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Elections and election fraud in Georgia and Armenia

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Full Title:	Elections and election fraud in Georgia and Armenia
Abstract:	<p>Elections on unfair playing fields are common. Yet election day fraud can result in authoritarians losing office. The freer the environment, the more an authoritarian must rely on means other than election day fraud to retain office, because they are less capable of coercing the population without facing repercussions. Among those other means is cooptation through public policy. A common theme in this special issue is that public policy has been of greater import in Georgia than Armenia. This article begins to explain this phenomenon using comparative case studies of election day fraud in Armenia and Georgia over time. To do so, the article uses methods from the field of election forensics to provide a quantitative comparison of the scale of election day fraud in each country's elections since 2007 using precinct level election results for parliamentary and presidential elections. The test results suggest, as has been widely believed, that Georgia's elections have had less election day fraud than Armenia's during this period. This finding provides a theoretical basis to explain why public policy has been a greater concern in Georgia than Armenia.</p>
Keywords:	Election Forensics; Election Fraud; South Caucasus
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Elections and election fraud in Georgia and Armenia

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Elections and election fraud in Georgia and Armenia

Elections on unfair playing fields are common. Yet election day fraud can result in authoritarians losing office. The freer the environment, the more an authoritarian must rely on means other than election day fraud to retain office, because they are less capable of coercing the population without facing repercussions. Among those other means is cooptation through public policy. A common theme in this special issue is that public policy has been of greater import in Georgia than Armenia. This article begins to explain this phenomenon using comparative case studies of election day fraud in Armenia and Georgia over time. To do so, the article uses methods from the field of election forensics to provide a quantitative comparison of the scale of election day fraud in each country's elections since 2007 using precinct level election results for parliamentary and presidential elections. The test results suggest, as has been widely believed, that Georgia's elections have had less election day fraud than Armenia's during this period. This finding provides a theoretical basis to explain why public policy has been a greater concern in Georgia than Armenia.

Keywords: elections, fraud, forensics, public policy, Georgia, Armenia

Introduction

From 1991 to 2016, 18 elections were held in Georgia and 20 in Armenia. Arguably, none of these have been carried out on a fully free and fair electoral playing field. However, the quality of elections has varied from the largely free and fair (e.g. Georgia's 2016 parliamentary elections, Armenia's 1991 presidential elections) to the highly problematic (e.g. Georgia's 2000 presidential elections, Armenia's 2008 presidential elections). While observer reports assessing the quality of elections are many, relatively few academic accounts of the elections exist. Importantly, very little work has looked at the quality of Georgian and Armenian elections over time or compared them. This article begins to fill the gap, providing an overview of the elections in a comparative perspective through offering a quantitative analysis of the quality of election days in Armenia and Georgia since 2007 using methods from the field of election forensics.

On less than democratic playing fields, such as Georgia and Armenia, incumbents must either commit electoral fraud (Sjoberg, 2016) or convince enough citizens to come to the voting booth for them to retain power. However, Tucker (2007) notes that authoritarians face being removed

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4 from office if fraud is so large that it brings people to the streets, as occurred in Georgia in 2003.
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6 If authoritarians want to remain in office, but the risk of being unseated through street protests is
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8 high, they should temper fraud with actual delivery on policy in order to maintain their office.
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10 Indeed, at the heart of the argument in this special issue is that policy and governmental
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12 performance matter even in less than fully democratic settings. As Gilbreath and Turmanidze
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14 (2017) argue, the state's capacity to implement policy affects the incumbent's chances of
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16 remaining in office. As Babunashvili (2017) argues, the public engages in retrospective voting in
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18 Georgia, meaning that they evaluate the performance of government and base their vote choice on
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20 it. Yet, the articles in this special issue also show (Shubladze and Khundadze, 2017; Gilbreath and
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22 Turmanidze, 2017) that policy has been less of a focal point in Armenia than in Georgia. To explain
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24 this last observation, the article tests and compares the relative levels of electoral fraud in Georgia
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26 and Armenia over time. To do so, the article reports the results of electoral forensics tests in
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28 elections in Armenia and Georgia between 2007 and 2016. The quantitative analysis of the
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30 elections suggest something which most observers of the region would likely agree with – while
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32 neither Armenia nor Georgia have exceptionally clean elections, Georgian elections generally have
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34 less election day fraud than Armenian ones. Although this is unlikely to surprise many scholars of
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36 the region, it is an important reality to establish, because it provides an explanation for why
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38 delivery on policy has been less important in Armenia than Georgia. Rather than engage in the
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40 business of providing good government in order to retain office, the analysis suggests that in
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42 Armenia the government could simply use enough electoral fraud to retain its incumbency.
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54 **Elections on uneven playing fields and election fraud**

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57 Free and fair elections are often considered the cornerstone of democracy. Yet in many countries,
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59 including those in the South Caucasus, elections are less than perfect, being characterized by
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4 uneven playing fields and sometimes election day fraud. Even though election day fraud is
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6 common, other strategies are available to authoritarians such as manipulating electoral institutions
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8 as well as actually convincing voters to vote for them.
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12 Much of the literature on uneven playing fields stems from the literature on comparative
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14 authoritarianism. Most prominently, Levitsky and Way (2010) have argued that a new regime type
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16 – competitive authoritarianism – emerged following the cold war. In such regimes, competitive
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18 elections are held on uneven electoral playing fields that favour the incumbent. Incumbents also
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20 sometimes use violence, intimidation, and direct changes of the vote through a variety of means,
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22 but they also use the resources they have access to through being in government to co-opt
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24 supporters through the distribution of resources (Gandhi and Lust-Okar, 2009). Incumbents also
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26 shape the formal rules of the game to their advantage to contribute to their retention of office
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28 (Gandhi and Lust-Okar, 2009; McElwain, 2008). Importantly, both Armenia and Georgia have
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30 been characterized as electoral authoritarian (Schedler, 2013) or competitive authoritarian regimes
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32 (Levitsky and Way, 2010), with elections taking place on uneven playing fields, characterized by
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34 the above tactics. These categorizations coincide with Freedom House ratings over time that label
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36 Georgia and Armenia as partly free (Freedom House, 2017a, Freedom House, 2017b).
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45 While just what constitutes election fraud is less than settled (Alvarez, Hall, and Hyde, 2008),
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47 some actions like voter intimidation, ballot box stuffing, and outright falsification of election
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49 results are agreed upon as fraudulent activities. Hence, at least in part, rather than from a unified
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51 framework, election fraud is often explored from a wide range of substantive and theoretical
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53 perspectives. For instance, a number of studies look at the results of revealing fraud and post-
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55 electoral protests (e.g. Tucker, 2007), the effects of election observation on decreasing fraud (e.g.
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57 Sjoberg, 2012), types of election fraud (e.g. Hyde and O'Mahony, 2010), and specific case studies
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4 of electoral fraud (e.g. Alston and Gallo, 2009). In this article, however, we are concerned with
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6 the relative levels of election day fraud as well as the relationship between election fraud and
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8 governance. As Sjoberg (2016) writes, “Autocrats face a dilemma.” They can use electoral fraud
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10 to retain office, however, they also may face post-electoral protests which can unseat them. This
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12 leads Sjoberg (2016) to suggest that authoritarians will engage in ‘smart fraud’ i.e. only engaging
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14 in enough fraud to win, but not enough to draw people to the streets. However, authoritarians have
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16 another strategy available to them. They can combine relatively low levels of fraud with policy
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18 delivery in order to co-opt citizens into actually voting for them. This strategy would be evidenced
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20 by relatively low levels of fraud and a high level of importance placed on public policy. While
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22 governments in general are likely to attempt to avoid street protests, ones which have seen previous
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24 incumbents lose power through street protest are more likely to avoid fraud than incumbents who
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26 have not seen politicians in their country or neighborhood lose power through street protests.
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28 Notably, Georgia and Armenia broadly follow these two patterns. As Gilbreath and Turmanidze
29
30 (2017) argue delivery on public policy in Armenia receives relatively little attention, while in
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32 Georgia policy is a prominent part of the country’s politics. At the same time, the Rose
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34 Revolutionary government knew that protests could unseat them, just as they unseated the previous
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36 incumbent through protests. In contrast, in Armenia the government put down large scale protests
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38 following the 2008 presidential elections, ultimately retaining office. As Novikova (2017)
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40 highlights, despite extensive problems in Armenia and a failure to respond to them, the incumbent
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42 has been able to retain office. Below, we show that following theoretical expectations Armenian
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44 elections have exhibited greater levels of fraud than Georgian, suggesting that indeed, the
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46 strategies described above are likely at play in Georgia and Armenia. Importantly, this article deals
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48 with the years between 1991 and 2016, and street protests have become more prevalent in Armenia
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4 in recent years (Ishkanian, 2015; Paturyan and Gevorgyan, 2016). Given the recent intensity of
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6 civic activism, the Armenian incumbents' strategy may begin to shift towards public service
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8 provision, though of course, this is yet to be seen.
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10 11 12 13 **Elections in Georgia and Armenia** 14

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16 Although little comparative work has been done on Georgian and Armenian elections, they are
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18 ideal candidates for comparative study since, the political and social landscapes in Armenia and
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20 Georgia started from similar slates at independence, although they diverged over time. Both
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22 experienced conflicts over territory at the outset of independence, and faced economic collapse
23
24 and slow recovery in the 1990s (De Waal, 2010). Neither Georgia nor Armenia has significant
25
26 natural resource wealth, and both have high levels of outmigration. Both countries, have also had
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28 relatively high levels of political instability (Powell and Tucker, 2014). Moreover, elections in
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30 both Armenia and Georgia have been and remain less than perfect. These attributes, together with
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32 a shared history among other numerous similarities make them ideal candidates for comparison.
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34 This section first provides an overview of the existing literature on elections in Georgia and
35
36 Armenia, and then shows that Georgia and Armenia are no exception in regard to manipulation of
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38 electoral institutions in order to gain an advantage on the electoral playing field, through providing
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40 an overview of major electoral system changes over time.
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48 In general, Georgian politics and elections have been more thoroughly examined than Armenian.
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50 In Georgia, much literature has focused on the Rose Revolution and the related 2003 parliamentary
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52 and 2004 presidential and parliamentary elections (e.g. Karumidze and Wertsch, 2005; Magaloni,
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54 2010). Several high quality political histories that touch on various elections in Georgia (e.g.
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56 Wheatley 2005; Jones 2012), and the quality of Georgian democracy (Mitchell, 2009) are also
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4 available. Besides these, Jones (2000) writes on the lack of interest groups in early Georgian
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6 democracy, and George (2014) has explored minority electoral behaviour, including a district level
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8 analysis of electoral fraud over time. Van Peski (2013) covers the 2012 elections and provides
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10 extensive background on Saakashvili's tenure in office. Schofield et al. (2012) looks at the
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12 importance of party leaders in the 2008 elections. In addition to these more theoretically oriented
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14 articles, most national elections are covered by academic electoral notes. Allison, Kukhianidze,
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16 and Matsaberidze (1993) provide an overview of the 1992 elections, and Allison (1996) describes
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18 the 1995 elections. Jones (2005) discusses the 2004 presidential and parliamentary elections.
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20 Mueller (2014) provides an overview of the 2012 parliamentary elections and Fumagalli (2014)
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22 describes the 2013 presidential elections.
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30 Significantly, less work has been done on the Armenian political landscape, let alone Armenian
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32 elections specifically. To the best of our knowledge, no political history of Armenia exists which
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34 covers independent Armenian political history in depth. Instead, work on Armenian politics has
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36 focused on nationalism and democracy (e.g. Rutland, 1994), the Nagorno Karabakh conflict (e.g.
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38 De Waal, 2003), the repercussions and memory of the Armenian Genocide (e.g. De Waal, 2015),
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40 the recent "civic initiatives" (e.g. Ishkanian, 2015), and the politics of human rights and the
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42 development (or lack thereof) of political culture (Payaslian, 2011). When it comes to elections in
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44 particular, the literature is relatively sparse, with only one set of academic electoral notes that focus
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46 on the 2007 Armenian Parliamentary elections (Ruiz-Rufino, 2008). Sjoberg (2016) carries out
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48 election forensics tests on the 2012 and 2013 Armenian elections making use of the randomization
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50 of local election commission chairs and secretaries, finding that the elections exhibit 'smart fraud'.
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52 In a recent contribution that deals with but is not focused on elections, Novikova (2017) discusses
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54 "(in)stability" in the aftermath of the 2016 four day war and in the context of recent developments
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4 in Armenia, including the 2015 constitutional referendum. The grey literature too is relatively
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6 sparse in terms of elections, with Policy Forum Armenia (2012) looking at election fraud.
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8 Potentially the most extensive coverage of the political history of Armenia is a working paper
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10 which discusses political developments in the country between 1990 and 2000 in depth (Astourian,
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12 2000).
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15 16 17 18 ***Political landscapes: from independence to 2007*** 19

20 Before discussing the electoral institutions of Armenia and Georgia in greater depth, this section
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22 provides a brief historical overview of the Georgian and Armenian political landscapes from
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24 independence to 2007. The section serves as an introduction to the subsequent section which
25
26 describes how electoral institutions have changed over time, wherein we argue that incumbents
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28 have used electoral institutions to retain office. The section is bounded by 2007, in order to avoid
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30 the repetition of discussion of the political landscapes in each country that accompany the analysis
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32 of the election forensics statistics. Although a relatively minor contribution to the literature in and
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34 of itself rather than the primary goal of the article, the section serves to set the stage for the
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36 comparative analysis of election fraud in each country over time.
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42 43 ***Georgia*** 44

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46 Coming to power in 1990 through elections to the Supreme Soviet, Zviad Gamsakhurdia secured
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48 his position in the subsequent 1991 presidential elections following Georgian independence. His
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50 tenure in power, however, was short-lived, being removed from office at the start of 1992 through
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52 coup d'état. Once the warlords who removed him realized they needed assistance in governance,
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54 Eduard Shevardnadze was invited back to Georgia from Moscow, and became the head of state
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56 following the 1992 elections (Jones, 2012). Given the low electoral threshold and encompassing
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4 electoral system more generally in 1992, the legislature included 24 parties. The increase of the
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6 threshold in 1995 led to a sharp decrease in the number of parties making it into parliament. In the
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8 presidential race, which took place at the same time as parliamentary elections, only the former
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10 Soviet Georgian leader Jumber Patiashvili, who was considered responsible for the April 9, 1989
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12 tragedy (Suny, 1994), presented any semblance of serious opposition, and Shevardnadze was
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14 elected president. In 1998, the country held its first local elections since the ones which took place
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16 for *sakrebulo*, the Georgian equivalent of a town or city council, in 1991 at the same time as the
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18 vote for independence. Shevardnadze's Citizens Union of Georgia took slightly under a majority
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20 of the seats, while at least 12 parties took seats in local councils. With the increase in electoral
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22 threshold, parliament saw a slight decline in the number of parties in 1999 parliamentary elections,
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24 and Shevardnadze's Citizens Union of Georgia retained control over parliament. In 2000, the
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26 country held presidential elections, which saw Shevardnadze re-elected, but with significant
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28 election day irregularities. Jumber Patiashvili again was Shevardnadze's main competition, and
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30 Shevardnadze again won by a large margin.
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39 In 2002 the second set of local elections since independence took place. These elections marked
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41 the beginning of the end for the Shevardnadze, and in many respects foreshadowed the 2003
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43 parliamentary electoral fraud and subsequent revolution. Following infighting over which group
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45 within the party would retain control of the party formally, after having effectively dissolved, the
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47 Citizen's Union of Georgia failed to gain seats. Notably, in Tbilisi, Shalva Natelashvili's Labor
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49 Party won the elections, though through horse trading, Mikheil Saakashvili was able to take the
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51 head of the *sakrebulo*.
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57 Following the fraudulent 2003 elections, and the fraud being publicly contested after the release
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59 of exit polls and parallel vote tabulations, the Rose Revolution removed Shevardnadze from, and
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4 swept Mikheil Saakashvili into office. Immediately following the revolution, in January 2004,
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6 presidential elections were held, resulting in a landslide victory for Mikheil Saakashvili. Following
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8 the Rose Revolution, the party list component of the 2003 elections was nullified, and repeat
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10 elections were held in March 2004. They resulted in a resounding victory for the United National
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12 Movement. The 2006 local elections saw a near UNM sweep of local government, with almost
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16 90% of seats.
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18 19 20 *Armenia* 21

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23 In contrast to Georgia's four incumbents, in Armenia there have only been two groupings to hold
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25 power – the Armenian National Movement and the Republican Party of Armenia. In Armenia, the
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27 1991 presidential election was the first to be held in independent Armenia, with Levon Ter-
28
29 Petrosyan winning the elections. The turnout was considerably higher than the previous Supreme
30
31 Council election and the public enthusiasm to participate was high (CSCE, 1992). These elections,
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33 however, were the last ones held in Armenia to be characterized by major international observers
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35 as free and fair.
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41 Although the Armenian Revolutionary Federation (ARF), a key opposition force, was banned in
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43 1995, many opposition leaders consolidated around Vazgen Manukyan, who the ARF endorsed,
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45 to form an opposition block which presented a reasonable challenge to Ter-Petrosyan and the
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47 Armenian National Movement. In the 1996 presidential elections Ter-Petrosyan won in the first
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49 round of elections with a slight majority. The other three contenders in the elections accused Ter-
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51 Petrosyan of ballot box stuffing and vote-counting fraud. Violence broke out in mass
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53 demonstrations. Despite demonstrations, the results were not amended.
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4 In 1998, a snap presidential election was called amidst the resignation of Ter-Petrosyan in response
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6 to perceived weakness in negotiations with Azerbaijan over the Nagorno-Karabakh conflict. A
7
8 clear red line was established in Armenian politics. The ARF returned to the political arena and
9
10 strongly supported Robert Kocharyan for the elections. Karen Demirchyan lost elections to
11
12 Kocharyan. Importantly, he did not dispute the results publicly. In 1999, a two party coalition
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14 emerged with the Republican Party led by Vazgen Sargsyan and the People's Party led by Karen
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16 Demirchyan becoming the Unity bloc. The latter was the winner of 1999 elections. However that
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18 year was significant not because of elections, but because of the October 27 attack on the National
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20 Assembly, when the leaders of Unity bloc, the Prime Minister, the Speaker of Parliament and six
21
22 other parliamentarians were killed.
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30 Robert Kocharyan won the 2003 presidential election, with his main opponent being Stepan
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32 Demirchyan, with two thirds of the vote according to the official results. However, both the
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34 opposition and international observers accused the incumbent of significant electoral fraud. As
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36 with the presidential elections, the parliamentary elections saw the Republicans retain power. In
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38 2007, after Prime Minister Andranik Margaryan, the leader of the Republican Party, passed away,
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40 Kocharyan appointed Serzh Sargsyan, his future successor, as the new prime minister.
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45 *Electoral systems and their manipulation*

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48 The electoral systems in both Georgia and Armenia are mixed with proportional and first-past-the-
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50 post components. Both currently have a 5% electoral threshold, and have moved towards
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52 parliamentary government from (semi) presidential government in recent years. Besides these
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54 commonalities, the institutions in each country are rather different, except on one key
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56 characteristic. As Gandhi and Lust-Okar (2009), among others (e.g. Boix, 1999; McElwain, 2008),
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4 have noted authoritarians often change electoral institutions to favour themselves. Georgian and
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6
7 Armenian incumbents are no exception in this regard.
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10 Perhaps the most significant electoral system change in terms of political consequences in Georgia
11
12 has been of the electoral threshold. In independent Georgia, the first parliamentary elections were
13
14 carried out under a compensatory list system in 1992 (Allison, Kukhianidze, and Matsaberidze,
15
16 1993). Through setting the electoral threshold at 2% and including a compensatory list, the system
17
18 aimed at including every party with the exception of supporters of Zviad Gamsakhurdia (ibid). It
19
20 succeeded in doing so, with 24 parties gaining seats in parliament. In 1995 the elections were
21
22 carried out under a mixed proportional and first-past-the-post system with a 5% electoral threshold.
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24 The increased threshold and lack of electoral blocks led to relatively few parties making it into
25
26 parliament. In the 1999 parliamentary elections, the mixed electoral system was maintained, yet
27
28 the electoral threshold was increased to 7% at the behest of an opposition party and with the
29
30 support of the ruling party. This too decreased the number of parties which could pass the electoral
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32 threshold. In 2008, following opposition protests and international pressure, the 7% threshold was
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34 reduced to 5%, where it stands at present, although amendments to the constitution may change
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45 In what many observers view as an attempt to consolidate rule, the currently ruling Georgian
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47 Dream party has proposed constitutional amendments which affect the electoral code, including a
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49 ban on electoral blocks and a wasted vote distribution rule. As Gilbreath and Sichinava (2017)
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51 highlight, the proposed ban on electoral coalitions seems like a clear instance of attempting to
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53 prevent the emergence of a viable opposition on the Georgian political landscape. In addition, the
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55 Georgian Dream has proposed moving to fully proportional system from the current mixed system.
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58 While opposition political parties and civil society organizations have long argued for such a shift,
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4 other changes attached to the system are considered to be aimed at the consolidation of Georgian
5 Dream rule. For instance, in the original proposal for changes, votes which did not go to winning
6 parties would have been distributed to the winner of elections. An input-output model run on past
7 elections suggested this would likely advantage the incumbent (Gilbreath and Sichinava, 2017). In
8 response to local and international criticism, the government has since lowered the electoral
9 threshold attached to the proposal and made a number of other amendments. Nonetheless, the
10 amendments to the electoral system are likely to give advantage to the incumbent Georgian Dream
11 party, particularly when compared with a proportional system without the peculiarities attached to
12 the system. Importantly, the amendments have passed two of three readings in Georgian
13 Parliament at the time of writing, however, their final form has yet to emerge in part due to the
14 controversy surrounding them.

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17 Besides the electoral threshold, the government has made numerous changes to the electoral code
18 in the run up to elections. Notably, the composition of the Central Election Commission has been
19 a frequent subject of controversy (Broers and Broxup, 2004), with arguments over changing its
20 structure, as well as frequent changes to its actual structure, recurring before most elections.
21 Besides CEC composition, the clearest issue has been districting. While in 2012, roughly 3000
22 voters in Kazbegi elected one majoritarian, so too did approximately 150,000 in Kutaisi, making
23 a Kazbegian's vote weight roughly 30 times that of a Kutaisians. This issue was addressed in 2016,
24 when redistricting occurred for the first time since independence. The redistricting resulted in a
25 largely equal distribution of voters between electoral districts, although some signs of
26 gerrymandering were present (CRRC, 2016).

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29 In Armenia, the electoral system has experienced significant changes, but has never undergone a
30 complete restructuring as occurred in Georgia between the 1992 and 1995 elections and as
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4 Georgia's system again appears to be undergoing today. Nonetheless, since 1995 four
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6 parliamentary elections have taken place in Armenia, each under different rules to distribute and
7
8 allocate seats as a consequence of strategic calculations of the political actors. After the first 1990
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10 'festive' elections, the electoral processes emerged as less free and fair. In the 'discursive history'
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12 of the unfairness of Armenian elections, 1995 signified the beginning of the institutionalization of
13
14 unfair electoral rules (Abrahamyan and Shagoyan, 2012). Potentially the most significant change
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16 in electoral system structure was the introduction of random assignment of local election
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18 commission chairs and secretaries, which followed the violence which resulted from the 2008
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20 elections and protests of the official results (Sjoberg, 2016). Besides this change, one of the more
21
22 salient institutional changes has been the size and composition of parliament. While in the 1995
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24 parliamentary elections, the parliament consisted of 190 seats, with 150 elected through single
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26 member mandate districts and 40 through party list, in the run up to the 1999 parliamentary
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28 elections, the system shifted to having 56 single member mandates and 75 party list seats, reducing
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30 the relative share of seats elected by single member mandate and the overall number of seats in
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32 parliament. By 2007, the number of single member mandates was further reduced to 41 and the
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34 number of party list seats increased to 90. The number of seats further reduced from 131 to 101
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36 in 2015 following Armenia's referendum on constitutional amendments that to its political system
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38 (Broers, 2015).
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49 Although not formally an aspect of the electoral system, it is notable that both countries have
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51 moved towards parliamentary government in recent years, and in each case the motivation appears,
52
53 at least in part, to be the consolidation of political rule rather than increased democratization. In
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55 Georgia, Shevardnadze's government was presidential, however, following the Rose Revolution,
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57 a number of constitutional amendments formally moved government towards a semi-presidential
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4 model (Gabedava, 2006). Although formally semi-presidential, this model concentrated
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6 presidential powers, leading some to consider it a super-presidential system (ibid). In 2010,
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8 Georgia passed amendments to the constitution that would move the country to a strong Prime
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10 Minister, weak President, semi-presidentialism. The amendments only took effect after the term
11
12 of then president Mikheil Saakashvili's term ended in 2013, which concerned many that the
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14 amendments' passing would lead to Saakashvili attempting to remain in office, though the UNM
15
16 ultimately lost the 2012 elections. In Armenia, the change from a presidential system to a
17
18 parliamentary system resulted from the 2015 constitutional referendum. Following the
19
20 referendum, the country officially switched from a semi-presidential to a parliamentary political
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22 system. One declared goal of the referendum was the replacement of personality-based political
23
24 culture and the consolidation of platform-based politics. While too soon to know the full effects
25
26 of the change, the shift has generally been greeted with criticism. As Novikova (2017) highlights,
27
28 while elites argued that the amendments would work towards the formal democratization of the
29
30 country, few in the Armenian public thought they would help. Generally, the referendum was
31
32 viewed as fraudulent with reports of vote buying, carousel voting, and voter intimidation
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34 (Grigoryan, 2015). One year after the changes, the discourse remained controversial, with
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36 discussion focused on whether president Sargsyan would become the prime minister after the end
37
38 of his presidential mandate in 2018. Indeed, as Broers (2015) argues, the changes appear to have
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40 been more about avoiding a succession crisis in 2018, than moving towards a more sustainable
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42 democratic system.
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54 While the specific changes to the electoral system in each country are different, the goal of many
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56 changes in both countries has been the incumbent trying to give themselves an electoral advantage.
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59 In Georgia changes to the electoral threshold and more recently to the electoral system have been
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4 aimed at increasing the incumbent's electoral advantage, thus obviating the need to commit
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6 electoral fraud and potentially face large scale protest. In Armenia, the incumbent too has
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8 consistently changed electoral and governing institutions with the aim of maintaining its own
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10 power.
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15 **Measuring election fraud: Theory, data, and methods**

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18 The main questions this article seeks to address are how the quality of election days compare in
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20 Georgia and Armenia and what this suggests for governance in each country. To do so, six election
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22 forensics tests were applied to parliamentary and presidential elections between the years 2007
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24 and 2016. By comparing the number of tests with significant deviations from expected results in
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26 each country over time, the article provides an indicator of the relative quality of elections in each
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28 country. Before discussing the results of the tests, this section provides an overview of measures
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30 of electoral fraud, the field of election forensics, the data used for analysis, and the six tests utilized
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32 to compare the quality of elections.
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39 While instances of election fraud are widely studied, just how imperfect elections are is difficult
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41 to measure. In Pottie's (n.d) applied review of different measures, five different forms of
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43 assessment, including public opinion polls, democracy assessments, election management
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45 assessments, election observation, and specialized missions are discussed. While each category
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47 has advantages, they also have disadvantages particularly as measures of quality of elections.
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49 Public opinion polls can accurately gauge how the public feels an election went, and expert
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51 assessments of democracy and election management can show how experts view the quality of
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53 elections. Looking at survey data from the region, Caucasus Barometer 2009 data suggests that
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55 Azerbaijanis were almost three times more likely to think that the most recent elections were fair
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4 in their country compared with Armenians and Georgians (CRRC, 2009). However, issues such as
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6 frame of reference bias – comparing quality based on one’s own experience and knowledge – make
7
8 comparison difficult and can lead to awkward conclusions like North Korea and Cuba having
9
10 higher levels of electoral integrity than North Carolina (Gelman, 2017). Notably, with specialized
11
12 missions, rather than being about measuring the quality of elections, they are in fact more about
13
14 provision of technical assistance. Finally, election observation is as much about the deterrence of
15
16 fraud as it is about the judgment of the quality of elections. Importantly, election monitoring
17
18 reports are often heavily context dependent, and actively situated within the political and historical
19
20 context of a country (Pottie, n.d.). All of this is to say that while the above activities have value,
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22 they are also problematic for measuring the quality of elections, and are particularly so for
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24 comparing the quality of elections between countries.
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32 While election quality is difficult to measure, in recent years, the field of election forensics has
33
34 emerged with a variety of methods for testing for election day fraud (Alvarez, Hall, and Hyde,
35
36 2008). The main idea behind the field is that when people manipulate election results, the results
37
38 will no longer follow patterns that are generally expected from numbers generated from a natural
39
40 process, such as voting (Montgomery et al., 2015). Hence, the field tests for the presence of
41
42 expected patterns in election returns; the absence of expected statistical patterns may suggest that
43
44 election fraud of one variety or another took place (Montgomery et al., 2015). Test results, as with
45
46 all statistics, are nonetheless probabilistic. Moreover, recent research suggests that strategic voting
47
48 can lead to statistically significant test results (Mebane and Klaver, 2015). While a lively debate
49
50 exists in the literature about the use of a variety of different tests (see, Shikano and Mack, 2009;
51
52 Deckert, Myagkov, and Ordeshook, 2011; Mebane, 2011), election forensics continues to develop
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54 as a field. Importantly, election forensics results are also comparable between elections in one
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4 country (Mebane and Kalinin, 2009). Although there is no literature, to the best of the authors'
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6 knowledge, which has compared election forensics tests between countries for the purpose of
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8 determining relative quality, this is a logical extension of current forms of analysis, which
9
10 potentially will enable a new path towards the comparative study of election quality. Notably, the
11
12 field's methods lend themselves to the quantification and comparison of election day quality
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14 between countries through the use of multiple tests, and comparing the number of statistical
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16 anomalies found in each election and country. While election forensics enable a comparison
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18 between and within countries, it is important to note that the tests provide indications of whether
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20 election day fraud took place and do not describe the quality of the pre-electoral environment,
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22 which is clearly an important aspect of elections. Hence, the election forensics test results should
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24 be interpreted with this in mind.
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32 Election forensics tests generally use election precinct level data. To obtain this data, we requested
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34 information from the Central Elections Commissions of Armenia and Georgia. While the datasets
35
36 contain a number of variables such as invalid ballots and vote counts for each party, we use precinct
37
38 level turnout in the proportional component of the elections to carry out tests. Proportional
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40 elections were selected for ease of presentation in principal, as first-past-the-post elections should
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42 be analyzed separately for each seat. Elections from 2007 to 2016 are used, because the electoral
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44 commissions only had paper copies of precinct level election protocols for prior elections.
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50 The article reports the results of six election forensics tests including the test of the distribution of
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52 second digits to a Benford-like law, the skew and kurtosis of the distribution of turnout, the average
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54 of final digits, the 0-5 mean of last digit test, and a dip test. A brief description of each test and its
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56 interpretation is provided below; however, for readers less interested in the technical details of the
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58 methods, the results below should be understandable without a thorough reading of this section.
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4 *Benford-like law test*
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8 The first test is a test of a Benford-like law. Benford found that the first digit in a number generated
9 from a natural process is more likely to be one than two, two than three, and so on (Benford, 1938).
10 This distribution is widely used in forensic accounting to detect when numbers reported on forms
11 appear to be fraudulent, because when humans change numbers, this distribution often does not
12 appear (Suh, Headrick, and Minaburo, 2011). Political scientists have, recognizing that the first
13 digit in a number is inappropriate for testing of election results (Mebane, 2010), used the
14 implications of Benford's law for the second digit in a number to test election results reported at
15 the precinct level (Mebane, 2011). Given this distribution of numbers, the average of all the second
16 digits in a series of numbers should be 4.1873 (Suh, Headrick, and Minaburo, 2011; Mebane and
17 Hickman, 2015). However, this test must be interpreted with caution, as Mebane and Hickman
18 (2015) highlight the test does not consistently pick up election fraud. To carry out this test, the
19 second digit of turnout was extracted from every precinct which had 100 or more votes cast. This
20 criteria was used, because the second digit in a two digit number should follow a different
21 distribution as would a single digit number. The resulting list of numbers was averaged and
22 compared to the expected average.
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45 *Skew of the distribution of turnout*
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48 The second test used of the skew of the distribution of turnout. Skew is a measure of the symmetry
49 of a distribution (Everitt and Skrondal, 2010). For voter turnout, the expectation is that the
50 distribution is more or less symmetrical, having a close to zero skew, indicating that while there is
51 extremely high turnout in some election precincts and extremely low turnout in others, these
52 outcomes are going to be relatively rare compared to the average or median level of turnout. This
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4 statistic could be statistically different from zero in cases where turnout is fraudulently inflated or
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6 deflated in a fair number of districts.
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10 *Kurtosis of the distribution of turnout*

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14 The third test used below looks at the kurtosis of the distribution of turnout. Kurtosis can be thought
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16 of as a measure of how sharp or dull the peak of a distribution is (Everitt and Skrondal, 2010). For
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18 voter turnout, the distribution is expected to have a kurtosis of 3 (Hickman and Mebane, 2015). If
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20 the kurtosis is significantly higher than 3, it suggests that there are more low and high turnout
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22 electoral precincts than expected, while if the kurtosis is significantly lower than 3, it suggests that
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24 there are fewer low and high turnout electoral precincts than expected.
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29 *Dip test for unimodality*

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33 The fourth test used in the article is Hartigan's dip test. This test also looks at the distribution of
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35 voter turnout, and tests whether it is unimodal or not (Hartigan and Hartigan, 1985). A unimodal
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37 distribution is one which has a single mode. A statistically significant test result is produced by
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39 the dip test when the distribution of voter turnout is either multimodal or nonmodal. A multimodal
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41 distribution has multiple modes, whereas a non-modal distribution does not have a mode. Both of
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43 these patterns suggest suspicious election returns. To understand the intuition, an example is
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45 useful. Imagine an election in which there are 100 election precincts. Voter turnout in the election
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47 is non-modal, with 1% of voters voting in one election precinct, 2% in one election precinct, 3%
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49 in another, 4% in another, and so on with every election precinct having a different level of turnout
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51 and with every percentage point between 1 and 100 represented. Clearly such a distribution is
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53 unlikely to occur by chance alone, or to put it in plainer terms, the turnout is just a bit too perfect
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55 to have happened without a human hand involved. Now, imagine an election under the same
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4 conditions, except that there is a multimodal distribution of voter turnout. In 50 precincts there was
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6 2% voter turnout and in 50 precincts there was 95% turnout. This is a multimodal distribution,
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8 which suggests that voter turnout was potentially inflated, forced, or otherwise fraudulent in 50%
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10 of precincts and deflated, suppressed, or otherwise fraudulent in 50% of precincts. Notably, if an
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12 election boycott occurred in some precincts and not others this pattern could also be produced as
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14 could a number of other election behaviours. Again, this distribution can be thought of as being a
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16 bit too perfect to have happened without some external force causing it. To be clear, the above are
17
18 idealized examples used to illustrate the intuition behind the test, and in reality the dip-test will
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20 result in a significant result in the absence of such extreme patterns.
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27 *Test of the distribution of the last digit in voter turnout*

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31 The fifth test is of the last digit of voter turnout. The last digit in a number is expected to be
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33 distributed equally between numbers zero through nine i.e. each number should be the last digit
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35 10% of the time if it has not been modified. The last digit test of voter turnout tests whether this is
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37 the case by taking the last digit of turnout in each electoral precinct, averaging them, and then
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39 comparing them to the theoretically expected value of 4.5 (the average of every number zero
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41 through nine). If the average of the last digits differs significantly from this value, it suggests that
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43 some form of fraud may be present, given that the final digit should follow the previously noted
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45 pattern if not tampered with.
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50 *0-5 last digit count test*

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55 The sixth test is also a last digit test, however, instead of averaging all numbers, the 0-5 last digit
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57 count tests the share of 0s and 5s in the last digit of election returns. The thinking behind this test
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59 is that party agents are likely to round up the number of votes they distribute to a party to 450, 500,
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4 or 50 rather than 364 or 67 in order to signal that they have in fact carried out the fraud they were
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6 expected to by party leadership (Kalin and Mebane, 2011). Based on a random distribution, zeros
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8 and fives should make up 20% of the last digits. Deviations from this distribution may suggest
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10 election day fraud.
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14 *Bootstrapping for significance testing*

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18 With all of the above tests besides the dip test, even though there is a theoretically expected value,
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20 reality is messy, and the expected values should emerge as the number of observations approaches
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22 infinity. Thus, there is a need to know how far the observed value can fall from the theoretically
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24 expected value by chance rather than electoral malfeasance. In order to understand whether the
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26 observed value is different from the theoretically expected value or whether an observed difference
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28 is due to chance variation, bootstrapping is used to generate 95% confidence intervals.
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31 Bootstrapping is a statistical resampling procedure that produces an upper and lower estimate of
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33 how far a statistic could have fallen by chance alone.¹ When the theoretically expected value for a
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35 given test falls outside the upper and lower estimate, it suggests that electoral malfeasance may
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37 have taken place.
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44 **Results and Discussion**

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47 The election results in Armenia and Georgia both exhibit a number of statistical anomalies,
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49 suggesting that election day fraud may have occurred in each parliamentary and presidential
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51 election between 2007 and 2016 in Georgia and Armenia. While the election forensics tests suggest
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53 that there were irregularities in every election, the number of tests in each country differs on
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59 ¹ For readers interested in a more in depth description of bootstrapping, see Efron and Tibshirani,
60 1994.
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4 average. In Georgia, an average of 2.6 tests were were significantly different from expected values
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6 per election compared to Armenia's 3.75, suggesting a higher level of election day fraud in
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8 Armenia over time. In Georgia, two tests were statistically significant in every election besides the
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10 2008 presidential elections and 2016 parliamentary elections, in which four and three tests show
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12 significant deviations. In contrast, in Armenia in three of four elections, four tests were significant,
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14 and in one three tests were. Notably, in the 2013 Armenian presidential elections, the dip test was
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16 nearly significant by conventional standards ($p=0.057$, rather than $p<0.05$), and a similar 'close
17
18 call' in the 2012 Armenian parliamentary elections led to three rather than four tests with
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20 statistically significant results. Results are presented for each country in Table 1 and Table 2 below.
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22 The election which results refer to is given in the far left column. The values presented in the row
23
24 of the election are the results of the above six statistical tests. The numbers in parentheses in each
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26 cell of the table are the 95% confidence intervals for each test. Confidence intervals that do not
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28 contain the theoretically expected value are highlighted in grey, indicating that fraud may have
29
30 occurred. In order to further unpack these results, each election is discussed below.
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39 [Table 1 here]
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42 *Georgia: 2008 presidential elections*

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46 The 2008 Georgian presidential elections resulted in Mikheil Saakashvili retaining office with 53%
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48 of the vote, albeit with accusations of election fraud surrounding the results. The elections came
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50 about as a result of a crackdown on street protests in November 2007. Hence, we would expect
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52 relatively low levels of fraud, because the government could feasibly lose office through street
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54 protests sparked by an excess of fraud. This pattern holds, with only two suspect test results,
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56 suggesting little election day fraud compared with either Armenian elections or other Georgian
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4 elections. Notably, a CRRC (2015) analysis showed that the government slowed fines and
5 increased social spending dramatically in the lead up to the elections, evidencing an attempt to
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7 obviate the need for election day fraud. However, one test result is notable - the zero-five mean
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9 test. This test is thought to be found positive due to signaling, i.e. when a party's agent suggests to
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11 the party that they have committed fraud through some signal. The United National Movement's
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13 ballot number (the number next to the party name on the ballot) was 5. Plausibly, agents may have
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15 been signaling that they carried out fraud to the party through making sure that a 5 appeared as the
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17 last digit in turnout. Whether one accepts this argument or not, there is no particular reason for
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19 why a greater number of 0s or 5s should appear in any case.
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27 *Georgia: 2008 parliamentary elections*
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31 The 2008 parliamentary elections resulted in the United National Movement retaining a majority
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33 in parliament. In contrast to the 2008 presidential elections, the parliamentary elections of the same
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35 year show higher levels of election day fraud, with four statistically anomalous results. This may
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37 be somewhat surprising to observers of the region, since these elections were considered broadly
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39 less fraudulent than the 2008 presidential elections. However, given the relatively weaker level of
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41 opposition contestation of the elections, the relatively smaller stakes of the election, as well as the
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43 smaller amount of attention paid to the elections internationally and domestically, the authorities
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45 plausibly could have thought they had more room to commit fraud. Given that street protests were
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47 more distant than in the previous elections, the government also likely felt they had less to fear in
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49 terms of backlash.
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56 *Georgia: 2012 parliamentary elections*
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4 The 2012 parliamentary elections marked the first electoral handover of power in Georgian history,
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6 with the Georgian Dream Coalition unseating the United National Movement. The elections had
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8 equally low levels of fraud as the 2008 presidential elections, with only two statistically anomalous
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10 results, both related to the distribution of turnout overall. The relatively low levels of election day
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12 fraud were likely the result of the highly tense situation surrounding the elections, the intense
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14 international scrutiny of the election environment, and the street protests which had erupted as a
15
16 result of a prison torture scandal weeks prior to the elections. These factors combined likely led to
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18 the relatively low levels of fraud.
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24 *Georgia: 2013 presidential elections*

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27 The 2013 presidential elections resulted in the United National Movement losing the presidency,
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29 with Georgian Dream candidate Giorgi Margvelashvili winning against the UNM's David
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31 Bakradze and Nino Burjanadze. The elections show only two statistical anomalies, suggesting a
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33 relatively low level of election fraud. This is an unsurprising result, given that in the lead up to the
34
35 elections, the Georgian Dream Coalition had a strong lead in the polls, and the economic volatility
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37 surrounding the currency devaluation which started in November 2014 had not yet begun. Hence,
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39 the Georgian Dream had little incentive to risk election fraud.
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46 *Georgia: 2016 parliamentary elections*

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49 The 2016 parliamentary elections were the first parliamentary elections since Georgian Dream
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51 took office. The Georgian Dream won a constitutional majority in the elections, with the United
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53 National Movement finishing second, and the Patriot's Alliance of Georgia, a newly emerged
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55 nationalist party, also passing the 5% electoral threshold. The elections were generally considered
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57 to be free and fair, and the pre-electoral environment was calm relative to previous elections.
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4 However, election day fraud was higher than in the 2013 presidential elections, with three
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6 statistical anomalies found in the tests conducted. This matches up with the general reports on the
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8 ground, which suggested some election fraud, although nothing to the extent of some earlier
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10 elections.
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15 [Table 2 here]
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18 *Armenia: 2007 parliamentary elections*
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22 The 2007 parliamentary elections resulted in the Republican party of Armenia winning a plurality
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24 of seats. Although judged to be an improvement by election monitors, the elections were contested
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26 as fraudulent, as had nearly every election in independent Armenia since 1995. A total of four tests
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28 had significant results, matching the highest level of election fraud in Georgia.
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33 *Armenia: 2008 presidential elections*
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36 In the 2008 presidential elections, the CEC declared Prime Minister Sargsyan the winner of the
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38 election with some 52.8% of all votes cast on February 24, after heated competition with the first
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40 president of Armenia, Levon Ter-Petrossian. Reports of fraud were widespread (e.g. Grigoryan,
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42 2008; It's Your Choice, 2008). And, in protests following the CEC's announcement of results, ten
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44 citizens were killed and the outgoing government coalition parties suggested a new Electoral Code
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46 in order to improve the electoral process in Armenia (Sjoberg, 2016). The reports of fraud match
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48 up with the election forensics results, with four significant tests. Notably, the same tests were
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50 significant as in the previous election, potentially suggesting a comparable fraud strategy.
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56 *Armenia: 2012 parliamentary elections*
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4 The 2012 parliamentary elections were the first national elections conducted under the new
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6 Electoral Code adopted in May 2011, and the first national elections since the events following the
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8 2008 post-election protests. Again, the the Republican Party won the most seats. While the 2012
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10 elections were generally considered suspect, the forensics tests show a lower number of statistical
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12 anomalies compared with other years. The lower number of test results in 2012 may reflect the
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14 authorities' changing strategies of election fraud in the 2012 elections, which included fewer
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16 strategies aimed at directly altering election results (Danielyan and Jenderejian, 2012) and “Smart
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18 fraud” (Sjoberg, 2016). Given that the memory of street protests following fraud in the 2008
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20 elections, the confluence of evidence suggests that the authorities adjusted their strategies,
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22 committing less fraud than in 2007 and 2008.
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30 *Armenia: 2013 presidential elections*
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33 Sargsyan officially won with 58.64% of the vote in the first round, and the majority of the election
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35 observation missions stated that this presidential elections were well administered and conducted
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37 in a manner that could be characterized as peaceful and an improvement over the May 2012
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39 elections for the National Assembly. However, the quantitative analysis shows that the relative
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41 level of fraud for this elections was higher than in the 2012 elections, with four election forensics
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43 tests showing statistical anomalies. Notably, this confirms the results of Sjoberg (2016), who found
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45 fraud based on whether the chair of the precinct election commission was from the ruling party or
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47 not in the 2013 elections, while finding no traces of fraud in the 2012 parliamentary results on the
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49 same indicator.
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56 Overall, the test results are similar to what would be expected based on observer reports. While
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58 Georgian elections do exhibit problems, they are fewer than in Armenia. Notably, test results
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4 which may at first not square with expert opinion are explained by the theoretical argument set out
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6 above – when fraud is risky, authoritarians will attempt to sway elections in their favour using
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8 other means or through using a limited amount of fraud.
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10 11 12 13 **Conclusion** 14

15
16 This article has provided a brief overview of elections in Georgia and Armenia since independence
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18 and presented the results of electoral forensics tests. While elections in both countries are less than
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20 perfect, Georgia's appear to be less problematic than Armenia's elections as has been broadly
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22 believed. What does the above analysis of electoral fraud in Armenia and Georgia suggest, besides
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24 confirming what has broadly been thought?
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29 First, this provides a theoretical basis for why delivery on public policy is less important in
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31 Armenia than Georgia. As the theory presented in the first section of this article suggests, rulers
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33 can use fraud or convince voters to actually vote for them in order to retain office. However, fraud
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35 carries with it the risk of being unseated through street protests. To date, street protests have been
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37 more successful in Georgia than Armenia. Hence, in Georgia, the government had to deliver on
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39 policy in order to avoid losing office given the higher risk associated with fraud. In Armenia by
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41 contrast, the weaker emphasis on policy delivery can be explained in part, by the fact that instead
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43 of delivering on policy, the government can substitute fraud for performance to keep themselves
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45 in office. Notably, whether this will remain the case given the recent civic movements in Armenia
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47 remains to be seen.
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54 Second, the above pattern suggests that politicians may engage in something analogous to voters
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56 engaged in retrospective voting. When reflecting on the past and present, they consider the risk of
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58 fraud. While both Armenia and Georgia suffered from electoral fraud in the early years of
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4 independence, Georgia has experienced less fraud on election day since at least 2007. A likely
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6 cause of the lower levels of fraud is the knowledge that just as the UNM came to power on waves
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8 of popular unrest over electoral malfeasance, they could be removed in the same manner given the
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10 right circumstances. Equally in Armenia, while incumbents surely realize that past performance
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12 does not guarantee future outcomes, it is suggestive. That is to say that the ruling coalition has
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14 likely been more willing to continue to engage in electoral fraud, because they have been able to
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16 in the past without being removed from office. Whether this trend continues in Armenia is of
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18 course an open matter. Given the increased levels of civic activism in recent years noted above,
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20 authorities there may think twice about whether or not and how much fraud to commit. If this leads
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22 Armenian authorities to put a greater emphasis on the delivery of public policy, this surely would
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24 be a positive outcome.
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32 The above two conclusions, while supported by the data in these two cases, suggest the need for
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34 future research. First, it is unclear whether this pattern may hold in other less than fully democratic
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36 regimes. Furthermore, the suggestion that past experience with peacefully overthrowing a
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38 government may lead politicians to be weary of faking elections at home deserves further
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40 exploration. Finally, further research should consider exploring the levels of election day fraud in
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42 hybrid and authoritarian regimes using a large-n dataset in relation to policy responsiveness.
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Armenian Parliamentary 2007	-0.2053929 (-0.2960, -0.1122)	-0.4551161 (-0.6213, -0.2879)	4.501098 (4.369, 4.633)	0.201427 (0.1831, 0.2197)	3.755763 (3.618, 3.893)	p= 0.03232	4
Armenian Presidential 2008	-0.3283973 (-0.4043, -0.2513)	-0.7702365 (-0.8869, -0.6543)	4.392447 (4.259, 4.528)	0.1975917 (0.1791, 0.2161)	3.245211 (3.122, 3.368)	p= 0.0004753	4
Armenian Parliamentary 2012	-0.4784841 (-0.5506, -0.4068)	-0.7164606 (-0.8430, -0.5930)	4.493925 (4.365, 4.623)	0.2150026 (0.1964, 0.2335)	3.272583 (3.140, 3.403)	p= 0.08472	3
Armenian Presidential 2013	-0.2687595 (-0.3443, -0.1918)	-0.5014074 (-0.6314, -0.3723)	4.356316 (4.229, 4.482)	0.2110526 (0.1927, 0.2294)	3.583158 (3.450, 3.717)	p= 0.05722	4

Elections and election fraud in Georgia and Armenia

Elections on unfair playing fields are common. Yet election day fraud can result in authoritarians losing office. The freer the environment, the more an authoritarian must rely on means other than election day fraud to retain office, because they are less capable of coercing the population without facing repercussions. Among those other means is cooptation through public policy. A common theme in this special issue is that public policy has been of greater import in Georgia than Armenia. This article begins to explain this phenomenon using comparative case studies of election day fraud in Armenia and Georgia over time. To do so, the article uses methods from the field of election forensics to provide a quantitative comparison of the scale of election day fraud in each country's elections since 2007 using precinct level election results for parliamentary and presidential elections. The test results suggest, as has been widely believed, that Georgia's elections have had less election day fraud than Armenia's during this period. This finding provides a theoretical basis to explain why public policy has been a greater concern in Georgia than Armenia.

Keywords: elections, fraud, forensics, public policy, Georgia, Armenia

Introduction

From 1991 to 2016, 18 elections were held in Georgia and 20 in Armenia. Arguably, none of these have been carried out on a fully free and fair electoral playing field. However, the quality of elections has varied from the largely free and fair (e.g. Georgia's 2016 parliamentary elections, Armenia's 1991 presidential elections) to the highly problematic (e.g. Georgia's 2000 presidential elections, Armenia's 2008 presidential elections). While observer reports assessing the quality of elections are many, relatively few academic accounts of the elections exist. Importantly, very little work has looked at the quality of Georgian and Armenian elections over time or compared them. This article begins to fill the gap, providing an overview of the elections in a comparative perspective through offering a quantitative analysis of the quality of election days in Armenia and Georgia since 2007 using methods from the field of election forensics.

On less than democratic playing fields, such as Georgia and Armenia, incumbents must either commit electoral fraud (Sjoberg, 2016) or convince enough citizens to come to the voting booth for them to retain power. However, Tucker (2007) notes that authoritarians face being removed

from office if fraud is so large that it brings people to the streets, as occurred in Georgia in 2003. If authoritarians want to remain in office, but the risk of being unseated through street protests is high, they should temper fraud with actual delivery on policy in order to maintain their office. Indeed, at the heart of the argument in this special issue is that policy and governmental performance matter even in less than fully democratic settings. As Gilbreath and Turmanidze (2017) argue, the state's capacity to implement policy affects the incumbent's chances of remaining in office. As Babunashvili (2017) argues, the public engages in retrospective voting in Georgia, meaning that they evaluate the performance of government and base their vote choice on it. Yet, the articles in this special issue also show (Shubladze and Khundadze, 2017; Gilbreath and Turmanidze, 2017) that policy has been less of a focal point in Armenia than in Georgia. To explain this last observation, the article tests and compares the relative levels of electoral fraud in Georgia and Armenia over time. To do so, the article reports the results of electoral forensics tests in elections in Armenia and Georgia between 2007 and 2016. The quantitative analysis of the elections suggest something which most observers of the region would likely agree with – while neither Armenia nor Georgia have exceptionally clean elections, Georgian elections generally have less election day fraud than Armenian ones. Although this is unlikely to surprise many scholars of the region, it is an important reality to establish, because it provides an explanation for why delivery on policy has been less important in Armenia than Georgia. Rather than engage in the business of providing good government in order to retain office, the analysis suggests that in Armenia the government could simply use enough electoral fraud to retain its incumbency.

Elections on uneven playing fields and election fraud

Free and fair elections are often considered the cornerstone of democracy. Yet in many countries, including those in the South Caucasus, elections are less than perfect, being characterized by

uneven playing fields and sometimes election day fraud. Even though election day fraud is common, other strategies are available to authoritarians such as manipulating electoral institutions as well as actually convincing voters to vote for them.

Much of the literature on uneven playing fields stems from the literature on comparative authoritarianism. Most prominently, Levitsky and Way (2010) have argued that a new regime type – competitive authoritarianism – emerged following the cold war. In such regimes, competitive elections are held on uneven electoral playing fields that favour the incumbent. Incumbents also sometimes use violence, intimidation, and direct changes of the vote through a variety of means, but they also use the resources they have access to through being in government to co-opt supporters through the distribution of resources (Gandhi and Lust-Okar, 2009). Incumbents also shape the formal rules of the game to their advantage to contribute to their retention of office (Gandhi and Lust-Okar, 2009; McElwain, 2008). Importantly, both Armenia and Georgia have been characterized as electoral authoritarian (Schedler, 2013) or competitive authoritarian regimes (Levitsky and Way, 2010), with elections taking place on uneven playing fields, characterized by the above tactics. These categorizations coincide with Freedom House ratings over time that label Georgia and Armenia as partly free (Freedom House, 2017a, Freedom House, 2017b).

While just what constitutes election fraud is less than settled (Alvarez, Hall, and Hyde, 2008), some actions like voter intimidation, ballot box stuffing, and outright falsification of election results are agreed upon as fraudulent activities. Hence, at least in part, rather than from a unified framework, election fraud is often explored from a wide range of substantive and theoretical perspectives. For instance, a number of studies look at the results of revealing fraud and post-electoral protests (e.g. Tucker, 2007), the effects of election observation on decreasing fraud (e.g. Sjoberg, 2012), types of election fraud (e.g. Hyde and O'Mahony, 2010), and specific case studies

of electoral fraud (e.g. Alston and Gallo, 2009). In this article, however, we are concerned with the relative levels of election day fraud as well as the relationship between election fraud and governance. As Sjoberg (2016) writes, “Autocrats face a dilemma.” They can use electoral fraud to retain office, however, they also may face post-electoral protests which can unseat them. This leads Sjoberg (2016) to suggest that authoritarians will engage in ‘smart fraud’ i.e. only engaging in enough fraud to win, but not enough to draw people to the streets. However, authoritarians have another strategy available to them. They can combine relatively low levels of fraud with policy delivery in order to co-opt citizens into actually voting for them. This strategy would be evidenced by relatively low levels of fraud and a high level of importance placed on public policy. While governments in general are likely to attempt to avoid street protests, ones which have seen previous incumbents lose power through street protest are more likely to avoid fraud than incumbents who have not seen politicians in their country or neighborhood lose power through street protests. Notably, Georgia and Armenia broadly follow these two patterns. As Gilbreath and Turmanidze (2017) argue delivery on public policy in Armenia receives relatively little attention, while in Georgia policy is a prominent part of the country’s politics. At the same time, the Rose Revolutionary government knew that protests could unseat them, just as they unseated the previous incumbent through protests. In contrast, in Armenia the government put down large scale protests following the 2008 presidential elections, ultimately retaining office. As Novikova (2017) highlights, despite extensive problems in Armenia and a failure to respond to them, the incumbent has been able to retain office. Below, we show that following theoretical expectations Armenian elections have exhibited greater levels of fraud than Georgian, suggesting that indeed, the strategies described above are likely at play in Georgia and Armenia. Importantly, this article deals with the years between 1991 and 2016, and street protests have become more prevalent in Armenia

in recent years (Ishkanian, 2015; Paturyan and Gevorgyan, 2016). Given the recent intensity of civic activism, the Armenian incumbents' strategy may begin to shift towards public service provision, though of course, this is yet to be seen.

Elections in Georgia and Armenia

Although little comparative work has been done on Georgian and Armenian elections, they are ideal candidates for comparative study since, the political and social landscapes in Armenia and Georgia started from similar slates at independence, although they diverged over time. Both experienced conflicts over territory at the outset of independence, and faced economic collapse and slow recovery in the 1990s (De Waal, 2010). Neither Georgia nor Armenia has significant natural resource wealth, and both have high levels of outmigration. Both countries, have also had relatively high levels of political instability (Powell and Tucker, 2014). Moreover, elections in both Armenia and Georgia have been and remain less than perfect. These attributes, together with a shared history among other numerous similarities make them ideal candidates for comparison. This section first provides an overview of the existing literature on elections in Georgia and Armenia, and then shows that Georgia and Armenia are no exception in regard to manipulation of electoral institutions in order to gain an advantage on the electoral playing field, through providing an overview of major electoral system changes over time.

In general, Georgian politics and elections have been more thoroughly examined than Armenian. In Georgia, much literature has focused on the Rose Revolution and the related 2003 parliamentary and 2004 presidential and parliamentary elections (e.g. Karumidze and Wertsch, 2005; Magaloni, 2010). Several high quality political histories that touch on various elections in Georgia (e.g. Wheatley 2005; Jones 2012), and the quality of Georgian democracy (Mitchell, 2009) are also

available. Besides these, Jones (2000) writes on the lack of interest groups in early Georgian democracy, and George (2014) has explored minority electoral behaviour, including a district level analysis of electoral fraud over time. Van Peski (2013) covers the 2012 elections and provides extensive background on Saakashvili's tenure in office. Schofield et al. (2012) looks at the importance of party leaders in the 2008 elections. In addition to these more theoretically oriented articles, most national elections are covered by academic electoral notes. Allison, Kukhianidze, and Matsaberidze (1993) provide an overview of the 1992 elections, and Allison (1996) describes the 1995 elections. Jones (2005) discusses the 2004 presidential and parliamentary elections. Mueller (2014) provides an overview of the 2012 parliamentary elections and Fumagalli (2014) describes the 2013 presidential elections.

Significantly, less work has been done on the Armenian political landscape, let alone Armenian elections specifically. To the best of our knowledge, no political history of Armenia exists which covers independent Armenian political history in depth. Instead, work on Armenian politics has focused on nationalism and democracy (e.g. Rutland, 1994), the Nagorno Karabakh conflict (e.g. De Waal, 2003), the repercussions and memory of the Armenian Genocide (e.g. De Waal, 2015), the recent "civic initiatives" (e.g. Ishkanian, 2015), and the politics of human rights and the development (or lack thereof) of political culture (Payaslian, 2011). When it comes to elections in particular, the literature is relatively sparse, with only one set of academic electoral notes that focus on the 2007 Armenian Parliamentary elections (Ruiz-Rufino, 2008). Sjoberg (2016) carries out election forensics tests on the 2012 and 2013 Armenian elections making use of the randomization of local election commission chairs and secretaries, finding that the elections exhibit 'smart fraud'. In a recent contribution that deals with but is not focused on elections, Novikova (2017) discusses "(in)stability" in the aftermath of the 2016 four day war and in the context of recent developments

in Armenia, including the 2015 constitutional referendum. The grey literature too is relatively sparse in terms of elections, with Policy Forum Armenia (2012) looking at election fraud. Potentially the most extensive coverage of the political history of Armenia is a working paper which discusses political developments in the country between 1990 and 2000 in depth (Astourian, 2000).

Political landscapes: from independence to 2007

Before discussing the electoral institutions of Armenia and Georgia in greater depth, this section provides a brief historical overview of the Georgian and Armenian political landscapes from independence to 2007. The section serves as an introduction to the subsequent section which describes how electoral institutions have changed over time, wherein we argue that incumbents have used electoral institutions to retain office. The section is bounded by 2007, in order to avoid the repetition of discussion of the political landscapes in each country that accompany the analysis of the election forensics statistics. Although a relatively minor contribution to the literature in and of itself rather than the primary goal of the article, the section serves to set the stage for the comparative analysis of election fraud in each country over time.

Georgia

Coming to power in 1990 through elections to the Supreme Soviet, Zviad Gamsakhurdia secured his position in the subsequent 1991 presidential elections following Georgian independence. His tenure in power, however, was short-lived, being removed from office at the start of 1992 through coup d'état. Once the warlords who removed him realized they needed assistance in governance, Eduard Shevardnadze was invited back to Georgia from Moscow, and became the head of state following the 1992 elections (Jones, 2012). Given the low electoral threshold and encompassing

electoral system more generally in 1992, the legislature included 24 parties. The increase of the threshold in 1995 led to a sharp decrease in the number of parties making it into parliament. In the presidential race, which took place at the same time as parliamentary elections, only the former Soviet Georgian leader Jumber Patiashvili, who was considered responsible for the April 9, 1989 tragedy (Suny, 1994), presented any semblance of serious opposition, and Shevardnadze was elected president. In 1998, the country held its first local elections since the ones which took place for *sakrebulo*, the Georgian equivalent of a town or city council, in 1991 at the same time as the vote for independence. Shevardnadze's Citizens Union of Georgia took slightly under a majority of the seats, while at least 12 parties took seats in local councils. With the increase in electoral threshold, parliament saw a slight decline in the number of parties in 1999 parliamentary elections, and Shevardnadze's Citizens Union of Georgia retained control over parliament. In 2000, the country held presidential elections, which saw Shevardnadze re-elected, but with significant election day irregularities. Jumber Patiashvili again was Shevardnadze's main competition, and Shevardnadze again won by a large margin.

In 2002 the second set of local elections since independence took place. These elections marked the beginning of the end for the Shevardnadze, and in many respects foreshadowed the 2003 parliamentary electoral fraud and subsequent revolution. Following infighting over which group within the party would retain control of the party formally, after having effectively dissolved, the Citizen's Union of Georgia failed to gain seats. Notably, in Tbilisi, Shalva Natelashvili's Labor Party won the elections, though through horse trading, Mikheil Saakashvili was able to take the head of the *sakrebulo*.

Following the fraudulent 2003 elections, and the fraud being publicly contested after the release of exit polls and parallel vote tabulations, the Rose Revolution removed Shevardnadze from, and

swept Mikheil Saakashvili into office. Immediately following the revolution, in January 2004, presidential elections were held, resulting in a landslide victory for Mikheil Saakashvili. Following the Rose Revolution, the party list component of the 2003 elections was nullified, and repeat elections were held in March 2004. They resulted in a resounding victory for the United National Movement. The 2006 local elections saw a near UNM sweep of local government, with almost 90% of seats.

Armenia

In contrast to Georgia's four incumbents, in Armenia there have only been two groupings to hold power – the Armenian National Movement and the Republican Party of Armenia. In Armenia, the 1991 presidential election was the first to be held in independent Armenia, with Levon Ter-Petrosyan winning the elections. The turnout was considerably higher than the previous Supreme Council election and the public enthusiasm to participate was high (CSCE, 1992). These elections, however, were the last ones held in Armenia to be characterized by major international observers as free and fair.

Although the Armenian Revolutionary Federation (ARF), a key opposition force, was banned in 1995, many opposition leaders consolidated around Vazgen Manukyan, who the ARF endorsed, to form an opposition block which presented a reasonable challenge to Ter-Petrosyan and the Armenian National Movement. In the 1996 presidential elections Ter-Petrosyan won in the first round of elections with a slight majority. The other three contenders in the elections accused Ter-Petrosyan of ballot box stuffing and vote-counting fraud. Violence broke out in mass demonstrations. Despite demonstrations, the results were not amended.

In 1998, a snap presidential election was called amidst the resignation of Ter-Petrosyan in response to perceived weakness in negotiations with Azerbaijan over the Nagorno-Karabakh conflict. A clear red line was established in Armenian politics. The ARF returned to the political arena and strongly supported Robert Kocharyan for the elections. Karen Demirchyan lost elections to Kocharyan. Importantly, he did not dispute the results publicly. In 1999, a two party coalition emerged with the Republican Party led by Vazgen Sargsyan and the People's Party led by Karen Demirchyan becoming the Unity bloc. The latter was the winner of 1999 elections. However that year was significant not because of elections, but because of the October 27 attack on the National Assembly, when the leaders of Unity bloc, the Prime Minister, the Speaker of Parliament and six other parliamentarians were killed.

Robert Kocharyan won the 2003 presidential election, with his main opponent being Stepan Demirchyan, with two thirds of the vote according to the official results. However, both the opposition and international observers accused the incumbent of significant electoral fraud. As with the presidential elections, the parliamentary elections saw the Republicans retain power. In 2007, after Prime Minister Andranik Margaryan, the leader of the Republican Party, passed away, Kocharyan appointed Serzh Sargsyan, his future successor, as the new prime minister.

Electoral systems and their manipulation

The electoral systems in both Georgia and Armenia are mixed with proportional and first-past-the-post components. Both currently have a 5% electoral threshold, and have moved towards parliamentary government from (semi) presidential government in recent years. Besides these commonalities, the institutions in each country are rather different, except on one key characteristic. As Gandhi and Lust-Okar (2009), among others (e.g. Boix, 1999; McElwain, 2008),

have noted authoritarians often change electoral institutions to favour themselves. Georgian and Armenian incumbents are no exception in this regard.

Perhaps the most significant electoral system change in terms of political consequences in Georgia has been of the electoral threshold. In independent Georgia, the first parliamentary elections were carried out under a compensatory list system in 1992 (Allison, Kukhianidze, and Matsaberidze, 1993). Through setting the electoral threshold at 2% and including a compensatory list, the system aimed at including every party with the exception of supporters of Zviad Gamsakhurdia (ibid). It succeeded in doing so, with 24 parties gaining seats in parliament. In 1995 the elections were carried out under a mixed proportional and first-past-the-post system with a 5% electoral threshold. The increased threshold and lack of electoral blocks led to relatively few parties making it into parliament. In the 1999 parliamentary elections, the mixed electoral system was maintained, yet the electoral threshold was increased to 7% at the behest of an opposition party and with the support of the ruling party. This too decreased the number of parties which could pass the electoral threshold. In 2008, following opposition protests and international pressure, the 7% threshold was reduced to 5%, where it stands at present, although amendments to the constitution may change this.

In what many observers view as an attempt to consolidate rule, the currently ruling Georgian Dream party has proposed constitutional amendments which affect the electoral code, including a ban on electoral blocks and a wasted vote distribution rule. As Gilbreath and Sichinava (2017) highlight, the proposed ban on electoral coalitions seems like a clear instance of attempting to prevent the emergence of a viable opposition on the Georgian political landscape. In addition, the Georgian Dream has proposed moving to fully proportional system from the current mixed system. While opposition political parties and civil society organizations have long argued for such a shift,

other changes attached to the system are considered to be aimed at the consolidation of Georgian Dream rule. For instance, in the original proposal for changes, votes which did not go to winning parties would have been distributed to the winner of elections. An input-output model run on past elections suggested this would likely advantage the incumbent (Gilbreath and Sichinava, 2017). In response to local and international criticism, the government has since lowered the electoral threshold attached to the proposal and made a number of other amendments. Nonetheless, the amendments to the electoral system are likely to give advantage to the incumbent Georgian Dream party, particularly when compared with a proportional system without the peculiarities attached to the system. Importantly, the amendments have passed two of three readings in Georgian Parliament at the time of writing, however, their final form has yet to emerge in part due to the controversy surrounding them.

Besides the electoral threshold, the government has made numerous changes to the electoral code in the run up to elections. Notably, the composition of the Central Election Commission has been a frequent subject of controversy (Broers and Broxup, 2004), with arguments over changing its structure, as well as frequent changes to its actual structure, recurring before most elections. Besides CEC composition, the clearest issue has been districting. While in 2012, roughly 3000 voters in Kazbegi elected one majoritarian, so too did approximately 150,000 in Kutaisi, making a Kazbegian's vote weight roughly 30 times that of a Kutaisians. This issue was addressed in 2016, when redistricting occurred for the first time since independence. The redistricting resulted in a largely equal distribution of voters between electoral districts, although some signs of gerrymandering were present (CRRC, 2016).

In Armenia, the electoral system has experienced significant changes, but has never undergone a complete restructuring as occurred in Georgia between the 1992 and 1995 elections and as

Georgia's system again appears to be undergoing today. Nonetheless, since 1995 four parliamentary elections have taken place in Armenia, each under different rules to distribute and allocate seats as a consequence of strategic calculations of the political actors. After the first 1990 'festive' elections, the electoral processes emerged as less free and fair. In the 'discursive history' of the unfairness of Armenian elections, 1995 signified the beginning of the institutionalization of unfair electoral rules (Abrahamyan and Shagoyan, 2012). Potentially the most significant change in electoral system structure was the introduction of random assignment of local election commission chairs and secretaries, which followed the violence which resulted from the 2008 elections and protests of the official results (Sjoberg, 2016). Besides this change, one of the more salient institutional changes has been the size and composition of parliament. While in the 1995 parliamentary elections, the parliament consisted of 190 seats, with 150 elected through single member mandate districts and 40 through party list, in the run up to the 1999 parliamentary elections, the system shifted to having 56 single member mandates and 75 party list seats, reducing the relative share of seats elected by single member mandate and the overall number of seats in parliament. By 2007, the number of single member mandates was further reduced to 41 and the number of party list seats increased to 90. The number of seats further reduced from 131 to 101 in 2015 following Armenia's referendum on constitutional amendments that to its political system (Broers, 2015).

Although not formally an aspect of the electoral system, it is notable that both countries have moved towards parliamentary government in recent years, and in each case the motivation appears, at least in part, to be the consolidation of political rule rather than increased democratization. In Georgia, Shevardnadze's government was presidential, however, following the Rose Revolution, a number of constitutional amendments formally moved government towards a semi-presidential

model (Gabedava, 2006). Although formally semi-presidential, this model concentrated presidential powers, leading some to consider it a super-presidential system (ibid). In 2010, Georgia passed amendments to the constitution that would move the country to a strong Prime Minister, weak President, semi-presidentialism. The amendments only took effect after the term of then president Mikheil Saakashvili's term ended in 2013, which concerned many that the amendments' passing would lead to Saakashvili attempting to remain in office, though the UNM ultimately lost the 2012 elections. In Armenia, the change from a presidential system to a parliamentary system resulted from the 2015 constitutional referendum. Following the referendum, the country officially switched from a semi-presidential to a parliamentary political system. One declared goal of the referendum was the replacement of personality-based political culture and the consolidation of platform-based politics. While too soon to know the full effects of the change, the shift has generally been greeted with criticism. As Novikova (2017) highlights, while elites argued that the amendments would work towards the formal democratization of the country, few in the Armenian public thought they would help. Generally, the referendum was viewed as fraudulent with reports of vote buying, carousel voting, and voter intimidation (Grigoryan, 2015). One year after the changes, the discourse remained controversial, with discussion focused on whether president Sargsyan would become the prime minister after the end of his presidential mandate in 2018. Indeed, as Broers (2015) argues, the changes appear to have been more about avoiding a succession crisis in 2018, than moving towards a more sustainable democratic system.

While the specific changes to the electoral system in each country are different, the goal of many changes in both countries has been the incumbent trying to give themselves an electoral advantage. In Georgia changes to the electoral threshold and more recently to the electoral system have been

aimed at increasing the incumbent's electoral advantage, thus obviating the need to commit electoral fraud and potentially face large scale protest. In Armenia, the incumbent too has consistently changed electoral and governing institutions with the aim of maintaining its own power.

Measuring election fraud: Theory, data, and methods

The main questions this article seeks to address are how the quality of election days compare in Georgia and Armenia and what this suggests for governance in each country. To do so, six election forensics tests were applied to parliamentary and presidential elections between the years 2007 and 2016. By comparing the number of tests with significant deviations from expected results in each country over time, the article provides an indicator of the relative quality of elections in each country. Before discussing the results of the tests, this section provides an overview of measures of electoral fraud, the field of election forensics, the data used for analysis, and the six tests utilized to compare the quality of elections.

While instances of election fraud are widely studied, just how imperfect elections are is difficult to measure. In Pottie's (n.d) applied review of different measures, five different forms of assessment, including public opinion polls, democracy assessments, election management assessments, election observation, and specialized missions are discussed. While each category has advantages, they also have disadvantages particularly as measures of quality of elections. Public opinion polls can accurately gauge how the public feels an election went, and expert assessments of democracy and election management can show how experts view the quality of elections. Looking at survey data from the region, Caucasus Barometer 2009 data suggests that Azerbaijanis were almost three times more likely to think that the most recent elections were fair

in their country compared with Armenians and Georgians (CRRC, 2009). However, issues such as frame of reference bias – comparing quality based on one’s own experience and knowledge – make comparison difficult and can lead to awkward conclusions like North Korea and Cuba having higher levels of electoral integrity than North Carolina (Gelman, 2017). Notably, with specialized missions, rather than being about measuring the quality of elections, they are in fact more about provision of technical assistance. Finally, election observation is as much about the deterrence of fraud as it is about the judgment of the quality of elections. Importantly, election monitoring reports are often heavily context dependent, and actively situated within the political and historical context of a country (Pottie, n.d.). All of this is to say that while the above activities have value, they are also problematic for measuring the quality of elections, and are particularly so for comparing the quality of elections between countries.

While election quality is difficult to measure, in recent years, the field of election forensics has emerged with a variety of methods for testing for election day fraud (Alvarez, Hall, and Hyde, 2008). The main idea behind the field is that when people manipulate election results, the results will no longer follow patterns that are generally expected from numbers generated from a natural process, such as voting (Montgomery et al., 2015). Hence, the field tests for the presence of expected patterns in election returns; the absence of expected statistical patterns may suggest that election fraud of one variety or another took place (Montgomery et al., 2015). Test results, as with all statistics, are nonetheless probabilistic. Moreover, recent research suggests that strategic voting can lead to statistically significant test results (Mebane and Klaver, 2015). While a lively debate exists in the literature about the use of a variety of different tests (see, Shikano and Mack, 2009; Deckert, Myagkov, and Ordeshook, 2011; Mebane, 2011), election forensics continues to develop as a field. Importantly, election forensics results are also comparable between elections in one

country (Mebane and Kalinin, 2009). Although there is no literature, to the best of the authors' knowledge, which has compared election forensics tests between countries for the purpose of determining relative quality, this is a logical extension of current forms of analysis, which potentially will enable a new path towards the comparative study of election quality. Notably, the field's methods lend themselves to the quantification and comparison of election day quality between countries through the use of multiple tests, and comparing the number of statistical anomalies found in each election and country. While election forensics enable a comparison between and within countries, it is important to note that the tests provide indications of whether election day fraud took place and do not describe the quality of the pre-electoral environment, which is clearly an important aspect of elections. Hence, the election forensics test results should be interpreted with this in mind.

Election forensics tests generally use election precinct level data. To obtain this data, we requested information from the Central Elections Commissions of Armenia and Georgia. While the datasets contain a number of variables such as invalid ballots and vote counts for each party, we use precinct level turnout in the proportional component of the elections to carry out tests. Proportional elections were selected for ease of presentation in principal, as first-past-the-post elections should be analyzed separately for each seat. Elections from 2007 to 2016 are used, because the electoral commissions only had paper copies of precinct level election protocols for prior elections.

The article reports the results of six election forensics tests including the test of the distribution of second digits to a Benford-like law, the skew and kurtosis of the distribution of turnout, the average of final digits, the 0-5 mean of last digit test, and a dip test. A brief description of each test and its interpretation is provided below; however, for readers less interested in the technical details of the methods, the results below should be understandable without a thorough reading of this section.

Benford-like law test

The first test is a test of a Benford-like law. Benford found that the first digit in a number generated from a natural process is more likely to be one than two, two than three, and so on (Benford, 1938). This distribution is widely used in forensic accounting to detect when numbers reported on forms appear to be fraudulent, because when humans change numbers, this distribution often does not appear (Suh, Headrick, and Minaburo, 2011). Political scientists have, recognizing that the first digit in a number is inappropriate for testing of election results (Mebane, 2010), used the implications of Benford's law for the second digit in a number to test election results reported at the precinct level (Mebane, 2011). Given this distribution of numbers, the average of all the second digits in a series of numbers should be 4.1873 (Suh, Headrick, and Minaburo, 2011; Mebane and Hickman, 2015). However, this test must be interpreted with caution, as Mebane and Hickman (2015) highlight the test does not consistently pick up election fraud. To carry out this test, the second digit of turnout was extracted from every precinct which had 100 or more votes cast. This criteria was used, because the second digit in a two digit number should follow a different distribution as would a single digit number. The resulting list of numbers was averaged and compared to the expected average.

Skew of the distribution of turnout

The second test used of the skew of the distribution of turnout. Skew is a measure of the symmetry of a distribution (Everitt and Skrondal, 2010). For voter turnout, the expectation is that the distribution is more or less symmetrical, having a close to zero skew, indicating that while there is extremely high turnout in some election precincts and extremely low turnout in others, these outcomes are going to be relatively rare compared to the average or median level of turnout. This

statistic could be statistically different from zero in cases where turnout is fraudulently inflated or deflated in a fair number of districts.

Kurtosis of the distribution of turnout

The third test used below looks at the kurtosis of the distribution of turnout. Kurtosis can be thought of as a measure of how sharp or dull the peak of a distribution is (Everitt and Skrondal, 2010). For voter turnout, the distribution is expected to have a kurtosis of 3 (Hickman and Mebane, 2015). If the kurtosis is significantly higher than 3, it suggests that there are more low and high turnout electoral precincts than expected, while if the kurtosis is significantly lower than 3, it suggests that there are fewer low and high turnout electoral precincts than expected.

Dip test for unimodality

The fourth test used in the article is Hartigan's dip test. This test also looks at the distribution of voter turnout, and tests whether it is unimodal or not (Hartigan and Hartigan, 1985). A unimodal distribution is one which has a single mode. A statistically significant test result is produced by the dip test when the distribution of voter turnout is either multimodal or nonmodal. A multimodal distribution has multiple modes, whereas a non-modal distribution does not have a mode. Both of these patterns suggest suspicious election returns. To understand the intuition, an example is useful. Imagine an election in which there are 100 election precincts. Voter turnout in the election is non-modal, with 1% of voters voting in one election precinct, 2% in one election precinct, 3% in another, 4% in another, and so on with every election precinct having a different level of turnout and with every percentage point between 1 and 100 represented. Clearly such a distribution is unlikely to occur by chance alone, or to put it in plainer terms, the turnout is just a bit too perfect to have happened without a human hand involved. Now, imagine an election under the same

conditions, except that there is a multimodal distribution of voter turnout. In 50 precincts there was 2% voter turnout and in 50 precincts there was 95% turnout. This is a multimodal distribution, which suggests that voter turnout was potentially inflated, forced, or otherwise fraudulent in 50% of precincts and deflated, suppressed, or otherwise fraudulent in 50% of precincts. Notably, if an election boycott occurred in some precincts and not others this pattern could also be produced as could a number of other election behaviours. Again, this distribution can be thought of as being a bit too perfect to have happened without some external force causing it. To be clear, the above are idealized examples used to illustrate the intuition behind the test, and in reality the dip-test will result in a significant result in the absence of such extreme patterns.

Test of the distribution of the last digit in voter turnout

The fifth test is of the last digit of voter turnout. The last digit in a number is expected to be distributed equally between numbers zero through nine i.e. each number should be the last digit 10% of the time if it has not been modified. The last digit test of voter turnout tests whether this is the case by taking the last digit of turnout in each electoral precinct, averaging them, and then comparing them to the theoretically expected value of 4.5 (the average of every number zero through nine). If the average of the last digits differs significantly from this value, it suggests that some form of fraud may be present, given that the final digit should follow the previously noted pattern if not tampered with.

0-5 last digit count test

The sixth test is also a last digit test, however, instead of averaging all numbers, the 0-5 last digit count tests the share of 0s and 5s in the last digit of election returns. The thinking behind this test is that party agents are likely to round up the number of votes they distribute to a party to 450, 500,

or 50 rather than 364 or 67 in order to signal that they have in fact carried out the fraud they were expected to by party leadership (Kalin and Mebane, 2011). Based on a random distribution, zeros and fives should make up 20% of the last digits. Deviations from this distribution may suggest election day fraud.

Bootstrapping for significance testing

With all of the above tests besides the dip test, even though there is a theoretically expected value, reality is messy, and the expected values should emerge as the number of observations approaches infinity. Thus, there is a need to know how far the observed value can fall from the theoretically expected value by chance rather than electoral malfeasance. In order to understand whether the observed value is different from the theoretically expected value or whether an observed difference is due to chance variation, bootstrapping is used to generate 95% confidence intervals. Bootstrapping is a statistical resampling procedure that produces an upper and lower estimate of how far a statistic could have fallen by chance alone.¹ When the theoretically expected value for a given test falls outside the upper and lower estimate, it suggests that electoral malfeasance may have taken place.

Results and Discussion

The election results in Armenia and Georgia both exhibit a number of statistical anomalies, suggesting that election day fraud may have occurred in each parliamentary and presidential election between 2007 and 2016 in Georgia and Armenia. While the election forensics tests suggest that there were irregularities in every election, the number of tests in each country differs on

¹ For readers interested in a more in depth description of bootstrapping, see Efron and Tibshirani, 1994.

average. In Georgia, an average of 2.6 tests were significantly different from expected values per election compared to Armenia's 3.75, suggesting a higher level of election day fraud in Armenia over time. In Georgia, two tests were statistically significant in every election besides the 2008 presidential elections and 2016 parliamentary elections, in which four and three tests show significant deviations. In contrast, in Armenia in three of four elections, four tests were significant, and in one three tests were. Notably, in the 2013 Armenian presidential elections, the dip test was nearly significant by conventional standards ($p=0.057$, rather than $p<0.05$), and a similar 'close call' in the 2012 Armenian parliamentary elections led to three rather than four tests with statistically significant results. Results are presented for each country in Table 1 and Table 2 below. The election which results refer to is given in the far left column. The values presented in the row of the election are the results of the above six statistical tests. The numbers in parentheses in each cell of the table are the 95% confidence intervals for each test. Confidence intervals that do not contain the theoretically expected value are highlighted in grey, indicating that fraud may have occurred. In order to further unpack these results, each election is discussed below.

[Table 1 here]

Georgia: 2008 presidential elections

The 2008 Georgian presidential elections resulted in Mikheil Saakashvili retaining office with 53% of the vote, albeit with accusations of election fraud surrounding the results. The elections came about as a result of a crackdown on street protests in November 2007. Hence, we would expect relatively low levels of fraud, because the government could feasibly lose office through street protests sparked by an excess of fraud. This pattern holds, with only two suspect test results, suggesting little election day fraud compared with either Armenian elections or other Georgian

elections. Notably, a CRRC (2015) analysis showed that the government slowed fines and increased social spending dramatically in the lead up to the elections, evidencing an attempt to obviate the need for election day fraud. However, one test result is notable - the zero-five mean test. This test is thought to be found positive due to signaling, i.e. when a party's agent suggests to the party that they have committed fraud through some signal. The United National Movement's ballot number (the number next to the party name on the ballot) was 5. Plausibly, agents may have been signaling that they carried out fraud to the party through making sure that a 5 appeared as the last digit in turnout. Whether one accepts this argument or not, there is no particular reason for why a greater number of 0s or 5s should appear in any case.

Georgia: 2008 parliamentary elections

The 2008 parliamentary elections resulted in the United National Movement retaining a majority in parliament. In contrast to the 2008 presidential elections, the parliamentary elections of the same year show higher levels of election day fraud, with four statistically anomalous results. This may be somewhat surprising to observers of the region, since these elections were considered broadly less fraudulent than the 2008 presidential elections. However, given the relatively weaker level of opposition contestation of the elections, the relatively smaller stakes of the election, as well as the smaller amount of attention paid to the elections internationally and domestically, the authorities plausibly could have thought they had more room to commit fraud. Given that street protests were more distant than in the previous elections, the government also likely felt they had less to fear in terms of backlash.

Georgia: 2012 parliamentary elections

The 2012 parliamentary elections marked the first electoral handover of power in Georgian history, with the Georgian Dream Coalition unseating the United National Movement. The elections had equally low levels of fraud as the 2008 presidential elections, with only two statistically anomalous results, both related to the distribution of turnout overall. The relatively low levels of election day fraud were likely the result of the highly tense situation surrounding the elections, the intense international scrutiny of the election environment, and the street protests which had erupted as a result of a prison torture scandal weeks prior to the elections. These factors combined likely led to the relatively low levels of fraud.

Georgia: 2013 presidential elections

The 2013 presidential elections resulted in the United National Movement losing the presidency, with Georgian Dream candidate Giorgi Margvelashvili winning against the UNM's David Bakradze and Nino Burjanadze. The elections show only two statistical anomalies, suggesting a relatively low level of election fraud. This is an unsurprising result, given that in the lead up to the elections, the Georgian Dream Coalition had a strong lead in the polls, and the economic volatility surrounding the currency devaluation which started in November 2014 had not yet begun. Hence, the Georgian Dream had little incentive to risk election fraud.

Georgia: 2016 parliamentary elections

The 2016 parliamentary elections were the first parliamentary elections since Georgian Dream took office. The Georgian Dream won a constitutional majority in the elections, with the United National Movement finishing second, and the Patriot's Alliance of Georgia, a newly emerged nationalist party, also passing the 5% electoral threshold. The elections were generally considered to be free and fair, and the pre-electoral environment was calm relative to previous elections.

However, election day fraud was higher than in the 2013 presidential elections, with three statistical anomalies found in the tests conducted. This matches up with the general reports on the ground, which suggested some election fraud, although nothing to the extent of some earlier elections.

[Table 2 here]

Armenia: 2007 parliamentary elections

The 2007 parliamentary elections resulted in the Republican party of Armenia winning a plurality of seats. Although judged to be an improvement by election monitors, the elections were contested as fraudulent, as had nearly every election in independent Armenia since 1995. A total of four tests had significant results, matching the highest level of election fraud in Georgia.

Armenia: 2008 presidential elections

In the 2008 presidential elections, the CEC declared Prime Minister Sargsyan the winner of the election with some 52.8% of all votes cast on February 24, after heated competition with the first president of Armenia, Levon Ter-Petrossian. Reports of fraud were widespread (e.g. Grigoryan, 2008; It's Your Choice, 2008). And, in protests following the CEC's announcement of results, ten citizens were killed and the outgoing government coalition parties suggested a new Electoral Code in order to improve the electoral process in Armenia (Sjoberg, 2016). The reports of fraud match up with the election forensics results, with four significant tests. Notably, the same tests were significant as in the previous election, potentially suggesting a comparable fraud strategy.

Armenia: 2012 parliamentary elections

The 2012 parliamentary elections were the first national elections conducted under the new Electoral Code adopted in May 2011, and the first national elections since the events following the 2008 post-election protests. Again, the the Republican Party won the most seats. While the 2012 elections were generally considered suspect, the forensics tests show a lower number of statistical anomalies compared with other years. The lower number of test results in 2012 may reflect the authorities' changing strategies of election fraud in the 2012 elections, which included fewer strategies aimed at directly altering election results (Danielyan and Jenderejian, 2012) and “Smart fraud” (Sjoberg, 2016). Given that the memory of street protests following fraud in the 2008 elections, the confluence of evidence suggests that the authorities adjusted their strategies, committing less fraud than in 2007 and 2008.

Armenia: 2013 presidential elections

Sargsyan officially won with 58.64% of the vote in the first round, and the majority of the election observation missions stated that this presidential elections were well administered and conducted in a manner that could be characterized as peaceful and an improvement over the May 2012 elections for the National Assembly. However, the quantitative analysis shows that the relative level of fraud for this elections was higher than in the 2012 elections, with four election forensics tests showing statistical anomalies. Notably, this confirms the results of Sjoberg (2016), who found fraud based on whether the chair of the precinct election commission was from the ruling party or not in the 2013 elections, while finding no traces of fraud in the 2012 parliamentary results on the same indicator.

Overall, the test results are similar to what would be expected based on observer reports. While Georgian elections do exhibit problems, they are fewer than in Armenia. Notably, test results

which may at first not square with expert opinion are explained by the theoretical argument set out above – when fraud is risky, authoritarians will attempt to sway elections in their favour using other means or through using a limited amount of fraud.

Conclusion

This article has provided a brief overview of elections in Georgia and Armenia since independence and presented the results of electoral forensics tests. While elections in both countries are less than perfect, Georgia's appear to be less problematic than Armenia's elections as has been broadly believed. What does the above analysis of electoral fraud in Armenia and Georgia suggest, besides confirming what has broadly been thought?

First, this provides a theoretical basis for why delivery on public policy is less important in Armenia than Georgia. As the theory presented in the first section of this article suggests, rulers can use fraud or convince voters to actually vote for them in order to retain office. However, fraud carries with it the risk of being unseated through street protests. To date, street protests have been more successful in Georgia than Armenia. Hence, in Georgia, the government had to deliver on policy in order to avoid losing office given the higher risk associated with fraud. In Armenia by contrast, the weaker emphasis on policy delivery can be explained in part, by the fact that instead of delivering on policy, the government can substitute fraud for performance to keep themselves in office. Notably, whether this will remain the case given the recent civic movements in Armenia remains to be seen.

Second, the above pattern suggests that politicians may engage in something analogous to voters engaged in retrospective voting. When reflecting on the past and present, they consider the risk of fraud. While both Armenia and Georgia suffered from electoral fraud in the early years of

independence, Georgia has experienced less fraud on election day since at least 2007. A likely cause of the lower levels of fraud is the knowledge that just as the UNM came to power on waves of popular unrest over electoral malfeasance, they could be removed in the same manner given the right circumstances. Equally in Armenia, while incumbents surely realize that past performance does not guarantee future outcomes, it is suggestive. That is to say that the ruling coalition has likely been more willing to continue to engage in electoral fraud, because they have been able to in the past without being removed from office. Whether this trend continues in Armenia is of course an open matter. Given the increased levels of civic activism in recent years noted above, authorities there may think twice about whether or not and how much fraud to commit. If this leads Armenian authorities to put a greater emphasis on the delivery of public policy, this surely would be a positive outcome.

The above two conclusions, while supported by the data in these two cases, suggest the need for future research. First, it is unclear whether this pattern may hold in other less than fully democratic regimes. Furthermore, the suggestion that past experience with peacefully overthrowing a government may lead politicians to be wary of faking elections at home deserves further exploration. Finally, further research should consider exploring the levels of election day fraud in hybrid and authoritarian regimes using a large-n dataset in relation to policy responsiveness.

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Table 1: Statistical anomalies in parliamentary and presidential elections between 2008 and 2016 in Georgia

Election	Skew (Expected Value = 0)	Kurtosis (Expected Value = 3)	Last Digit Mean (Expected Value = 4.5)	Zero Five Count Mean (Expected Value = 0.2)	Mean of second digit (Expected Value = 4.18730)	Unimodality test (Expected Value = $p > 0.05$)	# of positive tests
Georgian Presidential 2008	1.192487 (0.781, 1.625)	5.126035 (1.629, 8.899)	4.429493 (4.330, 4.528)	0.2156682 (0.2016, 0.2298)	4.226114 (4.128, 4.324)	$p = 0.9597$	2
Georgian Parliamentary 2008	-0.3653213 (-0.4123, -0.3186)	-0.7778435 (-0.8535, -0.7037)	4.458297 (4.362, 4.554)	0.1958733 (0.1826, 0.2091)	3.546353 (3.447, 3.646)	$p = 0.007939$	4
Georgian Parliamentary 2012	0.4422475 (0.2295, 0.6662)	1.595441 (0.613, 2.634)	4.455815 (4.361, 4.550)	0.2058153 (0.1924, 0.2192)	4.281357 (4.184, 4.379)	$p = 0.9927$	2
Georgian Presidential 2013	0.09371976 (-0.1490, 0.3448)	0.3954574 (-1.3026, 2.1679)	4.496137 (4.405, 4.588)	0.1903974 (0.1777, 0.2031)	3.541115 (3.449, 3.631)	$p = 0.9837$	2
Georgian 2016 Parliamentary Elections	-0.176 (-0.2452, -0.1072)	-0.725 (-0.8282, -0.6220)	4.4967 (4.346, 4.597)	0.2091 (0.1914, 0.2268)	4.4717 (4.346, 4.598)	$p = 0.9568$	3

Table 2: Statistical anomalies in parliamentary and presidential elections between 2007 and 2013 in Armenia

Election	Skew (Expected Value = 0)	Kurtosis (Expected Value = 3)	Last Digit Mean (Expected Value = 4.5)	Zero Five Count Mean (Expected Value = 0.2)	Mean of second digit (Expected Value = 4.18730)	Unimodality test (Expected Value = $p > 0.05$)	# of positive tests
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Armenian Parliamentary 2007	-0.2053929 (-0.2960, -0.1122)	-0.4551161 (-0.6213, -0.2879)	4.501098 (4.369, 4.633)	0.201427 (0.1831, 0.2197)	3.755763 (3.618, 3.893)	p= 0.03232	4
Armenian Presidential 2008	-0.3283973 (-0.4043, -0.2513)	-0.7702365 (-0.8869, -0.6543)	4.392447 (4.259, 4.528)	0.1975917 (0.1791, 0.2161)	3.245211 (3.122, 3.368)	p= 0.0004753	4
Armenian Parliamentary 2012	-0.4784841 (-0.5506, -0.4068)	-0.7164606 (-0.8430, -0.5930)	4.493925 (4.365, 4.623)	0.2150026 (0.1964, 0.2335)	3.272583 (3.140, 3.403)	p= 0.08472	3
Armenian Presidential 2013	-0.2687595 (-0.3443, -0.1918)	-0.5014074 (-0.6314, -0.3723)	4.356316 (4.229, 4.482)	0.2110526 (0.1927, 0.2294)	3.583158 (3.450, 3.717)	p= 0.05722	4

Table 1: Statistical anomalies in parliamentary and presidential elections between 2008 and 2016 in Georgia

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Table 2: Statistical anomalies in parliamentary and presidential elections between 2007 and 2013 in Armenia

Election	Skew (Expected Value = 0)	Kurtosis (Expected Value = 3)	Last Digit Mean (Expected Value = 4.5)	Zero Five Count Mean (Expected Value = 0.2)	Mean of second digit (Expected Value = 4.18730)	Unimodality test (Expected Value = $p > 0.05$)	# of positive tests
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Armenian Presidential 2008	-0.3283973 (-0.4043, -0.2513)	-0.7702365 (-0.8869, -0.6543)	4.392447 (4.259, 4.528)	0.1975917 (0.1791, 0.2161)	3.245211 (3.122, 3.368)	$p = 0.0004753$	4
Armenian Parliamentary 2012	-0.4784841 (-0.5506, -0.4068)	-0.7164606 (-0.8430, -0.5930)	4.493925 (4.365, 4.623)	0.2150026 (0.1964, 0.2335)	3.272583 (3.140, 3.403)	$p = 0.08472$	3
Armenian Presidential 2013	-0.2687595 (-0.3443, -0.1918)	-0.5014074 (-0.6314, -0.3723)	4.356316 (4.229, 4.482)	0.2110526 (0.1927, 0.2294)	3.583158 (3.450, 3.717)	$p = 0.05722$	4