

Modelling Elections in the Caucasus*

Norman Schofield[†], Maria Gallego,[‡]

JeeSeon Jeon[§] and Marina Muskhelishvili,[¶]
Center in Political Economy, Washington University,
1 Brookings Drive, Saint Louis, MO 63130.

January 31, 2012

Abstract

This paper constructs formal stochastic models of the elections in Georgia in 2008 and in Azerbaijan in 2010. The models include various kinds of *valence*, where valence is defined to be associated with the non policy considerations involving the electoral perceptions of party leaders. Valences can be (i) *exogenous*, held by all members of the electorate, giving an estimate of the perceived “quality” of the political leaders, and empirically estimated by the intercepts in a spatial model; (ii) *sociodemographic*, associated with the various propensities of subgroups in the polity to choose one candidate over another.

We consider logit models of electoral choice, involving these valences, as well as spatial components derived from policy differences between voters’ and candidates’ positions. We compute the “equilibrium” vote maximizing positions of the candidates or parties in the two elections and show that these involved divergence from the electoral center.

We argue that oppositional candidates faced different political quandaries in the two countries. In Georgia the opposition candidates had low valences and were associated with relatively non centrist policy positions. In Azerbaijan the survey we used indicates that there was a degree of political apathy, due to the perception that the election would not be democratic. This made it difficult for opposition candidates to offer credible political competition to the dominant party of the president.

*This paper is based on work supported by NSF grant 0715929 and a Weidenbaum Center grant. Earlier versions were first completed while Gallego was a visitor at the Center and later when Schofield was the Glenn Campbell and Rita Ricardo-Campbell National Fellow at the Hoover Institution, Stanford, 2010. The authors thank the anonymous referees of the journal for very helpful comments. Versions of this paper have been presented at APSA, Seattle, 2011 and the SPSA, New Orleans, 2012.

[†]Director of the Center in Political Economy, Washington University. Corresponding author: schofield.norman@gmail.com

[‡]Department of Economics, Wilfrid Laurier University, Waterloo, Canada and Center in Political Economy, Washington University (mgallego@wlu.ca)

[§]jsjeon@wustl.edu

[¶]Head of the Centre for Social Studies, Tbilisi, Georgia. marinmus@yahoo.com

1 Introduction

The Caucasus is a land of many nationalities, languages and ethnic antagonisms. These deep social divisions shaped the de-facto and de-jure frontiers of the emerging independent states of the region immediately after the dissolution of Soviet Union. The sharpest and the most violent division was the Nagorno-Karabakh separatist war between Armenia and Azerbaijan, which lasted from 1988 to 1994 and cost many hundreds of thousands of casualties. Other violent military conflicts were triggered in Georgia, where Abkhaz and Ossetia separatism conflicted with the Georgian National Independence Movement.

Nation building and territorial conflicts were only part of the complicated political agenda of the region. Liberation from the Soviet rule induced a deep institutional shock that encompassed all spheres of the political system. Countries of the region had to reform almost all aspects of social activity as the Soviet model of social arrangement collapsed. As the crisis was systemic and the new arrangements could not evolve from the old one, it required the creation of a new paradigm. One was provided by the logic of neoliberal globalization and “democratization.”

Besides the challenges of nation building, and the transformation of the political and economic systems, the societies of the region experienced a culture shock. All aspects of culture, including knowledge and symbols, patterns and norms of social arrangement, values and perceptions started to change dramatically. A majoritarian democracy, with political competition through free multiparty elections, was considered to be the main institution through which all these controversies could be transformed into governance.

There is a growing literature on the wave of democratic change that has occurred in the last twenty years in post-communist countries. Sometimes the transitions lead from autocracy to democracy and then back again, and may involve civil war or political instability, as discussed in Bunce and Wolchik (2010) and Carothers (2002). This literature has been complemented by the research on modelling elections in these polities, but this has tended to focus on Eastern Europe or Russia.¹ Many of these polities are “partial democracies”, polities that have elections but lack some of the important institutions of democracy such as a free press or independent judiciary.² Indeed, some partial democracies have also been called *anocracies*, since they exhibit mixed characteristics of both democratic and autocratic regimes and often fall into civil war.³

In this paper we examine the 2008 election in Georgia and the 2010 election in Azerbaijan. In these two “anocracies,” regular elections are held but the party of the president exerts undue influence over the elections and plays a dominant political role. Indeed, the dominant party sometimes uses the electoral

¹Powers and Cox (1997), Fidrmuk (2000a,b), Grzymala-Busse (2002), Kitschelt *et al.* (1999), Markowski (2006), Tucker (2006), Markowski and Tucker (2010a,b), Owen and Tucker (2010).

²See for example Epstein et al. (2006), Vreeland (2008), Fjelde (2010) on partial democracies.

³See Gandhi and Vreeland (2004) and Regan and Bell (2010).

commission to stack the odds in its favor. As a consequence, public protests and unrest seems to have been the only way in which Georgian voters have been able to obtain political changes and leadership turnover. In Azerbaijan, the Central Election Commission disqualified so many candidates that voters were discouraged from participating in the election, bringing the electoral outcome into disrepute.

Despite the problems faced by opposition parties in Georgia and Azerbaijan, if these parties are to ever succeed at replacing the current party in office, they must participate in the election and learn how to communicate and appeal to voters so that the available democratic institutions can work the way they should. If we accept this argument, then it becomes important to understand the electoral processes in these countries.

There appears to have been little research on elections in these two anocracies in the Caucasus. This is an increasingly important region of the world, as it abuts Iran, Turkey and Russia, and includes many major ethnic and religious conflicts involving Russia, and the countries in the region. Moreover, Azerbaijan is an important oil and gas exporter, and pipelines from other oil and gas producing counties to the east have been, or will be constructed through the region.

At a more theoretical level, we see the analysis of elections in this region as a contribution to the study of the political economy literature on the ability of elites to remain in power, even when democratic institutions are in place (Acemoglu, 2008; Acemoglu and Robinson, 2008)

We contribute to the further study of these anocracies by examining which policies the presidential candidates did or could adopt in order to appeal to voters. Opposition parties recognize that the President/autocrat has decided to use the legislature to provide his regime with some legitimacy by using parliamentary elections. Having the opportunity to gain some representation in the legislature, these oppositional parties or candidates have an incentive to maximize their vote share even if they believe that they have little chance of winning the election. The President also has an incentive to maximize vote share in order to give credibility to the regime.

To estimate electoral models for the two elections, we used survey data.. This allows us to deploy factor analysis of the survey data to obtain an estimate of the underlying “policy space” and thus of the positions of the voters. We also need an estimate of the distances between voters and party positions and thus we require estimates of the positions of party leaders. To do this we use the notion of “partisan constituency.” The idea here is that party leaders can fairly easily, through party membership, polls and data bases, obtain information about the policy positions of their supporters, and each can respond by advocating policies that are close to the mean of the preferences of their respective supporters (Roemer, 2001). Using these models we could estimate the positions of the parties that would maximize their vote share, given the positions of the other parties. (We call such a set of positions a *local Nash Equilibrium (LNE)*). We can use simulation of the model to determine precisely the nature of the LNE vector. The LNE is one way to estimate the consequence if

all party positions are determined by “opportunists” who simply want to maximize their parties vote share, as suggested by Downs (1957). In contrast, the “partisan constituency” positions may be regarded as reflecting the preferences of the “guardians” who champion the interests of the party’s core constituency (Roemer, 2011).

For both elections we also estimated spatial sociodemographic models incorporating gender, age, education and financial situation. None of the sociodemographic variables were statistically significant. As we discuss in Section 2.2, the spatial models that we used incorporated the notion of “valence”- an estimate of the electoral perception of the quality of the candidates (Stokes, 1963, 1992). Unlike the usual Downsian models of elections that suggest that parties converge to the electoral center, when we simulated these models we also found that low valence candidates would not position themselves near the electoral center.

Our models suggested that in both polities, candidates or parties opposed to the President faced somewhat different quandaries. In Georgia for example in 2008 there were three major opposition candidates to President Saakashvili, all of whom had much lower valence than the President. We performed a thought experiment, to study the consequence of a coalescence of the opposition parties. This suggested that this coalition would simply increase Saakashvili’s vote share by about 10%. The continuing dilemma for the opposition parties is that the government controls almost all the media so that the opposition is given little opportunity to change the electoral perception of the candidates. As a result, the opposition parties have tended to voice their discontent through popular protests, which may have the effect of lowering their valence further.

In Azerbaijan, President Ilham Aliyev’s ruling Yeni Azerbaijan Party (YAP) took a majority of 72 seats out of 125 and another 38 seats were won by parties supporting the government. We organized a small pre-election sample of 1002 citizens, but we could only use a small subsample of those who intended to vote. A large proportion of those who did not intend to vote believed that the election would be non-democratic. This was partly a response to the electoral commission’s disqualification of many candidates for the election. Using our sample, Yeni Azerbaijan Party had a three-to one advantage over the Azerbaijan Popular Front Party (AXCP) and Equality Party (MP) which together took 24% of the sample vote. According to the valence model, the AXCP-MP group had low valence in contrast to YAP. Again, the electoral origin was not an equilibrium. However we did compute what is called a mixed strategy equilibrium. This thought experiment suggested that among our sample, the AXCP-MP could gain no more than 24% of the vote, no matter what strategy it tried.

For both countries, our estimations suggest that the low valences of the opposition parties has meant that they have been unable to mount a serious challenge to the government regime. This parallels a result found by Schofield and Zakharov (2010) for the Russia Duma election of 2007, which showed that there was a similar valence weakness of the parties opposed to United Russia, the party supportive of then President Putin.

It would seem that in countries like Georgia, Azerbaijan and Russia it is

possible for relatively autocrat regimes to persist, even when though there are democratic elections and viable opposition parties.

2 Recent Georgian Politics

From the time of Perestroika to the present, Georgia has experienced three major changes of government, each of which was preceded by mass mobilization and unrest.

The first was the shift of power from the Communist party to the Round Table - Free Georgia block (headed by Gamsakhurdia) in 1990.

The second was the shift of power from Gamsakhurdia to Eduard Shevardnadze, through the interim government in 1992.⁴ After the first post-Soviet Georgian constitution established a presidential democratic republic, Shevardnadze was elected as a president in November 1995, with 70% of the vote. He won a second term in April 2000.

In 2003 Shevardnadze resigned under the pressure of mass protests, and in the third shift of the November 2003 "Rose Revolution" Mikheil Saakashvili, leader of the United National Movement Party, took 96% of the vote, becoming president on 25 January 2004.

Each of these transfers of power was radical in a sense that it changed not only the ruling elite, but also the dominant trend of political development.

National liberation stances were dominant after the politics of Glasnost and Perestroika allowed for the political involvement of the population. These stances dominated the Supreme Council elections of 1990, where Gamsakhurdia defeated the Communist Party. In 1991, Gamsakhurdia declared independence for Georgia, but he failed, however, to incorporate the agenda of liberal and democratic transformation and to gain support from the ethnic minorities as well as from the democratic opposition.

As a result, the regime was confronted with a new wave of protests. In January 1992, a coup d'état forced Gamsakhurdia to flee from Georgia, and Shevardnadze was invited back to the country from Moscow, in order to halt the collapse into total civil war. Shevardnadze was appointed acting chairman of the Georgian State Council in March 1992, and was elected as the head of state in the first post-soviet multiparty elections.

By late 1993, struggles over issues of Abkhazian and Ossetian separatism developed into a fully-fledged civil war. In 1993, Georgian troops were defeated in their attempt to restore control over the breakaway regions, "Ethnic cleansing" caused 200,000 Georgians to flee from the Abkhaz and Tskhinvali territories. By 1995 the period of civil war was over.

The constitution of 1995, as well as the basic economic reforms of 1994-1996 (including the introduction of a national currency, privatization, and structural adjustment in line with the Washington consensus) together established the fundamental framework for social, political and economic activities. However, there remained a serious gap between formal arrangements and informal practices.

⁴Shevardnadze had been baptized into the Georgian orthodox church in 1991.

Despite the declared pro-democratic and pro-western stance of the Shevardnadze regime, this was a hybrid system that existed until the end of his rule in 2003. On the one hand, Shevardnadze did not restrict freedom of society and allowed the emergence of new political and economic relations. On the other hand, he would not accept major changes within the state and government structures. The greater the demand for change, the more conservative he tended to become. As a result, corruption penetrated all spheres of life and distrust deepened against the state institutions.

The almost unanimous discontent with the conservative, weak and corrupt executive power of the regime overshadowed all other possible political divisions, and unified the opposition to Shevardnadze. The agenda of further democratization became dominant, promoted by the oppositional TV Rustavi2, which supported the "reformers" among the ruling elite - Zurab Jvania and Mikheil Saakashvili. The people eventually mobilized against Shevardnadze, and, in the November 2003 bloodless "Rose Revolution," forced him to resign. Saakashvili became the unchallenged leader of the mass protest movement, taking 96% of the vote for president, and becoming president on 25 January 2004.

Welt (2010) comments that

Georgia's Rose Revolution stemmed from Georgians' discontent with an ineffective, criminalized, and corrupt ruling regime. Georgia's ruling party was not only unpopular before the 2003 election, but also weak.

Saakashvili was regarded as a pro-NATO and pro-USA leader who initially spearheaded a series of political and economic reforms.

For the leaders of the revolution, for the National Movement, democracy was important, as much as democracy was the identity marker of becoming part of the West. In this sense, democracy was an external attribute, a self-declared ideology that aligned Georgia with the West, rather than a certain political practice concerning the organization of the political sphere through competitive elections, and other internal attributes of democratic performance. (Cheterian, 2008)

This time the country found new leadership, composed of a young energetic generation of risk-taking activists who opted for quick political changes. Slow, piecemeal and negotiations-based decision-making, typical for the democratic process, contradicted their perception of themselves as a vanguard of pro-western development. Rule of law, civil and political rights, together with constitutional checks and balances, were supposed to be the norm, but in fact were subject to manipulation and were sometimes clearly violated.

In 2004, Saakashvili established an armed presence in the disputed regions of South Ossetia and Abkhazia. In 2007, a series of anti-government demonstration were triggered by accusations of murder and corruption from several opposition groups.

The change of the constitution in 2004, a decrease in the freedom of the media, as well as cases of the redistribution of property and other violations of the law, marked a growing gap between the pro-western stance of governmental policies and the de facto concentration of power in the hands of a small elite who seemed above the law.

The incompatibility of the pro-western orientation and non-democratic practices split society into two poles. The government promoted its agenda of externally oriented policies, including integration into NATO, arguing that this required strong leadership. The opposition insisted on the agenda of democracy and rule of law, demanding greater equality.

The split of public opinion into two poles could be interpreted as a normal political struggle between those who supported a “Western integration” agenda against those who opted for “democracy and rule of law,” were it not for the illiberal environment in which the split occurred. Moreover, this split induced a change in attitude towards the U.S.

At one time, pro-American feeling was nearly universal in Georgia. This has begun to somewhat change – as manifested by protests in front of the U.S. Embassy and increasing charges levied by the opposition that the United States has chosen to support Saakashvili rather than democracy. (Mitchell, 2008)

Each of these two poles had the support of different media outlets, particularly TV channels. Saakashvili controlled Rustavi2, formerly for the opposition, but by this time pro-government. The opposition depended on Imedi, owned by Badri Patarkatsishvili, a media oligarch, who also ran in the 2008 presidential election.

The two opposed TV channels, Rustavi2 and Imedi, had two very different views of politics. By the Fall of 2007, the governing elite and the leaders of the opposition appeared on their own channels, and seemed to ignore each other. The resulting split within society became extremely polarized.

There are two realities in Georgia today – one seen by Saakashvili supporters and the other by the opposition and more apolitical members of society. (Sumbadze 2009).

2.1 The 2008 Georgian Presidential Election

This split in society, in which two versions of possible development existed simultaneously but separately, was a novelty for Georgia, and dominated the election of 5 January 2008. The anti-government demonstrations had led to a declaration of a state of emergency. The oppositional TV channel Imedi was closed and its equipment partly destroyed by the police. These events led to harsh criticism of the Saakashvili government by the Human Rights Watch for using “excessive” force against protesters. The International Crisis Group warned of growing authoritarianism.

The brief outline of Georgia’s political development given above suggests that voters considered that the 2008 election would be a highly contested election, where the candidates’ positions would be influential in determining the outcome of the election. While it is plausible that voters believed that the President would remain in office, it is also reasonable to infer that the opposition believed there was a chance that they could influence the policy outcomes. (See Table 1 for the election outcome).

[Insert Table 1 here]

We now proceed to model the 2008 election in order to determine the candidates’ policy positions. We use a sample survey to construct a formal model of the 2008 election in an attempt to understand the nature of politics in Georgia. The post-election survey was conducted by GORBI-GALLUP International from March 19 through April 3, 2008 (The details of the survey are given in Appendix 1 in the supplementary material available at <http://dx.doi.org/<full doi>>. The survey contains data on how respondents voted and their sociodemographic characteristics. Table 2 gives the vote shares for the candidates as indicated by the survey.⁵

The survey also contained the voters’ attitudes to the general direction of the country, how pro-western they are, their belief on whether the election was fair or not, their opinions of the USA, the EU, and NATO. The factor analysis done on these questions determined that there were two dimensions in which voters could be allocated in the 2008 election. These dimensions describe attitudes towards democracy and the west. Table 3 gives the factor loadings for the construction of the policy space.

[Tables 2 and 3 here]

The first factor dimension is strongly related with the respondents’ attitude toward the United States, the European Union and NATO. Those who have favorable opinion toward the US, EU and NATO have smaller values in this dimension. Thus, a larger value in the West (W) dimension means stronger anti-western attitude. The other dimension is related to respondents’ judgement about the current democratic environment in Georgia. Larger values in the democracy (D) dimension are associated with negative judgement about the current state of democratic institutions in Georgia, coupled with a demand for more democracy.

The covariance matrix of the electoral distribution of the sample is:

$$\nabla_0 = \begin{bmatrix} & \textit{Democracy} & \textit{West} \\ \textit{Democracy} & \sigma_D^2 = 0.82 & \sigma_{DW} = 0.03 \\ \textit{West} & \sigma_{DW} = 0.03 & \sigma_W^2 = 0.91 \end{bmatrix} \quad (1)$$

This is simply the variance/covariance matrix obtained from the voter distribution in the two dimensional policy space estimated by using each respondent’s

⁵Following a referee’s suggestion, we used multiple imputations so as to be able to use a sample size of 676.

answers to the survey questions, as weighted by the factor loadings given in Table 3. This distribution is displayed in Figure 1. We shall make use of the total electoral variance for Georgia, which is $\sigma^2 = \sigma_D^2 + \sigma_W^2 = 0.82 + 0.91 = 1.73$.

There were four candidates running in the election. The points (S,G,P,N) represents estimated candidate positions, corresponding to Saakashvili (S), Gachechiladze (G), Patarkatsishvili (P), and Natelashvili (N).

[Insert Figure 1 here]

We used the party constituency model to estimate party position in the two dimensional policy space and took the mean value in these two dimensions of those voters who voted for each candidate. The estimated party positions were:

$$\mathbf{z}^* = \begin{bmatrix} & S & G & P & N \\ Democracy : x & -0.41 & 0.79 & 0.49 & 0.62 \\ West : y & -0.08 & 0.01 & 0.33 & 0.39 \end{bmatrix}$$

The three opposition candidates are supported by voters who have similar negative judgments about democracy in Georgia. Figure 1 takes the democracy axis as the x -axis and attitudes to the west as the y -axis. Before discussing the electoral model that we use, we discuss the notion of valence which is crucial for understanding the model.

2.2 Valence in The Spatial Model

Recent research on modelling elections has followed earlier work by Stokes (1963, 1992) and emphasized the notion of valence of political candidates. As Sanders et al. (2011) comment, valence theory extends the spatial or Downsian model of elections by considering not just the policy positions of parties but also

the parties' rival attractions in terms of their perceived ability to handle the most serious problems that face the country...[Thus] voters maximize their utilities by choosing the party that they think is best able to deliver policy success.

Schofield and Sened (2006) have also argued that

Valence relates to voters' judgments about positively or negatively evaluated conditions which they associate with particular parties or candidates. These judgements could refer to party leaders' competence, integrity, moral stance or "charisma" over issues such as the ability to deal with the economy and politics.

Valence theory has led to a considerable theoretical literature on voting based on the assumption that valence plays an important role in the relationship between party positioning and the votes that parties receive.⁶ Empirical

⁶Ansolahehere and Snyder (2000), Groseclose (2001) Aragones and Palfrey (2002, 2005), Schofield (2003, 2004), Peress (2010).

work, based on multinomial logit methods, has also shown the importance of electoral judgements in analysis of elections in Canada, the United States and the United Kingdom.⁷ These empirical models of elections have a “probabilistic” component. That is they all assume that “voter utility” is partly “Downsian” in the sense that it is based on the distance between party positions and voter preferred positions and partly due to valence. The estimates of a party’s valence is assumed to be subject to a “stochastic error.”⁸ In this paper we use the same methodology.

Clarke et al. (2009a: 159) has compared pure “Downsian” spatial models of the 2000 and 2004 US presidential elections with valence models of the same elections. Their overall conclusion was that the two classes of models had “approximately equal explanatory power.” The pure “Downsian” spatial model of voting tends to predict that parties will converge to the center of the electoral distribution.⁹ However, when valence is included, then the prediction is very different. To see this suppose there are two parties, A and B, and both choose the same position at the electoral center, but A has much higher valence than B. This higher valence indicates that voters have a bias towards party A and as a consequence more voters will choose A over B. The question for B is whether it can gain votes by moving away from the center. It should be obvious that the optimal position of both A and B will depend on the various estimated parameters of the model.

To estimate optimal party positions we use a Downsian multinomial logit vote model incorporating valence. The model estimates a parameter β which gives a measure of the weight that voters assign to the policy differences they have with the various parties. Using $\{j \in P\}$ to denote the parties or candidates, the vector of valences $\boldsymbol{\lambda} = \{\lambda_j : j \in P\}$ can be estimated from the intercept terms of the model. Each intercept term, λ_j , can be interpreted as the exogenous valence of the candidate or leader of party j and essentially provides a measure the average electoral perception of the “quality” of j . Lastly, the distribution of voter preferences is given by the variance/covariance matrix of the electoral distribution.¹⁰ The total electoral variance is denoted by σ^2 . The model is therefore characterized by a set of estimates $\{\boldsymbol{\lambda}, \beta, \sigma^2\}$.

Using the estimated parameters of the probabilistic vote model, we can determine whether there are local Nash Equilibrium (LNE). An LNE is a vector of party positions such that each party, j , chooses a policy position, z_j , from the set of possible positions in order to locally maximize its vote share, given the positions of the other parties and the anticipated electoral outcome.

A theorem by Schofield (2007) provides a technique for examining this optimization problem in terms of a convergence coefficient, denoted c . This co-

⁷Clarke et al. (2005, 2006, 2009b, 2011a,b), Schofield (2005), Schofield et al. (2011a,c), Scotto et al. (2010).

⁸We assume the stochastic error is given by a Type I extreme value distribution.

⁹Enelow and Hinich (1982, 1984a,b).

¹⁰The electoral distribution of preferred points can be obtained from a survey. Assuming there are w dimensions in the policy space, then the electoral covariance matrix, ∇_0 , will be a w by w matrix, whose diagonal terms give the variances on each axis, taken about the mean on that axis.

efficient depends on various parameters, $\{\lambda, \beta, \sigma^2\}$, of the model. Firstly, the coefficient c is an increasing function of $\beta\sigma^2$. Secondly, c depends on the differences between the valence estimates. In particular, if the valence differences between the parties are increased for some exogenous reason, then c also increases.

Schofield (2007) shows that if $c < 1$, then the local Nash Equilibrium is one where all parties adopt the same position at the mean of the electoral distribution. On the other hand, if $c \geq w$, where w is the dimension of the policy space, then the electoral mean cannot be an LNE. Alternatively, we say that $c < w$ is a *necessary* condition for convergence to the electoral mean.

As $\beta\sigma^2$ increases together with the valence differences, then c will also increase. In a polity with small $\beta\sigma^2$ and with low valence differences, so that $c < 1$, we expect all parties to converge to the electoral center. Thus a low value of c is indicative of a *centripetal* tendency in the political configuration.

To the contrary, if there are many parties, some with low valences, then for $\beta\sigma^2$ sufficiently large so that $c \geq w$, then we expect parties to diverge away from the electoral center. Indeed, we expect those parties that exhibit the lowest valence to move further away from the electoral center. Thus a high value of c is indicative of a *centrifugal* tendency.

It also follows from the analysis that even when $c \geq w$ then a party that is generally regarded as having a very high valence will tend to respond to the electoral preferences by positioning itself close to the electoral center. This analysis suggests that low valence parties face a difficult quandary. If their valence is low then they will be forced to move to the electoral periphery. If they are perceived as too radical, then the electorate is also likely to perceive such a party as being ill-equipped to govern, thus maintaining the party's low valence.

Using the estimated parameters of the multinomial vote model, we can determine whether the electoral mean is an LNE.

As indicated above, for the 2008 Georgian election we find that the policy space is two dimensional (given by the two factors, Democracy and the West). Moreover, the convergence coefficient $c_{Georgia}$ was estimated to be 2.43 which is greater than 2. We therefore conclude that "opportunistic" low valence opposition candidates should adopt positions away from the electoral origin in order to increase their vote share. As discussed below, a similar analysis for the 2010 election in Azerbaijan gave a one-dimensional space. We found that the convergence coefficient $c_{Azerbaijan} = 1.44$ was greater than 1. Since this estimate also exceeds the necessary bound for convergence, we infer that the opposition parties should diverge from the electoral mean in order to maximize their vote share. We used simulation of the models to determine precisely the nature of the equilibria.

The formal details of the spatial model are given in Appendix 3 in the supplementary material available at <http://dx.doi.org/<full doi>>. We now apply the pure spatial model to the 2008 election in Georgia.

3 Interpreting the spatial model for Georgia

The survey gave information on whether respondents voted and for whom, and we constructed various logit models of the elections using these survey data combined with the pure spatial model presented in the previous section.

When estimating the model for Georgia, we used Natelashvili as the base candidate, so that the coefficients of the model are measured relative to that of Natelashvili. Table 4 gives the following coefficients for the MNL estimation:

$$\begin{aligned}\lambda_S &= 2.56, \lambda_G = 1.50, \lambda_P = 0.53, \lambda_N \equiv 0.0 \\ \beta &= 0.78.\end{aligned}\tag{2}$$

[Insert Table 4 here]

As Table 4 indicates, two of the candidates, Saakashvili and Gachechiladze, have valences that are significantly positive. In addition, the valence of Patarkatsishvili is positive and almost significantly different from 0 at the 5% level. It is then clear that Natelashvili with $\lambda_N \equiv 0$ has the lowest valence. Thus, these results indicate that in 2008 Natelashvili was the candidate generally regarded to be of the lowest quality, once policy differences between candidates were taken into account. When candidates locate at the electoral mean, then each candidate, j , is characterized solely by the exogenous valence, λ_j . (This corresponds to the intercept term in the regression.) Note that the valence term, λ_j , measures the common perception of the quality of candidate j among the sample. That is, λ_j is the non-policy component in the voter's utility function.

Recall that we are interested in finding where the candidates will locate in the policy space in order to locally maximize vote share. Because the outcome of the election depends on these vote shares, we implicitly assume that candidates use polls and other information at their disposal to form an idea of the election outcome.

One possibility is for all candidates to locate at the electoral mean. We let \mathbf{z}_0 denote the joint mean vector. Assuming this to be the case, then candidates will differ only in their valence terms (i.e., on the model's estimates of the candidates' quality). Under this assumption, we can then use the above coefficients given by (2), to estimate the probability that a typical voter chooses Natelashvili at the vector \mathbf{z}_0 . From standard results of the logit model this is:

$$\rho_N = \frac{\exp[\lambda_N]}{\sum_{k=1}^4 \exp[\lambda_j]} = \frac{e^0}{e^0 + e^{0.53} + e^{1.50} + e^{2.56}} \simeq 0.05.\tag{3}$$

Following a similar procedure we can estimate the probabilities that a typical voter chooses the various candidates at the vector \mathbf{z}_0 :

$$(\rho_S, \rho_G, \rho_P, \rho_N) = (0.65, 0.22, 0.08, 0.05)$$

These estimates are close to the sample vote shares, given in Table 2, of

$$(v_S, v_G, v_P, v_N) = (0.63, 0.23, 0.09, 0.05)$$

Many studies have shown however that parties do not find it in their best interest to locate at the electoral mean and we will show that this is the case in Georgia.

We now apply the theorem to determine whether Natelashvili, the candidate with the lowest valence, has any incentive to be positioned at the electoral mean. Schofield (2007) shows that the Hessian of the vote share function of Natelashvili, is given by the formula

$$C_N = 2\beta(1 - 2\rho_N)\nabla_0 - I.$$

Using (2) and (3) and the estimate $\beta = 0.78$, then

$$2\beta(1 - 2\rho_N) = 2 \times 0.78 \times 0.9 = 1.4.$$

Since

$$\nabla_0 = \begin{bmatrix} & Democracy & West \\ Democracy & \sigma_D^2 = 0.82 & \sigma_{DW} = 0.03 \\ West & \sigma_{DW} = 0.03 & \sigma_W^2 = 0.91 \end{bmatrix}$$

we find that

$$C_N = (1.4) \begin{bmatrix} 0.82 & 0.03 \\ 0.03 & 0.91 \end{bmatrix} - I = \begin{bmatrix} 0.15 & 0.04 \\ 0.04 & 0.28 \end{bmatrix}$$

It is easy to see that the eigenvalues of C_N are both positive (+0.29 and +0.14) with eigenvectors (1, 3.53) and (-3.53, 1) respectively. We infer that the joint electoral mean gives a *minimum* of Natelashvili's vote share function. This candidate thus has an incentive to move away from the electoral mean in order to increase his vote share. Schofield (2007) defines the *convergence coefficient* to be

$$c \equiv c(\boldsymbol{\lambda}, \beta) = 2\beta(1 - 2\rho_N)\sigma^2.$$

Since $\sigma^2 = 0.82 + 0.91 = 1.73$, we can compute the *convergence coefficient* for this election in Georgia to be:

$$c \equiv c(\boldsymbol{\lambda}, \beta) = 2\beta(1 - 2\rho_N)\sigma^2 = 1.4 \times 1.73 = 2.43.$$

Since the convergence coefficient $c = 2.43 > 2$, then by the Valence Theorem we know that the joint electoral mean cannot be locally maximize Natelashvili's vote function. Therefore, we conclude that, in the 2008 Georgian election, the electoral mean could not be a vote maximizing LNE.

We can perform the same analysis for Patarkatsishvili. Using $\rho_P = 0.09$, we find that

$$C_P = (2 \times 0.78 \times 0.82) \begin{bmatrix} 0.82 & 0.03 \\ 0.03 & 0.91 \end{bmatrix} - I = \begin{bmatrix} 0.06 & 0.04 \\ 0.04 & 0.19 \end{bmatrix}$$

Again C_P has positive eigenvalues.

Once Patarkatsishvili and Natelashvili move from the electoral mean, then the other candidates should also move. However, because Saakashvili has such a high valence ($\lambda_S = 2.56$), his vote share will be little affected by the positions of the other low valence candidates, and we would expect his vote maximizing position to be close to the electoral origin.

It is also possible that sociodemographic characteristics may influence voters' choices. We used the sociodemographic characteristics available in the survey: gender, age, education and financial situation. Table 5 gives the results of the spatial sociodemographic model. Only gender has a statistically significant effect, with women in favor of Saakashvili. Age, education, and financial situation are not significant.

[Insert Table 5 here]

Note that the loglikelihoods of the pure and the spatial sociodemographic models were not significantly different from one another. This implies that the sociodemographic characteristics are not statistically significant in explaining voter behavior in our sample for Georgia. Other analysis using the spatial model (Schofield et al., 2011b) have also found the loglikelihoods for the pure spatial model and the spatial model with sociodemographics to be almost identical. For Georgia the sociodemographic variables generally add little information once the estimated voter positions are utilized. More importantly the LNE for the pure spatial model and the spatial sociodemographic were found to almost identical.

We use the coefficients of the spatial sociodemographic model to estimate the local Nash equilibrium (LNE). To do this, we simulated the model by estimating each candidate's best response to the given positions in Figure 1 taking as given the anticipated electoral outcome as reflected in the coefficients estimated in the spatial sociodemographic model. We obtained the LNE that we label \mathbf{z}^{el} :

$$\mathbf{z}^{el} = \begin{bmatrix} & S & G & P & N \\ Democracy : x & -0.03 & 0.04 & -0.54 & 0.28 \\ West : y & -0.04 & -0.22 & -0.21 & 1.12 \end{bmatrix}.$$

The estimated vote shares at this LNE are

$$(e_S, e_G, e_P, e_N) = (0.63, 0.22, 0.09, 0.07)$$

in contrast to the vote shares at the electoral mean

$$(\rho_S, \rho_G, \rho_P, \rho_N) = (0.65, 0.22, 0.08, 0.05).$$

Notice that both Natelashvili and Patarkatsishvili do slightly better at the LNE.

Figure 2 gives the estimated equilibrium positions for this model. We reiterated this procedure many times starting with different initial positions but were unable to locate any other LNE.

[Insert Figure 2 here]

As expected from the model, the high valence candidate, Saakashvili, has an equilibrium position very near the origin, followed by Gachechiladze, followed by Patarkatsishevili, with Natelashvili furthest away. Notice that the equilibrium position for Natelashvili is $(0.28, 1.12)$ which almost lies on this candidate's major eigenvector $(1, 3.53)$.

Thus, according to our analysis, Saakashvili's vote maximizing position should be very close to the center of the electoral distribution, precisely because his vote share Hessian will have positive eigenvalues at the origin. In contrast, the low valence candidates, Patarkatsishvili and Natelashvili, if they wish to gain as many votes as possible would be forced by the logic of the electoral model, to adopt divergent positions away from the electoral center.

A comparison of Figures 1 and 2 suggests that there can be various incentives acting on the candidates which pull them away from the pure vote maximizing equilibrium positions. Indeed, we suggest that there is a tug of war in each party between opportunists who in a Downsian fashion, are concerned with vote maximization, and the party members who believe the party should express the policy preferences of the party's supporters. We further suggest that the partisan constituency positions of the candidates are maintained, in part, by the influence of activists, who provide resources to the candidates, and prefer more divergent positions than those suggested by the Downsian "opportunistic" model.

We suggest that activists pull Saakashvili to the lower left of the policy space, while the other oppositional candidates respond to their activists in demanding more democracy. Both Patarkatsishvili and Natelashvili also appear to appeal to voters who have attitudes opposed to western institutions.

A comparison of \mathbf{z}^* and \mathbf{z}^{el} , as illustrated by Figures 1 and 2 suggests the nature of the quandary that the opposition candidates face. All opposition candidates appeal to voters who wish for more democracy, but they split the votes between them, so together they take less than 50% of the vote. Partly because of this fragmentation, their valences are low, so they cannot mount a credible challenge to Saakashvili.

We can perform a thought experiment to determine the outcome if the opposition were to form a united front, under Gachechiladze. Assuming his valence is still $\lambda_G = 1.50$, then we estimate the opposition vote share at the mean to be $\rho_G = 0.26$. In this case we would find that Gachechiladze's vote maximizing position would be at the electoral mean, leading to a vote split of 74% for Saakashvili and 26% for Gachechiladze. In other words, the opposition would gain nothing from coalescing.

3.1 After the 2008 election

As we now discuss, after the election the opposition was involved in mass demonstrations, hoping thereby to reduce the electoral perception of Saakashvili's advantage. However, Saakashvili has been able to deploy various political and military stratagems, including provoking an invasion by Russian forces. The

intention of these strategems was presumably to give the electorate cause for fear of the future, increasing the perception of Saakashvili as a strong leader.

Muskhelishvili *et al.* (2009) commented that the election result

created suspicion, since cases of stuffing ballots ... were registered in many precincts... Being unable to either change the regime or improve its quality through elections the opposition movement gradually lost momentum. The main opposition parties refused to consider these results legitimate. Because...a large share of society welcomed this refusal by participating in mass post-electoral protest demonstrations, the political crisis of 2007 was not resolved by the [Presidential and Parliamentary] elections of 2008.

In August 2008, a series of clashes between Georgian and South Ossetian forces resulted in Saakashvili ordering an attack on the town of Tskhinvali. In response, the Russian army invaded South Ossetia, followed later by the invasion of other parts of Georgia. Eventually there was a cease fire agreement, and on 26 August the Russian president, Dmitry Medvedev, signed a decree recognizing Abkhazia and South Ossetia as independent states. On August 29, 2008, in response to Russia's recognition of Abkhazia and South Ossetia, Georgia broke off diplomatic relations with Russia.

Since then, opposition parties have accused the president of rigging elections and using riot police to crush opposition rallies. The government has established direct control over most of the TV outlets, leaving the opposition only with access to the internet. But such outlets do not allow the opposition to persuade the electorate that's its leaders are of high quality.

Opposition against Saakashvili intensified in 2009, when there were mass demonstrations against him. The next presidential election is planned for 2013. In preparation, on October 15, 2010, the Parliament approved, by 112 to 5, a constitutional amendment that increased the power of the prime minister over that of the president. It was thought that this was a device to allow Saakashvili to take on the role of prime minister in 2013, just as Putin had done in Russia.¹¹

4 The 2010 Election in Azerbaijan

In the 2010 election in Azerbaijan, 2,500 candidates filed application to run in the election, but only 690 were given permission by the electoral commission. The parties that competed in the election were: Yeni Azerbaijan Party (the party of the President, YAP), Civic Solidarity Party (VHP), Motherland Party (AVP), Azerbaijan Popular Front Party (AXCP) and Musavat (MP). Various

¹¹Another similarity between Georgia and Russia involves the funding of electoral competition. Sonin and Tucker (2007) suggest that the dominance of the pro-Putin party, United Russia follows from its control of economic resources. Notice that Prime Minister Putin and President Dmitry Medvedev announced in late September, 2011, that they had reached an accord under which Putin would again stand as President in the next election.

small parties formed political blocks (these are referred to in the survey question in the Appendix).

National and foreign experts expected no major improvement in the conduct of these elections. No election after 1992 has been fully in accordance with national and international democratic standards. So far Azerbaijan has been convicted twice of election fraud during the 2005 parliamentary elections by the European Court of Human Rights in Strasbourg. In April it was about Nemat Aliyev's case and in September about Flora Karimova. (More cases are expected to be decided soon.) The pre-election atmosphere was tense with the media complaining of pressure and of transparent financial transactions of state officials.

The opposition alleged irregularities and Musavat declared that the election was illegitimate. It also asserted that the West did not criticize the regime because of Azerbaijan's geostrategic location. President Aliyev, however, rejected the criticisms claiming the election "conformed to European standards."

President Ilham Aliyev's ruling Yeni Azerbaijan Party took a majority of 72 out of 125 seats (see Table 6a). Nominally independent candidates, who were aligned with the government, received 38 seats, and 10 small opposition or quasi-opposition parties took 10 seats. The Democratic Reforms party, Great Creation, the Movement for National Rebirth, Umid, Civic Welfare, Adalet (Justice), the Popular Front of United Azerbaijan most of which were represented in the previous parliament, won one seat a piece. Civic Solidarity retained its 3 seats, and Ana Vaten kept the 2 seats they had in the previous legislature.

For the first time, not a single candidate from the opposition Azerbaijan Popular Front (AXCP) and Musavat was elected. These two parties only took 3.1% of the vote, while the independent candidates took 48.2% of the vote but only 48 seats out of 125. See Table 6b for the seat distributions.

The Central Election Commission (CEC) said turnout was 50.1 percent, out of a total 4.9 million people eligible to vote. Opposition leaders suggested the low turnout was due to candidate disqualifications by the CEC, and consequent discouragements to vote after their choice of candidate was excluded. Anger with the regime later made itself felt in pro-democracy protests in early April 2011, triggered by protests throughout the Middle East from December 2010 onwards.

[Insert Tables 6a,b here]

We were able to organize a small pre-election survey of 2010 election in Azerbaijan which allowed us to construct a model of the election. The survey was conducted by the International Center for Social Research (ICSR), Baku, Azerbaijan. The survey data is given in the Appendix 2. These included questions about respondents' evaluations of the democratic situation, political institutions, and economic environment in Azerbaijan, as well as voting intention. The number of respondents in the original data set was 1002. The final number of observation used in this analysis was only 149 for three reasons.

First, a large number of respondents (636) abstained (they answered that they would not vote). Thus there is no information on their party preference. See

the material in Appendix 2, in the Supplementary material in <http://dx.doi.org/<full doi>>

Second, among the remaining are 138 who were independent voters (those who answered that they would vote for independent candidates) and 53 who reported that they intended to vote for the parties other than YAP, VHP, AVP, AXCP and MP.

Among the remaining 173 cases, only 160 had completed the factor analysis questions. The number of respondents choosing the various parties was (YAP,VHP,AVP,AXCP+MP)= (113, 7, 4, 36).¹²

Finally, for VHP and AVP, the estimation of party positions was very sensitive to inclusion or exclusion of one respondent. Thus, we used only the small subset of 149 voters who completed the factor analysis questions and intended to vote for YAP or AXCP+MP.

[Insert Table 6c here]

Table 7 gives the one-dimensional factor model. Larger values of the resultant factor score was associated with negative evaluation of the current democratic situation in Azerbaijan. Specifically, the respondents with larger values on the x -axis tended to be dissatisfied with the current Azerbaijani democracy, did not think that free opinion is allowed, had a low degree of trust in key national political institutions, and expected that the 2010 parliamentary election would be undemocratic. This dimension is called “Demand for democracy.” Figure 3 displays the distribution of respondents along this dimension. The respondents’ variance is $\sigma^2 = 0.93$.

As in the analysis for Georgia, party positions were taken to be the mean of the party voters’ positions. The party positions were estimated to be

$$(YAP, AXCP + MP) = (-0.47, 1.48).$$

Figure 3 also shows the estimated party positions for these two parties. We considered voters who evaluated themselves as a supporter of a party as *activists*. These party activist means were located at

$$(YAP, AXCP + MP) = (-0.63, 1.57)$$

The number of activists for YAP and AXCP-MP were 48 and 19, respectively. These activist mean positions are also shown in Figure 3.

[Insert Table 7 and Figure 3 here]

Table 8(i) presents the pure spatial *binomial* logit model while Table 8(ii) gives the model including the spatial coefficient and the sociodemographic variables.. In both cases we used AXCP-MP is the base party. In the first model, $\beta = 1.34$ and $(\lambda_{YAP}, \lambda_{AXCP-MP}) = (1.30, 0)$. As in the analysis for Georgia,

¹²See Table 6c. Because of the survey design, AXCP and MP were not differentiated and are regarded as one party block. See question wording in the Appendix 2 for vote choice.

none of the sociodemographic variables were found to be statistically significant.¹³ In particular, the loglikelihoods of the pure and the spatial sociodemographic models were not significantly different from one another.

Using the coefficients for the pure spatial we estimated the probabilities that a typical voter votes for one or other of these two parties in the pure spatial model to be $(\rho_{yap}, \rho_{axcp+mp}) = (0.79, 0.21)$. Using $\beta = 1.34$ and the electoral variance $\sigma^2 = 0.93$ we can then calculate the convergence coefficient of the pure spatial model to be

$$\begin{aligned} c &= 2\beta(1 - 2\rho_{axcp+mp})\sigma^2 \\ &= 2 \cdot (1.34) \cdot (1 - 2 \cdot 0.21) \cdot 0.93 \\ &= 1.445. \end{aligned}$$

Since $w = 1$, and $c = 1.445 > 1$ for the pure spatial model, then the valence theorem implies divergence from the electoral mean by all parties. Note that

$$\begin{aligned} C_{axcp-mp} &= 2\beta(1 - 2\rho_{axcp+mp})\sigma^2 - 1 \\ &= 0.445. \end{aligned}$$

Thus $C_{axcp-mp}$ has a positive eigenvalue and the electoral mean is a minimum of the AXCP+MP vote function. It follows that the AXCP+MP, regarded as a single party should move away from the mean, with the obvious direction being towards its party constituency position. In the same way YAP should move to the opposite side of the axis.¹⁴

When we analyzed the model we found that there was no LNE. Instead we found a limit cycle as in Figure 4. For example if we start at $(YAP, AXCP+MP) = (0.2, 0.33)$ with vote shares $(0.795, 0.205)$ then

AXCP+MP can shift to -0.54 to increase its share to 0.276. In response, YAP can move from 0.20 to -0.32 to increase its share from 0.724 to 0.811. The rest of the cycle is shown here:

		AXCP+MP	
	Position	0.33	-0.54
YAP	0.20	(0.795, 0.205)	(0.724, 0.276)
	-0.32	(0.713, 0.288)	(0.811, 0.189)

Payoffs: expected voteshares (YAP, AXCP) = (0.76, 0.24)

The *mixed strategy equilibrium* has YAP position itself at 0.20 with probability 0.58 and at -0.32 with probability 0.42, while AXCP+MP positions itself at 0.33 with probability 0.51 and at -0.54 with probability 0.49. The expected vote shares at the mixed equilibrium is identical to the two party sample vote

¹³The variable 'city' is a binary variable indicating whether the respondent resides in city area or not. The category 1, 2 and 3 in the question 'type of location' are coded as city, and 4 and 5 are coded as non-city residents.

¹⁴We may say the electoral mean is a "repellor."

shares. Notice that the AXCP+MP does slightly better than at the electoral mean, taking 0.24 instead of 0.21

[Insert Figure 4 here].

As we have noted, we only model voters who did intend to vote. We did not use survey respondents who stated that they would abstain from voting.

However, as Table A2 (in Appendix 2, in the supplementary material available at <http://dx.doi.org/<full doi>>) shows, those respondents who were unlikely to vote tended to believe that elections in Azerbaijan were not democratic.

5 Conclusion

As we observed in the introduction, in many of the newer democracies of the old Soviet Union, and in Latin America, there have been moves towards partial democracy and then reversion to military or autocratic rule.

Levitsky and Way (2002) have noted that the post-Cold War world has been marked by the proliferation of hybrid [or partially democratic] political regimes:

In different ways, and to varying degrees, polities across much of Africa (Ghana, Kenya, Mozambique, Zambia, Zimbabwe), post-communist Eurasia (Albania, Croatia, Russia, Serbia, Ukraine), Asia (Malaysia, Taiwan), and Latin America (Haiti, Mexico, Paraguay, Peru) have combined democratic rules with authoritarian governance during the 1990s. Scholars often treated these regimes as incomplete or transitional forms of democracy. Yet in many cases these expectations (or hopes) proved overly optimistic.

The analysis of Georgia and Azerbaijan indicates that the implementation of full democracy in these countries faces certain difficulties because of the fact that oppositional groups in these two countries have to deal with different political quandaries. In Georgia the three opposition candidates that we included in the analysis are estimated to have exogenous valences that are markedly different from that of President Saakashvili. As a result, electoral logic forces them to adopt relatively radical positions away from the electoral center in order to maximize their vote shares. Were any of them to attempt to appeal to more centrist voters by adopting less radical policies, then Saakashvili could offer compromises which would still result in his re-election. The fragmentation of the opposition has contributed to the low electoral perception of the quality of the opposition. This has led to a situation where the opposition is limited to the use of public demonstrations in the hope that this would bring greater opposition to Saakashvili, as exemplified by a decrease in his valence, or overall perception of the quality of the regime.

In Azerbaijan, although we have only a small sample, Table A2 suggests that there is a correlation between the intention to vote and the belief that the election would be democratic. Indeed, the survey suggests that there is a degree of electoral apathy. We can infer that after the electoral commission prevented

certain candidates from running in the election, many respondents saw no point in voting because they believed that the election would not be truly democratic.

The model estimate of the valence difference between YAP and AXCP-MP was sufficient to generate a theoretical vote share split of 79% to 21%, within our model. This is very close to the sample split between these parties. This estimated valence difference suggests that the electorate was unconvinced about the quality of the oppositional leaders. As in Georgia, the opposition was highly fragmented and this, together with the electoral perception of the opposition leaders, and the disqualification of many candidates, would seem to be the cause of the electoral apathy.

In both countries greater access to the media by opposition candidates could possibly lead to a change in the electoral perception of the opposition, thus bringing about a more effective opposition and a greater degree of democratic consolidation.

5.1 Acknowledgment

The authors thank Merab Pachulia, Director of GORBI, Tbilisi, Georgia for making the survey data for the 2008 election in Georgia available. We also thank Rauf Garagozov, Leading Research Fellow, International Center for Social Research (ICSR), Institute of Strategic Studies of the Caucasus, Baku, Azerbaijan. He and his colleagues, Tair Faradov and Rajab Sattarov, of ICSR, carried out the pre-election survey in Azerbaijan in 2010.

6 References

- Acemoglu, D., (2008). Oligarchic versus democratic societies. *Journal of the European Economic Association*, 6, pp. 1-44.
- Acemoglu, D. and J. Robinson. (2008) Persistence of power, elites, and institutions. *American Economic Review*, 98, pp.267-293.
- Anable, D. (2006) The Role of Georgia’s media—and Western aid—in the Rose Revolution. *The Harvard International Journal of Press/Politics*, 11, pp. 7-43.
- Ansolabehere, S., and J. Snyder. (2000). Valence politics and equilibrium in spatial election models. *Public Choice*, 103, pp.327–336.
- Aragones, E., and T. Palfrey. (2002). Mixed equilibrium in a Downsian model with a favored candidate. *Journal of Economic Theory* 103,pp.131–161.
- Aragones, E., and T. Palfrey. 2005. Spatial competition between two candidates of different quality: The effects of candidate ideology and private information, in D. Austen-Smith and J. Duggan (eds). *Social Choice and Strategic Decisions*. Heidelberg: Springer, pp.93-111.
- Broers, L. (2005) After the ‘Revolution’: Civil society and the challenges of consolidating democracy in Georgia. *Central Asian Survey*, 24, pp.333–350.
- Bunce, V. (2000) Comparative democratization. *Comparative Political Studies*, 33, pp.703-734.

- Bunce, V. and Wolchik, S. (2010) The regional tradition, in: V.Bunce and S.Wolchik (eds) *Democracy and Authoritarianism in the Post Communist World* (Cambridge: Cambridge University Press), pp.30-56.
- Carothers, T. (2002) The end of the transition paradigm. *Journal of Democracy* 13, pp. 5-21.
- Fjelde, H. (2010) Generals, dictators and kings. *Conflict Management and Peace Research*, 27, pp. 195-218.
- Cheterian, V. (2008) Georgia's Rose Revolution: Change or repetition? Tension between state-building and modernization projects. *Nationalities Papers*, 36, pp.689-712.
- Clarke, H., D. Sanders, M. Stewart, and P. Whiteley. (2005). *Political Choice in Britain*. (Oxford, Oxford University Press).
- Clarke, H., D. Sanders, M. Stewart, and P. Whiteley. (2006). Taking the bloom off new Labour's rose: Party choice and voter turnout in Britain. *Journal of Elections, Public Opinion, and Parties*, 16, pp.3-36.
- Clarke H.D., A.Kornberg A. and T. J. Scotto. (2009a). *Making Political Choices*. (Toronto, Toronto University Press).
- Clarke, H, D.Sanders, M. Stewart , and P. Whiteley.(2009b). *Performance Politics and the British voter*. (Cambridge: Cambridge University Press).
- Clarke, H, A. Kornberg, T. J. Scotto, J. Reifler, D. Sanders , M. Stewart ,and P. Whiteley (2011a). "Yes We Can! Valence politics and electoral choice in America 2008. *Electoral Studies* 30, pp.450-461.
- Clarke, H, T. J. Scotto, and A. Kornberg (2011b). Valence politics and economic crisis: Electoral choice in Canada 2008. *Electoral Studies* 30, pp. 438-449.
- Enelow J. M. and M. J. Hinich. (1982). Nonspatial candidate characteristics and electoral competition. *Journal of Politics* 44, pp.115-131.
- Enelow, J.M., and M. J. Hinich. (1984a). *The Spatial Theory of Voting*. Cambridge: Cambridge University Press.
- Enelow, J.M. and M.J. Hinich. (1984b). Probabilistic voting and the importance of centrist ideologies in democratic elections. *Journal of Politics* 46,pp. 459-478.
- Epstein D., R. Bates , J. Goldstone, I. Kristensen and S.O'Halloran (2006) Democratic transitions. *American Journal of Political Science*, 50, pp.551-568.
- Fidrmuk J (2000) Economics of voting in post-communist countries. *Electoral Studies*, 19, pp.199-217.
- Fidrmuk J (2000) Political support for reforms: Economics of voting in transition countries. *European Economic Review*, 44, pp. 1491-1513.
- Fjelde, H. (2010) Generals, dictators and kings. *Conflict Management and Peace Research*, 27, pp. 195-218.
- S.Galiani, Schofield, N. and Torrens G. (2012) Factor Endowments, Democracy and Trade Policy Divergence. forthcoming in *Journal of Public Economic Theory*.
- Gandhi, J. and J. Vreeland (2004) Political institutions and civil war: Unpacking anocracy. Working Paper, Emory University.
- Groseclose, T. 2001. A model of candidate location when one candidate has valence advantage. *American Journal of Political Science* 45,pp.862-886.

- Grzymala-Busse A (2002) *Redeeming the Communist Past*. (Cambridge, Cambridge University Press).
- Kitschelt H., Mansfeldova Z., Markowski, R., and Toka G. (1999) *Post-Communist Party Systems*. (Cambridge, Cambridge University Press).
- Levitsky, S., and L. A. Way. (2002) The rise of competitive authoritarianism. *Journal of Democracy*, 13, pp. 51-65.
- Markowski R (2006) Polish elections of 2005: Pure chaos or restructuring of the party system. *Western European Politics*, 29, pp. 814-832.
- Markowski R, and Tucker J (2010a) Euroskepticism and the emergence of political parties in Poland. *Party Politics*, 16, pp. 523-548.
- Markowski R., and Tucker J. (2010b) Subjective vs. objective proximity in Poland: New directions for the empirical study of Political representation. Working Paper, New York University.
- McKelvey, R. D., Patty, J. 2006. A theory of voting in large elections. *Games and Economic Behavior*, 57, pp.155–180.
- Mitchell L. (2008) Democracy bound. *The National Interest*, 95, pp. 70-76.
- Muskhelishvili, M. et al. (2009) Georgia's ongoing struggle for a better future continued: Democracy promotion through civil society development. *Democratization*, 16, pp. 682-708.
- Muskhelishvili, M. (2010) Georgia in a new wave of transformation. *Journal of Political and Economic Studies*, 4, pp. 35-41.
- Owen A, and Tucker J A (2010) Past is still present: Micro-level comparisons of conventional vs. transitional economic voting in three Polish elections, *Electoral Studies*, 29, pp. 25-39.
- Peress M. 2010. The spatial model with non-policy factors: A theory of policy motivated candidates. *Social Choice and Welfare*, 34: 265-294.
- Powers D.V., and Cox J.H. (1997) Echoes from the past: The relationship between satisfaction with economic reforms and voting behavior in Poland. *American Political Science Review* 91: 617–33.
- Quinn, K., Martin A., and Whitford A. (1999) Voter choice in multiparty democracies. *American Journal of Political Science*, 43: 1231–1247.
- Regan, P.M. and S. R. Bell. (2010) Changing lanes or stuck in the middle: Why are anocracies more prone to civil wars? *Political Research Quarterly*, 63: 747-759.
- Roemer, J. E. (2001) *Political Competition*. (Cambridge MA., Harvard University Press).
- Roemer, J. E. (2011). A theory of income taxation where politicians focus upon core and swing voters. *Social Choice and Welfare*, 36, pp. 383-422.
- Sanders, D., Clarke, H.D., Stewart, M.C., and Whiteley, P. (2011) Downs, Stokes and the dynamics of electoral choice. *British Journal of Political Science*, 41, pp.287-314.
- Schofield, N. 2003. Valence competition in the spatial stochastic model. *Journal of Theoretical Politics*, 15, pp.371–383.
- Schofield, N. (2004) Equilibrium in the spatial valence model of elections. *Journal of Theoretical Politics*, 16, pp.447–481.

- Schofield, N. (2005) A valence model of political competition in Britain: 1992-1997. *Electoral Studies*, 24, pp. 347–370.
- Schofield, N. (2007) The mean voter theorem: Necessary and sufficient conditions for convergent equilibrium, *Review of Economic Studies*, 74, pp.965–980.
- Schofield N., Claassen C., Ozdemir U., Zakharov A. V., 2011a. Estimating the effects of activists in two-Party and multi-party systems: Comparing the United States and Israel. *Social Choice and Welfare* 36, pp. 483-518.
- Schofield, N., Gallego, M., Ozdemir, U., Zakharov, A.V., 2011b. Competition for popular support: A valence model of elections in Turkey. *Social Choice and Welfare*, 36, pp.451-482.
- Schofield N., Gallego, M., Jeon, J., 2011c. Leaders, voters and activists in the elections in Great Britain 2005 and 2010. *Electoral Studies*, 30, pp. 484-496.
- Schofield, N., Sened, I. 2006. Multiparty Democracy: Elections and Legislative Politics. (Cambridge, Cambridge University Press).
- Schofield, N., Zakharov, A., 2010. A stochastic model of the 2007 Russian Duma election, *Public Choice*, 142, pp.177-194.
- Scotto, T.J., H.D. Clarke, A. Kornberg, J. Reifler, D. Sanders, M.C. Stewart, and P. Whiteley. (2010). The dynamic political economy of support for Barack Obama during the 2008 Presidential election campaign. *Electoral Studies*, 29, pp. 545-556.
- Sonin, K. and Tucker, J. (2007). Money, votes and effort. Working Paper, New York University.
- Stokes D (1963) Spatial Models and Party Competition. *American Political Science Review*, 57, pp.368–377.
- Stokes D (1992) Valence politics. In: Kavanagh D (ed), *Electoral Politics*. (Oxford, Clarendon Press).
- Sumbadze, N. (2009) Saakashvili in the public eye: What public opinion polls tell us. *Central Asian Survey*, 28, pp. 185-197.
- Train, K. (2003). *Discrete Choice Methods for Simulation*. (Cambridge, Cambridge University Press)
- Tucker J (2006) *Regional economic voting: Russia, Poland Hungary, Slovakia, and the Czech Republic, 1990-1999*.(Cambridge, Cambridge University Press).
- Vreeland, J. (2008) The effect of political regime on civil war, *Journal of Conflict Resolution*, 52, pp. 401-425.
- Welt, C. 2010. Georgia's rose revolution, in: Bunce, V., Wolchik, S. (eds.) *Democracy and Authoritarianism in the Post Communist World* (Cambridge, Cambridge University Press), pp.155-188.

7 Tables and Figures

Table 1. Georgian Presidential Election 2008

Candidate	Party	vote share
Saakashvili	United National Movement	53.5
Gachechiladze	Opposition coalition	25.7
Patarkatsishvili	media tycoon	7.1
Natelashvili	Georgian Labour Party	6.5
Gamkrelidze	New Right	4.0
Maisashvili	Party of the Future	0.7
Sarishvili-Chanturia	Hope party	0.2
Repeated ballots		1.7
Invalid ballots		0.6
Total		100

Table 2. Georgian Sample Vote Shares among the Four Candidates

Candidate	Vote	%
Saakashvili	426	63.02
Gachechiladze	154	22.78
Patarkatsishvili	60	8.88
Natelashvili	36	5.33
Total	676	100

Voteshares in the imputed dataset, rounded to 2 decimal places.

Table 3. Factor Loadings for Georgia

($n = 676$)	<i>West</i>	<i>Dem</i>
Q1. General direction	0.12	0.77
Q2. Democracy	0.15	0.85
Q3. Next election fair	0.20	0.66
Q4. Opinion USA	0.63	0.26
Q5. Opinion EU	0.78	
Q6. Opinion NATO	0.91	0.15
% var	0.32	0.30
Cumulative % var	0.32	0.62

**Table 4. Pure spatial model for Georgia
(Natelashvili as baseline)**

Variable	Estimate	Std.Error	t	value
β	0.78***	0.06		13.78
Saakashvili: λ_S	2.56***	0.19		13.66
Gachechiladze: λ_G	1.50***	0.19		7.96
Patarkatsishvili: λ_P	0.53*	0.21		2.51
n	676			
Log-likelihood	-533			
McFadden R^2	0.21			

In all tables we use:*** $prob < 0.001$, * $prob < 0.05$

**Table 5. Spatial Sociodemographic Model for Georgia
(Natelashvili as baseline)**

Candidate	Variable	Estimate	Std. Error	t-value
	β	0.82***	0.06	13.84
Saakashvili	Constant	0.92	1.11	0.83
	age	0.23	0.13	1.76
	education	-0.16	0.14	1.15
	gender (F)	0.61	0.38	1.58
	financial situation	0.36	0.24	1.51
Gachechiladze	Constant	0.40	1.13	0.35
	age	0.06	0.13	0.45
	education	-0.16	0.14	1.15
	gender (F)	0.43	0.39	1.12
	financial situation	0.52*	0.24	2.21
Patarkatsishevili	Constant	0.28	1.24	0.23
	age	-0.08	0.14	0.58
	education	-0.32*	0.16	2.04
	gender (F)	0.86	0.44	1.95
	financial situation	0.45	0.24	1.85
n		676		
Log-likelihood		-518		
McFadden R^2		0.23		

**Table 6a. Summary of the 7 November 2010
National Assembly of Azerbaijan election results**

Party	Votes (%)	Seats
Yeni Azerbaijan Party (YAP)	1,104,528 (45.8%)	72
Civic Solidarity Party (VHP)	37,994(1.6%)	3
Motherland Party (AVP)	32,935 (1.4%)	2
Equality Party (MP)	42,551 (1.8%)	0
Azerbaijan Popular Front Party (AXCP)	31,068 (1.3%)	0
Independents	1,160,053 (48.2%)	48
Independents who supported government		38
Independents who opposed government		10
Total turnout (50.1%)	2,409,129	125

Table 6b. Opposition Parties and seats

Party	Seats
Democratic Reforms party	1
Great Creation	1
The Movement for National Rebirth	1
Umid	1
Civic Welfare	1
Adalet (Justice)	1
The Popular Front of United Azerbaijan	1

**Table 6c
Sample votes between the Four Parties**

Party	Vote	Two party %
YAP	113	75.8
AXCP-MP	36	24.2
VHP	7	-
AVP	4	-
Total	160	100

Table 7. Factor Loadings for Azerbaijan

Question No.	Issue	Demand for democracy
Q4.	Democratic satisfaction	0.844
Q5A	Democratic improvement	0.771
Q5B	Free opinion	0.761
Q6.1	Trust Parliament	0.717
Q6.2	Trust Government	0.656
Q6.3	Trust President	0.883
Q6.4	Trust elections	0.742
Q7	Political inactiveness	0.709
Q8	Free election	0.774
% var		0.584
<i>n</i>		149

**Table 8. Azerbaijan Pure Spatial and Sociodemographic models
(AXCP-MP baseline)**

	(i) Pure Spatial		(ii) Spatial +Sociodem.	
	Coef.	t -value	Coef.	t -value
β	1.34 ***	4.62	1.65 ***	3.38
λ_{YAP}	1.30 *	2.14	-4.57	0.99
city			1.40	0.94
gender (female)			-0.65	0.40
age			-0.14	0.15
education			0.65	1.01
financial situation			0.90	1.08
n	149		149	
loglikelihood	-11.5		-10.0	
McFadden R^2	0.86		0.88	

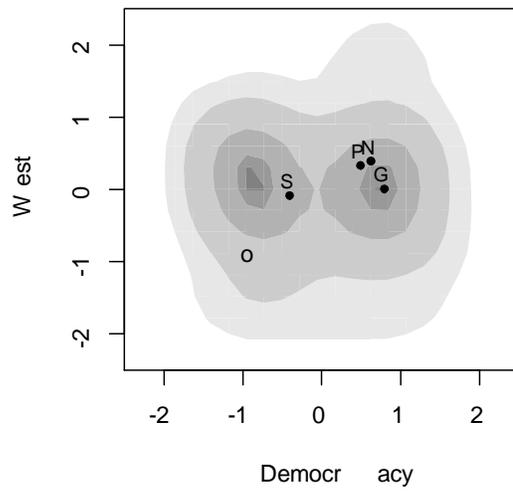


Figure 1: Voter distribution and candidate positions in Georgia in 2008

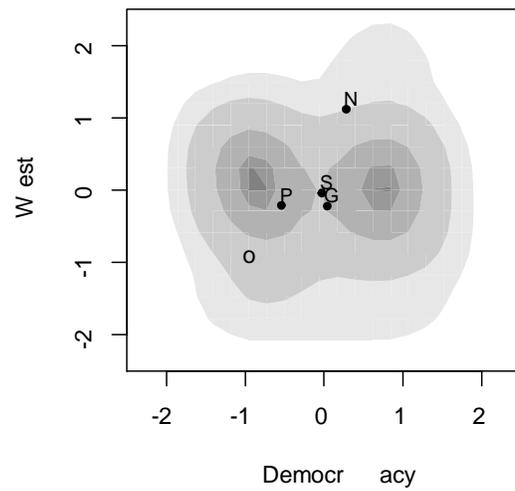


Figure 2: Estimated local equilibrium positions in Georgia 2008

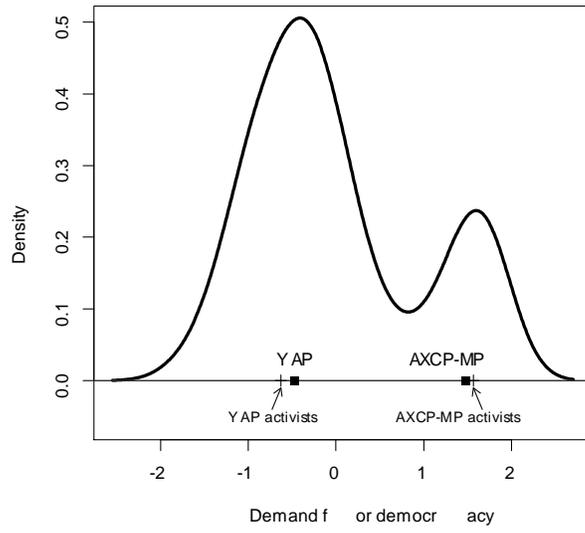


Figure 3: Voter distribution, party and activist positions in Azerbaijan in 2010

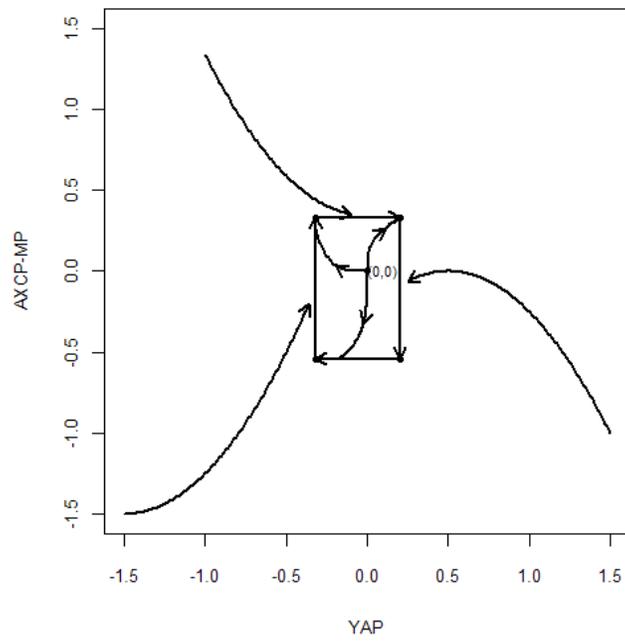


Figure 4: A limit cycle in Azerbaijan

1 Appendices to Modelling Elections in the Caucasus

1.1 Appendix 1: Georgia

Survey Data: Post-election surveys conducted by GORBI-GALLUP International from March 19 through April 3, 2008. In the original dataset $n = 1000$. Among the respondents, 745 answered that they cast a vote on the election day. Of the 745, only 399 completed the survey questions. Instead of deleting the cases with missing values, we implemented a multiple imputation and created five datasets. The analysis presented here is based on the first dataset. However, the analysis of other datasets and the combined results are similar with the one presented here. The combined results and the analyses of other imputed datasets can be found in the authors' webpage, at http://polisci.wustl.edu/norman_schofield

1.1.1 Question Wording for the Georgian Election

Survey Items

Vote choice: Please tell me which candidate did you vote for during the presidential elections on the 5th of January 2008?

1. Levan Gachechiladze; 2. Badri Patarkatsishevili; 3. Davit Gamkrelidze;
4. Shalva Natelashvili; 5. Mikheil Saakashvili; 6. Gia Maisashvili;
7. Irina Sarishvili; 8. Against all; 9. NA

Recoding

1. Saakashvili; 2. Gachechiladze; 3. Patarkatsishevili; 4. Natelashvili;
5. NA

Questions used in the factor analysis

(1) In your opinion, are things in Georgia generally going in the right general direction or the wrong direction?

1. Right direction; 2. Wrong direction; 9. DK/NA

(2) In general would you say that currently democracy works in Georgia

1. Very well; 2. Rather well; 3. Rather poorly; 4. Very poorly;
9. DK/NA.

(3) How much confidence do you have that upcoming parliamentary elections will be transparent and fair?

1. Great deal of confidence; 2. Fair amount of confidence;
3. No much confidence; 4. No confidence at all; 9. NA

(4) Tell me your overall opinion of USA.

(5) Tell me your overall opinion of EU.

(6) Tell me your overall opinion of NATO.

For question (4) to (6) the possible answers were:

1. Very favorable;
2. Somewhat favorable;
3. Somewhat unfavorable;
4. Very unfavorable;
99. NA

Sociodemographic variables included in the analysis

SD1: gender: male=1, female 2

SD2: Age: 1. 18-24: 2. 25-30: 3. 31-39: 4. 40-50: 5. 51-60 6. 60+

SD3: Education:

1. Pre-primary;
2. Primary;
3. Incomplete general secondary, vocational;
4. Complete specialized secondary;
5. Complete general secondary;
6. Incomplete higher;
7. PhD, post graduate courses

SD4: Financial situation

1. No money for food;
2. Not for clothing;
3. Not for expensive things;
4. Expensive things;
5. Whatever we want;
9. NA

SD5: Region

1. Tbilisi;
2. Kakheti;
3. Shida Kartli;
4. Kvemo Kartli;
5. Samtskhe-Javakheti;
6. Adjara;
7. Guria;
8. Samegrelo;
9. Imereti/Racha/Svaneti;
10. Mtskheta-Tianeti

1.2 Appendix 2: Azerbaijan

A small pre-election survey was conducted by the International Center for Social Research (ICSR), Baku, Azerbaijan.

Question Wording for the Azerbaijan Election

Survey Items

Vote Choice

(1) Are you going to vote for the candidate from political party/block or for the independent candidate?

1. Candidate from political party/block;
2. Independent candidate.

(2) Here is the list of political parties and blocks, which will run for coming parliamentary elections on 7 November, 2010.

A. Political Parties

1. AXCP;
2. YAP;
3. ALDP;
4. SOCIAL DEMOKRAT;
5. DADP;
6. ANA VATAN;
7. MILLI DEMOKRAT;
8. MMP;
9. AMIP

B. Blocks

1. AXCP-MUSAVAT;
2. KARABAKH (UMID, ADP, AYDINLAR);
3. INSAN NAMINA (VIP, ALP);
4. ISLAHAT (BQP, BAXCP, ADALAT);
5. DEMOKRATIYA (VHP, ADIP)

Please indicate how likely you are to vote for the above party or block.

1. Yes, for sure;
2. Very likely;
3. Likely;
4. Indifferent;
5. Not likely;
6. No, for sure;
77. NA;
88. Don't know/hard to say;
99. NA

Activists

(3) Some people think of themselves as usually being a supporter of one political party rather than another. Do you usually think of yourself as being a supporter of one particular party or not?

1. Yes (name);
2. No;
3. It is difficult to answer

Survey items used for Factor Analysis- Demand for democracy

(4) Are you satisfied with the current state of democracy in Azerbaijan?

1. Fully satisfied;
2. Partially satisfied;
3. Neither satisfied nor dissatisfied;
4. Partially dissatisfied;
5. Completely dissatisfied;
88. Don't know/hard to say; NA

(5) Would you agree with the following two statements?

[A]. Azerbaijan is more democratic now than it was 10 years ago.

[B]. People in Azerbaijan are free to express their opinions and concerns.

1. Strongly agree;
2. Agree;
3. Disagree;
4. Strongly disagree;
88. Don't know/hard to say; NA

(6) What is the degree of your confidence towards the following institutions?

- (1) Parliament (Milli Mejlis)
- (2) Government (Cabinet of Ministers)
- (3) President of the country
- (4) Validity of Elections

1. High;
2. Average;
3. Low;
88. Don't know/hard to say; NA

(7) As is known, many people in our country are not politically active. To what extent do you agree or disagree with the following statement about the reason for this?

Lack of freedom and Democracy

1. Fully disagree;
2. To some extent disagree;
3. Neither agree, neither disagree;
4. To some extent agree;
5. Fully agree;
88. Don't know/hard to say; NA

(8) Do you believe that forthcoming parliamentary elections in Azerbaijan will be really democratic (free, open, transparent and fair)?

1. Yes;
2. No;
88. Don't know/hard to say; NA

Sociodemographic variables included in the analysis

SD1: Gender: 1. male; 2. female

SD2: Age group: 1. 18-24; 2. 25-34; 3. 35-44; 4. 45-54; 5. 55-64; 6. 65+

SD3: Education:

1. Without any education;
2. Primary school;
3. Incomplete secondary;
4. Complete secondary;
5. Secondary technical;
6. Incomplete higher;
7. Higher

SD4: Financial situation: Pick the phrase which best describes the economic situation in your family

1. There is not enough money even for food, we have to go into debt or get help from relatives or friends
2. There is enough money for food, but we have difficulty buying clothes
3. There is enough money for food and clothes, but expensive durable goods such as TV or refrigerator are a problem for us
4. We can buy durable goods from time to time, but the purchase really expensive things, such as an automobile, home, or a trip abroad, are beyond our means
5. Nowadays we can afford many things - an automobile, home, foreign travel - in a word, we do not deny ourselves anything
88. Don't know/hard to say/NA

SD5 Location:

1. Capital city; 2. Large city; 3. Small city; (1,2,3 are coded as city).
4. Village; 5. Camp for Displaced Persons (4,5 are coded as non-city)

Table A1: Azerbaijan Vote Intention

Going to Vote	Freq.	Percent
Definitely yes	198	19.8
More likely	230	23.0
Unlikely	241	24.1
Definitely no	143	14.3
NA	190	18.7
total	1002	100

Those who answered ‘unlikely’ or ‘definitely no’ to the vote intention question were more skeptical about the democratic quality of the 2010 election. About half of the respondents who intended to vote expected the forthcoming election to be democratic, while only 4.2 percent of the intended abstainers had positive expectation about fairness of the 2010 parliamentary election (Table A2).

**Table A2: Azerbaijan Vote Intention
and Expectation on the election**

Vote Intention	Democratic election			Total
	yes	no	NA	
Definitely yes	90 (45.5)	101 (51.0)	7 (3.5)	198 (100)
More likely	112 (48.7)	95 (41.3)	23 (10.0)	230 (100)
Unlikely	10 (4.2)	169 (70.1)	62 (25.7)	241 (100)
Definitely no	6 (4.2)	92 (64.3)	45 (31.5)	143 (100)
NA	32 (16.8)	83 (43.7)	75 (39.5)	190 (100)
Total	250 (25.0)	540 (53.9)	212 (21.2)	1,002 (100)

* Row percentage in the parenthesis

1.3 Appendix 3: The Pure Spatial Model

The theoretical pure spatial model developed in Schofield (2007) assumes that the positions of the p candidates or *agents*¹ are given by the vector

$$\mathbf{z} = (z_1, \dots, z_j, \dots, z_p)$$

where each $z_j \in X$, the policy space, of dimension w . When voter i is located at $x_i \in X$, then the voter's utility is given by the expression $u_i(x_i, z) = (u_{i1}(x_i, z_1), \dots, u_{ip}(x_i, z_p))$ where

$$u_{ij}(x_i, z_j) = \lambda_j - \beta \|x_i - z_j\|^2 + \epsilon_j = u_{ij}^*(x_i, z_j) + \epsilon_j. \quad (1)$$

Here $u_{ij}^*(x_i, z_j)$ is the observable component of utility. The *exogenous valence* of agent j is λ_j , and the exogenous valence vector $\boldsymbol{\lambda} = (\lambda_1, \lambda_2, \dots, \lambda_p)$ is assumed to satisfy $\lambda_p \geq \lambda_{p-1} \geq \dots \geq \lambda_2 \geq \lambda_1$. Note that λ_j is the same for all voters and provides an estimate of the “quality” of agent j . The term $\|x_i - z_j\|$ is simply the Euclidean distance between voter i 's position, x_i , and agent j 's position z_j . The coefficient β is the weight given to this policy difference. We assume that the error vector $\epsilon = (\epsilon_1, \dots, \epsilon_j, \dots, \epsilon_p)$ has a Type I extreme value distribution, as appropriate for a multinomial logit (MNL) estimation (Train, 2003). The variance of ϵ_j is fixed at $\frac{\pi^2}{6}$. Note that β has dimension $\frac{1}{L^2}$, where L is whatever unit of measurement is used in X .

Thus, voter behavior is modelled by a probability vector. The probability that voter i chooses agent j at the vector z is

$$\begin{aligned} \rho_{ij}(\mathbf{z}) &= \Pr[u_{ij}(x_i, z_j) > u_{il}(x_i, z_l), \text{ for all } l \neq j] \\ &= \Pr[\epsilon_l - \epsilon_j < u_{ij}^*(x_i, z_j) - u_{il}^*(x_i, z_l), \text{ for all } l \neq j]. \end{aligned}$$

¹We use the terms agent, party and candidate interchangeably.

Here Pr stands for the probability operator generated by the distribution assumption on ϵ . Thus, the probability that i votes for j is given by the probability that $u_{ij}(x_i, z_j) > u_{ij}(x_i, z_l)$, for all l , i.e., that i obtains a higher utility from j than from any other agent.

Given the extreme value distribution, the probability $\rho_{ij}(z)$ has a MNL specification and can be estimated. Train (2003) shows that for each voter i , and agent j , the probability that voter i chooses agent j at the vector \mathbf{z} is then given by

$$\rho_{ij}(\mathbf{z}) = \frac{\exp[u_{ij}^*(x_i, z_j)]}{\sum_{k=1}^p \exp u_{ik}^*(x_i, z_k)} \quad (2)$$

Voters decisions are stochastic in this framework.² Even though parties cannot perfectly anticipate how voters will vote, they can estimate the expected vote share of candidate j as the average of these probabilities:

$$V_j(\mathbf{z}) = \frac{1}{n} \sum_{i \in N} \rho_{ij}(\mathbf{z}). \quad (3)$$

We assume that agents can estimate how their vote shares would change if they marginally move their policy position. The LNE is that vector \mathbf{z} of candidate positions so that no candidate may shift position incrementally to increase vote share. The usual equilibrium concept in social choice is that of pure strategy Nash equilibrium (PNE) defined to be a vector z such that no agent may shift position in any way to increase vote share. However, a PNE must be a LNE so if the joint mean cannot be a LNE it cannot be a PNE.³

Using the estimated MNL coefficients we simulate these models and then relate any vector of party positions, \mathbf{z} , to a vector of vote share functions $V(\mathbf{z}) = (V_1(z), \dots, V_p(z))$, predicted by the particular model with p agents. Moreover, we can examine whether in equilibrium agents position themselves at the electoral mean.⁴

Since voter i 's utility depends on how far from the party i is located, then the probability that i votes for j given in (2) and the expected vote share of the party given in (3) are influenced by the voters and parties positions in the two dimensions. That is, in the empirical models estimated below, the positions of voters and parties in the multidimensional policy space are determinants of the voters electoral choices.

Suppose that *all* parties locate at the same position so $z_k = z$ for all k . In this case using (2) we see that

$$[u_{ik}^*(x_i, z) - u_{ij}^*(x_i, z)] = (\lambda_k - \lambda_j)$$

²Note that there is a problem with the independence of irrelevant alternatives assumption (IIA) which can be avoided using a probit model. However Quinn *et al.* (1999) have shown that probit and logit models tend to give very similar results. Indeed the results given here for the logit model carry through for probit, though they are less elegant.

³Note also that neither an LNE nor a PNE need exist. However, for the Georgia election we did obtain an LNE that was indeed a PNE. If no LNE exists then we can use the notion of a mixed strategy equilibrium (MNE).

⁴We take the electoral mean to be the mean of all voters' positions, $\frac{1}{n} \sum x_i$. We can also normalize this to be the electoral origin, i.e., by setting $\frac{1}{n} \sum x_i = 0$.

so the probability that i votes for j is given by

$$\begin{aligned}\rho_{ij}(\mathbf{z}) &= \frac{1}{\sum_{k=1}^p \exp[u_{ik}^*(x_i, z_k) - u_{ij}^*(x_i, z_j)]} \\ &= \left[\sum_{k=1}^p \exp(\lambda_k - \lambda_j) \right]^{-1}.\end{aligned}$$

Clearly, $\rho_{ij}(\mathbf{z})$ is independent of voter i 's ideal point. Let \mathbf{z}_0 be the vector of party positions when all parties are at the electoral mean. Then at \mathbf{z}_0 , only valence differences between parties matter in voters' choices. In this case, the probability that a generic voter votes for party 1 with the lowest valence, is

$$\rho_1 = \rho_1(\mathbf{z}_0) = \left[\sum_{k=1}^p \exp(\lambda_k - \lambda_1) \right]^{-1}. \quad (4)$$

Using this pure spatial model, Schofield (2007) proved a *Valence Theorem* that determined whether parties should locate at the electoral mean. The theorem showed that the pure spatial model is characterized by a *convergence coefficient*, given by

$$c \equiv c(\boldsymbol{\lambda}, \beta) = 2\beta[1 - 2\rho_1]\sigma^2. \quad (5)$$

Here β is the weight given to policy differences, ρ_1 is the probability that a generic voter will vote for the lowest valence party/candidate at the vector \mathbf{z}_0 . The *electoral variance* σ^2 is given by

$$\sigma^2 = \text{trace}(\nabla_0) \quad (6)$$

where ∇_0 is the symmetric $w \times w$ *electoral covariance matrix*.⁵

The convergence coefficient increases as the weight given by voters to the policy differences, β , increases. It also increases in the electoral variance σ^2 and as the probability of voting for the lowest valence party, ρ_1 , decreases. Thus the convergence coefficient c is an increasing function of $\beta\sigma^2$ and decreasing in ρ_1 . Note that, in general, the probability ρ_1 , decreases if the valence differences between λ_1 and the other parties $\{\lambda_2, \dots, \lambda_p\}$ increase.

As noted in the previous section, a *sufficient* condition for convergence to the electoral mean is that $c < 1$. In this case, the local Nash Equilibrium (LNE) is one where all parties adopt the same position at the mean of the electoral distribution. A *necessary* condition, for convergence to the electoral mean is that $c < w$ where w is the dimension of the policy space. If $c \geq w$, then either there will exist a non-convergent LNE, or, if there is no such LNE, then there will exist a *mixed strategy Nash equilibrium (MNE)*.⁶ In both cases we expect at least some of the parties to *diverge* away from the electoral mean. Thus, if the valence differences are sufficiently large, then not all vote maximizing parties will converge to the electoral mean.

⁵ ∇_0 is simply the a description of the distribution of voter preferred points taken about the electoral mean.

⁶This is a formal notion, involving randomization across different policy positions by the parties. For more explanation see Galiani et al. (2012).

Note that c is dimensionless, because $\beta\sigma^2$ has no dimension. In a sense $\beta\sigma^2$ is a measure of the polarization of the preferences of the electorate. Moreover, ρ_1 is a function of the distribution of beliefs about the competence of party leaders. In a fragmented polity, there will be many parties, some with low valence, so ρ_1 will tend to be small, implying that c will be close to $2\beta\sigma^2$. We can interpret this to mean that the centrifugal force on parties will be significant.

Thus for $\beta\sigma^2$ sufficiently large so that $c \geq w$, then we expect parties to diverge away from the electoral center. Indeed, we expect those parties that exhibit the lowest valence to move further away from the electoral center. We can interpret this to mean that the centrifugal force on parties will be significant. We see therefore, in polities which are fragmented and where the electorate is polarized, that the nature of the equilibrium tends to maintain this centrifugal characteristic.

On the contrary, in a polity with a plurality electoral system where there are no very small or low valence parties, then ρ_1 will tend to $\frac{1}{2}$, and so c will be small. In a polity with small $\beta\sigma^2$ and with low valence differences, so that $c < 1$, we expect all parties to converge to the electoral center. In a plurality polity we might expect this centripetal tendency to be maintained.

Note that by its construction, c is dimensionless, and independent of the units of measurement of the various parameters. The coefficient can thus be used to compare results across models, elections and countries.

The convergence coefficient is a way of characterizing the Hessian (the w by w second derivative of the vote share function) of party 1 with the lowest valence.

The Hessian of the vote share function of candidate 1 with the lowest valence is given by the characteristic matrix

$$C_1 = 2\beta(1 - 2\rho_1)\nabla_0 - I. \quad (7)$$

Here ∇_0 is the w by w covariance matrix and I is a w by w identity matrix. The eigenvalues of C_1 determine whether the vote share function of party 1 will be at a maximum, minimum or at a saddle point at the electoral mean. If C_1 shows that party 1 is at a minimum or at a saddle point at the electoral mean then party 1 will not locate at the electoral mean, since it has an incentive to move in order to increase its vote share.

When all parties are at the mean and $c < 1$, then all eigenvalues of the Hessian of the vote share function of the lowest valence party are negative definite. This corresponds to a maximum of the vote share function. The LNE must then be at the joint electoral mean.

When $c > w$, then one of the eigenvalues of this Hessian must be positive, so that the electoral mean cannot be a local maximum of the vote share function of the low valence party. Consequently, the joint electoral mean *cannot* be a LNE. In particular the Hessian of the low valence party at the joint mean must be a saddlepoint or a minimum. In the case of a saddlepoint, the low valence party can shift position by moving away from the mean, either up or down the eigenvector associated with the positive eigenvalue. In the case both eigenvalues

are positive, the low valence party can move along both eigenvectors to increase vote share. If there is a non-convergent LNE, then it can be found by simulation.

Another way to interpret the convergence result is that it asserts that if the party with the lowest valence does not locate at the electoral mean it is because it has an incentive to move towards the location preferred by its core constituency in order to increase its vote share. When this is the case then other low valence parties may also find it advantageous vacate the center. The convergence coefficient then gives an easy and intuitive way to identify whether a low valence party should vacate the electoral mean.

We can also assume that voter sociodemographic characteristics are independent of party' positions, so these sociodemographic characteristics can be incorporated into the voter's utility function in (1) to obtain

$$u_{ij}(x_i, z_j) = \lambda_j + (\theta_j \cdot \eta_i) - \beta \|x_i - z_j\|^2 + \epsilon_j = u_{ij}^*(x_i, z_j) + \epsilon_j. \quad (8)$$

Sociodemographic aspects of voting are modelled by θ , a set of k -vectors $\{\theta_j : j \in P\}$ representing the effect of the k different sociodemographic parameters (gender, age, class, education, financial situation, etc.) on voting for party j while η_i is a k -vector denoting the i^{th} individual's relevant "sociodemographic" characteristics. The compositions $\{(\theta_j \cdot \eta_i)\}$ are scalar products, called the sociodemographic valences for j . Given the independence of the sociodemographic characteristics of party's position, this model is an extension of the pure spatial model. The above results on the convergence coefficient do not immediately apply, but the LNE can be obtained by simulation. In previous empirical models it has been found that the convergence or divergence results for the pure spatial model also hold for the spatial model with sociodemographics.