Regression Discontinuity diagnostics reveal statistical anomalies in Turkish elections

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Abstract

Using Regression Discontinuity diagnostics we document a number of statistical anomalies in the 2004 Turkish mayoral elections. The governing party that controls the parliament is much more likely to win close races than lose. Moreover, compared to close governing party losses, there is a sharp drop in turnout and contending party votes in close governing party wins. Finally, the parties that disproportionately lose very close races are exclusively ideological competitors of the governing party. Among the potential mechanisms that may create those anomalies, electoral manipulation seems to a plausible explanation. Those anomalies show that the outcomes of very close popular elections can be non-random and that the assumption of the continuity of the expected potential outcomes at the threshold could be violated. We discuss implications of our findings for Regression Discontinuity Designs and for understanding the consolidation of the right-wing electorate in Turkey during the last decade.

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1. Introduction

The founding principle of democracy is that public will is transferred to power through fair elections. This gives people the power to punish or control their leaders without resorting to outside options such as violence. Hence, fair elections are a necessary condition for legitimate governing. Because of their importance, elections have been studied extensively by social and political scientists.

This paper addresses two broader debates in the study of elections. The first debate is methodological and on whether the outcomes of extremely close popular elections are random with approximately equal chances of winning and losing (Snyder, 2005; Listokin, 2008; McCrary, 2008; Caughey & Sekhon, 2011; Grimmer et al. 2011; Eggers et al. 2014; Snyder, Folke & Hirano, 2014). More precisely, the debate is on whether the expected potential outcomes are continuous at the winning threshold of close elections (de la Cuesta and Imai, 2016).[1] This debate is of great methodological importance because if the expected potential outcomes are indeed continuous at the winning threshold, then this allows for causal inference through a so called Regression Discontinuity Design (RDD) which compares cases just below and above the winning threshold, typically with a local regression specification (see e.g., Thistlethwaite & Campbell, 1960; Hahn, Todd & van der Klaauw, 2001; Imbens & Lemieux, 2008; Lee, 2008; Lee & Lemieux, 2010 for the theory and Lee, Moretti & Butler, 2004; Eggers & Hainmueller, 2009; Meyersson, 2014; Aksoy & Billari, 2016 for recent examples of RDDs).

Scholars have not reached a consensus on the aforementioned methodological debate. It has been shown theoretically that the outcomes of extremely close elections, apart from differences due to the curvature of the "running" variable (Snyder, Folke & Hirano, 2014), should indeed be random and that the potential outcomes should be continuous at the threshold (Snyder, 2005; Listokin, 2008; McCrary, 2008; Eggers et

[1] de la Cuesta and Imai (2016) distinguish the assumption of the continuity of the potential outcomes at the winning threshold from the assumption of local randomization within a pre-specified window around the threshold. It is the former which is a less stringent assumption that the latter is a key assumption for RDDs. The two assumptions converge as the pre-specified window around the threshold approaches to zero.

al. 2014). This is because in such close elections random noise in the electoral system dominates the few votes that determine the outcome. Irrespective of how hard a candidate tries to manipulate the outcomes pre-election, unless the candidate has full control over the results, random noise in the electoral system ensures continuity at the winning/losing cut-off. A recent empirical analysis of more than 40,000 close races in 10 countries shows that the outcomes of close elections are generally random (Eggers et al., 2014). In a small minority of occasions, however, close elections are found to be non-random and discontinuities are observed at the threshold, i.e., such razor sharp elections are won disproportionately by particular, often advantageous parties (Snyder, 2005; Listokin, 2008; McCrary, 2008; Caughey & Sekhon, 2011; Eggers et al., 2014;Vogl, 2014). Pure chance, pre-election campaign effort, post-election legal challenges, incumbency advantage, and electoral manipulation and fraud are mechanisms considered as possible explanations of these anomalies. The relative scarcity of popular elections with sorting around the winning threshold, on the other hand, prevents in depth statistical analyses. Eggers et al. (2014) for example, conclude, after a careful examination of other potential explanations, that the anomalies observed in the US context should be due to pure chance. Using the Regression Discontinuity diagnostic tools (Snyder, 2005; McCrary, 2008; Lee & Lemieux, 2010), we investigate recent first-past-the-post Turkish mayoral elections and document a case with a clear sorting around the winning threshold. In the 2004 mayoral elections, the Justice and Development Party (*AK Parti*) which controlled the central government was much more likely to win razor sharp elections than lose. This disproportionate success of the AK Parti in close races is accompanied by a number of other statistical anomalies that we document below. These findings show that the outcomes of extremely close popular elections can be highly non-random and that the continuity assumption can be violated. In the concluding section we discuss whether our findings imperil the validity of RDDs.

The second broader debate the paper addresses is a substantive one. The phenomenal success and the very long tenure of the AK Parti, despite the traditionally slippery nature of the Turkish electorate landscape, has fascinated and puzzled political scientists (see e.g., Carkoglu, 2012; Marschall, Aydogan, and Bulut,

2016). Since the introduction of free elections in 1950, only the AK Parti has managed to maintain its majority status for more than a decade. In fact, the AK Parti has consolidated and grown its electoral base in the last 12 years despite a number of otherwise destabilizing events, such as the 2008-2009 economic recession, a strong popular opposition during and after the Gezi Park protests, and a number of corruption scandals.[2] Classical mechanisms such as economic voting and voters' evaluation of the economic performance of the party as well as clientalistic party-voter networks seem to provide only partial explanations (Marschall et al., 2016). AK Parti's clientalistic distributive politics through the Mass Housing Administration (TOKI) projects (Marschall et al., 2016) and the strategic deployment of social assistance (Aytac, 2014) are other factors that have contributed to the AK Parti's success.

Our findings suggest yet another, complementary mechanism that may have contributed to AK Parti's rise and consolidation of power. As we will show below, the disproportionate success of the AK Parti in razor-sharp contests in 2004 came at the expense of its close ideological competitors. Those competitors lost significant ground in the Turkish political landscape in the years following 2004. While there may be possible "fair" explanations of a disproportionate success in extremely close races, such as pre-election strategic campaign effort, post-election legal challenges, incumbent candidate advantages, and pure chance, none of these seems to account for the statistical anomalies as we discuss below (also see Eggers et al. 2014). Undermining the proximate rivals thanks to those anomalies that happened at a crucial stage of the party may have complemented (or gave way to) other strengths of the party such as its clientalistic, patronage networks and redistribution policies in the party's consolidation of the right. Despite the fact that Turkey would seem to be a prime candidate for electoral manipulation due to its relatively weak political institutions and rule of law, as well as the controversies that the recent elections have sparked, scholars have not systematically studied the integrity of elections in Turkey. So far, much of the

[2] The effects of the recent unsuccessful military coup attempt and its aftermath on the electorate are yet to be seen.

discussion has happened in the mass and social media.[3] Using modern statistical tools, this study takes initial steps in documenting anomalies in Turkish elections.

Below we will first provide contextual information on Turkish politics and the rise of the AK Parti. We then discuss the Regression Discontinuity Design and expected properties of extremely close popular elections. After presenting our findings, we will discuss the implications of our findings for RDDs and for understanding the rise and consolidation of the AK Parti.

2. The rise of the AK Parti

The AK Parti originated from the long tradition of political Islam in Turkey (Mecham, 2004). The roots of the party can be found in Necmettin Erbakan's National Order Party (MNP) founded in 1970 as the first Turkish political party with a clear Islamic agenda (Özbudun, 2006). The MNP was replaced by the National Salvation Party (MSP) in 1973 after the MNP was shut down following the 1971 military coup by the constitutional court. The MSP played a medium-size role in right-wing politics until it is was shut down once again after the 1980 military coup. In 1983 the MSP reorganized under the Welfare Party (RP) which enjoyed moderate political success in the following decade, capturing the largest mayoralties of the country, Istanbul and Ankara, in 1994. In fact, Recep Tayyip Erdogan, the to-be founder of the AK Parti, became Istanbul's mayor from the RP in 1994. In 1998, the RP was shut down again by the constitutional court for "violating the secularist principles of the constitution" (see Özbudun, 2006 pp. 546). Erbakan was banned from politics and the RP was replaced by the Virtue Party (FP) under the leadership of Recai Kutan. The FP was also closed down almost instantly by the constitutional court in 2001 which split Turkey's political Islam into two. The "traditionalists" reorganized under the Felicity Party (*Saadet*

[3] See e.g., "Turkey election fraud claims emerge as Twitter ban is dropped" Url: http://www.ft.com/cms/s/0/d4184afa-bb37-11e3-b2b7-00144feabdc0.html#axzz3MGr1cTPb (Accessed on 19.12.2014) and http://erikmeyersson.com/2014/04/11/capital-fraud-in-turkey-evidence-from-citizen-initiatives/ (Accessed on 19.12.2014)

Partisi) led by Kutan whereas the "innovationists" founded the AK Parti under Recep Tayyip Erdogan's leadership. This chronology of events shows that from its inception, the Saadet (Felicity Party) has been the most proximate rival of the AK Parti.

This long tradition of Islamic parties relied on a machine-like functioning grassroots movement, the National Outlook (*Milli Görüş*), which was organised at the level of neighbourhoods and villages. National Outlook provided those Islamic parties with a very valuable organisational network, enabling face-to-face interactions with residents. Despite this strong local organisation, however, none of those parties managed to consolidate the right until the rise of the AK Parti. The most successful of them before the AK Parti, the RP obtained 21% of the votes in 1995 and could form a coalition with the centre-right *DYP* (True Path Party) in 1996. In the 2002 general elections the AK Parti secured 34% of the popular vote and became the first party since 1983 that could govern Turkey without a coalition. The only other party that made it to the parliament in 2002 was the centre-left secular *CHP* (Republican People's Party) with 19% of the votes. The ideological competitors of the AK Parti, including the centre-right DYP, the nationalist *MHP* (Nationalist Movement Party), and the AK Parti's most proximate rival Saadet were all below the national electoral threshold of 10%.[4] In fact, the DYP and the MHP both missed the 10% threshold by very narrow margins, obtaining 9.54% and 8.62% of the popular vote, respectively, and hence did not have any representation in the parliament.[5]

[4] DYP's roots go back to the populist conservative Democrat Party which was reestablished as the Justice Party after the 1960 military coup. While the Democrat Party was not strictly an Islamic party, it is generally seen as the first party that relaxed Turkey's secularist laws. MHP is traditionally a far-right party with a Turkish-nationalist agenda. It originally adhered to secularism but over time it became more pro-Islamic. Ideologically, both DYP and MHP diverge from the AK Parti. Nevertheless both parties are traditionally strong in the Turkish hinterland, and target the right-wing and conservative electorate, the same pool of voters that the AK Parti targets.

[5] As obvious from this account, Turkey has a multi-party system. General and mayoral elections take place in every four and five years, respectively. In the general election a party should obtain at least 10% of all national votes to be able to have any representation in the Grand National Assembly. The 10% threshold is the highest of its kind in any country.

This initial success of the AK Parti seems less surprising given the political and the economic context of the early 2000s (Marschall et al. 2016). The 2001 economic crisis led the public to punish the previously governing coalition parties which could not prevent the crisis. The AK Parti then seemed a fresh alternative. The more puzzling question is how the AK Parti managed to consolidate the right-wing electorate, wiping out its proximate rivals, Saadet, DYP, and MHP in the decade following 2002, despite the 2008-2009 economic crisis, foreign policy challenges, corruption scandals, and the public uproar during Gezi Park protests.

The AK Parti's core competitive strategy has been capturing and consolidating the centre-right electorate (Özbudun, 2006). Municipalities play a crucial role in this strategy. Traditionally, Turkish municipalities are primarily responsible for providing basic services, such as public transportation, water and waste, urban issues. Nonetheless, since the decentralization of power that took place after 1980s, local authorities have been enjoying relative financial and administrative freedom (Bayraktar, 2007). Municipal mayors are elected every five years with a first-past-the-post rule. Every municipality also has an elected council, but compared to the mayor, its power is rather limited (Bayraktar, 2007).

Since the AK Parti came to power, municipalities have been playing an increasingly important role in the Turkish social and political system. Firstly, as a part of their competitive strategy, the elected AK Parti mayors aim to demonstrate that they can provide better basic municipal services than their precursors, a strategy they borrowed from the Welfare Party (Mecham, 2004). The strategy of incrementally wining the public support through offering better local services seems to be a general strategy of Islamic movements that operate in secular authoritarian regimes (Blaydes, 2014).

Secondly, municipalities play an essential role in the clientalistic distributive politics of the AK Parti. Turkey's Mass Housing Administration (TOKI) built about 450,000 houses between 2003 to 2010, a tenfold increase compared to the 1984-2002 period (Marchall et al. 2016). Local governments have large

discretion over the size, location, and type of those projects and the AK Parti has been extensively involved in those projects through an organic relationship between the central AK Parti government and its local authorities. Machall et al. (2016) show that electoral support for the AK Parti mayoral candidates has substantially increased in municipal districts where TOKI investment was higher. Similarly, controlling municipalities enables parties to strategically distribute social assistance. Since 2002, the AK Parti has pushed forward a local charity-based welfare system. In this system, local authorities and municipalities channel social assistance through the "Social Assistance and Solidarity Foundations" organised at the district-level (Buğra and Keyder, 2006). Turkey's Conditional Cash Transfer (CCT) program introduced by the AK Parti in 2004 is an example of this welfare-system. Because local authorities have considerable discretion in the distribution of these social assistance funds, the CCT program and other forms of social assistance are subject to clientalistic politics (Aytac, 2014).

With this importance of mayoralties for the core competitive strategy of the party in the background, in its first mayoral elections in 2004 the AK Parti increased its vote share by about 10 percentage points to 42% and captured 1765 of all 3225 (55%) municipalities. Since then, the AK Parti's upward trend and its proximate rivals' downward trend have continued. Below we will take a closer look at the 2004 local elections that came at this crucial stage in the AK Parti's rise. Before, however, we will discuss briefly the Regression Discontinuity Design on which our analyses are based.

3. Regression Discontinuity Design and close elections

The Regression Discontinuity Design (RDD) can be used in situations in which a generic treatment variable *d* is assigned to cases based on the values of a running variable *r* and a threshold scalar *t* (see e.g., Hahn, Todd and Van der Klaauw 2001; de la Cuesta and Imai 2016; Imbens and Lemieux 2008; Lee and Lemieux 2010; Thistlethwaite and Campbell 1960 for a more detailed treatment of RDDs). When there is sharp discontinuity, observations with values of *r* above the threshold *t* are assigned to the treatment

condition, and observations below the threshold value (i.e., $r < t$) are assigned to the control condition. To give a more concrete example, let's define an AK Parti winning/losing margin in a first-past-the-post mayoral election as the AK Parti's vote share minus the vote share of the largest remaining party. This AK Parti winning/losing margin will be our running variable *r*. The threshold value *t* will then be zero, so that when the winning/losing margin *r* is larger than zero, an AK Parti mayoral candidate wins the election ($d = 1$) and when $r < 0$ a candidate from another party wins the election ($d = 0$). In a typical RDD, a dependent variable *y* is predicted from the treatment variable *d* and from a function of *r*, that is:

$$y = \alpha + f(r) + \beta \times d \quad + e \quad \text{with} \quad d = \begin{cases} 1 \text{ if } & r > t \\ 0 \text{ if } & r < t \end{cases} \quad (1)$$

where *f(r)* is some control function of *r* fitted separately on the two sides of the threshold *t*, β is the coefficient of the treatment indicator *d* capturing the jump in *y* at the threshold, and *e* is unsystematic error assumed to have a zero mean and nonzero variance. Equation (1) is typically fitted using only the cases within a small bandwidth around the threshold value *t.* In other words, in a Regression Discontinuity Design one compares the values of *y* for cases just around the discontinuity threshold *t.* The estimated difference in *y* between the cases just above and just below the threshold (controlling for *f(r)*) gives the "causal" effect of the treatment variable.

Lee (2008) shows formally that "if individuals—even while having some influence—are unable to *precisely* manipulate the assignment [running] variable, a *consequence* of this is that the variation in treatment near the threshold is randomized as though from a randomized experiment" (Lee and Lemieux 2010, pp.283 emphasis in the original). Turning back to our example, unless the mayoral candidates are unable to *precisely* manipulate the difference between the number of votes they and other candidates get, the winner of extremely close races are determined as-if with a coin flip. In popular elections, it is extremely improbable that candidates can precisely manipulate the running variable, for there is always *some* noise in the electoral system, e.g., a few partisans failing to turn up to vote due to sickness or accident. This feature of the RDD at the threshold value mimics a randomized experiment which enables

the interpretation of the β coefficient in (1) as the causal effect of the treatment variable on y, controlling for all observed and unobserved pre-treatment covariates.

Some scholars, nonetheless, challenged the conjecture that the outcomes of extremely close popular elections should be random (e.g., Snyder, 2005; Listokin, 2008; Caughey & Sekhon, 2011;Vogl, 2014). They argue that extremely close races could be non-random, because some individuals, particularly advantaged ones with more resources (e.g., incumbent or richer candidates) can systematically tilt the results of razor-sharp elections in their own favour. Investing aggressively in pre-election campaign in highly contested districts, legally challenging the results of extremely close races, and post-election manipulation and fraud are the potential mechanisms proposed by these scholars through which certain types of candidates may sort around the winning threshold. Eggers et al. (2014), on the other hand, analysed more than 40,000 close races in 10 countries and found no evidence against the randomness of close elections. That is, no particular party or candidate, incumbent or not, could systematically win close races. Eggers et al. (2014) conclude that the few occasions in which some types of candidates seem to have a systematic advantage in close elections occur as a result of pure chance (i.e., type-1 error).[6]

While theoretically one expects the outcomes of extremely close elections to be random and that expected potential outcomes are continuous at the threshold, there are formal tests that can detect violations. Firstly, one can perform *placebo* tests by comparing observations just below or above the threshold with regards to available pre-treatment covariates (after appropriately controlling for *f(r)*, see de la Cuesta and Imai 2016). Any significant difference in those pre-treatment covariates around the threshold indicates sorting. This procedure is analogous to comparing the values of pre-treatment covariates in the treatment and the control groups in "true" randomised experiment to ascertain whether randomisation worked in

[6] de la Cuesta and Imai (2016) also show that performing a simple comparison of the means of pre-treatment covariates above and below the threshold within the pre-specified bandwidth, without properly controlling for the running variable (*f(r)* in equation 1) may yield misleading results as such a mean comparison may appear to be showing sorting around the threshold when there is none.

practice. Secondly, McCrary (2008) proposed a density test to detect sorting. This test simply looks at the density of *r* (i.e., the running variable) just below and above the threshold *t*. Any significant imbalance in the density of *r* around the threshold would indicate sorting, for this indicates that it is more likely to be just above the threshold than below which should not happen if the assignment *at the threshold* was done as-if with a coin flip.

With this methodological discussion in mind, we will now look at close races in Turkish mayoral elections.

4. Results and discussion

As we discussed above, our main focus is the AK Parti's first mayoral elections after the 2002 general elections, that is, the mayoral elections held on 28.03.2004 for 3.225 municipalities. After analysing the 2004 elections in detail, we will briefly report the results for the 2009 and 2014 mayoral elections, too. Note that because the 2004 mayoral elections are the AK Parti's first ever mayoral elections they isolate out, at least partially, an incumbent party advantage for the AK Parti (Lee, 2008). Nevertheless, the AK Parti transferred some of its candidates from other parties, thus in 2004 some of the AK Parti's mayoral candidates may have been incumbent. In other words, the AK Parti may have had an incumbent *candidate* advantage in 2004. We will return to this issue below and discuss whether the incumbency statuses of AK Parti candidates in 2004 affect our results in a substantial way.

We use publicly available official election statistics published by the Turkish Statistical Institute (TurkStat). All datasets and the code used for our analyses are available for replication. The dataset for the 2004 elections includes 3209 municipalities and 16 metropolitan municipalities.[7] 20 parties and

[7] TSI updated the data for 16 municipalities in which elections were repeated. Some sources are not up-to-date with these 16 cases, hence reporting 3193 municipalities and 16 metropolitan municipalities. Excluding these 16 cases does not change any of the results.

several independent candidates participated in the elections. In the 2004 elections, ~25 of the ~34 million registered electorate voted (73%). The AK Parti won 1,765 of all municipalities. The four largest opposition parties, the *CHP* (Republican People's Party), the *MHP* (Nationalist Movement Party), the *DYP* (True Path Party), and the *Saadet Partisi* (Felicity Party) won 471, 389, 247, 63 municipalities respectively. Recall from the discussion in Section 2 above that among these four opposition parties, the secularist and the centre-left CHP is the most distant to the AK Parti on the political spectrum. The MHP and the DYP are far and centre right parties, respectively. The Islamist Saadet is politically closest to the AK Parti.

We start the analysis by plotting the density of the winning/losing vote margin of the largest party, the AK Parti, in close elections in 2004 (Fig. 1a). The winning/losing vote margin is simply the difference between the vote share of the AK Parti and of the largest of the remaining parties. There is an apparent jump around the winning threshold. The probability that the AK Parti wins a razor sharp election is more than twice of the probability that it loses it.[8]

Fig. 1b shows the density of the AK Parti's winning/losing margin for a wider range and the formal McCrary test result. The information depicted in Fig. 1b is very similar to that in the histogram in Fig. 1a. Fig. 1b just plots the estimated density of the AK Parti's winning/losing margin for a larger range than Fig. 1b (-50% to +50% instead of -15% and + 15%), and the y-axis is density rather than frequencies. In Fig. 1b the area under the curve for a particular range of the x-axis can be interpreted as the proportion of elections that resulted in a winning/losing margin for the AK Parti within that range. For instance, Fig. 1b shows that close elections are not the exception but the norm: the density is the highest around the cut-off. This also improves statistical precision around the cut-off. Fig. 1b also includes a 95% confidence interval for the density estimate and shows that the jump at the cut-off is statistically highly significant. That is,

[8] In two municipalities the votes of the AK Parti and the contending party were exactly equal and results were determined with a lottery. The AK Parti won both. These two cases were excluded from the analysis. Including them would strengthen the results.

there are significantly more razor-sharp elections that the AK Parti won than it lost. To put the test statistic in Fig. 1b into context, in none of the 20 elections in 10 countries analyzed by Eggers et al. (2014), the same test yields a *p*-value < 0.01.We also do not observe such discontinuities in 2009 and 2014 in Turkey. See SI for the 2009 and 2014 results and robustness checks for the 2004 results.

If the AK Parti disproportionately wins very close elections who is/are the loser(s)? Fig. 2 plots the same densities as in Fig. 1b and McCrary tests, but this time for the four largest opposition parties. Three of the four, the MHP, the DYP, and the Saadet experience a significant discontinuity around the cut-off for their disadvantage. The CHP is the only large opposition that does not experience a disproportionate loss in close elections. Note that, this is not because in very few occasions the competition between the CHP and the AK Parti was cut-throat. In 126 municipalities the vote share difference between CHP and AK Parti was smaller than 2.5%. The Saadet which is the closest ideological competitor of the AK Parti experiences the largest discontinuity. When one restricts the analysis to close races that do not involve the AK Parti, no party experiences a discontinuity at the cut-off. On the other hand, when one analyzes only the races that involve the AK Parti, the statistically significant discontinuities in Fig. 2 become much stronger.

[Fig. 1. ABOUT HERE]

[Fig. 2. ABOUT HERE]

How can we explain this significant jump in close AK Parti wins and contender party losses at the cut-off? As discussed above, it has been shown formally that as long as there is *some* noise in the system, no pre-election behaviour of parties, such as strategic election campaigning, should result in such discontinuities in popular elections (Snyder, 2005; McCrary, 2008; Lee & Lemieux, 2010; Eggers et al. 2014). Nonetheless, some scholars argue that particular parties may increase their campaign effort disproportionately and more effectively than others in close races (Listokin, 2008, Caughey & Sekhon,

2011, Grimmer et al., 2011; Vogl, 2014). There are several requirements for this strategic campaign explanation to be true (Listokin, 2008; Eggers et al. 2014). Most importantly, the AK Parti must have had extremely precise information about expected vote shares (in the order of quarter of a percentage, see Eggers et al., (2014)) and the disadvantaged parties must have lacked this information. In addition, the AK Parti must have been able to strategically mobilize its voters in highly contested municipalities which could be won by the party. Such precise information is unlikely to be obtained in large municipalities. To check whether the discontinuity is larger in smaller municipalities where obtaining extremely precise information might be easier, we split the 3,225 observations into three equally sized clusters: small, medium, and large municipalities. In the largest group of municipalities, the average number of registered voters is about 42,000. Having extremely precise information on expected vote counts in such large municipalities should be almost impossible. Table S2 shows that the discontinuity in Fig. 1b is very similar in small (discontinuity estimate = 0.248), medium (disc. est. = 0.259), and large (disc. est. = 0.194) municipalities. The differences between those estimates are statistically insignificant indicating that the municipality size does not affect the discontinuity estimate.

The campaign effort explanation can also be tested more directly: if it was true, close AK Parti wins should involve a higher turnout than close AK Parti losses, especially in areas where the competing party was not the CHP (Vogl, 2014). Table 1 presents a number of Regression Discontinuity estimates, obtained using the model in equation (1). The models fit a local linear specification for $f(r)$ on both sides of the threshold and uses only the observations within the optimal bandwidths around the threshold which is the appropriate method of implementing an RDD (de la Cuesta and Imai 2016). The estimation of those optimal bandwidths is beyond the scope of this paper, so we refer to Imbens & Kalyanaraman (2011) for details. We give robustness checks for different bandwidths in the Supplementary Material (Fig S2). Graphical representations of the statistically significant results in Table 1 can be seen in Fig. 3. The estimates in Table 1 can be interpreted as differences in the outcome variables between very close AK

Parti wins and very close AK Parti losses in 2004, controlling for the running variable. The table presents the effects for all municipalities and for a subset excluding close races with the CHP.

The first row in Table 1 shows that election turnout was in fact *lower* in close AK Parti wins than close AK Parti losses. When one excludes close races with the CHP, the turnout drop of 2.5% becomes statistically highly significant. This sharp drop in turnout in close AK Parti wins cannot be explained by pre-election campaign effort because a disproportionate increase in campaign effort should increase turnout not decrease.

The significant drop in turnout cannot be explained by post-election recounting influence or legal challenge as recounting or legal challenges do not influence turnout. Table 1 also shows that compared with close AK Parti losses, close AK Parti wins are not associated with any shift in the ratio of the number of votes declared as valid to the number of total votes cast. Such a shift would support the post-election recounting or legal challenge explanations.

[Table 1. ABOUT HERE]

What about possible incumbent candidate advantage? Caughey & Sekhon (2011) argue that incumbent candidates may be able to tilt the outcomes of extremely close elections. Note, however, that it is not clear how incumbents could manage to systematically win close elections using "fair" methods, especially in relatively large districts (Eggers et al., 2014). While the AK Parti could not have an incumbent party advantage, for 2004 was its first mayoral elections, it transferred some of its candidates from other parties, including the previously shut-down RP and other right-wing parties. So, some AK Parti candidates could have been incumbent in 2004, or served as mayors previously. Unfortunately, neither TurkStat nor the Turkish Supreme Electoral Council (SEC) publishes data on candidates in the 2004 elections. TurkStat only publishes the list of the names of winners in 2004. Moreover, the list of winners

is not available for elections earlier than 2004. It is thus not possible to find data from TurkStat or SEC on the incumbency status of a candidate in 2004.

Nevertheless, to address a possible incumbent candidate advantage, we collected our own data. Collecting these additional data was cumbersome, for one had to go through the municipalities one by one (sometimes using the municipality's official website, sometimes using the Center for Local Administrator's website yerelnet.org.tr) and check whether the winner in 2004 was incumbent or served as mayor before. Because of this difficulty, we selected only a subset of municipalities. To choose which subset we should focus on, we estimated separately the discontinuity in the AK Parti's winning/losing margin at the threshold for the 12 Nomenclature of Territorial Units for Statistics (NUTS-1). In four of the 12 NUTS-1 regions, we find statistically significant discontinuity, and perhaps not surprisingly these discontinuities were all positive. Those regions with statistically significant discontinuities are plotted in Fig. 4. We chose two NUTS-1 regions with highest discontinuities: North East Anatolia and Central Anatolia, and checked whether the 2004 winner was incumbent in the 496 municipalities in these two regions. If the incumbency advantage was the main driving force behind the discontinuities we report, this advantage should be most detectable in these two regions.

We find that the proportion of incumbents among the AK Parti winners (31%) is virtually identical to the proportion of incumbents among winners from other parties (32%). It is, thus, not the case that the AK Parti nominated more incumbents than other parties, even in the regions with the highest discontinuities. Furthermore, the discontinuity in the AK Parti winning/losing margin estimated using only *non-incumbent winners* in North East Anatolia and Central Anatolia is still quite positive and statistically significant (discontinuity est. = .597, S.E. = .213, $p < 0.01$). Thus, incumbent candidate advantage cannot explain the AK Parti's disproportionate success in close races, either.

Could these results simply be Type-1 error? While statistical chance can never be fully excluded, the p-value in Fig. 1 is very small. Also, obtaining all of the significant estimates in Table 1, Fig. 1, and Fig. 2 just by chance is highly unlikely.

[Fig. 3 ABOUT HERE]

[Figure 4. ABOUT HERE]

Electoral manipulation is a potential explanation (Snyder, 2005; Listokin, 2008; Lehoucq, 2003; Klimek, Yegorov & Thurner, 2012). In fact, the drop in turnout in close governing party wins is consistent with voter suppression and ballot removal both of which are common manipulation methods (Lehoucq, 2003). Table 1 further shows that there is a sharp and significant decrease in the vote share of the largest contending party in close AK Parti wins. Note that, one expects a negative association between the AK Parti win/lose margin and the vote share of the contending party (which is also apparent from the overall slope of the curve in Fig. 3), but one does not expect an abrupt jump around the threshold. Table 1 also includes estimates predicting the vote share of the AK Parti and of the largest contending party in 2009 mayoral elections for which we do not find anomalies. These estimates show that the subsequent vote share of the AK Parti in municipalities that the AK Parti barely won in 2004 is significantly *lower* than municipalities that the AK Parti barely lost. This finding is particularly interesting as it is against the incumbent party advantage documented consistently (Lee, 2008). Also, the vote share of the contending party in 2009 is higher in close AK Parti wins than close AK Parti losses in 2004. As an aside, the number of municipalities dropped significantly in 2014 to 1.296. Thus, merging 2004 results with 2014 discards the majority of cases, making it difficult to obtain sensible estimates.

Here we would like to discuss an additional important result. We show above that when the contender party is the CHP, there is no jump in the AK Parti winning/losing margin at the threshold, and when the contender party is either the Saadet, the DYP, or the MHP (i.e., the AP Parti's proximate rivals) the jump is highly significant. These finding may suggest that in 2004 the AK Parti has tried strategically to undermine its proximate rivals. Alternatively, these results could only be a by-product of opportunity. That is, systematically winning close elections (through manipulation or other method) could be easier in places where the AK Parti's main rival happened to be another right-wing party. Indeed, it appears from

Figure 4 that discontinuities happen mostly in central and north-east Anatolia where the CHP is thought to be weaker. However, even one looks at the four regions where there *is* a significant discontinuity (see Fig. 4), when the main rival was the CHP, the discontinuity estimate is rather low and insignificant (discontinuity est. = .231, S.E. = .24). In the same four regions, the discontinuity estimate is a whopping .75 (S.E. = 0.16) when the main rival of the AK Parti is any other party than the CHP. Moreover, if one restricts the analysis to the eight regions where the overall discontinuity was statistically *insignificant* (see Fig. 4), the AK Parti still enjoys a statistically significant discontinuity when the main rival was either the MHP or the Saadet (Discontinuity est. = .42, S.E. = 0.17, $p < 0.05$). These results show that the AK Parti enjoys a disproportionate success ratio in close election throughout all regions of Turkey when the main rival is a fellow right-wing party.

A further interesting question is, then, the following. If the anomalies observed in 2004 are indeed due to electoral manipulation, why would then we see no such anomalies in the 2009 and 2014 mayoral elections? An important difference between the 2004 and the subsequent elections is the introduction of the *SECSIS*--a "secure and transparent" computer supported central voter roll system--in 2006.[9] While the 2009 and 2014 elections and the SECSIS itself created their own controversies, the type of manipulation that might have happened in 2004 could have been prevented by the SECSIS. Once vote counts from neighbourhoods are entered in the SECSIS digitally, it may be much more difficult to discard votes depending on how critical the outcome happen to be after the final count. A further possibility is that in later elections the governing party may have resorted to more sophisticated tactics than manipulation, for they might have had more time to build patronage and clientalistic networks which guarantee success without manipulation. Harvey (2016) shows that in Russia ballot stuffing decreases as extra-legal mobilization increases in areas where the winning margin is rather tight. Our findings also do not imply

[9] The project has started in 1986 and the online version has gone live on 02.10.2006. Objectives of SECSIS include "transferring the election results from districts to the center rapidly and securely; providing the opportunity of identity, address and polling data examination via the Internet to voters and the opportunity of monitoring the election results via internet to the political parties, press and public." See (in English): http://www.ysk.gov.tr/ysk/content/conn/YSKUCM/path/Contribution%20Folders/Secsis/secsising.pdf

that there was no manipulation in 2009 or 2014. The RD diagnostics we use above can reveal statistical irregularities only around the winning/losing threshold. Hence, they may only reveal the lower-bound of manipulation. If, for example, a few votes were strategically discarded in every ballot box in 2009 and 2014, this would not show up as a discontinuity at the winning/losing margin, but would simply shift the entire distribution of the running variable to the right.

5. Conclusions

Using Regression Discontinuity diagnostics we document a number of statistical anomalies in the 2004 Turkish mayoral elections. The governing party that controlled the parliament was much more likely to win close races than lose. Compared to close governing party losses, there was a sharp drop in turnout and contending party votes in close governing party wins. Moreover, the parties that disproportionately lost very close races were exclusively ideological competitors of the governing party. We consider potential mechanisms that may resulted in those anomalies. Those mechanisms are pre-election campaign effort, post-election legal challenges, incumbency advantages, pure chance, and electoral manipulation. The last mechanism seem to be the one which is most consistent with our findings.

There is an unsettled methodological debate among political scientists on whether extremely close popular elections resemble a natural experiment in which incumbency is assigned as-if randomly. If the winners of close races are indeed determined as-if randomly (or technically more correctly if the expected potential outcomes are continuous at the threshold (de la Cuesta and Imai 2016)) then the researcher can use a Regression Discontinuity Design (RDD) to derive causal estimates for the effects of electoral outcomes on some dependent variable by comparing observations just around the winning threshold. Our results, however, show clearly that the outcomes of extremely close popular elections can be highly non-random and that pre-treatment covariates can be discontinuous at the threshold.

We, however, do not suggest that our results imperil the validity of RDDs in electoral contexts. Rather, our findings reiterate the importance of testing the identification assumptions of RDDs case by case. The clarity of those assumptions as well as available diagnostic tools make those tests very easy to implement. In fact, this ease of testing its assumption makes Regression Discontinuity a particularly powerful method. As Eggers et al. (2014) show, in almost all cases the winners of close elections are determined as-if through a coin toss. Moreover, even if one observes sorting around the winning threshold, as long as the mechanisms that underlie the sorting are exogenous to the dependent variable the researcher is interested in, the use of RDDs can be justified. For example, if sorting is due to electoral manipulation but there are strong reasons to believe that the observations just below and above the winning threshold are otherwise balanced in all other covariates, then the use of a RDD can still be justified.

Besides their methodological importance, our results are substantively very important, too. Recent Turkish elections have sparked ample controversy. Efforts to document anomalies focused mainly on the 2014 mayoral elections, particularly on the close race between the AK Parti and the CHP in Ankara.[10] Using official data, our analysis shows for the first time that anomalies were particularly present in earlier elections and involved predominantly ideological competitors of the governing party, not the CHP. These findings help understand how the AK Parti managed to consolidate its position on the right. It seems that the party has undermined its proximate rivals quite early on, thanks to the anomalies documented above which happened at a crucial stage. After abnormally losing the majority of close races in 2004, ideological competitors on the right, the Saadet, the DYP, and the MHP, lost significant ground in the Turkish political landscape.

Figure and Table Captions

[10] Meyersson presents interesting statistical analyses in his blog: http://erikmeyersson.com/2014/04/11/capital-fraud-in-turkey-evidence-from-citizen-initiatives/ (Accessed on 19.12.2014)

Fig. 1. Histogram (A) and density plot (B) for AK Parti win/lose margin (the difference between the vote share of AK Parti and the largest of the remaining parties).

Fig. 2. Density plots and McCrary tests for the four largest opposition parties.

Fig. 3 Graphical representation of Regression Discontinuity results. Dots represent unconditional means in 8% bins by AK Parti win/lose margin in 2004 mayoral elections. Solid lines are local linear smoothers with 90% confidence intervals.

Fig. 4. Geographical distribution of the discontinuity of the AK Parti winning/losing margin at the zero threshold. Only statistically significant ($p < 0.05$) discontinuity estimates are plotted.

Table 1. Local Linear Regression Discontinuity estimates (Nichols, 2012) of the effect of AK Parti rule in 2004 and cluster (Province-level) robust standard errors for optimal bandwidths (Imbens & Kalyanaraman, 2011). See SI for robustness checks. ***p(2-sided)<0.001; **p(2-sided)<0.05.

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TABLES AND FIGURE:
Fig. 1:

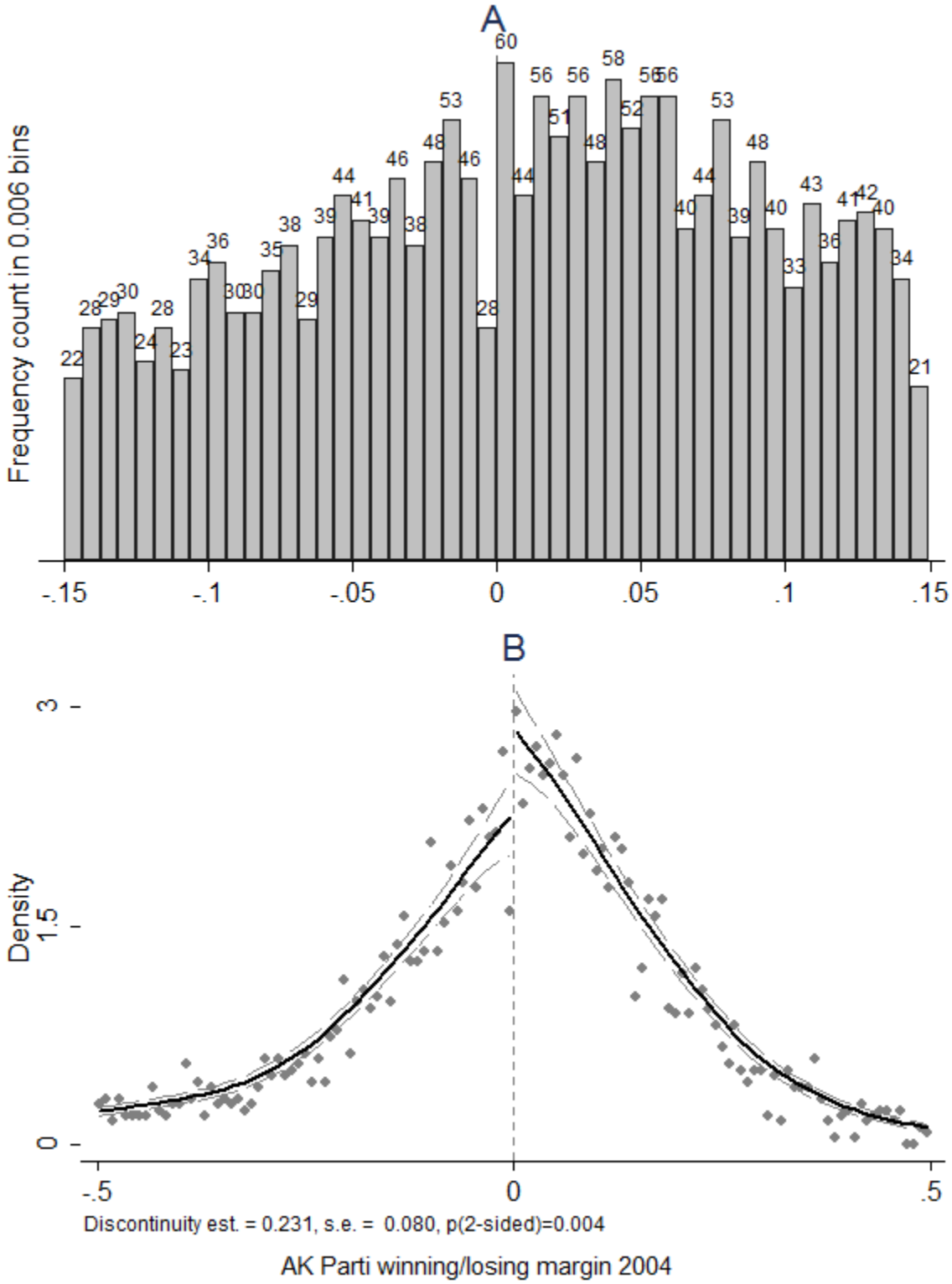

Fig. 2:

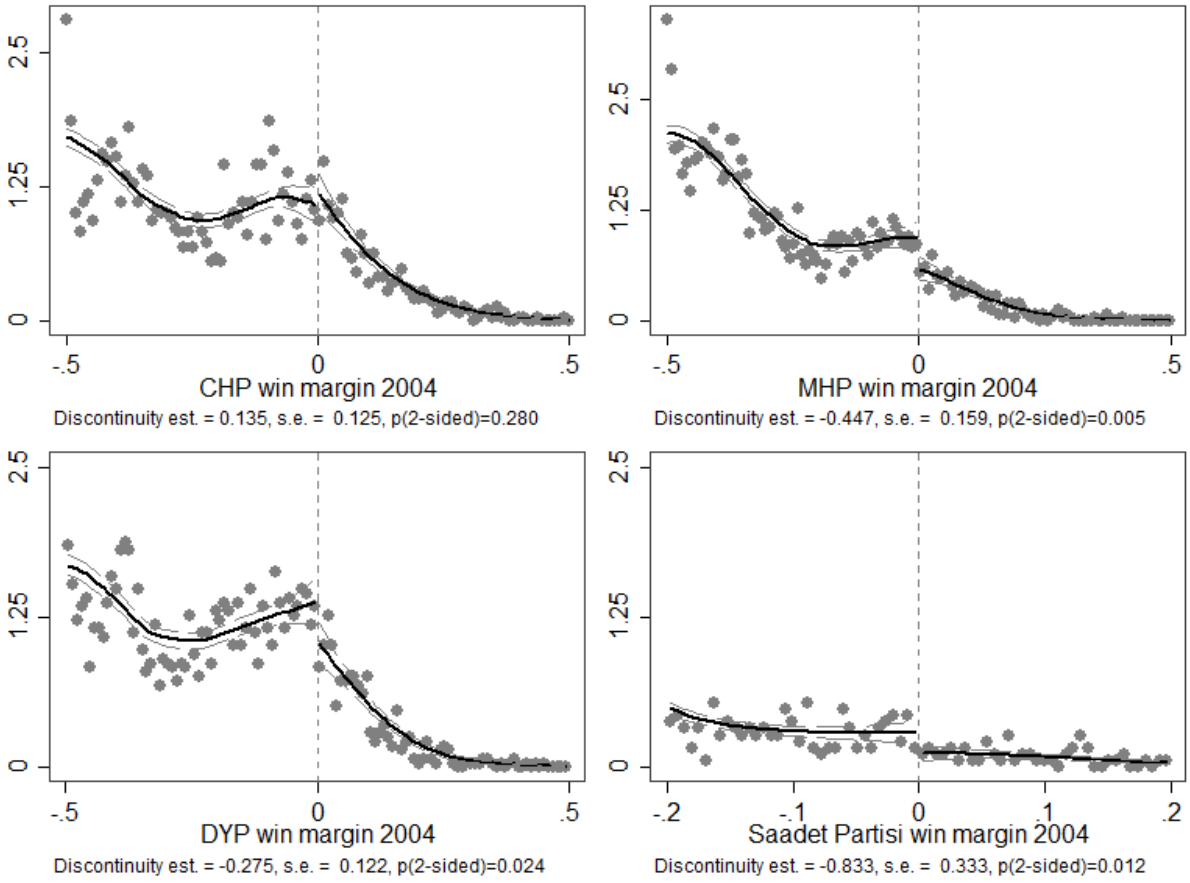
0
1.25
2.5
-.5
0
.5
CHP win margin 2004
Discontinuity est. = 0.135, s.e. = 0.125, p(2-sided)=0.280
MHP win margin 2004
Discontinuity est. = -0.447, s.e. = 0.159, p(2-sided)=0.005
DYP win margin 2004
Discontinuity est. = -0.275, s.e. = 0.122, p(2-sided)=0.024
-.2
-.1
.1
.2
Saadet Partisi win margin 2004
Discontinuity est. = -0.833, s.e. = 0.333, p(2-sided)=0.012

Fig. 3:

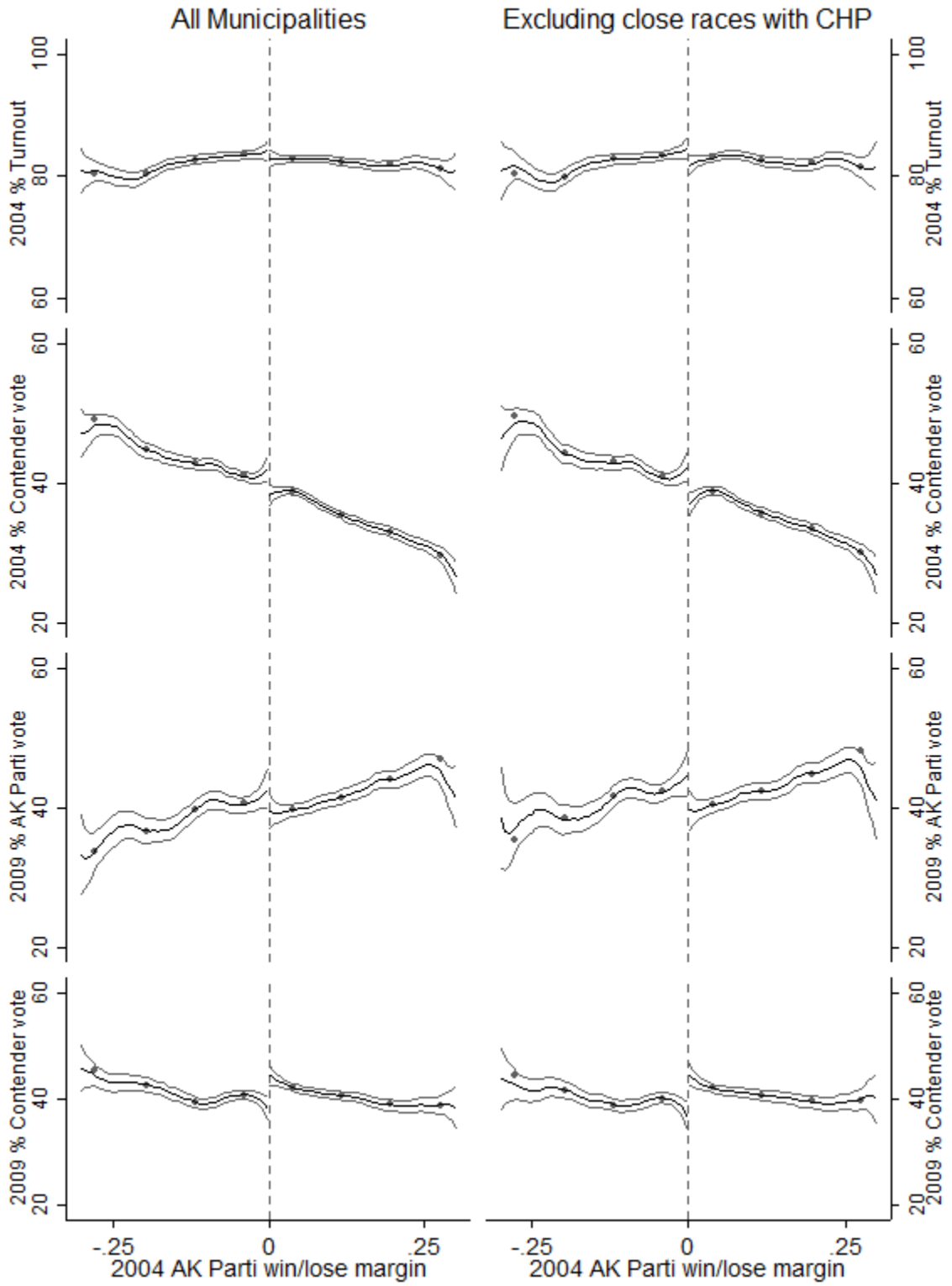
All Municipalities
Excluding close races with CHP
2004 % Turnout
2004 % Contender vote
2009 % AK Parti vote
2009 % Contender vote
60
80
100
20
40
60
-.25
0
.25
2004 AK Parti win/lose margin

Fig. 4:

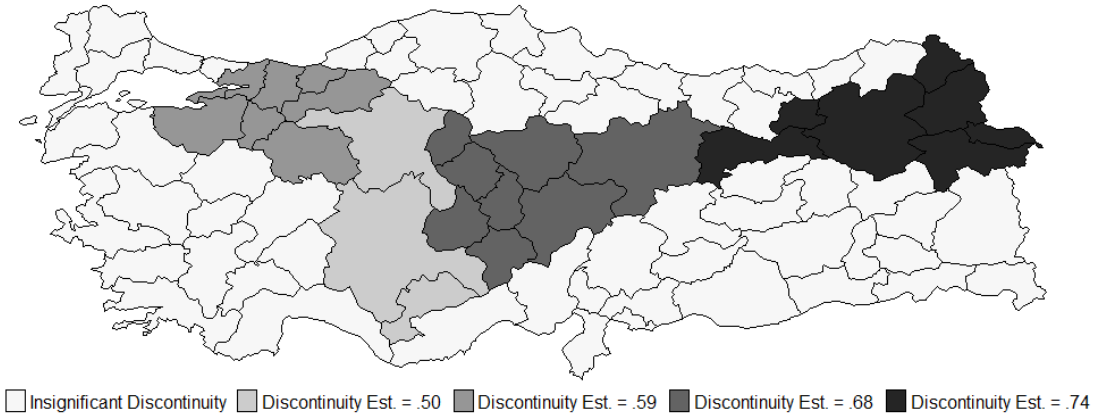
Insignificant Discontinuity
Discontinuity Est. = .50
Discontinuity Est. = .59
Discontinuity Est. = .68
Discontinuity Est. = .74

Table 1. Local Linear Regression Discontinuity estimates (Nichols, 2012) of the effect of AK Parti rule in 2004 and cluster (Province-level) robust standard errors for optimal bandwidths (Imbens & Kalyanaraman, 2011). See SI for robustness checks. ***p(2-sided)<0.001; **p(2-sided)<0.05.

	Excluding close races with CHP		All municipalities	
Outcome variable	Coefficient	S.E.	Coefficient	S.E.
'04 % turnout	-2.497***	0.911	-1.004	0.611
'04 % # valid votes/# all votes	-.078	0.116	-.150	0.127
'04 % contender vote	-4.968***	1.463	-2.901**	1.185
'09 % AK Parti vote	-4.121***	1.520	-2.973**	1.163
'09 % contender vote	5.243***	1.667	4.378***	1.120