

Evo Morales and Electoral Fraud in Bolivia: A Natural Experiment Estimate

Diego Escobari

Gary A. Hoover

Abstract—This paper exploits a natural experiment based on a disruption in the official preliminary vote counting system to identify and estimate the size of electoral fraud in the 2019 Bolivian presidential elections. The results show evidence of a statistically significant electoral case of fraud that increased the votes of the incumbent *Movimiento al Socialismo* and decreased the votes of the runner up *Comunidad Ciudadana*. We estimate that the extent of the fraud is at least 2.67% of the valid votes, sufficient to change the outcome of the election. We validate our results with pseudo-outcomes on a placebo analysis. We also allow for heterogeneous voting preferences across different geographical regions (e.g., rural vs. urban) and document how fraudulent polling stations were hidden in the final reporting of the votes.

Resumen—Este artículo utiliza un experimento natural basado en la ruptura del sistema oficial de conteo rápido de votos para identificar y cuantificar el fraude en las elecciones presidenciales de 2019 en Bolivia. Los resultados muestran evidencia de un fraude electoral estadísticamente significativo que incrementó los votos del partido de gobierno *Movimiento al Socialismo* y disminuyó los votos del principal partido opositor *Comunidad Ciudadana*. Estimamos que el fraude fue de al menos 2,67% de los votos válidos, suficiente como para cambiar el resultado final de las elecciones. Validamos nuestros resultados con pseudo-efectos en un análisis de placebo. También controlamos por preferencias de voto heterogéneas en diferentes regiones geográficas (e.g., rural vs. urbana) y documentamos cómo se ocultaron las mesas electorales fraudulentas en el reporte final de los votos.

Keywords—Electoral Fraud; Natural Experiment; Bolivia; Evo Morales

JEL Classifications—C21; D72; K42

1 INTRODUCTION

“IF the fraud is proved, we go to the runoff” said Bolivian President Evo Morales on October 26, 2019 after being accused of electoral fraud in the elections that took place only six days earlier.¹ Due to its illegal nature, the identification of electoral fraud is difficult. Moreover, convincing identification of the magnitude of the fraud is methodologically challenging (10). Capturing fraud is important as it slows leadership turnover, which is known to lower economic growth (3). It also decreases accountability and helps autocratic leaders stay in power (20).

In this article we use a natural experiment to test for the existence and estimate the magnitude of electoral fraud in the Bolivian presidential elections of October

20, 2019. A shutdown of the official preliminary vote counting system *Transmisión de Resultados Electorales Preliminares* (TREP) gave us a rare opportunity that created a natural experiment to formally test for electoral fraud.² We take advantage of the shutdown to separate polling stations between a control group that is less likely to be associated with fraud, and a treatment group where fraud is more likely to have occurred. The Bolivian presidential elections were run under some unique rules. To win the election a candidate either needed to obtain the majority of the votes or get more than 40% with a difference of at least 10% over the runner up. We test whether the exogenous effect of the fraud treatment increased the votes of the incumbent *Movimiento al Socialismo* (MAS) and if it decreased the votes of the main opposition party *Comunidad Ciudadana* (CC) so that fraud would help to have a gap of at least 10%.

The results show evidence that electoral fraud was highly statistically significant, increasing the votes of MAS and reducing the votes of CC. We estimate that election fraud increased the gap between these two parties by at least 163,717 votes or 2.67% of the valid votes. This point estimate is big enough to conclude that fraud had an impact on the outcome of the election. Moreover, it is a lower bound estimate because we cannot rule out the existence of fraud in our control group. We take three steps to validate our natural experiment identification

- D. Escobari is with the Department of Economics & Finance, The University of Texas RGV, Edinburg, TX 78539
Phone: (956) 665-2104
Email: diego.escobari@utrgv.edu
URL: <http://faculty.utrgv.edu/diego.escobari>
- G.A. Hoover is with the Department of Economics, University of Oklahoma, Norman, OK 73072
Phone: (405) 325-5857
Email: ghoover@ou.edu
URL: <https://sites.google.com/site/garyhoovereconomics>

Manuscript version November 25, 2019.

1. Mitra Taj and Daniel Ramos “Bolivia’s Morales vows second-round vote if fraud found in election, threatens siege of cities” Reuters, October 26, 2019.

2. [25] explain that natural experiments typically have a greater external validity than field experiments (see, e.g., 9).

strategy. First, a placebo analysis shows no economically significant effect on the votes of other political parties which serve as pseudo-outcomes. Second, we control for unobserved factors that allow having heterogeneous voting preferences across geographical regions (e.g., rural vs. urban areas), with fraud being statistically significant even at the most disaggregated geographical level. Third, after finding no discontinuities with a cutoff point grid search and with the progress of the votes as the running variable, we discovered that the fraud treatment polling stations were evenly scattered in the reporting of the final results. We interpret this as evidence that these are, indeed, fraudulent polling stations that were deliberately hidden to avoid jumps in the final voting reports.

Evo Morales eventually stepped down on November 10, 2019 following further accusations of election fraud, mass protests, and an Organization of American States (OAS) audit that found “serious irregularities” in the elections.³ In particular, the international audit discovered a manipulation of the reporting system, physically altered tally sheets, forged signatures, and was unable to confirm a first-round victory for Morales. This would have been Morales’ fourth consecutive term in office in a country where the constitution only allows for a single reelection. He lost a referendum in 2016 where Bolivians had already voted against him participating in the 2019 elections. His participation followed a controversial ruling by the Supreme Court which said that limits on the lengths of his tenure would violate Morales’ human rights.⁴ His resignation ended close to 14 years in power of a once very popular president that had important achievements (see, e.g., 15) under extremely favorable external conditions (7).

Two previous papers studied the 2019 Bolivian elections. [6] presents a simple theoretical framework to understand fraud with an empirical section that finds different patterns in the polling stations with TREP and those that were never included in the TREP. [21] finds no evidence that fraudulent votes were decisive.⁵ To the best of our knowledge, ours is the first paper to formally test and capture the magnitude of the fraud.

Previous work aimed at capturing the size of the voting fraud includes [22] who use second-digit mean tests, but need to make strong assumptions regarding the underlying voters’ preferences. [2] and [17] focus on voters’ registration rather than voting results. Moreover, [16] and [13] assume away the existence of voters’ heterogeneity across precincts, while [10] use the random assignment of independent observers in Russian parliamentary elections. In addition, [4] study the role of political networks and weak institutions to find that

the announcement of a new monitoring technology reduced fraud, consistent with the monitoring of illegal activities under corruption in [11]. [12] used a regression discontinuity design to show the importance of voting technology. [18] use the frequency of reported round percentages to present a novel statistical fraud indicator. This large body of work on electoral fraud is part of the election forensics literature (see, e.g., 23), where one of the goals is to diagnose the accuracy of reported election results.⁶

The rest of the paper is structured as follows. Section 2 presents the data, while we explain the natural experiment and empirical model in Section 3. The results and robustness tests are presented in Section 4. Section 5 concludes.

2 DATA

The data for this paper comes from the *Organo Electoral Plurinacional* (OEP), the official government body in charge of the elections. We used two datasets downloaded directly from OEP’s website, the TREP and the *Computo*. The TREP stands for “Transmission of Preliminary Electoral Results” and its role was to publish online the preliminary results of the polling stations in real time as they arrived at the OEP. The second dataset is the final version of *Computo*, which contains the official results of the election.⁷

The version of the TREP that we use was downloaded during the shutdown of the system that occurred at 7:40 pm on the day of the elections. This version of the TREP contains 84% of the polling stations. We do not use the preliminary results from the TREP, we use this dataset only to identify the polling stations that were already reported before the shutdown. All estimates in the paper come from using the official final vote count that we downloaded directly from OEP.

Columns 1 and 2 of Table 1 present the final results of the election.⁸ The key element in column 2 is that the difference between the votes of MAS and CC is 10.56%, more than the 10% needed to guarantee reelection of the incumbent party, MAS. Note that blank and null votes are not counted when computing the shares. Columns 3 and 4 show the final vote count (and percentages), but only for those polling stations that were not reported in the TREP prior to the shutdown. Noteworthy, this column shows that the proportion of votes for MAS is larger in the polling stations that were not reported in the TREP prior its shutdown, while the opposite happens for CC.

6. For a review of the literature, see [19].

7. These datasets were downloaded from <https://trep.oep.org.bo/> and <https://computo.oep.org.bo/> respectively.

8. In addition to Movimiento and Socialismo (MAS) and Comunidad Ciudadana (CC), the other political parties running were Partido Demócrata Cristiano (PDC), Bolivia dice No (21F), Movimiento Tercer Sistema (MTS), Movimiento Nacionalista Revolucionario (MNR), Partido de Acción Nacional Boliviano (PAN), Unidad Cívica Solidaridad (UCS), and Frente para la Victoria (FPV).

3. Kay Guerrero and Dakin Andone “Bolivian President Evo Morales steps down following accusations of election fraud” CNN, November 10, 2019.

4. Yascha Mounk “Evo Morales finally went too far for Bolivia” The Atlantic, November 11, 2019.

5. It is likely that the algorithm in [21] works poorly in recent elections because the algorithm is available online so electoral fraud strategies can be fine-tuned to avoid detection.

TABLE 1: Summary of the votes

Parties:	Final Computo		After the Shutdown ^a	
	Votes (1)	Percentage (2)	Votes (3)	Percentage (4)
MAS	2,889,359	47.08%	531,018	54.09%
CC	2,240,920	36.51%	289,017	29.44%
PDC	539,081	8.78%	87,856	8.95%
21F	260,316	4.24%	38,451	3.92%
MTS	76,827	1.25%	13,317	1.36%
MNR	42,334	0.69%	7,199	0.73%
PAN	39,826	0.65%	6,167	0.63%
UCS	25,283	0.41%	4,388	0.45%
FPV	23,725	0.39%	4,300	0.44%
Blank	93,507	1.52%	19,662	2.00%
Null	229,337	3.74%	41,448	4.22%
Valid Votes ^b	6,137,671		981,713	
Total Votes	6,460,515		1,042,823	
polling Stations	34,555		5,580	

Notes: ^a The numbers in columns 3 and 4 are calculated with final Computo votes, but from the polling stations that were *not* included in the TREP prior to the shutdown. ^b Valid votes do not include blank and null votes, while total votes do.

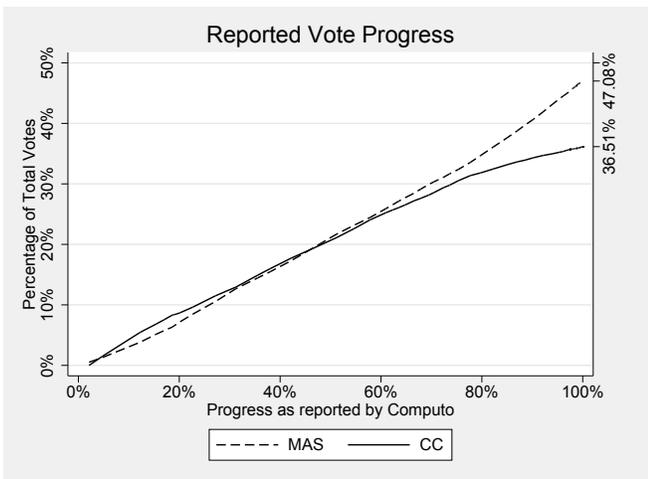


Fig. 1: Progression of the votes as reported by Computo.

Figure 1 illustrates the progress of the voting percentages for MAS and CC, based on *Computo*, to give an idea of how the sequence of the reporting of the polling stations might have played a role. This figure was constructed based on data shared by Edgar Villegas from Universidad Mayor de San Andrés.⁹ We have 104 different versions of the *Computo*, recorded approximately every hour between October 20, 2019 at 10:29 pm (containing 2.12% of the valid votes) and October 25, 2019 at 7:20 am (containing 99.99% of the valid votes). We included an additional wave recorded on Friday, October 25, 2019 at 9:09 pm that contains 100% of the valid votes. Consistent with the differences in the percentages of MAS and CC reported in columns 2 and 4 of Table 1, there appears to be a suspicious increase in the gap around the last 25% of the reported votes.

9. <https://twitter.com/edgarinvillegas>

3 THE NATURAL EXPERIMENT

On the day of the elections, Sunday October 20, 2019, TREP stopped posting the information online at 7:40 pm when it had already reported 84% of the valid votes.¹⁰ The president of the Electoral Supreme Court Tribunal Supremo Electoral (TSE), María Eugenia Choque announced that they stopped transmitting the TREP results to avoid “confusions” as they were planning to start transmitting the verified final results via the *Computo*. The representatives of the Organization of American States overseeing the election met with the TSE officials to stress the importance of keeping the TREP running. Regardless, TREP remained inactive for at least 20 hours. This disruption of the system resulted in a general public outcry as it jeopardized the transparency of the process.

The shutdown helps our identification strategy as it divides the polling stations in two. The first group, reported prior to the shutdown, serves as a control group that is less likely to be associated with fraud because the information on these polling stations was made public relatively fast as it arrived at the TSE. The second group of polling stations, which was halted for over 20 hours, is our fraud treatment group. We later discuss the implications of potentially having fraud in the control group.

To illustrate how TREP displays the results, Figure 2 presents a screenshot taken during the shutdown for the Bolivia section of the TREP (which excludes votes from abroad). The lower right-hand side of the screenshot shows the exact time and date of the shutdown, 20/10/2019 19:40:57.¹¹ The figure shows how the gap between the incumbent MAS and the runner up CC, excluding the votes from abroad, was 45.28% – 38.16% = 7.12%, below the 10% MAS needed to win. Counting the votes from abroad the difference was slightly greater.

To test for differences between the control and the (fraud) treatment group, we estimate the following equation:

$$PP_{ij} = \beta \cdot \text{SHUTDOWN}_{ij} + \mu_j + \varepsilon_{ij}, \quad (1)$$

where PP_{ij} denotes the share of the votes obtained by a political party in polling station i which belongs to precinct j . SHUTDOWN_{ij} is a dummy variable equal to one if the polling station i in precinct j was *not* reported in the TREP prior to the shutdown. μ_j is the precinct unobserved fixed effects, while ε_{ij} is the remainder stochastic term.

We are interested in estimating β , the effect of SHUTDOWN_{ij} on the votes PP_{ij} , and we formally test two different hypotheses. In the first, we test if fraud has a negative effect on the votes of CC. In the second,

10. This 84% is calculated using the valid votes from columns 1 and 3 of Table 1, i.e., $1 - \frac{981,713}{6,137,671} = 84\%$.

11. The link “Actas” below, contained the Excel file `acta.2019.10.20.19.40.57.xlsx` that included the details of the polling stations reported prior to the shutdown. The name of the file signals the time and date the file was last updated.

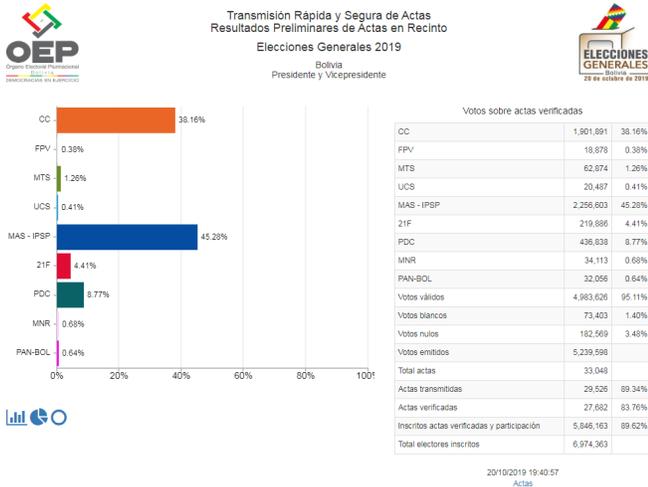


Fig. 2: Screenshot of the TREP taken during the shutdown.

we test if fraud has a positive effect of the votes received by MAS. β will also help determine the size of the fraud.

4 RESULTS

Table 2 presents the least squares regression results of the estimation of Equation 1. Panel A has the shares of the votes as the dependent variable, while Panel B has the number of votes. The point estimate on the dummy variable SHUTDOWN in column 1 of Panel A shows that the polling stations after the shutdown saw an increase of 7.98% of the votes for MAS. This effect is highly statistically significant. Moreover, column 2 shows that the votes for CC experienced a statistically significant 8.29% decrease when they were not included in the TREP prior to the shutdown. From Table 1 we see that 981,713 of the votes remained to be reported after the shutdown, which implies that the shutdown increased the difference between MAS and CC by an estimated 159,636 votes ($981,713 \times (7.98 + 8.29) / 100$) or about 2.60% of the valid votes. This magnitude is big enough to have switched the outcome of the election.¹²

When examining Panel B, we find similar results. Column 1 reports an increase of 13.77 votes for MAS, while column 2 reports a decrease of 15.57 votes for CC. These estimates are at the polling station level and are both highly statistically significant.¹³ Given that 5,580 polling stations were left to be reported, we estimate that the shutdown increased the difference between MAS and CC by about 163,717 votes ($5,580 \times (13.77 + 15.57)$) or about 2.67% of the valid votes. This is close to the estimate from Panel A, and again big enough to change the outcome of the election. Interestingly, the magnitude of the decrease in CC is greater than the magnitude of the increase for

12. Note that these estimates are consistent with the irregularities reported by [24] and [8].

13. These results hold when we use Poisson regressions.

MAS. This makes sense because at the margin, if the goal is to increase the percentage difference, it is more efficient to decrease CC than to increase MAS.

We take three different actions to validate these results. First, we use pseudo-outcomes in a placebo analysis. Second, we control for unobserved factors that might be different before and after the shutdown. Third, we investigate how these treatment polling stations were reported in the final voting results of the *Computo*.

4.1 Placebo Analysis

The idea in the placebo analysis is that we replace the outcome variable (CC or MAS) with a pseudo-outcome that is known not to be affected by the treatment (1). The primary analysis, when applied to the pseudo-outcome, is to assess whether the estimates are close to zero. In addition to MAS and CC, this election had seven more political parties running. If there are any unobserved factors that might be driving the results in columns 1 and 2 of Table 2, it is reasonable to argue that those factors should also affect the votes of other political parties.

Columns 3 through 9 show the results for the other political parties. While we cannot reject the null hypothesis that the effect on the pseudo-outcomes is zero for most of the political parties, the magnitude of the coefficients is much smaller (Panels A and B). On average, from Panel A we see that the magnitudes of the coefficients are about 50 to 100 times smaller for the other political parties when compared to MAS or CC. The largest coefficient in absolute value is the one for 21F. The negative estimate can be explained by the fact that 21F was widely seen as the closest ally to CC. The same holds for Panel B. Overall, we interpret these placebo results as evidence to validate our interpretation of the coefficient estimates on SHUTDOWN in columns 1 and 2 as electoral fraud.

4.2 Unobserved Heterogeneity

The incumbent party justified the unusual increase in their votes by arguing that the polling stations from rural communities were yet to be considered and that those communities were more likely to support them. It is reasonable to expect greater support for MAS in rural areas, for example, see the findings in [15].¹⁴ However, we know that about two-thirds of the polling stations remaining after the shutdown were from urban areas. Regardless of the validity of this rural vs. urban argument, we might still want to control for unobserved voters' heterogeneity across regions.

Unobserved heterogeneity might be driving the results if SHUTDOWN in Equation 1 is correlated with one of the components of the two-way error term $\mu_j + \varepsilon_{ij}$, making

14. [15] show that during the early years of the Evo Morales government, indigenous groups closed part of the income gap with non-indigenous households.

it endogenous. As explained in [14], we can control for heterogeneous voters' preferences by simply including geographical region fixed effects μ_j that will control for any potential "rural vote" effect even if unobserved and even if it has an unknown effect on voting. We exploit the fact that we have 34,555 polling stations divided into 441 municipalities, which are then further divided into 4,814 precincts. On average there are 78.35 polling stations per municipality, and only 7.18 per precinct.

Table 3 uses the difference between MAS and CC as the dependent variable. The first three columns consider the shares of the votes, while the last three columns look at the number of votes. Moreover, we allow for systematic variation in the differences in voting preferences across municipalities (columns 2 and 5) and across municipalities and precincts (columns 3 and 6), given that precincts are a sub-unit of the municipalities. Across all specifications, the coefficients are statistically significant, and the positive signs imply that the difference between MAS and CC increased after the shutdown.

The point estimates from columns 1 and 4 are equivalent to those reported in columns 1 and 2 of Table 2. For example, the coefficient of 29.34 in column 4 (Table 3) corresponds to an electoral fraud of about 2.67% of the valid votes. In a scenario of no electoral fraud

the MAS lead would be below the required 10% to win. When controlling for municipality fixed effects, the estimate in column 5 corresponds to about 1.41% of the valid votes ($5,580 \times 15.52 / 6,137,671$). Hence, under a no fraud scenario, the 1.41% is still higher than the 0.57% (i.e., $47.08\% - 36.51\%$), so the outcome of the election would have been different. However, when controlling for precinct fixed effects in column 6, the point estimate of 3.443 translates to about 0.31% of the valid votes, below the 0.57%. Note that the coefficient is highly statistically significant, showing strong evidence of electoral fraud. Given the results from the placebo analysis, it is reasonable to argue that municipality fixed effects might be enough to control for any unobserved voters' heterogeneity.

One drawback from the fixed effects estimates is that as we move to control for smaller geographical units j , some of the variation in the dependent variable that is due to electoral fraud will be erased if, for example, electoral fraud affects all polling stations within the same precinct. In this case we will have that fraud is perfectly collinear with the fixed effect, hence μ_j will wipe out some fraud and we will not detect it. Moreover, identification will be coming only from precincts that have polling stations before and after the shutdown. This

TABLE 2: Regression Estimates for All the Political Parties (Placebo Analysis)

Parties:	MAS (1)	CC (2)	PDC (3)	21F (4)	MTS (5)	MNR (6)	PAN (7)	UCS (8)	FPV (9)	Blank (10)	Null (11)
<i>Panel A. Share of Votes:</i>											
SHUTDOWN	7.975*** (0.343)	-8.286*** (0.324)	0.122 (0.0799)	-0.227*** (0.0850)	0.186*** (0.0399)	0.0975*** (0.0247)	-0.0126 (0.0139)	0.0511*** (0.0167)	0.0741*** (0.0108)	0.669*** (0.0519)	0.611*** (0.0493)
Constant	46.69*** (0.134)	36.86*** (0.136)	8.627*** (0.0313)	4.324*** (0.0323)	1.257*** (0.0129)	0.714*** (0.00836)	0.654*** (0.00486)	0.426*** (0.00511)	0.397*** (0.00386)	1.569*** (0.0159)	3.773*** (0.0194)
Observations	34,529	34,529	34,529	34,529	34,529	34,529	34,529	34,529	34,529	34,529	34,529
R-squared	0.016	0.017	0.000	0.000	0.001	0.001	0.000	0.000	0.002	0.007	0.005
<i>Panel B. Number of Votes:</i>											
SHUTDOWN	13.77*** (0.671)	-15.57*** (0.623)	0.172 (0.154)	-0.766*** (0.137)	0.195*** (0.0625)	0.0775** (0.0359)	-0.0565*** (0.0207)	0.0652** (0.0288)	0.100*** (0.0158)	0.975*** (0.0690)	0.943*** (0.0729)
Constant	81.39*** (0.249)	67.37*** (0.266)	15.57*** (0.0607)	7.657*** (0.0565)	2.192*** (0.0216)	1.213*** (0.0136)	1.162*** (0.00827)	0.721*** (0.00810)	0.670*** (0.00591)	2.549*** (0.0210)	6.485*** (0.0253)
Observations	34,555	34,555	34,555	34,555	34,555	34,555	34,555	34,555	34,555	34,555	34,555
R-squared	0.014	0.016	0.000	0.001	0.000	0.000	0.000	0.000	0.001	0.009	0.006

Notes: The dependent variable in Panel A is the share of the votes (from 0 to 100), while in Panel B is the number of votes. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

TABLE 3: Regression Estimates for the Difference (MAS–CC)

Variables:	Share of Votes			Number of Votes		
	(1)	(2)	(3)	(4)	(5)	(6)
SHUTDOWN	16.26*** (0.653)	7.705*** (0.442)	0.954*** (0.329)	29.34*** (1.168)	15.52*** (0.836)	3.443*** (0.644)
Municipality FE ^a	No	Yes	Yes	No	Yes	Yes
Precinct FE	No	No	Yes	No	No	Yes
Observations	34,529	34,529	34,529	34,555	34,555	34,555
R-squared	0.017	0.632	0.902	0.018	0.572	0.867

Notes: The dependent variable in columns 1 through 3 is the difference in the share of the votes (from 0 to 100), while in columns 4 through 6 is the difference in the number of votes. ^a Municipality and precinct fixed effects. Robust standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

is consistent with the increasing R-squared as we move to include smaller geographical fixed effects. Note that for columns 4 through 6, the variation in the dependent variable explained by the model increased from less than 2% to about 86.7% when including precinct fixed effects.

4.3 Reporting at *Computo*

If the magnitude of the effects found in columns 1 and 2 of Table 2 are so large, why do we not observe any jump in the votes as reported by *Computo*? Using the progress as reported by *Computo* (see Figure 1) as the running variable, we run a grid search by changing the cutoff points with the idea that a regression discontinuity design would allow us to identify fraud (see, e.g., 5). We found no discontinuities. Hence, we plot in Figure 3 the evolution of the *Computo* over time, as reported by the TSE. Our different versions of the *Computo* go from Sunday, October 20, 2019 at 10:29 pm to Friday, October 25, 2019 at 9:09 pm when 100% of the valid votes were reported.

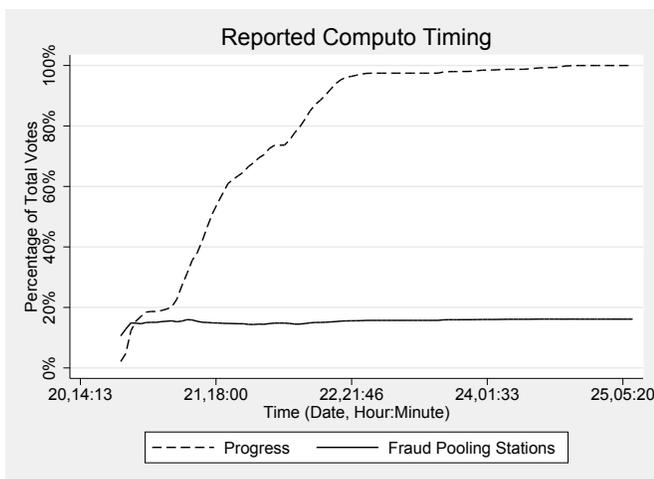


Fig. 3: Timeline of the reporting of the polling stations by *Computo*.

This Figure 3 illustrates a puzzling finding. The 5,580 fraud treatment polling stations—not reported in the TREP before the shutdown—have been evenly scattered when reporting the final results at the *Computo*. Every time a new wave of polling stations was reported, it contained about 16% of fraud treatment polling stations. This is illustrated by the nearly flat solid line. We have no explanation for this other than the TSE was trying to deliberately hide these polling stations and avoid jumps. We read this as additional evidence that identifies these group of polling stations as fraudulent.

5 CONCLUSION

It is easy to argue that Evo Morales is Bolivia’s most controversial figure of the last decade. From his humble beginnings to being the Bolivian president that served

the longest. He grew his popularity while organizing his fellow coca farmers against US-backed efforts to reduce cocaine production.¹⁵ His administration achieved great economic results while focusing on leftist policies. However, those results have been attributed to favorable external conditions (7), and he left office with the highest fiscal deficit in the region. While in his exile in Mexico City, he continued to declare himself as the winner of the elections. Bolivians and citizens around the world are deeply divided in their assessment of the 2019 elections.

This paper is the first to formally test for the existence and estimate the size of voting fraud in the 2019 Bolivian elections. Based on an identification strategy that relies on a rare natural experiment—the shutdown of the official vote counting system—we find that the size of the fraud was big enough to change the outcome of the election. We obtain a point estimate that shows that fraud increased the gap between MAS and CC by at least 2.67% of the valid votes. We took various steps to validate our identification strategy. A placebo analysis showed no economically significant effect on pseudo-outcomes. Moreover, even when controlling for unobserved voters’ heterogeneity that was allowed to vary across 4,814 precincts, we find highly statistically significant voting fraud. Lastly, we find that our group of fraud treatment polling stations were evenly dispersed when reporting the official final results. We believe this was done intentionally to avoid jumps that could have been easily detected as fraud. Our identification strategy provides a downward biased estimate of the actual overall fraud because we cannot rule out the existence of fraud in our control group.

Finally, note that our identification strategy is different than the “change in trends” illustrated in Figure 1 around the last 25% of the reported votes. An alternative identification approach might use this change in trends, with the corresponding assumptions, to potentially obtain further evidence of fraud. We adopted a more conservative approach of using a natural experiment that allows having a more transparent identification.

ACKNOWLEDGMENTS

We thank comments by Binay Adhikari, Gustavo Canavire-Bacarreza, Jorge Dávalos, Jean-Baptiste Tondji, and Mauricio Vargas. We also thank Edgar Villegas and his team from Universidad Mayor de San Andrés.

REFERENCES

- [1] S. Athey and G. Imbens. The state of applied econometrics: Causality and policy evaluation. *Journal of Economic Perspectives*, 31(2):3–32, 2017.
- [2] B. Beber and A. Scacco. What the numbers say: A digit-based test for election fraud. *Political Analysis*, 20(2):211–234, 2012.

15. As president he expelled the US ambassador and the US Drug Enforcement Administration.

- [3] T. Besley, T. Persson, and D. Sturm. Political competition, policy and growth: Theory and evidence from the US. *The Review of Economic Studies*, 77(4):1329–1352, 2010.
- [4] M. Callen and J. Long. Institutional corruption and election fraud: Evidence from a field experiment in Afghanistan. *American Economic Review*, 105(1):354–381, 2015.
- [5] S. Calonico, M. D. Cattaneo, and R. Titiunik. Robust nonparametric confidence intervals for regression-discontinuity designs. *Econometrica*, 82(6):2295–2326, 2014.
- [6] R. Chumacero. El camaleón, el mutante y Houdini: Resultados de las elecciones en Bolivia. University of Chile Working Paper, 2019.
- [7] R. Chumacero. Skills versus luck: Bolivia and its recent bonanza. *Latin American Economic Review*, 29(7):1–27, 2019.
- [8] J. Dávalos. Sistemática de la bi y trilocación de electores en las elecciones presidenciales Bolivia-2019. Universidad del Pacífico, Perú, Working Paper, 2019.
- [9] E. Duflo, R. Glennerster, and K. M. *Using Randomization in Development Economics Research: A Toolkit*. T. Schultz and John Strauss, eds., Handbook of Development Economics. Vol. 4. Amsterdam and New York: North Holland., 2008.
- [10] R. Enikolopov, V. Korovkin, M. Petrova, K. Sonin, and A. Zakharov. Field experiment estimate of electoral fraud in Russian parliamentary elections. *Proceedings of the National Academy of Sciences of the United States of America*, 110(2):448–452, 2013.
- [11] D. Escobari. Imperfect detection of tax evasion in a corrupt tax administration. *Public Organization Review*, 12(4):317–330, 2012.
- [12] T. Fujiwara. Voting technology, political responsiveness, and infant health: Evidence from Brazil. *Econometrica*, 83(2):423–464, 2015.
- [13] K. Fukumoto and Y. Horiuchi. Making outsiders’ votes count: Detecting electoral fraud through a natural experiment. *The American Political Science Review*, 105(3):586–603, 2011.
- [14] W. Greene. *Econometric Analysis*. Eight Edition, Pearson, 2018.
- [15] D. Hicks, B. Maldonado, B. Piper, and A. Goytia Rios. Identity, patronage, and redistribution: Economic inequality in Bolivia under Evo Morales. *Journal of Economics, Race, and Policy*, 1(1):26–41, 2018.
- [16] S. Hyde. The observer effect in international politics: Evidence from a natural experiment. *World Politics*, 60(1):37–63, 2007.
- [17] N. Ichino and Schündeln. Deterring or displacing electoral irregularities? Spillover effects of observers in a randomized field experiment in Ghana. *The Journal of Politics*, 74(1):292–307, 2012.
- [18] D. Kobak, S. Shpilkin, and M. Pshenichnikov. Integer percentages as electoral falsification fingerprints. *The Annals of Applied Statistics*, 10(1):54–73, 2016.
- [19] F. Lehoucq. Electoral fraud: Causes, types, and consequences. *Annual Review of Political Science*, 6(1):233–256, 2003.
- [20] B. Magaloni. *Voting for Autocracy: Hegemonic Party Survival and its Demise in Mexico*. Cambridge Studies in Comparative Politics, Cambridge Univ Press, Cambridge., 2009.
- [21] W. Mebane Jr. Evidence against fraudulent votes being decisive in the Bolivia 2019 election. University of Michigan Working Paper, 2019.
- [22] W. Mebane Jr. and K. Kalinin. Electoral fraud in Russia: Vote counts analysis using second-digit mean tests. In *Annual Meeting of the Midwest Political Science Association*. Chicago, IL., 2010.
- [23] M. Myagkov, P. Ordeshook, and D. Shakin. *The Forensics of Election Fraud: Russia and Ukraine*. Cambridge Univ Press, Cambridge., 2009.
- [24] Organization of American States. *Electoral Integrity Analysis, General Elections in the Plurinational State of Bolivia*. Preliminary Findings, Report to the General Secretariat, 2019.
- [25] B. Roe and D. Just. Internal and external validity in economics research: Tradeoffs between experiments, field experiments, natural experiments, and field data. *American Journal of Agricultural Economics*, 91(5):1266–1271, 2009.