country and which had lower turnout. Glasgow and Edinburgh, Scotland and England, are each more varied and less distinctive than is sometimes supposed. As in other chapters special attention is given to the conceptualisation of group differences.

Leaving the political sphere behind, the last three chapters in Part II turn to the world economy, gender relations and world sport (not, of course, that these spheres are without a political aspect!).

# **Yearbook 2015**

<http://www.cambridgescholars.com/values-world-society-and-modelling-yearbook-2015>

## **8 Nigeria, Greece and Ireland: geography and one-dimensional political space**

This chapter is about the relationship between political space and geographical space. The political space considered here is only one-dimensional because it is based on the percentage vote in cases where there are just two options. Three cases are considered: the presidential election in Nigeria; the bailout referendum in Greece; and the same-sex referendum in Ireland. The background to these three cases is given in Chapter 5.

The first case is Nigeria. Presidential elections were held in Nigeria in March 2015. Muhammadu Buhari gained 54% of the votes and the sitting president, Goodluck Johnson, gained 45% - a sizeable win for Buhari but still substantial support for Johnson. Of the total variation in voting, 59% was within-state variation and 41% was between-state variation. Across the 37 states, the vote for Buhari ranged between 1% and 95%.

Political space relates to geographical space. This can be studied in various ways. Looking at the 50% ‘winning contour partition’, Buhari won in a single set of connected states and Johnson won in three connected sets of states: the mid-south, the east-middle and the Federal capital. Contour-partitions at different levels divided the country into four: north, upper middle, lower middle, and mid-south, ordered according to decreasing Buhari vote. Latitude north correlates 0.9 with the Buhari vote. The voting surface can be represented by a series of west-east sections for different latitudes north and this suggests an interaction between latitude north and longitude east and also a special mid-south effect. The pattern of results is also illustrated by looking at the spatial network of states and the correlated profiles for the primary and secondary concentric perimeters.

The second case is Greece. Three elections were held in Greece in 2015: a legislative election on 25 January and a second legislative election on 20 September – but it is the bailout referendum, held on 5 July between these two other elections, that we focus on here. In terms of differences between states the two legislative election results correlated 0.9 with one another and each correlated 0.7 with the

referendum results. The bailout proposal was rejected with 61% voting 'No' and 39% voting 'Yes' - a sizeable win for 'No'. Voting percentages across the 57 regions ranged between 51% and 74% - revealing a moderately divided society. Political space relates to geographical space. Perimeter profiles exhibited local jaggedness superposed on single-peakedness.

The third case is Ireland. On 22 May 2015 a referendum was held in Ireland to mandate provision for same-sex marriage. The bill was supported by all political parties but officially opposed by the Roman Catholic Church, in Ireland and in the Vatican (85% of the population in Ireland is Catholic). The 62% 'Yes' vote was, as well as being a sizeable win, also reflective of a divided society. Voting across the 43 constituencies exhibited a uniform distribution with the 'Yes' vote ranging from 75% (Dublin South East) to 49% (Roscommon Leitrim). So variation within constituencies was much greater than variation between constituencies. Political space relates to demographics: the 'Yes' vote correlated 0.9 with the logarithm of population density, with the area of the constituency and with the 'internal distance'. Political space relates to geographical space, in particular to an urban-rural divide. The highest 'Yes' vote was in the capital, Dublin, in the East; next were 'medium urban' areas, the east & south coastal corridor and the two urban areas in the west, Limerick and Galway; and finally, lowest were rural and lesser urban areas, the north being lower than the south. An equation seeks to capture east-west and south-north gradients as well as urban peaks. Ireland has a lower urban population (63%) than the UK (83%) and just nine urban areas with more than 30,000 people (following a power distribution). These areas and their internal transport linkages are mostly situated on the east & south coastal corridor, and are the primary terminals for transport to the UK and the rest of Europe. Turnout was positively related to the 'Yes' vote; and (hence?) to demographics.

The chapter ends with a comparison of seven binary-option elections: USA 2008 and 2012; Ukraine 2014; Scotland 2014; Nigeria 2015; Greece 2015; and Ireland 2015.

## **9 Northern Ireland: multidimensional political space and geography**

This chapter, like the previous one, is about the relationship between political space and geographical space. Unlike the previous chapter, the political space considered here is multi-dimensional because it is based on the percentage votes in a case where there are many options. Also, in this chapter it is the political space that receives most attention with only a brief consideration of the geographical aspect.

The chapter is about the Northern Ireland election of 2015 (held as part of the UK general election which is discussed in the following Chapters 10 to 12). Voters can choose between many parties. So the voting percentages can be represented by a point in multidimensional political space. The overall result is a point in political space; each constituency result is a point in political space; and the set of constituency results can be represented as a set of points in political space. The space is a percentage space and so is finite with a well-defined centre. What is the shape of the set of points in relation to the centre?

There are a few large parties and many small parties and so the 'overall point' is quite far from the centre of the space. Moreover, many of the individual constituency results show dominance by a single party - and so the constituency points are quite far from the overall point. Different parties have dominance in different constituencies ('multidimensional polarisation') and so the constituency points are quite far from one another - in different directions from the overall point.

Larger parties vary more across constituencies than smaller parties do, and this is reflected in differential variation in different dimensions. The first component in a principal component analysis concerns the competition between the two largest parties: Sinn Fein against the Democratic Unionists. It explains 30% of the total variance. The thirteen parties can be ordered along this primary continuum with Sinn Fein at one extreme and the Democratic Unionists (and the smaller Alliance and Conservative parties) at the other. The eighteen constituencies can also be ordered along this primary continuum with Belfast and Newry & Armagh (where Sinn Fein is strong) at one extreme and Belfast East and North Down (where Democratic Unionists, Alliance and Conservatives are strong) at the other. Restricting attention to the subspace containing the five largest parties, another analysis finds the same first component as before, and a second component being Ulster Unionists versus the Social Democratic and Labour Party.

On a one-dimensional continuum, parties tend to peak to the left or to the right. In a two-dimensional space, constituencies are located on a closed loop and parties peak at the point on the loop nearest the party vertex, giving an approximately sinusoidal curve.

Political space relates to geographical space. There is a gradient of increasing X score (DUP strong) running from South-West to North-East - with contours of equal X-score at right angles to the gradient. The borders reflect the gradient, the North-East looking to Scotland and the UK and the South-West adjoining Ireland - Ulster Unionists look to the UK and Sinn Fein looks to Ireland.

## **10 The UK general election, 2015: prelude and outcome**

The UK general election of 2010 had replaced Gordon Brown's Labour government with a coalition between David Cameron's Conservatives and Nick Clegg's Liberal Democrats. The subsequent party fortunes in the period between the 2010 and 2015 can be gauged from a number of sources. Opinion polls had tracked the almost immediate collapse of Liberal Democrat support and the steady rise in UKIP support. In Scotland, Scottish Nationalists overtook Labour, briefly in 2011 and again, massively, in 2015. Less dramatically, in the UK overall, Conservative support had fallen and Labour support had risen but the gap closed as the 2015 election approached. The results of by-elections, local government elections and European elections were broadly consistent with the patterns indicated by the polls. Migration of support on the left-right continuum was characterised by a flight from the centre.

Widespread dissatisfaction and disagreement characterised the debate in the run-up to the election. On election morning the poll of polls indicated a hung parliament. The day before, the press on the right, left and centre had warned the electorate of the consequences of making the wrong choice. Over the preceding month *The Times* had headlined: 'panic in the markets', Farage and Sturgeon winning the seven-way leaders' debate, Clegg opening the door to a Miliband government backed by SNP, Cameron inching ahead, and the Queen to take control of the election aftermath.

... Then the dramatic change in just 24 hours: the belief on election morning that this was going to be 'the closest vote for decades'; and at 10pm the same day the Exit poll put the Conservatives well ahead. It was the 'sweetest victory' for the Conservatives and in the north 'the Scottish lion [had] roared'. In the aftermath the performance of the opinion polls was appraised.

... The chapter studies the distribution of shares of the vote, overall and by nation; and power and representation are considered.

## **11 Democracy: satisfaction? ... dissatisfaction? ... value space**

Does democracy deliver satisfaction? - or dissatisfaction? Over the past year, dissatisfaction has been expressed with various aspects of democracy. Democratic elections raise hopes of satisfaction which cannot be fulfilled for all. The elections we have studied in previous chapters have given the satisfaction of victory sometimes to a majority and sometimes to just a minority - but always leaving at least a sizeable minority experiencing the dissatisfaction of defeat. Moreover the following Chapter 12 will show that the percentage experiencing the satisfaction of victory in UK elections has declined over the past seventy years.

The concept of a value space can provide useful insight into these issues. Using it, Chapter 14 will show that there are theoretical limits to the amount of satisfaction which democracy can deliver. In this chapter we look at two studies which are particularly informative. The first study asks about the amount of value of each option; it asks about many options; and the analysis applies multiple criteria in its evaluation of the options. The second study asks for a full preference ordering of the options.

With the prospect (at the time) of a coalition government a survey asked people to place a value on each of nine possible government outcomes. All nine options had a mean negative rating, with a Conservative majority government being the least negative. However this option scored poorly on polarisation and extreme dissatisfaction. People's views were approximately consistent with single-peaked value functions on a left-right continuum in value space.

After the election, dissatisfaction within society gave way to dissatisfaction within parties. In particular there was a discourse of dissatisfaction in the Labour Party and in the media relating to the candidacy and leadership of Jeremy Corbyn. A survey found a diversity of views amongst Labour Party members. The preference orderings can be represented by the vertices of a tetradecahedron. Most preference orderings were close to a transversal corresponding to single-peaked value functions on a left-right continuum in value space.

Finally it should be noted that the same broad argument applies not just to democracy but to any system of government, and not just to systems of government but to all social arrangements.

## **12 Time series: UK general elections, 1945 to 2015**

This is the second chapter about time. The first chapter on time discussed time series for international measures of social value, violence and population. Here we discuss UK general elections. The first part of the chapter is about change from one point in time to the next: from 2010 to 2015. The second part of the chapter is about time series: from 1945 to 2015.

Volatility measures are used to check the claim that the result of the 2015 general election was a political 'earthquake'. Some things stayed the same and some things changed. Some things changed

just a little and some things changed a lot. The flight from the centre is noted – in terms of both aggregate and individual vote. Detailed results for votes and for seats for the four nations are noted and related to party contributions to volatility.

Looking at the seventy post-war years, 1945 to 2015, there have been nineteen governments and elections. Governing parties age: they are likely to win a second election but increasingly unlikely to win later elections.

The trends in UK general elections over the period 1945 to 2015 exhibit: the post-war decline of two-party politics; the post-war decline of three-party politics; the rise of ‘Other’ parties; and the decline in electoral support for incoming governments. The time series for party support are modelled by first-order auto-regressive models and equilibrium values are noted. The time series for Liberal Democrats suggests a model with two equilibria. The trajectories are studied by plotting change in vote against vote. Party trajectories are related: percentages sum to 100%; and the correlation matrix exhibits certain patterns. The notion of a hierarchy of competition between the parties is noted and the corresponding trajectories investigated.

## **Part III Modelling**

### **13 Sets and functions; time and space**

The preceding chapters have discussed a variety of topics and in many cases drawn on mathematics to provide models of the topics. In this chapter and the following one we bring all these applications together and also deepen and extend the mathematical treatment. The first part of the present chapter reviews the basic mathematics - the sets, functions and distributions - that have been used in the book. Linear, logarithmic, exponential, power and sinusoidal functions; arithmetic and geometric series; and probability, cumulative, geometric and beta distributions are all considered. There are specific links to Chapters 7, 8 and 10.

The second part of the chapter considers the basic concepts of time and space. Linear and exponential functions, difference and differential equations, autoregression, flow and complexity provide models of change over time – with application to Chapters 7 and 12. The notion of a space-time varying probability distribution is discussed – relating to the war death rate model in Chapter 7. Attention then turns to spaces: abstract space, geographical space and factor spaces such as those for social and psychological variables. The geometry of objects in abstract space is noted – relating to Chapters 9 and 11 – but this will be discussed in detail in the next chapter. Different approaches to modelling variation over geographical space are discussed including the use of spatial correlations – relating to Chapters 8 and 9. The analysis of multidimensional space is then discussed with special attention to a geometric representation of the correlation matrix – relating to Chapters 6 and 9.

### **14 Value spaces; the Earth in space and time**

The present chapter is the second on modelling and continues the work of Chapter 13. The chapter is in two parts. The first part continues the discussion of space in Chapter 13, now addressing the topic of value spaces. The second part considers the concept of space and time in relation to the Earth and two of the news stories which appeared in 2015.

We consider value spaces in three different contexts: amount of value, preference and voting percentage. In each case there is a set of individuals and a set of objects.

The first context is where each individual places a value (an amount of value) on each object. For example in one of the studies discussed in Chapter 11 each individual places a value on each possible coalition government. A possible model for this situation is that objects are located in an object space and that people have different ideal points in object space and different single-peaked value functions on object space. Both the inverted modulus function and the quadratic function are discussed. The latter gives the result that the social welfare of a situation depends on the population sensitivity, the population-weighted variation, the deviation of the situation from the welfare ideal and the welfare ceiling.

The second context is where each individual puts an order of preference on the set of objects. For example in one of the studies discussed in Chapter 11 each individual puts an order of preference on the candidates for the Labour party leadership. The set of orderings of four objects forms a tetradecahedron in which single-peaked transversals can be identified.

The third context is where each individual identifies only their first preference amongst a set of objects. This enables an aggregate social value, the percentage of first preferences, to be placed on each

object – as in the various elections studied in Chapters 8 to 12. The overall result is a point in percentage space and the set of constituency results gives a set of points. The case where the set of points lie on a circle inscribed in a tetrahedron are discussed.

There is a relationship between value space, preference space and percentage space: preference orderings correspond to regions of value space; and percentage space is a finite polytope contained in value space. For example the preference hexagon can be inscribed in the percentage triangle – and the preference tetradehedron in the percentage tetrahedron.

The chapter ends with two examples from the physical world, both involving modelling space and time in the solar system: the total eclipse of the sun which occurred on 20 March 2015 in the Faroe Islands; and the notion of midsummer.

## Yearbook 2016 (in preparation)

first draft of Overview with online links to Commentary:

<https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbm93Jk90bWF0aHNvY3NjaXxneDo3ZDk2ZjNjMDI2MzNhNTFl>

### 9 USA Presidential Elections, 1789-2016

First the 2016 presidential election is discussed and then the history of presidential elections is studied. A Pew Centre survey in 2014 had reported a divided country. There were many contestants in the 2016 primaries but their steady withdrawal left Hillary Clinton leading and finally defeating Bernie Sanders in the Democratic primaries; and outsider Donald Trump forcing a number of leading contenders out of the race and finally defeating Ted Cruz in the Republican primaries. The opinion polls put Clinton ahead of Trump, sometimes by large amounts, sometimes hardly at all. However the possibility of a Trump win was registered early on and also there was particular reference to the rust-belt states. The result was close, with Clinton winning the popular vote but Trump winning the college vote and the presidency. Compared with 2012, Trump gained Iowa, Wisconsin, Ohio, Pennsylvania, Michigan and Florida. Opinion was evenly divided.

Social groups. Variation *within* social groups is greater than variation *between* social groups. In each group, opinion is divided with a minority of at least a third ... The Trump vote in groups ranges between 4% and 72%. Gender, ethnicity, religion, education ... Trump was preferred by men, white, Christian, old, high school, married, high income, concerned about terrorism and immigration. Clinton was preferred by women, non-white, Jewish, young, post-graduate, unmarried, low income, concerned about the economy and foreign policy.

Geography. Variation *within* states is greater than variation *between* states. In each state, opinion is divided with a minority of at least a third ... The Trump vote in states ranges between 30% and 70%. The geographical aspect of the between-state variation in voting percentages is studied in terms of its contour structure. The winning contour divides the country between three separate connected high-Trump areas (most of the country, all except two of the interior states; Maine; and Alaska) and five separate connected low-Trump areas (the west coast; the north-east coast; Illinois; Minnesota; and Hawaii). The 55% Trump contour divides the country into a single high-Trump area, the 'mid-north-west-and-south-east' and two separate low-Trump areas, the west coast and the east coast; plus Alaska for Trump and Hawaii for Clinton. The dividing range consists of [the Canadian border], North Dakota (64), South Dakota (62), Wyoming (70), Nebraska (60), Kansas (57), Oklahoma (65), Arkansas (60), Tennessee (61) (Kentucky (63), West Virginia (69)), Alabama 63% for Trump, [the Gulf of Mexico].

The state variation in the 2008, 2012 and 2016 elections is studied. There is almost perfect correlation but varying means and idiosyncratic variation. The relationship between the popular vote  $n$  and the electoral college vote  $c$  is modelled using the concept of political space and the 1912-2017 data gives an equation for the z-scores:  $z(c)=6.7z(n)+\epsilon$ .

A listing of the Presidents of the USA, 1789-2017, and their parties is given. The number of terms served by individual presidents is studied and a conditional probability model of the number of consecutive party wins is presented. The time series for the party voting percentages is presented. An

autoregression model is briefly noted but the main focus is on a pendulum model. The velocity-position graph exhibits damped orbits around an equilibrium. The acceleration-position graph shows damped oscillations along the line  $a=-k(x-0.5)$ . The mathematics of a pendulum, simple harmonic motion and the periodic orbits of Hamiltonian systems are discussed.

## 8 The UK Brexit referendum: voters in social space

The concept of an abstract space was a central theme in many of the chapters in the 2015 Yearbook. The concept of space also informs our analysis here of the Brexit referendum to decide whether the UK should remain a member of the European Union (EU) or leave. Leave had 52% of the vote and Remain had 48%. So on the one hand there was a clear win for Leave; and on the other hand the country was quite evenly divided between the two options.

Psychology. The voting areas used in the referendum are the same as the areas used in a recent study of geographical variation in personality. Openness has a high correlation with the Remain vote ... and also with higher education, same-sex marriage, foreign-born and Liberal Democrat. London is particularly high on openness.

The social groups more likely to vote Leave were: older, working class, less educated, professing an English identity and not of an ethnic minority.

Politics. Defining Left-Right in terms of voting in the 2015 general election, in terms of newspaper readership and in terms of political attitudes, the Leave vote *increased* from Left to Right. However there is what might be called the class-politics/Brexit paradox. Defining Left-Right in terms of social class we obtain the opposite result: the Leave vote *decreased* from Left to Right - the working class voted Leave and the middle class voted Remain.

Economics. Leave areas are associated with high manufacturing, low wages, low house prices and low education; and Remain areas are associated with low manufacturing, high wages, high house prices and high education.

Variation *within* units is greater than variation *between* units. This is the case whether the UK is divided into nations, regions or areas. Looking at the shape of the variation, the frequency distribution of the Leave percentage for the four hundred areas is unimodal with a skew – more areas are to the higher end than are to the lower end.

The geographical aspect of the between-unit variation in voting percentages is studied looking at the ‘contour areas structure’. At one level the country is divided between one connected High-Leave area (the Midlands and north England) and three separate connected Low-Leave areas (south England and Wales; Scotland and Northern Ireland; and Gibraltar). Leave is low in cities and university towns.

## 7 Ireland politics, 1801-1916-2016

A general election was held in Ireland on 26<sup>th</sup> February 2016. The top three parties – Fine Gael (FG), Fianna Fáil (FF) and Sinn Féin (SF) - all had their origins in the Sinn Féin of 1916 and in the Easter Rising which a few years later led to Ireland gaining independence from Britain. The centuries-long English and British rule had been preceded by invasions and influences by the Romans, Christianity, the Vikings and the Normans. In 1801 ‘The United Kingdom of Great Britain and Northern Ireland’ had been established and the following century saw the electoral dominance of the two British parties, Tories and Whigs, give way to the dominance of the Home Rule party. The First World War, the postponement of Home Rule and the Easter Rising in 1916 and its suppression were the prelude to Sinn Féin’s dominance in the 1918 election – with a Unionist presence in the North. The 1922 election in the South split pro-Treaty Sinn Féin and anti-Treaty Sinn Féin. By 1937, this split had transformed into two parties, Fine Gael (FG) and Fianna Fáil (FF) which have continued to dominate Ireland’s elections ever since.

The chapter focuses on a statistical analysis of governments and election results in the period 1919-2016. The start of the period exhibited transition volatility in terms of the identity of the major parties. Single-party majority governments with consecutive wins at the start have given way to coalition minority governments often with a single term of office. The average over the period has given FF 44% of the seats, FG 33%, Labour 11% and Independents 5%.

The trajectories of parties’ shares of seats are correlated and a principal component analysis finds five components: (C1) ‘FF versus Indep, SF and Other’, 38% of the variation; (C2) ‘FG and Labour versus the rest’, 28%; (C3) ‘Labour versus FG and Independent’, 15%; (C4) ‘Independent and Labour versus Sinn Féin’, 10%; and (C5) ‘Sinn Féin versus Other’, 9%. Parties and elections are located in C1-C2

space. Rotating the axes gives U1-U2 space with short-term fluctuations in the U1 direction and long-term change in the U2 direction.

The size of the electorate has doubled in the second half of the period – with roughly corresponding changes in a number of other variables. The number of parties contesting the election correlates: positively with the size of the electorate; negatively with the turnout; negatively with the percentage vote for the largest party (and negatively with the seat share for the dominant party FF); and the percentage vote for the largest party is negatively associated with the presence of a coalition. Also party percentages are related to turnout.

## 11 Social choice: Dublin’s Rosie Hackett Bridge

People often have different values - so they often prefer different social options. Different social choice methods sometimes choose the same option and sometimes choose different options. People tend to want the social choice method which chooses the option that they want. Losing sides often complain about the method used. Recent examples include: the 2014 referendum on Scottish Independence; the 2015 UK general election; the 2015 UK Labour leadership election; the 2016 UK Brexit referendum and the 2016 USA presidential election. This prompts the question: are some methods intrinsically better than others? A substantial literature addresses this question and this has led some people to advocate specific methods and to seek the adoption of these methods. Citing Dummett and others, Peter Emerson is a long-standing and energetic critic of two-option voting and of majority choices, advocating instead the Modified Borda Count (MBC) for decision-making, the Quota Borda System (QBS) in elections and the matrix vote in governance.

In 2013 Emerson was instrumental in Dublin City Council using the BC method to decide the name of a new bridge over the River Liffey. The results of the voting are analysed. Statistical measures of the distribution of rankings are used as criteria for judging the winner. Most methods choose the same winner, Rosie Hackett, but a few do not. Kay Mills has fewest lowest rankings and lowest polarisation. Rosie Hackett is the most overtly political option, has a bimodal ranking distribution, has greater spread in rankings and has most polarisation. There is a sizeable negative correlation in the rankings of Hackett and Bermingham. A continuum from Hackett to Bermingham to Stoker exhibits single-peaked group means for ‘supporter groups’. The corresponding single-peaked transversal has most voters on or near it. This Dublin Bridge continuum relates to the familiar Left-Right political continuum. Councillors’ votes relate to their party allegiance. The Left vote for Hackett and the Right vote for Mills or Bermingham.

# Commentary 2017

## Colombia Peace Agreement Referendum, 2016: the geography of the vote

April 2017, issue 40, section 2

<https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbXnb3Jkb25idXJ0bWF0aHNvY3NjaXxneDo3ZGI2ODg3YWQzZTIzYTO>

### 2.1 The referendum in 2016

The Colombia Peace Agreement Referendum in 2016

The polls ... the turnout ... the result ... the winning margin

Variation between provinces

Variation within each province

Territory and physical geography

The winning contour ... its topology

The perimeter profile and spiral

A comparison: Nigeria, Greece, Ireland, USA, Ukraine and Scotland ... and Colombia

The exceptionality of the capital

### 2.2 Correlated contour maps

The correlation of the 2016 vote with non-violent politics, 1982-2014  
The correlation of the 2016 vote with violent politics  
The correlation of the 2016 vote with social and economic geography  
The correlation of the 2016 vote with physical geography

## **Mathematical political science [2010]**

[https://books.google.co.uk/books?id=fdgiB3YjpKMC&pg=PA1&source=gbs\\_toc\\_r&cad=4#v=onepage&q&f=false](https://books.google.co.uk/books?id=fdgiB3YjpKMC&pg=PA1&source=gbs_toc_r&cad=4#v=onepage&q&f=false)

### **4 Possibility and probability; value, conflict and choice**

Complete knowledge of a particular world involves knowing the truth values of all the propositions concerning that world. Complete ignorance involves knowing nothing at all. The first major step beyond complete ignorance is knowing the set of all possibilities within which the particular world might occur. Between complete knowledge and knowing just the set of possibilities, there is partial knowledge which can be expressed in terms of the probability of events. In some situations it is appropriate to assume a priori that each (elementary) event is equally likely.

Possibilities and probabilities are to the fore in the discussion of value, conflict and choice. In the absolute notion of value, value may be binary, ordinal or quantitative. In the comparative notion of value a preference is expressed in relation to each pair of objects. Multidimensional value arises when values are placed on a set of objects by a set of individuals – either by individual people or by individual criteria. The likelihood of value consensus decreases and the likelihood of value conflict increases as the number of individuals and the number of options increases.

How should we choose? All of five sets - options, methods, criteria, choosers and situations – need to be thought about when addressing the fundamental problem of social choice: there is conflict between choosers, methods and criteria in that in some situations the different choosers, methods and criteria select different options. For example there are situations where the Condorcet majority principle, the De Borda ranking principle and the welfare principle select different options. Also there are situations where a voting cycle occurs – a result which provides the basis for Arrow's general impossibility theorem. The likelihood of those undesirable situations is considered.

An individual may seek success or power (or influence or decisiveness). 'Success equals power plus luck'. The likelihood of success and the likelihood of power depend on the social choice function; and both likelihoods decrease as the number of individuals and the number of options increases. In their discussion of possible voting rules for the European Council of Ministers Laruelle et al. (2006) ask whether states seek power or success and argue that states which are concerned about their sovereignty and states which are concerned to deepen integration are likely to press for different voting rules.

## **5 Theory, evidence and reality; the mean and median ideals of competing groups**

Mathematical truth require consistency with axioms whereas scientific truth requires correspondence between theory and reality. Theory may be more restricted than reality and reality can be more restricted than theory. Sometimes reality can be represented by a simple equation and at other times a complex structure of context-dependent equations may be required. Evidence from social science investigations often require us to consider empirical probabilities and approximations.

The notion of value in this chapter is that objects can be located in a continuous space and that preferences for objects are single-peaked or Euclidean. There is some evidence that the population distribution of peaks (or ideals) is itself sometimes peaked. Under certain circumstances these features eliminate the possibility of voting cycles and give the median ideal or the mean ideal as the majority winner. If the outcome is the mean ideal then it can be shown that an individual's power decreases as the size of the population increases. Larger groups have greater power. In the absence of equal democratic power the outcome may be modelled as the weighted mean ideal with overall power being a combination of egalitarian power and non-egalitarian power. The presence of non-egalitarian power can be detected by looking at the social outcome in terms of the relationship between the overall mean (or median) and the means (or medians) of competing groups. Wiseman and Wright's investigation of evidence of partisan policy in the US Senate is used as a case study.

## **6 Social design, ethics and the amount of value**

Ethics is a complex subject and here we focus on a specific ethical criterion, the utilitarian social welfare function. The ideas are relevant to other values besides welfare and the maximisation of total welfare may under certain circumstances be associated with the minimisation of inequality. The notion of value in this chapter is that an object can have a certain amount of value for an individual. Limitations on social value are noted. There are tensions between competing options. The provision of more than one option allows some relaxation of these limitations and tensions. If the option space is continuous then the social value function can take a variety of specific forms. The notion of value-generating power is introduced. Given certain assumptions, the mean social value is a maximum at the mean ideal. Sub-optimal social value can arise as a result of the following factors: a sub-maximal value of the best option; population variation in ideals; the distance of the provided option from the best option; and sensitivity to deviation from the ideal. Practical social design requires attention to a variety of design dimensions and knowledge about people's values regarding these dimensions. This knowledge may not be known in advance and so the design process can be usefully informed by the identification of design dimensions and the obtaining of evidence about people's values regarding these dimensions. An application of these ideas to educational design is described.

## **11 Mathematical political science and game theory**

A game is a structure of actions chosen within the rules. Politics is the game of choosing the rules. In any social activity, the participants have action options and these action options have value consequences. The value consequences for any one individual of that individual's actions may or may not be dependent on other

participants' actions. If the value consequences are not dependent on others' actions then the individual may proceed to make their choice in the manner discussed in Chapter 9. However if the value consequences are dependent on others' actions then the situation has a structure which forms the basis for game theory. In some situations game theory allows an unambiguous identification of the set of best actions for all participants. However there are some situations where it is not clear what the set of best actions for the participants is. In some situations there is a tendency for conflict rather than cooperation. It may be that participants can learn or evolve so that cooperation is more likely. Beyond the simple two-person game a variety of additional features have been added in order to introduce more realistic complexity to the models; and there is growing interest in exploring this complexity using computer simulation.

Social activities are governed by rules and a supporting rule system. A rule partitions the set of all action options into a subset of rule-conforming options and a subset of rule-breaking options. The social choice, the option selected, is influenced by both individual preferences and rules and a consideration of the rule system. For any social activity A there is a social meta-activity concerning the rules for social activity A. Politics is the social activity which focuses on rules: making representations about rules; and making, implementing and applying rules. There are conflicting views about what is the ideal social activity structure and this conflict is played out in the political sphere with actors engaging in strategic interaction within the constraint of rules which are themselves part of the social activity structure. Note that much of the discussion of social choice and social welfare in Chapters 4 to 6 is relevant to politics.

## Political Theology for Peace

This is to let you know that this exciting postgraduate resource for those grappling with the challenges to peace and justice in and through their occupational spheres and localities is available again in the coming academic year. Provided through the Richardson Institute for Peace Studies and located in the PPR Department at Lancaster, the course runs from January to April 2018 and is taught via an intensive residential teaching weekend and five online webinars. Assessment is based on a 5,000 word mini-dissertation on a subject central to the main obstacles to peace within the personal work-life situation of the student concerned. The course is ideal for those seeking to discover and apply love-based contemporary theological resources to their field and in some exceptional circumstances evidence of parallel life experience may be accepted in place of a relevant first degree.

This is likely to be the last year I will be delivering this course, as my seven year research fellowship is coming to a conclusion, so this is a final opportunity to take on board a unique resource which past students have been very positive, even euphoric about! The course carries a postgraduate certificate of academic achievement and costs £805. The initial residential weekend is scheduled for January 19th-21st 2018. The syllabus is attached and the link to for enrolment is here: <http://www.lancaster.ac.uk/study/postgraduate/postgraduate-courses/political-theology-for-peace-distance-pgcert-of-achievement/>

Online registration is now open, and applicants are recommended to begin the progress as soon as possible. Please don't hesitate to contact me if you have any further questions about the course. If you commence the online process, please let me know too.

I look forward to hearing from you,  
Love and peace,  
Roger

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