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.

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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.

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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 causalities. 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

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[1] Powers 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).

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

[3] See 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 maximimize 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 have little effect on the election result unless the opposition challenger could increase his valence. 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 peception 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.

A recent literature, ably summarized in Gandhi and Lust-Okar (2009), has examined elections in authoritarian or anocratic regimes, asking questions about the incentives of regime leaders to allow elections, and the degree to which such elections can lead to further democratization. The contribution of this paper to this literature is that it focuses on the details of two elections in a relatively unstudied area of the world and closely examines the electoral strategies of

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oppositional parties in a precisely detailed model of electoral response. 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 Dumma 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 counties like Georgia, Azerbaijan and Russia it is possible for relatively autocrat regimes to persist, even though there are democratic elections and potentially viable opposition parties. The analysis that we present does suggest that in order to become viable, it is necessary for opposition candidates to attempt to change electoral perceptions. This strategic possibility has (as far as we are aware) not been discussed extensively in the literature.

There is a theoretical aspect to this paper, beside the application of a theoretical model that was developed earlier. We show that the electoral mean was a repellor for both the Georgian and Azerbaijan elections. Simulation showed that there was a non convergent LNE for the Georgia election. This LNE was generated by the major eigenvalue of the Hessian of the low valence party. For the election in Azerbaijan, the joint strategy space was two dimensional but there was no non-convergent LNE. Instead there was a limit cycle, an *attractor*, inside the support of the electoral distribution. This generated a mixed strategy Nash equilibrium. We believe these formal aspects of the model are of considerable interest.

The paper is structured as follows. The next section discusses recent Georgian politics. Section 2.1 briefly comments on the election in 2008. Section 3 describes the electoral model that we use. while Section 3.1 gives the details of formal model. Section 4 gives the empirical details of the model for Georgia while Section 5 gives the model details for Azerbaijan. Two Appendices give further details on the empirics of the model.

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.[5]

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

[5] Beissinger (2007) notes that this election exhibited electoral fraud and other electoral violations.

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, became 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 major trend of political development.

National liberation stances were dominant after the politics of Glasnost and Perestroika allowed for the political involvement of the population and led to 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 an attempt 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, however, 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. Nonetheless, there remained a serious gap between formal arrangements and informal practices.

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, the unchallenged leader of the mass protest movement, took 96% of the vote for

president.

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 (see details of the survey in the Appendix

1). The survey contains data on how respondents voted and their sociode-mographic characteristics. Table 2 gives the vote shares for the candidates as indicated by the survey.[6]

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:

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

This is simply the variance/covariance matrix obtained from the voter distrib-ution in the two dimensional policy space estimated by using each respondent's answers to the survey questions, as weighted by the factor loadings given in Ta-ble 3. This distribution is displayed in Figure 1. We shall make us 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), Gachechi-ladze (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:

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

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[6] We used multiple imputations so as to be able to use a sample size of 676.

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.

3 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.[7] Empirical 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.[8] 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."[9] 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

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[7] Ansolabehere and Snyder (2000), Groseclose (2001) Aragones and Palfrey (2002, 2005), Schofield (2003, 2004), Peress (2010).

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

[9] We assume the stochastic error is given by a Type I extreme value distribution.

voting tends to predict that parties will converge to the center of the electoral distribution.[10] 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.[11] 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 coefficient depends on various parameters, $\{\boldsymbol{\lambda}, \beta, \sigma^2\}$, 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.

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[10] Enelow and Hinich (1982, 1984a,b).

[11] The 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.

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 the 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 that 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 more precisely the nature of the equilibria.

We now present the details of the pure spatial model.

3.1   The Pure Spatial Model

The theoretical pure spatial model developed in Schofield (2007) assumes that the positions of the p candidates or *agents*[12] are given by the vector

$$\mathbf{z} = (z_1, .., z_j, .., z_p) \in X^p$$

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 $u_i(x_i, z) = (u_{i1}(x_i, z_1), \ldots, u_{ip}(x_i, z_p))$ where

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

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 $\boldsymbol{\lambda} = (\lambda_1, \lambda_2, \ldots, \lambda_p)$ is assumed to satisfy $\lambda_p \geq \lambda_{p-1} \geq \cdots \geq \lambda_2 \geq \lambda_1$. Note that λ_j is the same for all

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[12] We use the terms agent, party and candidate interchangeably.

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 $\epsilon = (\epsilon_1, .., \epsilon_j, .., \epsilon_p)$ 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

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

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

$$
\rho_{ij}(\mathbf{z}) = \frac{\exp[u_{ij}^*(x_i, z_j)]}{\sum_{k=1}^{p} \exp u_{ik}^*(x_i, z_k)} \tag{3}
$$

Voters decisions are stochastic in this framework.[13] 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:

$$
V_j(\mathbf{z}) = \frac{1}{n} \sum_{i \in N} \rho_{ij}(\mathbf{z}). \tag{4}
$$

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.[14]

Using the estimated MNL coefficients we simulate these models and then relate any vector of agent positions, $\mathbf{z}$, to a vector of vote share functions $V(\mathbf{z}) = (V_1(z), ... V_p(z))$, predicted by the particular model with p agents. Moreover, we

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[13] Note 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.

[14] As we note below, 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 used the notion of a mixed strategy equilibrium (MNE).

can examine whether in equilibrium agents position themselves at the electoral mean.[15]

Since voter i's utility depends on how far i is located from the agent j, then the probability that i votes for j given in (3) and the expected vote share of the party given in (4) are influenced by the voters and agent positions in space X. That is, in the empirical models estimated below, the positions of voters and agents in X are determinants of the voters' electoral choices.

Suppose that *all* agents locate at the same position so $z_k = z$ for all k. In this case we see that

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

so using (3) 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. Thus $\rho_{ij}(\mathbf{z}) = \rho_j(\mathbf{z})$ is independent of i. Let $\mathbf{z}_0$ be the vector of agent positions when all agents are at the electoral mean. Then at $\mathbf{z}_0$, only valence differences between agents matter in voters' choices and the probability that a generic voter chooses agent 1 (with the lowest valence) is:

$$\rho_1 = \rho_1(\mathbf{z}_0) = \left[\sum_{k=1}^{p} \exp(\lambda_k - \lambda_1) \right]^{-1}. \tag{5}$$

The *Valence Theorem* that determines whether parties should locate at the electoral mean. The theorem showed that the pure spatial model is characterized by a *convergence coefficient*, given by

$$c \equiv c(\boldsymbol{\lambda}, \beta) = 2\beta[1 - 2\rho_1]\sigma^2. \tag{6}$$

Here β is the weight given to policy differences, $\rho_1 = \rho_1(\mathbf{z}_0)$. The *electoral variance* σ^2 is given by

$$\sigma^2 = \text{trace}(\nabla_0) \tag{7}$$

where ∇_0 is the symmetric $w \times w$ *electoral covariance matrix*.[16]

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. As noted above, the convergence coefficient c is an increasing function of $\beta\sigma^2$ and

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

[16] ∇_0 is simply the covariance matrix of the distribution of voter preferred points taken about the electoral mean.

decreasing in ρ_1. Note that, in general, the probability ρ_1, decreases if the valence differences between λ_1 and the other valences $\{\lambda_2, ..., \lambda_p\}$ increase.

As noted above, the Valence Theorem shows that a *sufficient* condition for convergence to the electoral mean is that $c < 1$. In this case, a local Nash Equilibrium (LNE) is one where all agents 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)*.[17] In both cases we expect at least some of the agents to *diverge* away from the electoral mean. Thus, if the valence differences are sufficiently large, then not all vote maximizing agents will converge to the electoral mean.

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, because β has dimension $\frac{1}{L^2}$ so $\beta\sigma^2$ has no dimension. Thus c is 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

$$C_1 = 2\beta(1 - 2\rho_1)\nabla_0 - I. \tag{8}$$

Here 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

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[17] This is a formal notion, involving randomization across different policy positions by the parties.

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 will be 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 correspond to a saddlepoint or a minimum of the vote share function. 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 all eigenvalues are positive, the low valence party can move along any eigenvector to increase vote share. If there is a non-convergent LNE, then it can be found by simulation. However, there may not be a non-convergent LNE. In this case there will be a mixed strategy Nash equilibrium, which was the case for the Azerbaijan election. As we observe below, the mixing will involve agent strategies other than the electoral mean, so the outcome will be divergent.

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 (2) to obtain

$$u_{ij}(x_i, z_j) = \lambda_j + (\theta_j \cdot \eta_i) - \beta \|x_i - z_j\|^2 + \epsilon_j = u_{ij}^*(x_i, z_j) + \epsilon_j. \qquad (9)$$

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 ith 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. We can sumarize these conclusions as follows.

3.2 The Nature of equilibria.

We can generalize the two conditions given by the convergence coefficient as follows:

i) The convergence coefficient $c < 1$: In the pure spatial model, then all eigenvalues of C_1 are negative, and joint mean $\mathbf{z}_0$ will be a LNE and can be termed an *attractor.* Consider a *gradient field in the strategy space* X^p. There will exist a basin of attraction, B in X^p such that all vote increasing trajectories will approach $\mathbf{z}_0$. If there is another critical point it must be outside B, which suggests that there is a limit cycle, a repellor outside B. Such a critical point cannot be an attractor, therefore cannot be a LNE or a PNE. Similarly, we expect the spatial model with sociodemographics to be a perturbation of the pure spatial model, so that it will have an LNE in a neighborhood of $\mathbf{z}_0$. Indeed, in both cases, if the basin of attraction is sufficiently large to include all voter preferred points, then the payoff functions of the candidates will be quasi concave. By the Glicksberg Theorem (1952) the LNE will also be a PNE, and we expect it to be unique. Empirical analyses of recent elections in the US and Great Britain (Schofield et al.(2011a,c) have confirmed this inference. The same argument holds if $c \geq 1$, but $c \leq w$, but the eigenvalues of C_1 are negative.

ii) The convergence coefficient $c > w$, or more generally if at least one of the eigenvalues of C_1 is positive. The the joint mean $\mathbf{z}_0$ cannot be a LNE. In some subspace of X^p, $\mathbf{z}_0$ will be a repellor (also called a source). There are two possibilities in this case.

(a) there exists a non-convergent LNE. One possibility is that $\mathbf{z}_0$ is a saddle-point of C_1. In this case only one eigenvalue of C_1 is positive and the others are negative (or possibly zero in the non generic case). Then $\mathbf{z}_0$ will be a repellor in the eigenspace associated with this eigenvalue. The LNE will associated with a position z_1 on, or close to this eigenvector. Empirical analyses of recent elections in Israel and Turkey found this to be the case, for the spatial sociodemographic model as well (Schofield et al.(2011a,c). On the other hand, if all eigenvalues of C_1 are positive then $\mathbf{z}_0$ will be a global repellor, and the LNE will be associated with a cone generated by the positive eigenvectors of C_1. The model for Georgia, discussed below, showed this to be the case.

(b) If there is no LNE, then since $\mathbf{z}_0$ is a repellor in some subspace, there will be a limit cycle, an attractor, in X^p. We found that the one dimenional model for Azerbaijan displayed this feature. In this case, there will be a mixed strategy Nash equilibrium, whose support will be associated with the points bounded by the limit cycle.

4 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:

$$\lambda_S = 2.56, \lambda_G = 1.50, \lambda_P = 0.53, \lambda_N \equiv 0.0$$
$$\beta = 0.78. \tag{10}$$

[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 (10), 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:

$$\rho_N = \frac{\exp[\lambda_N]}{\sum_{k=1}^{4} \exp[\lambda_j]} = \frac{e^0}{e^0 + e^{0.53} + e^{1.50} + e^{2.56}} \simeq 0.05. \tag{11}$$

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

$$(v_S, v_G, v_P, v_N) = (0.6302, 0.2278, 0.088, 0.0533)$$

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

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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. 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 (10) and (11) 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. As discussed above, the *convergence coefficient* is:

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

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 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 may also have an incentive to 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 $\mathbf{z}^{el}$:

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

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

The 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

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

and sample shares

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

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 $\mathbf{z}^*$ and $\mathbf{z}^{el}$, as illustrated by Figures 1 and 2, allows us to consider various thought experiments. We can reject the joint electoral mean as a plausible outcome. Our analysis suggests that the divergent LNE at $\mathbf{z}^{el}$ is an "attractor" pulling in opportunistic candidates. If the opposition parties were to move to these LNE positions so as to maximize their own vote shares, then Saakashvili could respond by adopting a position close to the electoral center. and he would still gain about 63% of the vote. By adopting positions that appeal to voters who wish for more democracy the opposition candidates still gain about 37% of the vote, but at least they appeal to their core constituency. However, partly because of this fragmentation, their valences are low, so they cannot mount a credible challenge to Saakashvili.

If the opposition were to form a united front, under Gachechiladze, and assuming that his valence was still $\lambda_G = 1.50$, then we estimate that ρ_G would increase from 0.22 to 0.26. Indeed, the opposition gains a greater share being fragmented, so very little is gained from coalescing. A successful challenge would depend on increasing the valence of a single opposition challenger.

4.1   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 deploy various political and military strategems, 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.[18]

5   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 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.

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[18]Another 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.

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.

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).[19]

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[19] See 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 for vote choice.

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 taken 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, none of the sociodemographic variables were found to be statistically significant.[20] 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

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[20]The 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.

spatial model to be

$$c = 2\beta(1 - 2\rho_{axcp-mp})\sigma^2$$
$$= 2 \cdot (1.34) \cdot (1 - 2 \cdot 0.21) \cdot 0.93$$
$$= 1.44.$$

Since $w = 1$, and $c = 1.44 > 1$ for the pure spatial model, then the valence theorem implies divergence from the electoral mean by all parties. Note that

$$C_{axcp-mp} = 2\beta(1 - 2\rho_{axcp-mp})\sigma^2 - 1$$
$$= 0.44.$$

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.[21]

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 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 shows, those respondents who were unlikely to vote tended to believe that elections in Azerbaijan were not democratic.

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[21] We may say the electoral mean is a "repellor."

6   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 partial] 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 exemplfied 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.

6.1 Acknowledgment

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8 Appendices

8.1 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.

8.1.1 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

8.2   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			
	yes	no	NA	Total
Definitely yes	90	101	7	198
	(45.5)	(51.0)	(3.5)	(100)
More likely	112	95	23	230
	(48.7)	(41.3)	(10.0)	(100)
Unlikely	10	169	62	241
	(4.2)	(70.1)	(25.7)	(100)
Definitely no	6	92	45	143
	(4.2)	(64.3)	(31.5)	(100)
NA	32	83	75	190
	(16.8)	(43.7)	(39.5)	(100)
Total	250	540	212	1,002
	(25.0)	(53.9)	(21.2)	(100)

* Row percentage in the parenthesis

9 Tables

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

$(n = 676)$	West	Dem
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
n		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	
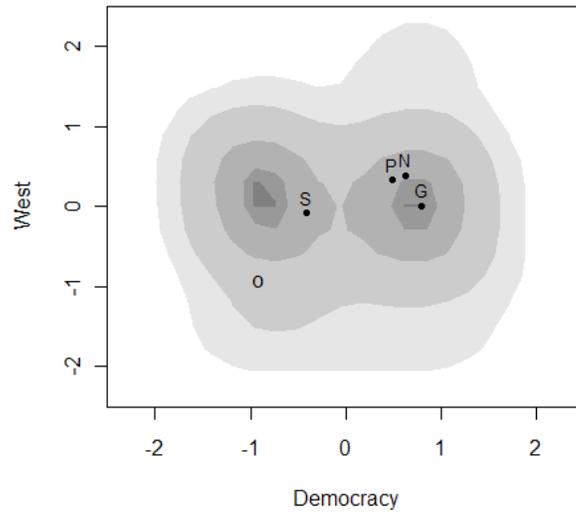
Figure 1: Voter distribution and candidate positions in Georgia in 2008
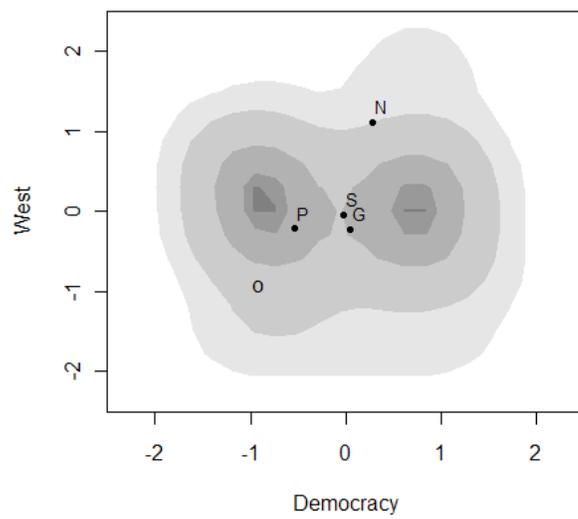
Figure 2: Estimated local equilibrium positions in Georgia 2008
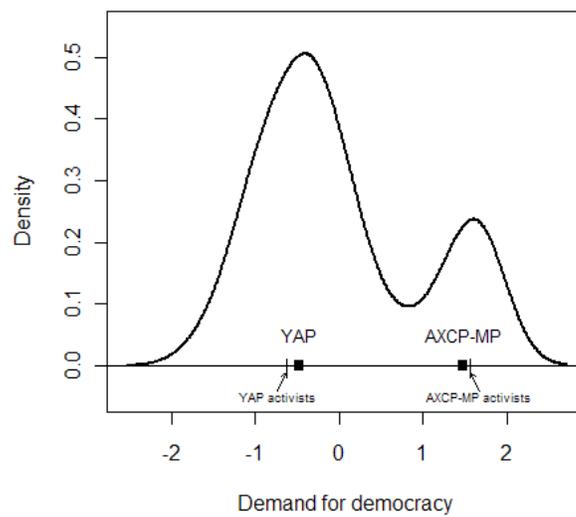
Figure 3: Voter distribution, party and activist positions in Azerbaijan in 2010
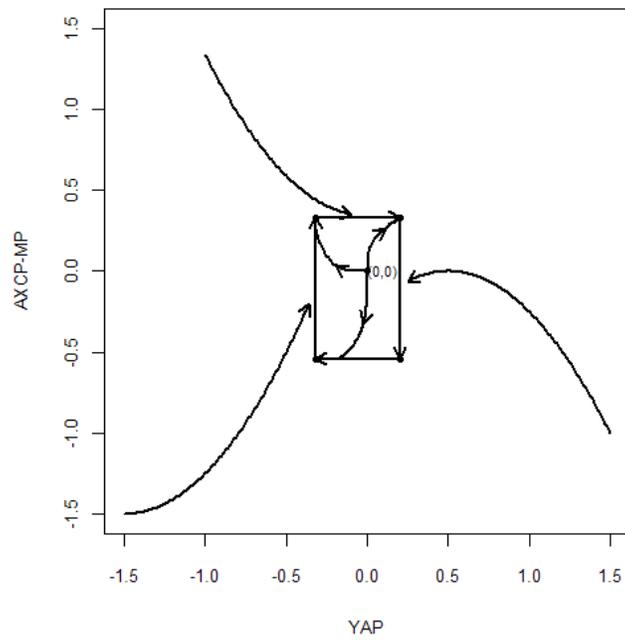
Figure 4: A limit cycle in Azerbaijan