Reinforced Islamophobia and Xenophobia after the Terror Attack of Clarlie Hebdo? An Analysis using Regression Discontinuity Design

Alexander Dalheimer

Introduction

In the recent years, many terrorist attacks happend in Europe e.g. in Brussels, Paris, Nice or Berlin. Some have assumed that such terror attacks could increase the islamophobia and xenophobia in Europe. For example, Wilkins-Laflamme (2018) state that the fear of terrorism is stronger than ever in western societies. She states that this fear is coupled with prejudices and a general fear of Muslems and thus with an increasing islamophobia. But it is also important to mention that the islamophobia did not started in the last years as a reaction to the terror attacks, rather it has a long history. d'Appollonia (2017) claims that many people consider immigrants as potential terrorists. Thus, immigrants are considered as a threat to the national safety. However Sniderman et al. (2019) developed a heuristic model which claims that the reactions of most of the citizens are restricted by size and duration. They claim that after a special duration, the citizens return to their baseline values of tolerance. In the recent years many studies have investigated terror attacks Coupe (2017); Geys and S. (2017); Balcells and Torrats-Espinosa (2018); Boydstun, Feezell and Glazier (2018); Silva (2017)

This assignment considers the terror attack of Charlie Hebdo in the year 2015 in France. At this terror attack two brothers stormed in the offices of the satirical newspaper Charlie Hebdo in Paris where they killed 12 people and injured 11 others. The aim of this assignment is to evaluate if the terror attack of Charlie Hebdo had an influence on islamophobia and xenophobia considering the French citizens based on ESS data. The assignment aims not to provide or test a new or existing theoretical explanation.

Data and Methodology

Data is used from the seventh wave of the "European Social Survey" (ESS) in France. Special about the data is that right in the middle of the data collection - which was from 31.10.14 - 03.03.15 - the terror attack of Charlie Hebdo took place (07.01.2015). The data set contains variables about the attitudes towards immigrants and Muslims as well as socio-demographic information about the respondents.

For this research question and the given data there are, in general, two different estimation approaches appropriate: Matching and Regression Discontinuity Design. Both have their advantages and disadvantages but regarding the research question - had the terror attack of Charlie Hebdo a influence on the attitudes - an RDD approach seems to be more appropriate. For matching one needs to assume *unconfoundness* which means that the potential outcomes under treatment and control are independent from the treatment assignment. To fulfill this assumption we need a fully specified model. However, it is only possible to match on observables. Thus, there is always the risk of an omitted variable bias which hinders to interpret the effect causally. This unobservable issue can be adressed by using a Regression Discontinuity Design (RDD). In a RDD framework, one is interested in the effect of a binary treatment π an on an outcome Y. The treatment here is the knowledge of the terror attack of Charlie Hebdo and the outcome is the attitude of the respondents. The treatment is determined by a running variable V which is here the *date of inverview*. The terror attack took place on the 07.01.2015 which defines the cutoff point. All respondents which are interviewed before the date of the terror attack are assigned to control and all respondents interviewed after the attack are assigned to treatment.

However, the running variable had to be recoded first, because it needs to be a continious variable. The original variable contains the dates of the interviews. In order to have a continuous running variable, the date of the terror attack - the cutoff point - is recoded as 0. One interview-day before the attack is coded as -1, two days before as -2 and so on. One day after the attack is coded as 1, and two day after the attack as 2 and so on. Figure 1 shows two histograms. The one on the left-hand side shows the running variable before recoding and the one on the right hand side the result after recoding - note the different x-axis.

Also the RDD needs some assumptions to be fulfilled. As for matching, *Stable Unit-Treatment-Value Assumption* (SUTVA I and II) are essential. *SUTVA I* states that the potential outcome of unit i is independent from the treatment assignment of unit j. This assumption is fulfilled because the selection

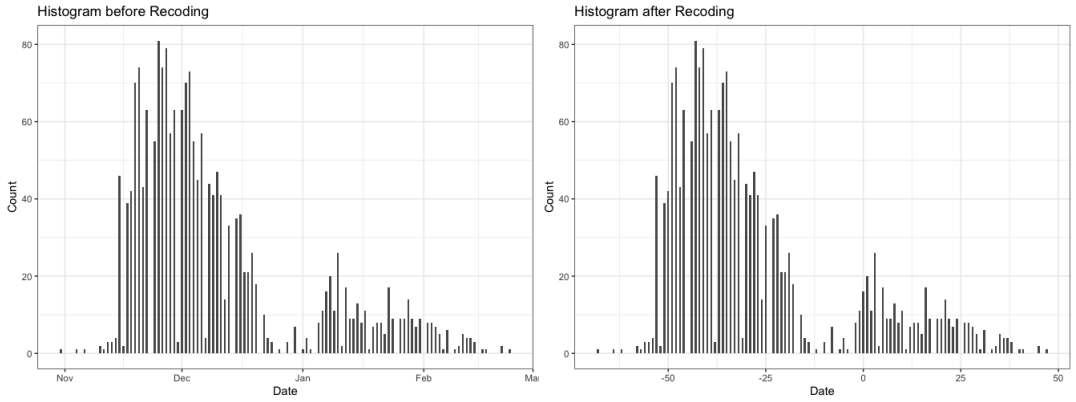

Figure 1: Histograms which show the distribution of the running variable before (left) and after (right) recording

process of respondents is random in the European Social Survey. *SUTVA II* states that everyone in treatment group receives the exact same form of treatment while everyone in control receives the exact same form of control. We can assume that all got the same control, while we cannot assume the same, without discussion, for those which got treatment. One can suppose that the level of information has an influence on the respective attitudes. Thus, we have to assume that all respondent have the same information level regarding the terror attack - which is done in this assignment but which is of course debatable.

Specific assumptions for RDD are the *Continuity of Average Potential Outcome Assumption* and the *No Self-Selection Assumption*. The former assumption requires that the potential outcome under treatment, and the potential outcome under control are linearly related to the running variable at the cutoff-point. This assumption is fulfilled because we can assume that in absence of the qualitative difference at the cutoff point, the relationship between the running variable and the outcome would be one line without a jump at the cutoff point. Finally, the *no self-selection assumption* means that an respondent cannot determine whether s/he is interviewed before or after the attack. From a theoretical perspective, a manipulation is impossible because the respondents in the sample are selected randomly. However, the histogram in figure 1 shows that more respondents were interviewed in the period between mid November and mid December. Moreover, if we have a more detailed look at a short period around the attack, we can see that before the attack there are some gaps between days where no one was interviewed. In addition, at the days before the attack only less people were interviewed compared to the days after the attack. Probably, this can be explained by the fact that in this period christmas and new years's day was located. Furthermore a McCrary test was runned to test statistically whether there is a discontinuity on the running variable. The McCrary test is significant at a 1% level which indicates a discontinuity. This result is visualized in Figure 2. Statistically correct would be to admit that RDD is not applicable and the effect is not interpretable causally. However, there is no doubt that the respondents had any chance to manipulate their interview date and therefore from a substantial perspective, the analysis can be undertaken despite the test result (see e.g. Silva, 2017).

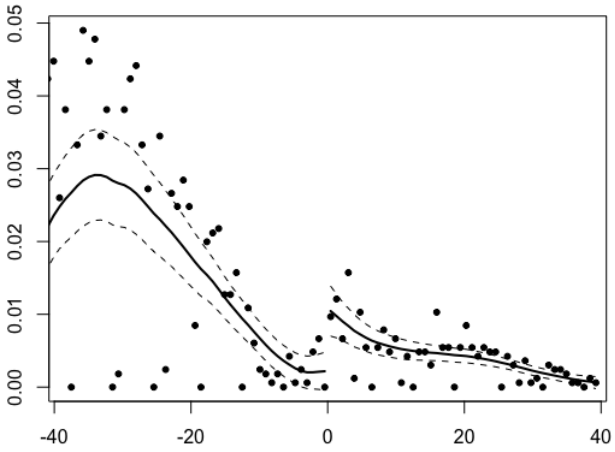

Figure 2: Result of McCrary Test
Note: The McCrary test analyse the running variable on a discontinuity. a clear cutoff point - which can be see here - indicates a discontinuity

Hypotheses and Models

This paper has not the aim to develop or test specific theories, rather it just analysis data to get a insights in causal mechanims related to the terror attack of Charlie Hebdo. The assumption is that the terror attack led to a reinforcement of islamophobia and xenophobia which is tested using RDD or according to Munoz, Falco-Gimeno and Hernandez (2020) by an UESD (Unexpected Event during

Survey Design) which is more or less an RDD for the special case of having an event (e.g. terror attack) during a survey. In order to measure if the event had a causal effect on the attitudes of the French, I formulate four hypotheses:

Hypothesis 1: *French people prefer allowing less Muslims to come and live in France after the attack than before the attack.* [1]

Hypothesis 2: *French people prefer allowing less immigrants from different race / ethnic group after the attack than before the attack.* [2]

Hypothesis 3: *French people have different impressions of immigrants before and after the attack.* [3]

Hypothesis 4: *French people have different opinions about how the government should judge applications for refugee status.* [4]

Thus one hypothesis (H1) considers Muslims only and three hypotheses (H2, H3 and H4) considers immigrants more generally.

At constructing RDD models there are - besides the already mentioned assumptions - three practical aspects important. First, the specification of the bandwidths. The bandwidths in a RDD are generally selected as narrow as possible in order being able to consider the treatment assignment as-if random. According to Munoz, Falco-Gimeno and Hernandez (2020) it is unlikely that the timing of interviews is related to the potential outcomes in most applications. They claim that a narrow bandwidth will not necessarily reduce bias but will probably increase variance and decrease the observations and thus the statistical power. Furthermore, they state that a larger bandwidth increase the generalizability of the results. In the main analysis the optimal bandwidth were computed using the algorithm of Imbens and Kalyanaraman (2012). The bandwidth across all models were in a range of 3.5 to 5.9 days before and after the attack. For comparability across the models, a uniform bandwidth of 3 days is chosen. From a theoretical point of view a bandwidth of 3 should be appropriate due to the fact that the sample selection was random and a manipulation by respondents is impossible. Furthermore, it is the rounded lower limit of the optimal bandwidth computed by the algorithm. Thus, I assume a as-if random treatment assignment by using a bandwidth of 3. Due to the fact that Munoz, Falco-Gimeno and Hernandez (2020) suggest using larger bandwidth, I will consider larger ones in the robustness section.

Second, the covariates need to be selected carefully. Covariates can reduce the asymptotic covariance and thus increase the preciseness of the estimatior (Froelich and Huber, 2017). However, a post-treatment bias should be avoided - meaning that covariates which could be affected by the event / treatment (here: terror attack) should not be included in the model (Montgomery, Nyhan and Torres, 2018). Thus, covariates which measure attitudes regarding Muslims or immigrants are not included. Also a self-positioning on the left-right-scale is excluded, because if islamophobia and xenophobia increases after an attack, it is likely that there is also an effect on the left-right-scale (e.g. more right self-placement).

Finally, multicollinearity should be avoided. That is the reason why, for example, the variables with the corresponding questions "Are you born in France" and "Do you belong to a ethnic minority" are not both included - even if the correlation of -0.25 is not "dangeously" high - but also, generally, parsimonious models in regressions are prefereable in order to minimize the variance.

The analysis covers three models with four different dependent variables, corresponding to one of the hypotheses each. The first model includes no covariates, the second includes socio-demographic covariates (age, gender, education) and the third model contains the socio-demographic covariates plus if someone is born in France and the attitudes towards LGBTQ as a proxy for the general tolerance level. Other available variables are not included due to the already described reasons.

Results

Table 1 shows the results of the RDD models. Similar to the results of Silva (2017), only less significant results can be found. Thus, the general implication is that the terror attack had no relevant impact on the

[1] Corresponding questionnaire question: "Allow many/few immigrants of different race/ethnic group from majority" (1 "Allow many to come and live here" - 4 "Allow none"

[2] Corresponding questionnaire question: "Allow many or few Muslims to come and live in country" (1 "Allow many to come and live here" - 4 "Allow none"

[3] Correspnding question in ESS: "Immigrants make country worse or better place to live" (0 "worse place to live" - 10 "better place to live)

[4] Correspnding question in ESS: "Government should be generous judging applications for refugee status" (1 "agree strongly" - 10 "disagree strongly")

	AML	AIL	IMC	GGR
No Covariates				
LATE	-0.18	-1.04	1.53	-0.38
Std. Error	0.67	0.60	1.71	0.75
p-value	0.29	0.43	0.84	0.95
N	64	64	65	65
Socio-demogr. covariates				
LATE	0.11*	-0.57*	-0.57	-0.54
Std. Error	0.83	0.64	2.08	0.80
p-value	0.05	0.04	0.15	0.77
N	64	64	65	65
Full set of covariates				
LATE	0.27	-0.39*	-0.37*	-0.54
Std. Error	0.84	0.58	1.91	0.80
p-value	0.06	0.03	0.03	0.92
N	64	64	65	65

Table 1: Output of RDD (=Regression Discontinuity Design). Bandwidth are calculated by the algorithm of Imbens and Kalyanaraman (2012). For comparability the bandwidth are set manually to 3 for this analysis. Detailed reports of bandwidth can be found in the robustness section. LATE = "Local Average Treatment Effect" which is the estimated causal effect. Dependent variables: AML = Allow many/few Muslims to come in my country, and AIL = Allow many/few Immigrants to come, IMC = Immigrant make country worse/better, GGR = Government should be generous judging applications for refugee status. The rows are different specified models: No covariates, socio-demographic covaiates (age, gender, education level) and as set of covariates (age, gender, educational level, born in France and attitude toward LGBTQ).
* $p < 0.05$

attitudes of the respondents. However, significant effects on a 5% level can be found for the dependent variable AML which captures if it should be allowed that more Muslims come and live in France. The effect is only significant in the model which controls for socio-demographic variables. Controlling for more variables the effect becomes stronger but is no longer significant. Due to the non-consistent significance across the models, this effect should not be taken as valid for a causal interpretation. Therefore, hypothesis H1 has to be rejected because there is no evidence that the French people want to allow less Muslims after the attack then before. For the dependent variable AIL which measures if it should be allowed that more immigrants come and live in France, a significant effect can be found for the last two models controlling for socio-demographic and the full set of covariates. The effect is negative meaning that being interviewed after the attack leads to a more tolerant attitude (allowing more to come). This result is not conform

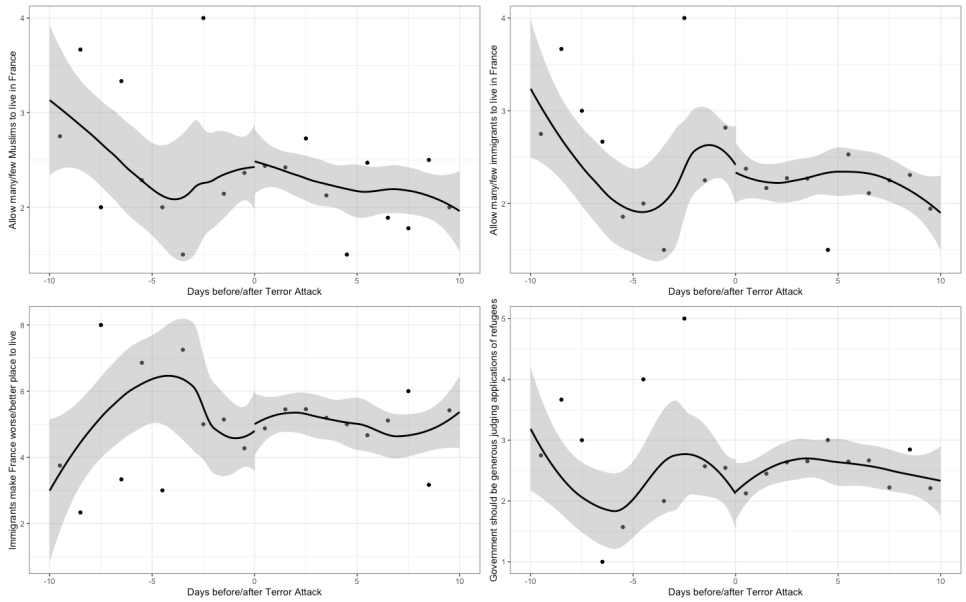

Figure 3: RDD Models 1-3. The gray area represents a 95% confidence interval. The gap between the intercepts of both lines at $x = 0$ displays the estimated treatment effect. Overlapping confidence intervals indicate no significant effect. The bandwidth are manually set to 3 for comparability. Here are no significant results because the plots shows the effect without controlling for covariates.

	Treatment	Gender	Age	Educ	Born in Country	Left-Right-Scale
Min	0: 20	0: 44	16.00	1: 13	0: 13	0.00
1st Qu.	1: 73	1: 49	36.00	2: 9	1: 80	4.00
Median			48.00	3: 21		5.00
Mean			49.22	4: 18		5.169
3rd Qu.			62.00	5: 15		7.00
Max			92.00	6: 2		10.00
NA	0	0	0	7: 15	0	4

Table 2: Descriptive Statistics
Overview of some of the used variables in the analysis. Treatment = binary variable determining wheter some one was interviewed before (0) or after (1) the terror attack, Education = measures the level of education from low to high level, Born in country = binary variable with born in country (1) and not born in country (0) the other variables are self-explainatory.

with hypothesis H2 which states that French people should want to allow less immigrants to come after the attack than before it. Thus, also H2 has to be rejected. For the dependent variable IMC, which captures if immigrants make country a worse place to live, only the last effect is significant. Actually, this negative effect indicates that respondent which were interviewed after the attack have, on average, a more negative opinion (-0.37) about the impact of immigrants on the living conditions in France. Thus, this effect corresponds with H3. However, only the third model is significant why we should interpret the effect cautiously. Considering, the last dependent variable GGR, which captures how the government should judge applications for refugee status, there is no significant effect founded. Therefore, H4 has to be rejected because there seems to be no difference in the opinion before and after the attack.
Figure 3 show the effects for each dependent variable in a RDD plot. On the x-axis, the point 0 is the cutoff-point. To the left of the cutoff is the regression line for the control group (before attack) and to the right of the cutoff is the regression line for the treated (after attack). The shaded area represents a 95% confidence interval. The overlapping confidence intervals of both lines in each of the plots indicates no significant results. In conclusion, there is no serious evidence that the terror attack of Charlie Hebdo has increased islamophobia or xenophobia.

Robustness

In this section, some robustness checks are conducted. First, as already mentioned it can be discussed about the size of the bandwidth. In the analysis a bandwidth of 3 was chosen in order to have enough statistical power and being able to assume as-if random treatment assignment. Due to Munoz, Falco-Gimeno and Hernandez (2020) who see in this type of research design no issue in extending the bandwidth, I will have a more detailed look at the double bandwidth (6 days before/after the attack). However, in most of the models the estimated effect has the same algebraic sign but of course the effect size fluctuates due to more included observations. However, the question is if it still can be assumed that the respondents are as-if random assigned. On the one hand, the sample is random. On the other, it is possible that, for example, the quote of refusal of participating in the study is lower after the attack than before, because the people could have a higher incentive to express their opinions after the attack. Therefore, the analysis is conducted more conservatively with bandwidth of 3.

Second, a balance test was done in order to check if there are systematic differences between treatment and control group. Figure 4 shows the balance results for the used covariates and some more. The result indicates that the groups have a overall good balance considering their standardized difference.

Finally, one of the main issues of RDD is the generalizability. To evaluate to which population these results can be generalized, we need to take a look at descriptive statistics of the respondents which are included using the bandwidth of three days. Table 3 shows the result. For the variables which are not continious the freuquencies are reported. Only 20 people are not treated and 73 are

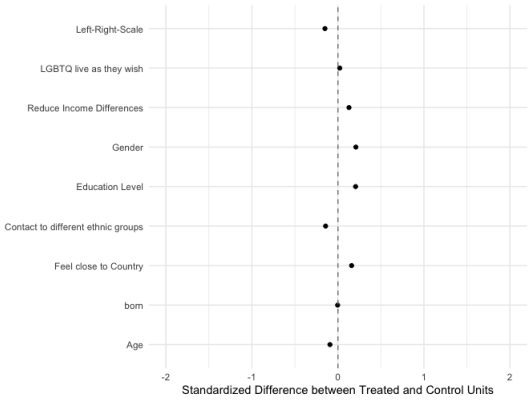

Figure 4: Balancing Results

treated. Gender is very balanced. Also, all age and education groups are represented. We have 80 people which are born in France and only 13 which are not but the balance of this variable is nearly perfect. Finally, the left-right scale indicates a mean of 5.17 which is the middle of the scale. All in all, it seems that there are no real underrepresented or overrepresented groups with good balance. Thus, the result can be cautiously - due to the low sample size - generalized.

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