Replication Exercise: Hit or Miss? The Effect of Assassinations on Institutions and War

Niccolò Borri, Philipp Hilmbauer, Ramzi Chariag,
Marton Vegh, Adam Vig

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Abstract

The purpose of this report is to replicate the results from *Jones and Olken (2009)* on democratization and conflict, to test their robustness and to augment their analysis by adding new methods. In particular, we recreate the main results of the original analysis, we add controls and fixed effects to examine the robustness of their main results, and we employ an event study design to investigate the dynamic aspects of the post-assassination period. Overall, the results are largely reproducible and robust, however the effects cannot be found when adding the dynamic component to the analysis.

Contents

1 Introduction

Political assassinations can have large effects on domestic and foreign policy. They can be a casus belli for war (think of the assassination of Archduke Franz Ferdinand that lead to WWI), can cause huge domestic uprisings like in 1968 after the killing of Martin Luther King but often fail to achieve their objectives too, like the assassination of Abraham Lincoln, which did not help to advance the cause of Confederacy. But extending beyond this anecdotes is there empirical evidence of positive or negative effects on regime stability or democratic transitions?

In this report we will replicate the results from Jones and Olken (2009) on democratization and conflict, test their robustness and augment their analysis by adding new methods. In particular, we will reproduce the main results of the original study, we will add controls and fixed effects to show the robustness of their main results, and we employ an event study design to investigate the dynamic aspects of the post-assassination period.

The study *"Hit or Miss? The Effect of Assassinations on Institutions and War"* examines the effect of assassinations on the political landscape. They exploit the randomness in the success or failure of attempted assassinations to identify the potential effects of assassination using a novel dataset of assassination attempts, that includes most world leaders from 1875 to 2004. They find evidence that successful assassinations of autocrats can initiate sustained movement toward democracy. The authors also provide suggestive evidence that assassinations affect the intensity of small-scale conflicts. These results provide a source of institutional change which can inform our understanding of conflicts, and provides clues that even small, random acts can have strong effects on democracy and peace.

The remainder of this paper is structured as follows: Section 2 provides evidence on the validity of the identifying assumption, section 3 replicates and augments the results on assassinations and institutional change, section 4 shows the effect of assassination on the Polity2 variable and democratic transitions, in section 5 we present the results of our event study estimation, section 6 presents different matching estimations of the impact of success and failure on institutional change and section 7 concludes.

2 Replication (Adam)

2.1 Table 4

First, I present the results replicating Table 4. The authors investigate whether control variables predict successful assassinations. Panel A of Table 4 is replicated perfectly and shown below in a separate table. The table shows that the sample of successful and failed assassination attempts is balanced across a wide variety of variables: a dummy for whether the country was democratic or not (defined using the POLITY2 variable from Polity IV) and recent changes therein, the status of war and recent changes therein (from the Gleditsch–COW war data), the age of the leader, the tenure of the leader, and log per-capita energy consumption, which serves as a proxy measure for per capita income. The only result in Table 4 where the difference between successes and failures is statistically significant is the log of national population (p-value 0.05).

In Table 4B I estimated the following probit specifications that consider all of these variables simultaneously:

$$P(SUCCESS_a) = \Phi(\gamma_1 + \gamma_2 \mathbf{X}_a)$$

where a is a serious assassination attempt, and $\mathbf{X}$ represent the same variables considered in Table 4A. Specifications are with and without weapon fixed effects, and also with and without fixed effects for the region of the world where the attack takes place.

Table 4: Are Successful and Failed Attempts Similar?

	Success	Failure	Difference	p-val on difference
Democracy dummy	0.362	0.344	0.018	0.80
	(0.064)	(0.035)	(0.072)	
Change in democracy dummy	-0.036	-0.022	-0.013	0.67
	(0.025)	(0.019)	(0.032)	
War dummy	0.263	0.318	-0.055	0.42
	(0.059)	(0.034)	(0.068)	
Change in war	0.036	0.011	0.025	0.71
	(0.058)	(0.034)	(0.067)	
Log energy use per capita	-1.589	-1.740	0.152	0.69
	(0.338)	(0.180)	(0.383)	
Log population	9.034	9.526	-0.492	0.05*
	(0.219)	(0.117)	(0.248)	
Age of leader	55.172	52.777	2.395	0.14
	(1.351)	(0.866)	(1.604)	
Tenure of leader	9.328	7.619	1.709	0.27
	(1.440)	(0.544)	(1.539)	
Observations	59	194		
	(1)	(2)	(3)	(4)
Democracy dummy	0.068	0.063	0.071	0.070
	(0.068)	(0.066)	(0.070)	(0.067)
Change in democracy dummy	-0.039	-0.050	-0.033	-0.036
	(0.100)	(0.103)	(0.104)	(0.109)
War dummy	-0.024	-0.017	-0.025	-0.013
	(0.077)	(0.083)	(0.076)	(0.083)
Change in war	0.057	0.063	0.061	0.067
	(0.069)	(0.065)	(0.070)	(0.065)
Log energy use per capita	0.002	0.001	0.008	0.009
	(0.014)	(0.014)	(0.015)	(0.015)
Log population	-0.027	-0.025	-0.028	-0.032
	(0.021)	(0.021)	(0.021)	(0.020)
Age of leader	0.003	0.003	0.002	0.002
	(0.003)	(0.003)	(0.003)	(0.003)
Tenure of leader	0.004	0.004	0.005	0.004
	(0.003)	(0.003)	(0.003)	(0.003)
Weapon FE	No	Yes	No	Yes
Region FE	No	No	Yes	Yes
Observations	208	208	208	208
p-value of F-test on all listed variables	0.460	0.486	0.460	0.398
p-value of F-test on all vars and FE-s	0.460	0.0597*	0.586	0.0108**

Note: Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

In footnote 18 the authors claim that "if using the linear POLITY2 variable instead of the democracy dummy, the joint p-values range from 0.09 to 0.31, with the linear variable significant in some specifications". I estimated the same probit specification as before but included the linear POLITY2 variable instead of the democracy dummy. Results are in Table 4.2, suggesting that the POLITY2 variable is significantly dif-

ferent from 0 in all specifications. In specification (1)–(3) the tenure of the leader is also a significant predictor of a successful assassination. The join p-values range from 0.25 to 0.38.

Table 4.2: Are Successful and Failed Attempts Similar?

	(1)	(2)	(3)	(4)
Democracy (POLITY2)	0.012***	0.010**	0.014***	0.013**
	(0.005)	(0.005)	(0.005)	(0.005)
Change in democracy dummy	-0.067	-0.072	-0.081	-0.076
	(0.105)	(0.106)	(0.107)	(0.112)
War dummy	-0.031	-0.021	-0.028	-0.014
	(0.077)	(0.083)	(0.075)	(0.081)
Change in war	0.049	0.056	0.053	0.059
	(0.070)	(0.065)	(0.070)	(0.064)
Log energy use per capita	-0.001	-0.002	0.005	0.005
	(0.014)	(0.014)	(0.015)	(0.015)
Log population	-0.031	-0.028	-0.029	-0.033*
	(0.019)	(0.020)	(0.020)	(0.019)
Age of leader	0.002	0.002	0.001	0.001
	(0.003)	(0.003)	(0.003)	(0.003)
Tenure of leader	0.006*	0.005*	0.006*	0.005
	(0.003)	(0.003)	(0.003)	(0.003)
Weapon FE	No	Yes	No	Yes
Region FE	No	No	Yes	Yes
Observations	207	207	207	207
p-value of F-test on all listed variables	0.259	0.378	0.357	0.364
p-value of F-test on all vars and FE-s	0.048*	0.0215**	0.0784	0.00643***

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

2.2 Table 7: original

In this section I replicate Table 7 on the effect of assassinations on war status, implementing an additional set of control variables. Overall, the results are robust to the inclusion of new controls. The first table replicates the original results, the second one includes new control variables, while the third one uses additional dummies for world regions besides beyond the first set of controls.

In panel A of each table, I estimate the following regression equation for each country-year i,

$$Y_i = \beta Success_i + \gamma X_i + \epsilon_i,$$

whereby β captures the effect of successful assassinations, after controlling for the elements of vector X_i. Controls in each regression include dummy indicators for weapons and serious assassination attempts. The dependent variable is the difference in war status of a country one year after assassination attempts compared to one year before. In Panel B of each table, I estimate the following regression, in which $Success_i$ is interacted with indicators of war status in the year prior to the attempt.

All results are successfully replicated, and are robust to the inclusion of additional controls and regional dummies. Average effects are insignificant in the Gleditsch-COW dataset through all specifications. An effect of a successful assassination ranges from 15.4-18 percentage points in the PRIO/Uppsala dataset.

In panel B, column 1 suggests that successful assassination lowers the probability of continued, intense conflict by 25 percentage points, and this result is robust in the specifications with controls and regional dummies. In panel B, column 3, the point estimate on the probability that a war intensifies when a leader is killed increased to 36 percentage points in the specifications with control variables, which strengthens the author's conclusion on the effects on moderate war. The p-values decreased to 0.014 and 0.020 in this specification. I found no effect of successful assassinations on the start of new war.

Table 7: Assassinations and Conflict: Change One Year After Attempt

	Gleditsch-COW dataset 1875–2002	Gleditsch-COW dataset 1946–2002	PRIO/Uppsala dataset 1946–2002
Panel A: Average effects			
success	-0.072	0.041	0.162
	(0.068)	(0.093)	(0.071)
Observations	223	116	116
Parm p	0.29	0.66	0.02**
Nonparm. p	0.57	0.83	0.03**
Panel B: Split by war status in year before attempt			
Success × intense war	-0.255	-0.103	-0.110
	(0.144)	(0.257)	(0.294)
Success × moderate war			0.334
			(0.163)
Success × not at war	–0.024	0.020	0.070
	(0.068)	(0.086)	(0.057)
Intense war-Parm p	0.0794	0.690	0.709
Intense war-Nonparm p	0.133	1	0.688
Moderate war-Parm p			0.045**
Moderate war-Nonparm p			0.126
No war-Parm p	0.729	0.819	0.222
No war-Nonparm p	0.620	0.709	0.208
Observations	223	116	116

Robust standard errors in parentheses
*** p<0.01, ** p<0.05

2.3 Table 7: additional controls

The following tables depict regressions with additional control variables for log population, log energy use per capita, and log age of leader (as well as their lags).

Table 7: Assassinations and Conflict: Change One Year After Attempt

	Gleditsch-COW dataset 1875–2002	Gleditsch-COW dataset 1946–2002	PRIO/Uppsala dataset 1946–2002
Panel A: Average effects			
success	-0.076	0.049	0.154
	(0.133)	(0.235)	(0.071)
Observations	197	113	113
Parm p	0.35	0.67	0.033**
Nonparm. p	0.57	0.83	0.029**
Panel B: Split by war status in year before attempt			
Success × intense war	-0.254	-0.076	-0.078
	(0.144)	(0.257)	(0.303)
Success × moderate war			0.360
			(0.142)
Success × not at war	0.033	0.037	0.079
	(0.074)	(0.097)	(0.063)
Intense war-Parm p	0.060	0.748	0.797
Intense war-Nonparm p	0.133	1	0.688
Moderate war-Parm p			0.014**
Moderate war-Nonparm p			0.126
No war-Parm p	0.658	0.703	0.220
No war-Nonparm p	0.620	0.709	0.208
Observations	197	113	113

Robust standard errors in parentheses
*** p<0.01, ** p<0.05

2.4 Table 7: additional controls and regional dummies

In the following regressions, X_i includes dummy variables for each world region besides the controls described above.

Table 7: Assassinations and Conflict: Change One Year After Attempt

	Gleditsch-COW dataset 1875–2002	Gleditsch-COW dataset 1946–2002	PRIO/Uppsala dataset 1946–2002
Panel A: Average effects			
success	-0.0707	0.0750	0.180
	(0.0815)	(0.100)	(0.0709)
Observations	197	113	113
Parm p	0.39	0.46	0.01**
Nonparm. p	0.57	0.83	0.03**
Panel B: Split by war status in year before attempt			
Success × intense war	-0.249	0.003	-0.023
	(0.126)	(0.234)	(0.266)
Success × moderate war			0.369
			(0.103)
Success × not at war	0.044	0.035	0.073
	(0.077)	(0.109)	(0.066)
Intense war-Parm p	0.052	0.989	0.933
Intense war-Nonparm p	0.133	1	0.688
Moderate war-Parm p			0.020*
Moderate war-Nonparm p			0.126
No war-Parm p	0.571	0.747	0.274
No war-Nonparm p	0.620	0.709	0.208
Observations	197	113	113

Robust standard errors in parentheses
*** p<0.01, ** p<0.05

3 Replication (Marton)

In this section I replicate table 5 on the effect of assassinations on institutional change (from POLITYIV) and leader transitions (from Archigos), implementing an additional set of control variables. Overall, the results are robust to the inclusion of new controls. The first table replicates the original results, the second one includes new control variables, while the third one uses additional dummies for world regions besides beyond the first set of controls.

The only part that I failed to replicate here are non-parametric p-values for democracies in Panel B for all specifications, including the original 8thus it may be due to the use of a newer Stata version for this assignment).

Otherwise, the key results were replicated in each set of specifications. In Panel A, the effect of successful assassinations on the absolute change in POLITY2 dummy and percentage of "regular" leader transitions is positive and significant in all tables, albeit the coefficient values are somewhat higher in the specifications with controls. On average, a successful assassination on results in a 9-11% increase in the likelihood of regime transition depending on specification, while the likelihood of regular leader transitions increase even more at 11-14%. The effect of success on directional change is positive in all specifications at around 8-9%, meaning that assassinations are more likely to result in a transition to democracy than to autocracy. However, it is only significant with non-parametric p-values.

Overall, in Panel B, the interaction term of autocracy and success is significant and positive in all specifications. The estimates based on the inclusion of additional controls are somewhat higher than the original ones. The likelihood of democratic change increases by 13-18% points after the assassination of an autocrat, while the assassination of a democratic leader only has a negligible and statistically insignificant effect on the direction of regime change. Similarly, the assassination of an autocrat increases the change of regular leader transitions by 18-21% on average depending on the set of controls. In this case, the inclusion of regional dummies actually results in a lower coefficient estimate. The chances of leader transition after the assassination of democrats increase by 3-4- percentage points with the inclusion of controls, but the coefficient values are still below 7% and lack statistical significance.

3.1 Table 5: original

In panel A of each table, I estimate the following regression equation for each country-year i,

$$Y_i = \beta Success_i + \gamma X_i + \epsilon_i,$$

whereby β captures the effect of successful assassinations, after controlling for the elements of vector X_i. Controls in each regression include dummy indicators for weapons and serious assassination attempts.

In Panel B of each table, I estimate the following regression, in which $Success_i$ is interacted with lagged indicators for democracy and autocracy.

$$\begin{aligned} Y_i = &\beta Success_i \times LagAutocracy_i + \gamma Success_i \times LagDemocracy_i + \\ &\delta X_i + \epsilon_i \end{aligned}$$

In the above equation, beyond the dummies mentioned above, X_i also contains an indicator for lagged autocracy in each case.

Table 5A			
	(1) Absolute change in POLITY2 dummy	(2) Directional change in POLITY2 dummy	(3) Percentage of "regular" leader transitions in next 20 years
success	0.0907*	0.0790	0.111*
	(0.0471)	(0.0508)	(0.0573)
Observations	221	221	138
Parm p	0.0572	0.124	0.0575
Nonparm p	0.0343	0.0162	0.178
New controls	no	no	no
Region FE	no	no	no

Table 5B		
	(1) Directional change in POLITY2 dummy	(2) Percentage of "regular" leader transitions in next 20 years
success x autoc	0.131**	0.191**
	(0.0550)	(0.0853)
success x democ	-0.0117	0.0344
	(0.0826)	(0.0429)
Observations	221	133
Autoc-Parm p	0.0193	0.0296
Autoc-Nonparm p	0.00852	0.0461
Democ-Parm p	0.888	0.426
Democ-Nonparm p	1	0.956
New controls	no	no
Region FE	no	no

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

3.2 Table 5: additional controls

The following tables depict regressions with additional control variables for log population, log energy use per capita, and log age of leader (as well as their lags).

Table 5A			
	(1) Absolute change in POLITY2 dummy	(2) Directional change in POLITY2 dummy	(3) Percentage of "regular" leader transitions in next 20 years
success	0.110*	0.0874	0.137**
	(0.0595)	(0.0601)	(0.0643)
Observations	207	207	122
Parm p	0.0671	0.150	0.0383
Nonparm p	0.0418	0.0220	0.233
New controls	yes	yes	yes
Region FE	no	no	no

Table 5B		
	(1) Directional change in POLITY2 dummy	(2) Percentage of "regular" leader transitions in next 20 years
success x autoc	0.156**	0.214*
	(0.0775)	(0.109)
success x democ	-0.00407	0.0558
	(0.0838)	(0.0583)
Observations	207	120
Autoc-Parm p	0.0475	0.0564
Autoc-Nonparm p	0.0103	0.0185
Democ-Parm p	0.961	0.344
Democ-Nonparm p	1	0.669
New controls	yes	yes
Region FE	no	no

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

3.3 Table 5: additional controls and regional dummies

In the following regressions, X_i includes dummy variables for each world region besides the controls described above.

Table 5A

	(1) Absolute change in POLITY2 dummy	(2) Directional change in POLITY2 dummy	(3) Percentage of "regular" leader transitions in next 20 years
success	0.105*	0.0915	0.132**
	(0.0576)	(0.0609)	(0.0580)
Observations	207	207	122
Parm p	0.0724	0.137	0.0268
Nonparm p	0.0418	0.0220	0.233
New controls	yes	yes	yes
Region FE	yes	yes	yes

Table 5B

	(1) Directional change in POLITY2 dummy	(2) Percentage of "regular" leader transitions in next 20 years
success x autoc	0.184**	0.183*
	(0.0796)	(0.102)
success x democ	-0.0260	0.0666
	(0.0721)	(0.0605)
Observations	207	120
Autoc-Parm p	0.0238	0.0788
Autoc-Nonparm p	0.0103	0.0185
Democ-Parm p	0.720	0.277
Democ-Nonparm p	1	0.669
New controls	yes	yes
Region FE	yes	yes

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5A

	(1) Absolute change in POLITY2 dummy	(2) Directional change in POLITY2 dummy	(3) Percentage of "regular" leader transitions in next 20 years
success	0.105*	0.0915	0.132**
	(0.0576)	(0.0609)	(0.0580)
Observations	207	207	122
Parm p	0.0724	0.137	0.0268
Nonparm p	0.0418	0.0220	0.233
New controls	yes	yes	yes
Region FE	yes	yes	yes

3.4 Table 8

Table 8

	Absolute change in POLITY2 dummy one year out	Directional change in POLITY2 dummy one year out		Percentage regular leader transitions 1–20 years out	
	(1)	(2)	(3)	(4)	(5)
	all	all	autocrats	all	autocrats
baseline	0.09	0.08	0.12	0.13	0.25
	(0.05)	(0.05)	(0.06)	(0.05)	(0.08)
p-value	0.06	0.13	0.04	0.02	0.00
nonparm p-value	0.04	0.02	0.01	0.23	0.06
Control group:	0.08	0.08	0.11	0.15	0.32
bystanders or wounded	(0.05)	(0.05)	(0.06)	(0.06)	(0.09)
p-value	0.11	0.16	0.05	0.02	0.00
nonparm p-value	0.08	0.07	0.02	0.21	0.02
Control group:	0.11	0.07	0.12	0.11	0.29
target wounded	(0.04)	(0.05)	(0.05)	(0.07)	(0.11)
p-value	0.02	0.14	0.02	0.15	0.01
nonparm p-value	0.05	0.07	0.05	0.62	0.09
Control group:	0.09	0.07	0.11	0.11	0.21
any attempt	(0.04)	(0.05)	(0.05)	(0.05)	(0.08)
p-value	0.04	0.15	0.04	0.03	0.01
nonparm p-value	0.03	0.02	0.01	0.42	0.12
Solo attempts only	0.07	0.03	0.08	0.14	0.32
	(0.06)	(0.06)	(0.05)	(0.05)	(0.10)
p-value	0.21	0.68	0.16	0.01	0.00
nonparm p-value	0.23	0.26	0.17	0.53	0.23
First attempt on leader	0.07	0.06	0.09	0.12	0.28
	(0.06)	(0.07)	(0.07)	(0.05)	(0.09)
p-value	0.19	0.36	0.20	0.02	0.00
nonparm p-value	0.21	0.05	0.08	0.47	0.14
Table 4 controls, quarter-	0.11	0.09	0.16	0.19	0.26
century & region FE,	(0.03)	(0.06)	(0.08)	(0.06)	(0.10)
p-value	0.00	0.13	0.05	0.00	0.02
nonparm p-value	0.04	0.02	0.01	0.23	0.06

Table 8 replicates the main results with different specifications. Overall, the replicated results closely resemble those in the original publication, with the exception of the non-parametric p-values.

4 Replication (Ramzi)

4.1 Table 6: Original

In table6, the authors present one of their main results. In panel A, they run the POLITY2 dummy variable indicating whether a country is democratic or not on success plus a vector of control variables containing dummies for the weapon and number of serious attempts (presented in table 2). In panel B, they change the dependent variable to percentage of transitions happening by regular means. To investigate the length of tenure effect, and whether the leader being an autocrat makes a difference they run separate regressions on sub-samples where $Tenure \leq 10$ and $tenure > 10$ for all leaders, and for a sub-sample of leaders who are autocrats. They basically ran the following model on different samples.

$$Y_i = \beta Success_i + \gamma X_i + \epsilon_i,$$

In which i represents an assassination attempt. I replicate table 6.
I replicate table 6 and then use tenure and autocracy as independent variables instead in table 6b column (1), and I add an interaction term between tenure and autocracy in column (2).

Column 1:

$$Y_i = \beta_1 Success_i + \beta_2 tenure + \beta_3 autocrat + \gamma X_i + \epsilon_i,$$

Column 2:

$$Y_i = \beta_1 Success_i + \beta_2 tenure + \beta_3 autocrat + \beta_4 tenure \times autocrat + \gamma X_i + \epsilon_i,$$

	All Leaders			Autocrats only		
	All	Tenure ≤ 10	Tenure > 10	All	Tenure ≤ 10	Tenure > 10
	(1)	(2)	(3)	(4)	(5)	(6)
Panel A: Directional change in POLITY2 dummy						
1 year out	0.0790	0.058	0.129	0.130	0.088	0.214
	(0.051)	(0.051)	(0.125)	(0.057)	(0.069)	(0.110)
Param P-value	0.12	0.26	0.31	0.03**	0.21	0.06*
Nonparam p-value	0.02**	0.31	0.01***	0.01***	0.13	0.02**
10 years out	0.046	0.013	0.092	0.0.190	0.226	0.169
	(0.062)	(0.075)	(0.146)	(0.079)	(0.108)	(0.132)
Param P-value	0.46	0.86	0.53	0.02**	0.04**	0.21
Nonparam p-value	0.01***	0.12	0.03**	0.05**	0.22	0.08*
20 year out	-0.003	-0.006	0.001	0.023	0.091	0.013
	(0.091)	(0.116)	(0.154)	(0.090)	(0.117)	(0.157)
Param P-value	0.98	0.96	0.99	0.80	0.44	0.94
Nonparam p-value	0.86	0.78	0.72	0.59	0.75	0.60
Panel B: Percentage of transitions by "regular" means						
1-10 year out	0.099	0.126	0.087	0.186	0.197	0.102
	(0.077)	(0.089)	(0.243)	(0.113)	(0.145)	(0.255)
Param P-value	0.21	0.16	0.73	0.11	0.18	0.70
Nonparam p-value	0.35	0.18	0.53	0.16	0.25	0.28
1-20 year out	0.111	0.116	0.274	0.165	0.147	0.306
	(0.057)	(0.063)	(0.181)	(0.095)	(0.113)	(0.227)
Param P-value	0.06*	0.07*	0.15	0.09	0.20	0.20
Nonparam p-value	0.18	0.23	0.03	0.05	0.15	0.0.03
11-10 year out	0.119	0.100	0.368	0.208	0.181	0.422
	(0.068)	(0.072)	(0.246)	(0.107)	(0.110)	(0.275)
Param P-value	0.0.09*	0.17	0.16	0.06	0.11	0.15
Nonparam p-value	0.25	0.59	0.04	0.03	0.16	0.05

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4.2 Table 6b: controls instead of separate regressions

	No Interaction	With Interaction
	(1)	(2)
Panel A: Directional change in POLITY2 dummy		
1 year out	0.083	0.086
	(0.047)	(0.045)
Param P-value	0.08*	0.06*
Nonparam p-value	0.02**	0.02**
10 years out	0.060	0.059
	(0.058)	(0.058)
Param P-value	0.31	0.31
Nonparam p-value	0.01	0.01
20 year out	0.039	0.041
	(0.075)	(0.076)
Param P-value	0.61	0.59
Nonparam p-value	0.86	0.86
Panel B: Percentage of transitions by "regular" means		
1-10 year out	0.112	0.112
	(0.073)	(0.073)
Param P-value	0.13	0.13
Nonparam p-value	0.35	0.35
1-20 year out	0.156	0.153
	(0.057)	(0.057)
Param P-value	0.01***	0.01***
Nonparam p-value	0.18***	0.18***
11-10 year out	0.162	0.159
	(0.072)	(0.072)
Param P-value	0.03**	0.03**
Nonparam p-value	0.25**	0.25**

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5 Event-Study Design (Niccolò & Philipp)

Up to this point, we have studied a static model to estimate the effects of assassination conditioning on serious attempts, now we want to change the estimation procedure using different models that can estimate the dynamic effect of leader's assassination on democratization and democratic transitions. The main model used to estimate the dynamic model is the following,

$$Y_{it} = \sum_{k=-T}^{T} \beta_k D_{it}^k + X_{it}'\theta + \epsilon_{it}$$

Y_{it} is the outcome variable, for democratization we used the difference of the Polity2 score between years t and $t-1$ for country i while for democratic transitions we used a dummy variable equal to 1 if in one country there is at least one democratic transition in a given year, X_{it}' contains all the fixed effects for year, country and weapon used in order to account for differences between years, countries and efficiencies of the various weapons used for the assassination attempts.

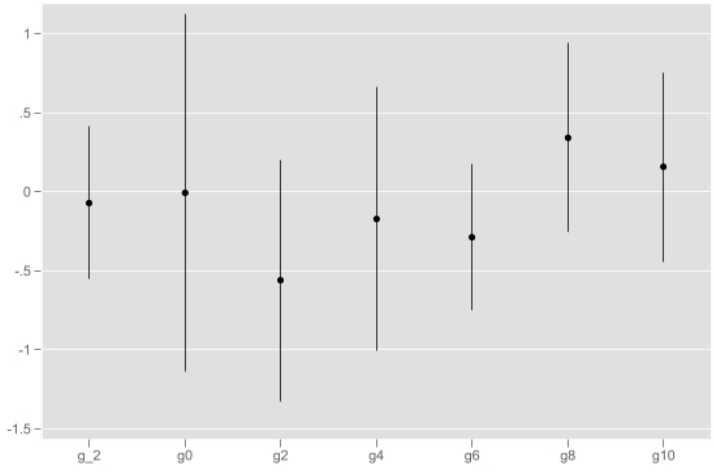
5.1 Panel A: Polity2 Score

The results for the Polity2 Score are reported in the tables and figures are presented in this section. Differently from the original paper we don't find significant effects on the dynamics of the Polity2 score, though here we use the *actual change* in the variable between two subsequent years while in the original paper they used the variable for *directional change*. This is used afterwards in the robustness checks, for a time-frame of 5 years before and after a serious attempt of assassination. In the six different estimations we study the effect on the full sample (Figure 1a), on the full sample with tenure less than 10 years (Figure 1b), on the full sample with tenure greater than 10 years (Figure 1c). Then we did the same analysis using the sub-sample of autocrats, using the sample with all of them (Figure 2a) and restricting again to leaders with tenure lower (Figure 2b) or higher (Figure 2c) than 10 years. For the estimation of standard error we cluster them at the country level at this point, while different estimations of standard errors are provided in the next sections.

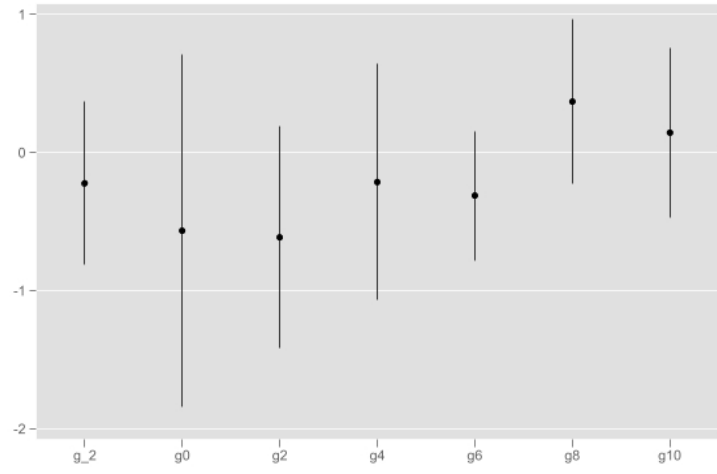
Table 5.1: Event-Study Design: Panel A (Polity2 Score)

Dep. var.:	*Difference in Polity2 Score*						
Time:	$t = -2$	$t = 0$	$t = 2$	$t = 4$	$t = 6$	$t = 8$	$t = 10$
All Leaders:							
Full sample	-0.070	-0.007	-0.560	-0.173	-0.288	0.342	0.157
	(0.246)	(0.576)	(0.390)	(0.425)	(0.235)	(0.305)	(0.305)
Tenure $< 10y$	-0.220	-0.566	-0.614	-0.211	-0.312	0.369	0.145
	(0.302)	(0.651)	(0.409)	(0.437)	(0.240)	(0.303)	(0.312)
Tenure $> 10y$	-0.101	0.438	-0.798	0.025	-0.415	0.274	0.123
	(0.418)	(0.779)	(0.698)	(0.264)	(0.403)	(0.321)	(0.546)
Autocrats only:							
Full sample	-0.138	0.115	-0.201	0.263	-0.479	0.325	0.178
	(0.236)	(0.695)	(0.272)	(0.458)	(0.374)	(0.435)	(0.482)
Tenure $< 10y$	-0.029	-0.605	-0.336	0.056	-0.610	0.258	0.124
	(0.242)	(0.696)	(0.322)	(0.485)	(0.415)	(0.472)	(0.482)
Tenure $> 10y$	-0.218	0.369	-0.112	0.074	-0.556	0.127	0.170
	(0.382)	(0.918)	(0.329)	(0.347)	(0.529)	(0.373)	(0.698)

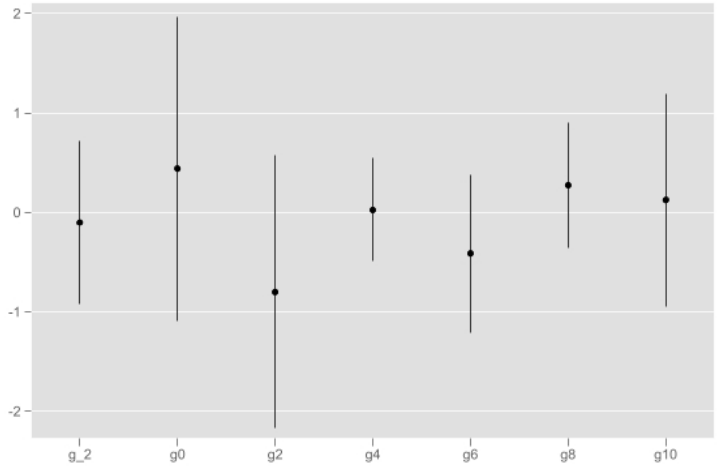
Note: *std. errors* in parentheses below



(a) Difference in Polity2 Score (All)

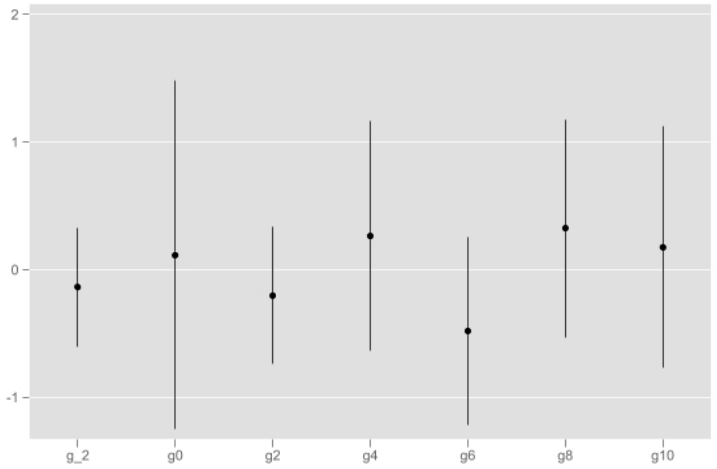


(b) Difference in Polity2 Score (Tenure < 10)

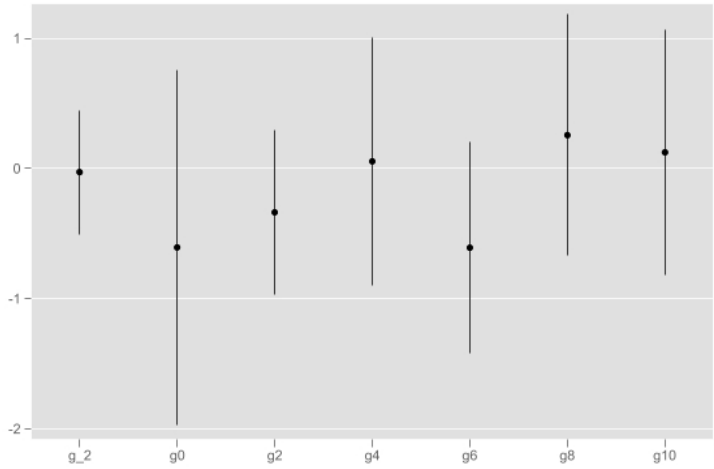


(c) Difference in Polity2 Score (Tenure > 10)

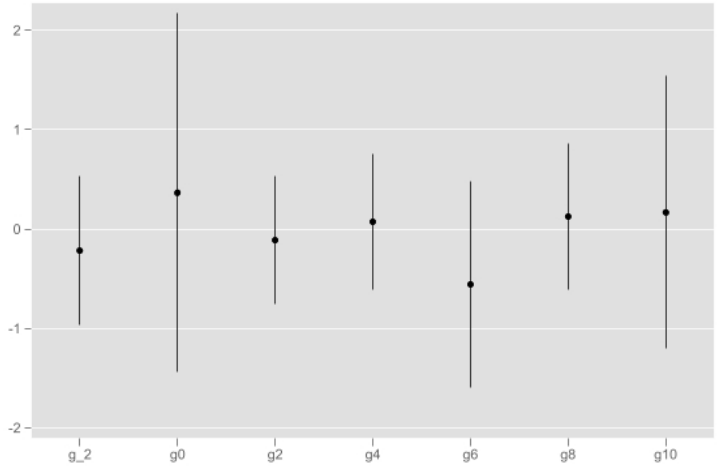
Figure 1: Panel A: Full sample



(a) Difference in Polity2 Score (Autocrats)



(b) Difference in Polity2 Score (Autocrats, Tenure < 10)



(c) Difference in Polity2 Score (Autocrats, Tenure > 10)

Figure 2: Panel A: Autocrats only

5.2 Panel B: Regular Transitions

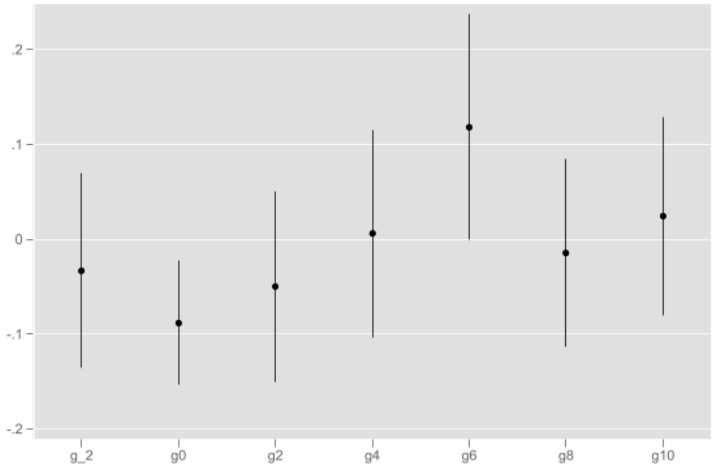
For what concerns the regular transitions, we use the variable that contains the number of regular exits from power as the outcome variable. This is 1 if in a given year t, country i faced a regular transition and 0 otherwise. The results provided, use similar sub-samples with respect to subsection 5.1 but the results are slightly different from before. We can observe that, in the sample with all leaders there is some positive effect on regular transitions of power after the assassination although, given the small sample that we use, the effect is not precisely estimated.

The possible interpretation of those results is that democratic transitions increase in the years after an assassination attempt, while after more than 5 years from the event the democratic transitions between the control group of serious attempt without successful assassination and the relative treatment group is roughly the same. This pattern, anyway, is not observed when we restrict our analysis to autocrats only. Standard errors are estimated clustering at the country level. These results are presented in Table 5.2 and for each row of the estimations, the plots are depicted in Figures 3a-c and 4a-c.

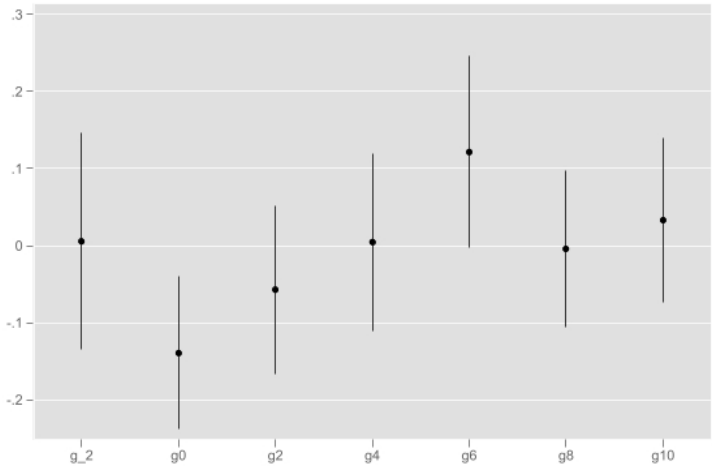
Table 5.2: Event-Study Design: Panel B (Regular Transitions)

Dep. var.:	*Regular Transitions*						
Time:	$t=-2$	$t=0$	$t=2$	$t=4$	$t=6$	$t=8$	$t=10$
All Leaders:							
Full sample	-0.033	-0.088	-0.050	0.006	0.118	-0.015	0.025
	(0.052)	(0.033)	(0.051)	(0.056)	(0.060)	(0.051)	(0.053)
Tenure $< 10y$	0.005	-0.139	-0.058	0.005	0.122	-0.004	0.033
	(0.072)	(0.050)	(0.056)	(0.059)	(0.063)	(0.052)	(0.054)
Tenure $> 10y$	-0.061	-0.038	-0.012	0.027	0.079	-0.017	-0.109
	(0.028)	(0.034)	(0.065)	(0.059)	(0.070)	(0.049)	(0.031)
Autocrats only:							
Full sample	-0.009	-0.044	0.004	-0.043	0.021	-0.023	0.013
	(0.052)	(0.031)	(0.064)	(0.040)	(0.050)	(0.045)	(0.058)
Tenure $< 10y$	0.054	-0.085	0.011	-0.040	0.020	-0.027	0.012
	(0.080)	(0.057)	(0.068)	(0.048)	(0.054)	(0.048)	(0.063)
Tenure $> 10y$	-0.056	-0.026	0.020	0.002	-0.022	0.030	-0.052
	(0.033)	(0.033)	(0.081)	(0.044)	(0.022)	(0.056)	(0.029)

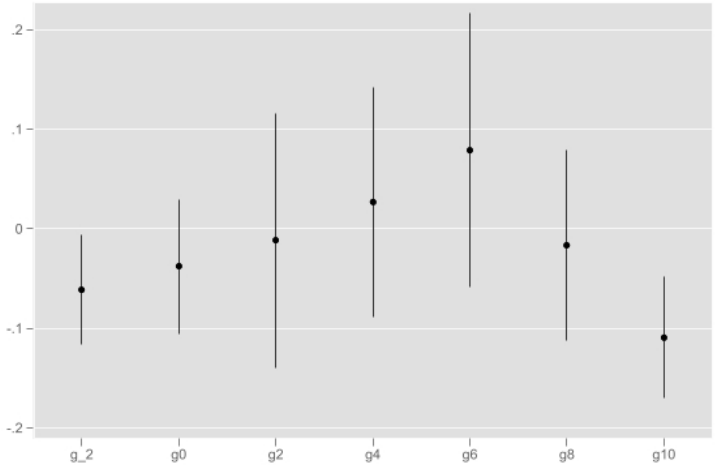
Note: *std. errors* in parentheses below



(a) Regular Transitions (All)

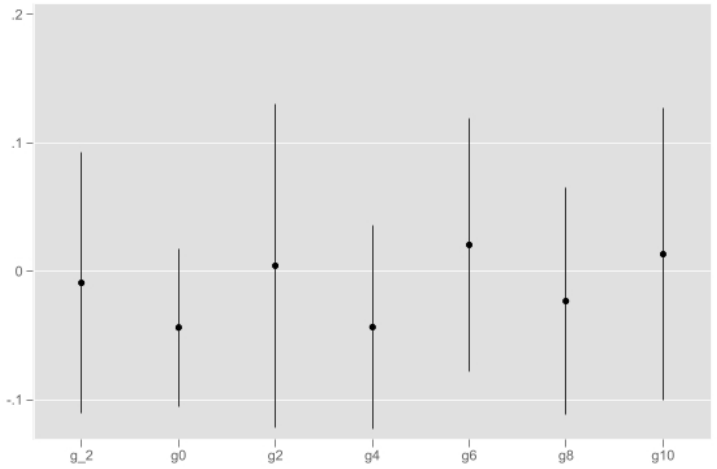


(b) Regular Transitions (Tenure < 10)

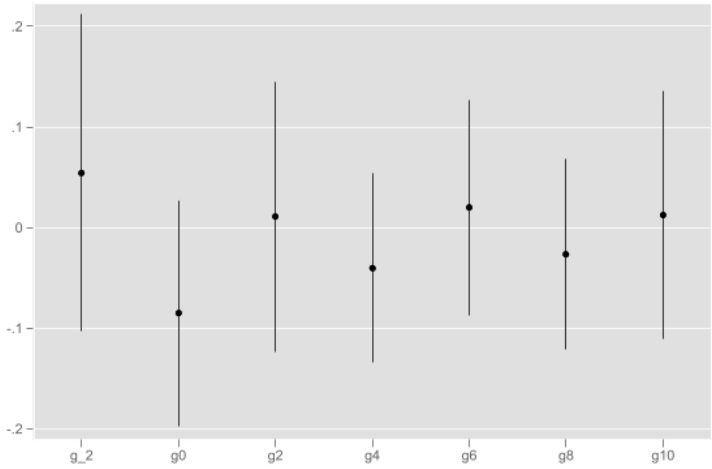


(c) Regular Transitions (Tenure > 10)

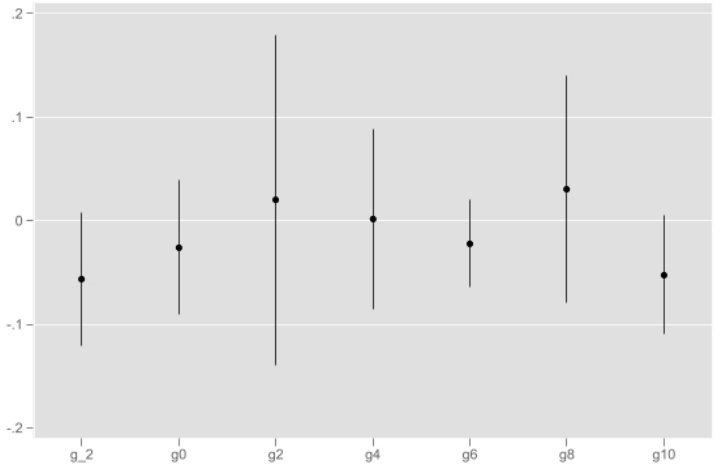
Figure 3: Panel B: Full sample



(a) Regular Transitions (Autocrats)



(b) Regular Transitions (Autocrats, Tenure < 10)



(c) Regular Transitions (Autocrats, Tenure > 10)

Figure 4: Panel B: Autocrats only

5.3 Robustness of Event-Study Design

5.3.1 Actual Change vs. Any Directional Change

As a first robustness check, we use a different time horizon as mentioned above. Instead of using 2 lags and ten leads (with an observation every other year), we use five lags and leads (with obs. every year). This is presented in Panel I of Table 5.3 and Figure 5a. In Figure 5b we show only the 10 leads. The results qualitatively the results from section 5.1 above. Then, we examine the dynamics of *any directional change* Polity2 score for again a time-frame of 5 years before and after a serious attempt of assassination. This is a dummy of the flavor used in the original study, taking the value 1 (-1) if there was any positive (negative) change in the Polity2 score and 0 if not. The results are displayed in Panel I of Table 5.3 and Figure 5c. Additionally in Figure 5d the 10 leads are reported. Reassuringly, the dummy for *any directional change* confirms the qualitative pattern we observed using the difference in Polity2 score.

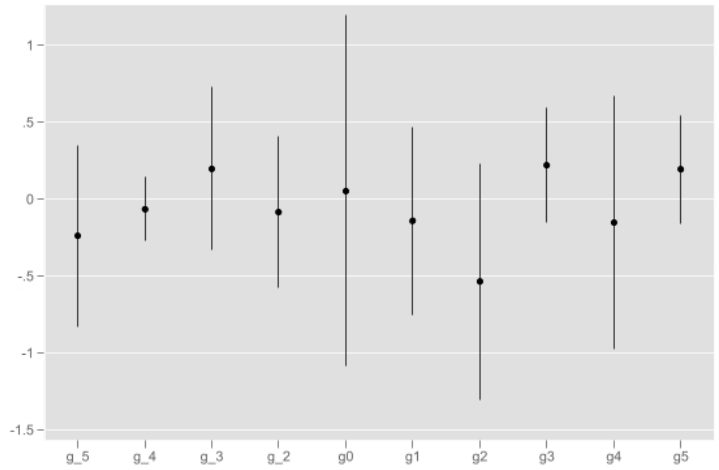
5.3.2 Standard Errors

In Panel II of Table 5.3 we test the robustness of our choice of standard errors. Above, we clustered them at the country level, like in the original study. However, there are other possibilities. If we adopt the view that there might be strong time- or regional effects, that could affect our inference problem. In row 1 of Panel II we present the results of a specification with robust standard errors, in row 2 the standard errors are clustered on the region-level and in row 3 on the year-level. Compared to the original specification with country-level clustered standard errors (like in row 1 of Panel I) we can see that robust standard errors and region-clusters are very similar, while year-clusters are slightly less conservative.

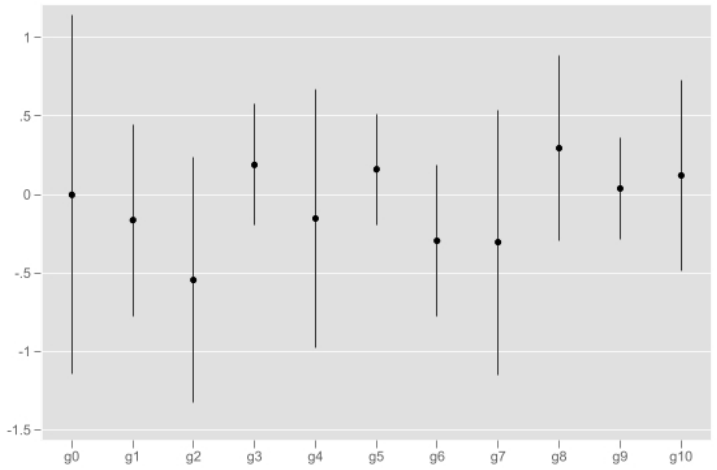
Table 5.3: Event-Study Design: Robustness

Time:	$t=-5$	$t=-4$	$t=-3$	$t=-2$	$t=0$	$t=1$	$t=2$	$t=3$	$t=4$	$t=5$
Panel I	*Dep. vars.: Difference in Polity2 Score / Any directional Change in Polity2 Score*									
All Leaders:										
Difference	-0.240	-0.064	0.197	-0.085	0.053	-0.139	-0.537	0.219	-0.153	0.193
	(0.299)	(0.105)	(0.271)	(0.250)	(0.582)	(0.312)	(0.391)	(0.190)	(0.419)	(0.180)
Any Change	-0.011	-0.019	-0.037	0.007	0.029	0.006	-0.078	0.053	-0.032	0.062
	(0.044)	(0.019)	(0.060)	(0.063)	(0.087)	(0.053)	(0.063)	(0.050)	(0.065)	(0.047)
Panel II	*Dep. var.: Difference in Polity2 Score (different std. errors)*									
All Leaders:										
Robust	-0.240	-0.064	0.197	-0.085	0.053	-0.139	-0.537	0.219	-0.153	0.193
	(0.306)	(0.125)	(0.275)	(0.253)	(0.603)	(0.313)	(0.398)	(0.191)	(0.413)	(0.170)
Region-Cluster	-0.240	-0.064	0.197	-0.085	0.053	-0.139	-0.537	0.219	-0.153	0.193
	(0.278)	(0.128)	(0.284)	(0.241)	(0.586)	(0.324)	(0.374)	(0.186)	(0.475)	(0.163)
Year-Cluster	-0.240	-0.064	0.197	-0.085	0.053	-0.139	-0.537	0.219	-0.153	0.193
	(0.204)	(0.098)	(0.237)	(0.192)	(0.563)	(0.234)	(0.342)	(0.149)	(0.325)	(0.108)

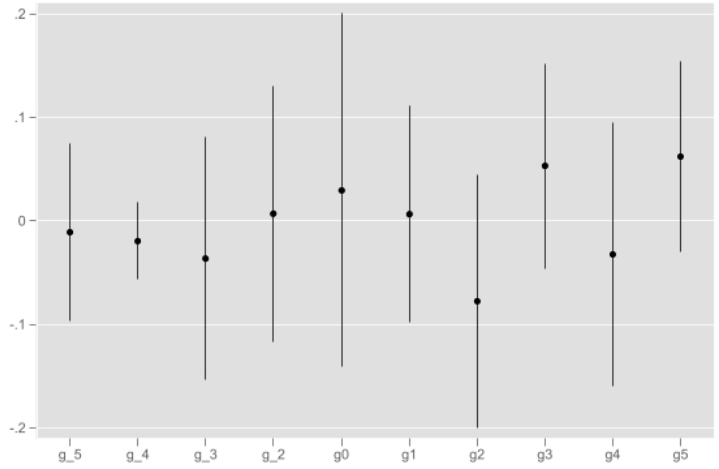
Note: *std. errors* in parentheses below



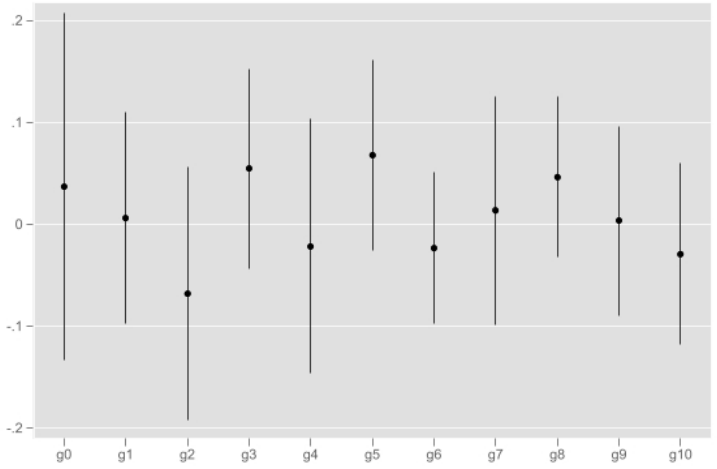
(a) Difference in Polity2 Score (5 leads & lags)



(b) Difference in Polity2 Score (only leads)



(c) Any change in Polity2 Score (5 & 5)



(d) Any change in Polity2 Score (only leads)

Figure 5: Robustness Checks

6 Kernel Density & Nearest-Neighbor Matching (Niccolò & Philipp)

In this section we present the results for the matching estimation, comparing these results with with those reported in Table 10 Panel A, including the estimates for the nearest neighbor and kernel density matching for the three different variables used as outcomes: Absolute change in Polity2 dummy, Directional change in Polity2 dummy and percent of regular leader transitions 1–20 years out.

In order to estimate the propensity scores we run a probit regression to estimate the probability of having a serious attempt based on observable variables such as: democratic score, presence of wars, population, income, geographic location, age and tenure of the leader.
In column 1 and 2 of Table 6.1 we run a simple regression of the outcome variable considered each time with success and failure, in column 2 we added control variables (quarter century FE and the ones used for the estimation of propensity scores).
In column 3 we used the quintiles of propensity scores to stratify the sample on the probability of having a serious attempt. In column 4 we used the propensity scores value to match the scores of the treatment group with the ones of the control group with the closest score value. In column 5 we used a kernel density matching using propensity scores to create a balanced sample of treated and control groups using the standard Gaussian kernel, the bandwidth used is the standard 0.06. Standard error are clustered at country level for the first three columns, while we used bootstrapped standard errors for the nearest neighbor and kernel density matching.

The results are qualitatively similar to the ones present in Table 10 for both success and failures, differently from the results given by the event study design we can see that a successful assassination gives positive effects on the three different outcome variables in all the different specifications. Since the results are similar we can conclude that there are no systematic differences in observable variables that can bias the standard estimations in columns 1 and 2 therefore the matching specifications do not lead to different conclusions.

Table 6.1: **Propensity-Score/Kernel-Density/Nearest-Neighbor Matching**

	(1)	(2)	(3)	(4)	(5)
Panel A:			***Absolute change in POLITY2 dummy***		
	No controls	Controls	Propensity Score	Nearest Neighbor	Kernel Density
Success	0.098	0.101	0.100	0.105	0.098
	(0.042)	(0.042)	(0.042)	(0.053)	(0.048)
Failure	0.006	0.005	0.005	-0.018	0.006
	(0.018)	(0.017)	(0.017)	(0.028)	(0.018)
Panel B:			***Directional change in POLITY2 dummy***		
	No controls	Controls	Propensity Score	Nearest Neighbor	Kernel Density
Success	0.066	0.060	0.059	0.070	0.066
	(0.047)	(0.044)	(0.044)	(0.049)	(0.051)
Failure	-0.017	-0.019	-0.019	-0.006	-0.017
	(0.019)	(0.019)	(0.019)	(0.030)	(0.017)
Panel C:			***Percent regular leader transitions 1–20 years out***		
	No controls	Controls	Propensity Score	Nearest Neighbor	Kernel Density
Success	0.071	0.115	0.112	0.222	0.072
	(0.040)	(0.043)	(0.042)	(0.104)	(0.043)
Failure	-0.071	-0.039	-0.040	0.026	-0.071
	(0.041)	(0.024)	(0.024)	(0.062)	(0.038)

Note: *std. errors* in parentheses below

7 Conclusion

In this report we sought to replicate and augment the study by Jones and Olken (2009) on democratization and conflict, we tested the robustness of their results and expanded their analysis by adding new methods. In summary, we were able to replicate almost all of the results presented in the original study and adding controls seems not to affect the robustness of their main results. Then we utilized an event study design to investigate the dynamic aspects of the post-assassination period. We could not confirm most of the original study's conclusions from their comparative statics, potentially because the more granular, dynamic year-on-year effects were too small to be measured precisely. Lastly, we expanded on their propensity score matching method when measuring success and failure probabilities by using kernel-density- and nearest-neighbor-matching. Our results largely confirm the qualitative patterns observed by the original study.

All in all, the results presented above and in Jones and Olken (2009) show that assassinations can affect both political institutions and conflict. While assassinations seem not to cause a clear dynamic pattern, the change induced by them appears to strongly affect the history of individual countries. The empirical evidence shows that small, random acts - the path of a bullet, the timing of an explosion, a leader running behind schedule - can result in substantial shifts, both in a country's path to democracy or in the intensity of conflicts.

References

Becker, Sascha O., and Andrea Ichino. "Estimation of average treatment effects based on propensity scores: Stata-Package." (2002). Source: `http://sobecker.de/pscore.html`.

Jones, Benjamin F., and Benjamin A. Olken. "Hit or miss? The effect of assassinations on institutions and war." *American Economic Journal: Macroeconomics* 1, no. 2 (2009): 55-87.

Sun, Liyang. "Event Study Interact: Stata-Package." (2020). Source: `https://github.com/lsun20/EventStudyInteract`.