Positive Spillovers from Negative Campaigning

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Abstract

Negative advertising is frequent in electoral campaigns, despite its ambiguous effectiveness: negativity may reduce voters' evaluation of the targeted politician but have a backlash effect for the attacker. We study the effect of negative advertising in electoral races with more than two candidates with a large scale field experiment during an electoral campaign for mayor in Italy and a survey experiment in a fictitious mayoral campaign. In our field experiment, we find a strong, positive spillover effect on the third main candidate (neither the target nor the attacker). This effect is confirmed in our survey experiment, which creates a controlled environment with no ideological components nor strategic voting. The negative ad has no impact on the targeted incumbent, has a sizable backlash effect on the attacker, and largely benefits the idle candidate. The attacker is perceived as less cooperative, less likely to lead a successful government, and more ideologically extreme.

Keywords: Electoral Campaign, Political Advertisement, Randomized Controlled Trial, Field Experiment, Survey Experiment.

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1 Introduction

Negative advertising in electoral campaigns is on the rise and social media have provided new ways of going negative. During the 2016 U.S. Presidential campaign, more than 55 percent of all televised ads released by the Clinton and Trump campaigns were negative. Even more negative were the campaigns by the respective Super PACs. Since the Democratic National Convention, Priorities USA Action released 14 (out of 15) ads attacking Trump. Analogously, of the 13 ads released by Rebuilding America Now, 11 attacked Clinton.

Apparently, political strategists have been convincing in advising candidates to vilify their opponents. Yet, the academic debate on the effectiveness of negative ads in persuading voters is still open. Indeed, despite its popularity among practitioners, the empirical evidence on whether negative ads are more or less effective than positive ones is ambiguous (Lau et al., 2007). Early studies (Ansolabehere et al., 1994) suggest that negativity demobilizes voters, while other contributions find instead a mobilizer (Goldstein and Freedman, 2002) or no effect at all (Finkel and Geer, 1998). These conflicting findings may depend on how (and when) negativity evokes emotional responses on voters. Aggressive negative messages (mudslinging) and attacks done late in the electoral campaign, when individuals have locked in their voting choices, tend to depress turnout (Kahn and Kenney, 2004; Krupnikov, 2011). Negativity is also effective in reducing the voters' evaluation of the targeted politician (Kahn and Kenney, 2004). However, since political choices tend to be persistent, even if their appraisal of the candidate decreases, voters may still continue to vote for the target of the negative ads (Lau et al., 2007). Moreover, negativity tends to have a backlash effect, which—by worsening the evaluation of the attacker (Carraro and Castelli, 2010; Lau and Rovner, 2009)—may reduce her support (Kahn and Kenney, 2004; Lau and Rovner, 2009). This backlash effect is more likely to occur if the attack is deemed inappropriate, e.g., on the opponent's family or religious views (Mattes and Redlawsk, 2014), or if a candidate launches the initial negative campaign rather than responds to a previous attack (Peterson and Djupe, 2005). Individual characteristics also matter: female candidates are more likely to experience a backlash for

going negative (Herrnson et al., 2003) and female voters to dislike negative campaigning (Galasso and Nannicini, 2016). Going negative is thus a strategic choice that a candidate makes, by weighting the benefit from driving down the positives of the opponents (i.e., the target effect) against the risk of being perceived negatively (i.e., the backlash effect). The literature (Dowling and Krupnikov, 2016; Mattes and Redlawsk, 2014) suggests that a candidate is more likely to go negative if she trails behind in the polls, has less campaign funding than the rival(s), is facing an incumbent, or is running in a close race.

We study another important, yet largely unexplored, feature of the electoral campaign that may affect the candidate choice of going negative: the existence of more than two candidates in the race. With two candidates running for office, voters' attention is split between the two of them (or abstaining). The decision to run negative ads is thus primarily about reducing the rival's evaluation among the voters, while trying to avoid a backlash effect. With more challengers in the race, going negative may help a candidate to differentiate herself from the others (Peterson and Djupe, 2005). In fact, there seems to be greater recall for negative ads (Geer and Geer, 2003). However, in a race with multiple candidates, a negative effect on the target of the attack, coupled with a backlash effect on the attacker, may benefit the other candidates, who refrained from going negative. We call this effect on the idle candidate(s) a positive externality (for the idle candidates) from negative campaigning. This effect should reduce the incentives for any candidate to go negative in races with multiple candidates (Gandhi et al., 2015). Clearly, this effect is more likely to emerge in multiparty systems (Elmelund-Præstekær, 2008; Hansen and Pedersen, 2008).

To analyze the effect of negative campaigning in electoral races with multiple candidates, we present results from two experiments with positive and negative campaigning in elections with two or three candidates. Our experiments are designed to test for the existence of a positive effect from negative campaigning in favor of an idle candidate (i.e., the *spillover effect*), and to evaluate the magnitude of the effect of going negative on the target (i.e., the *target effect*) and on the attacker (i.e., the *backlash effect*). A field experiment, run during a

multi-candidate electoral race, provides the perfect real testing ground for our hypotheses. The causal results from a real-life campaign show the existence of a positive spillover effect on the idle candidate from negative campaigning. In a set of survey experiments, we construct a controlled environment in order to isolate the mechanisms behind this spillover effect. In particular, we create a controlled setting with no ideological components and no concerns for strategic voting, in which the effect of negative campaigning on voters' decisions can be evaluated in isolation.

We implemented a large scale field experiment during an electoral campaign for mayor in Italy and a survey experiment in a fictitious electoral campaign for mayor. First, we ran the field experiment during the 2015 electoral race for mayor in Cava de' Tirreni (a midsize town in the South of Italy), which featured the incumbent facing two main challengers. In this experiment, our treatments consisted of canvassing done by volunteers of one of the challengers either with a positive message or with a negative message against the incumbent. Our randomization took place at the precinct level: a third of the 55 precincts were canvassed by the volunteers with a positive message, a third with a negative message, and the remaining third received no informational treatment. We study the effect of these treatments on the actual electoral outcome: that is, the vote shares obtained by the three candidates at the precinct level in the first round of the election.

Second, we staged a fictitious election in which either three or two candidates were running for mayor. Voters in this election were the respondents of an online survey, in which they were told to consider that they just moved to a town with an upcoming mayoral election. In the experiment with three candidates, the respondents were introduced to the incumbent and two opponents. To isolate the effect of negativity from ideological or strategic aspects, the candidates were designed to have similar individual characteristics and no ideological difference. Participants to this survey experiment were shown a video ad from each of the candidates. For the incumbent and one of the opponents, the video contained a positive message, whereas the campaign of the other opponent was randomized. The treatment

group was shown a video with a negative message against the incumbent, while the control group watched a video with a positive message. In the experiment with two candidates, survey respondents were presented with the incumbent and one opponent, again with similar individual characteristics and no ideological difference. For the incumbent, we showed the video with a positive message. For the opponent, we randomized: the treatment group was shown the video with a negative message against the incumbent, the control the one with a positive message. In both experiments (with two or three candidates), we asked the respondents to indicate whom they would vote for, and this is our outcome of interest.

In the field experiment, we find a strong, positive spillover effect of negative campaigning on the idle candidate, whose vote share increases by 3.7 percentage points when the incumbent is attacked with a negative ad by the other challenger (a gain of about 13% with respect to the idle candidate's average vote share). To understand the mechanisms behind this effect, we need to move to the controlled environment of the survey experiments, where we neutralize the ideological components and strategic voting aspects that are relevant in actual electoral races. The empirical evidence from our survey experiments confirms the existence of a strong, positive spillover effect in favor of the idle candidate (17.1 percentage points for a gain of about 48% with respect to the average). We also find a sizable backlash effect, which is partially attenuated in two-candidate races. Moreover, the candidate running the negative ad was perceived as less cooperative, less likely to lead a successful government, and more extreme on the political scale. The attack had little effect on the incumbent and largely benefited the idle candidate.

We contribute to a large literature on the effects of negative campaigning on electoral outcomes.[1] In their seminal experimental paper, Ansolabehere et al. (1994) use responses

[1]More generally, the effectiveness of electoral campaigns in mature democracies has been studied, among others, by Ansolabehere and Iyengar (1995), Gerber and Green (2000), Gerber and Green (2004), Gerber et al. (2003), Nickerson (2008), and Dewan et al. (2014). Typically, these studies rely on either small scale experiments for partisan ads, or on large

from a post-test questionnaire, administered after subjects had seen the advertisements, to show that negative ads reduce average voting intentions by 5%. This early result is encouraging, since in a two-party system abstaining from voting should be consider a third vote options, just as voting for a third, idle candidate in a three-candidate election. Arceneaux and Nickerson (2010) implemented a field experiment, in which volunteers personally delivered a political message to their treatment groups to find that, while canvassing is effective in influencing voters, there is little evidence of a differential effect between negative and positive campaigning.[2] Studies on negative campaigning, which use aggregate and survey data and classify the negativity of actual campaign advertisements, find either no impact of negative campaigning (Wattenberg and Brians, 1999), or even supporting evidence for a "stimulation" effect on electoral turnout (Finkel and Geer, 1998; Freedman and Goldstein, 1999; Kahn and Kenney, 1999; Freedman and Goldstein, 2002; Clinton and Lapinski, 2004; Brooks and Geer, 2007). A meta-analytic assessment of this literature by Lau et al. (2007) reports inconclusive results: negative campaigns are neither effective to win votes, although they may be more memorable, nor seem to depress turnout. Recent contributions (Dowling and Krupnikov, 2016; Mattes and Redlawsk, 2014) suggest that specific features may explain the different effectiveness of going negative: trailing behind in the polls, having less campaign funding than the opponent(s), facing an incumbent.

Our contribution to this literature is to study the effects of going negative in multi-candidate elections in order to measure possible spillover effects. In a rent-seeking contest, Konrad (2000) provides a theoretical framework to show how effort for negative activities

scale non-partisan campaigns for turnout. For (randomized) partisan campaigns, see Gerber et al. (2011), Kendall et al. (2015), Pons (2018), and Braconnier et al. (2017).

[2]Barton et al. (2014) provide evidence from a US local election that canvassing by the candidate is effective in increasing her vote share. Bhatti et al. (2019) question the effectiveness of canvassing outside the US. However, Pons and Liegey (2018) find evidence of an increase in turnout among French immigrants due to visits from political activists.

(sabotage), as opposed to positive ones (self-promotion), is decreasing in the number of contenders. In multiparty systems that feature many candidates running for election, the degree of negativity is typically lower (Hansen and Pedersen, 2008). However, as in the US politics, trailing behind in the polls and fierce competition lead to more negativity (Elmelund-Præstekær, 2008). Empirical evidence in Gandhi et al. (2015) shows that, in US non-presidential primary contests, electoral races with more challengers are characterized by less airing of negative ads than two-candidate races. Our paper provides a (causal) measure of this spillover effect and of the backlash effect in a controlled environment. In a sense, we also contribute to a recent literature that studies the increasing trend of negative advertising by independent groups in the United States (Brooks and Murov, 2012; Dowling and Wichowsky, 2015). Since the "Citizens United v. Federal Election Commission" U.S. Supreme Court decision in 2010, which abolished restrictions on campaign advertising by outside groups, negative ads run by independent groups have been shown to produce less backlash effects.

The paper is organized as follows. The next section introduces a simple conceptual framework that characterizes the electoral outcomes associated with different combinations of target and backlash effects induced by negative campaigning. Section 3 presents the field experiment in Cava de' Tirreni, while Section 4 presents the survey experiments. Section 5 concludes. Descriptions and English translations of the (randomized) campaign tools for all experiments are in the Online Appendix.

2 Conceptual Framework

We introduce a simple conceptual framework to characterize the individual voting decisions. The aim of this theoretical framework is to analyze the mechanisms that may induce voters to react to negative campaigning, in a setting in which there is no strategic voting nor ideology. This theoretical framework will help us to design a survey experiment in which we can isolate the effect of negative campaigning from other electoral features.

We consider three parties (A, B, C), which do not differ in their ideology nor in their policy. Each voter is assumed to have a preference for one party, solely based on individual sympathy. A voter i of type j, with $j = A, B, C$, is characterized by a sympathy $s_j^i \in (0, S)$ for party j and no sympathy for the other two parties, $s_{-j}^i = 0$. Parties' valence also matter for the voters. We indicate this valence factor with $\delta_j = \widehat{\delta}_j + e_j > 0$, where e_j depends on the electoral campaign of party j and $\widehat{\delta}_j$ depends on a shock realized before the election. These two components — and, thus, the valence factor — are common to all voters.

Voters' electoral decisions depend only on their individual sympathy for a party and on the common valence factor. Hence, a voter i of type A votes for:

$$\begin{aligned} &\text{party A if} \quad s_A^i + \delta_A \geq Max\{\delta_B, \delta_C\} \\ &\text{party B if} \quad \delta_B > Max\{s_A^i + \delta_A, \delta_C\} \\ &\text{party C if} \quad \delta_C > Max\{s_A^i + \delta_A, \delta_B\}. \end{aligned}$$

And analogously for voters of types B and C.

To evaluate the effects of the electoral campaign on the voting decision, without loss of generality, we assume that, if all parties run positive campaigns, the electoral campaign component of the valance factor is the same for all parties and is normalized to zero: $e_A = e_B = e_C = 0$. Consider a negative campaign run by party B against party A. This negative campaign can give raise to an effect for the target, a change in e_A, and/or an effect for the attacker, a change in e_B. The existing literature (see Lau et al. 2007 for a review) suggests that both effects are negative, $e_A < 0$ and $e_B < 0$. However, we do not rule out that they could be null or even positive, and obtain ten possible cases. For each case, we determine, ceteris paribus — i.e., for given realizations of the shocks $\left(\widehat{\delta}_A, \widehat{\delta}_B, \widehat{\delta}_C\right)$ and given distributions of the voters' types — how the votes for the three parties change with respect to our baseline case, constituted by the positive campaigning ($e_A = e_B = e_C = 0$).

It is convenient to assume, without loss of generality, that the shocks have the same realization for all parties, $\widehat{\delta}_A = \widehat{\delta}_B = \widehat{\delta}_C = \widehat{\delta}$. Hence, with all parties running positive campaigns, every type j voter ($s_j > 0$) votes for party j. Consider the case in which

the negative campaign creates only a negative effect for the target, that is, $e_A < 0$ and $e_B = e_C = 0$. Clearly, this reduces the votes for party A among type A voters. In fact, only voters with a sympathy greater than $s'_A \geq -e_A > 0$ vote for party A. The other type A voters, with $s^i_A < s'_A$, will not vote for party A and will be indifferent between voting for party B or C. If instead a negative effect emerges for the attacker only, that is $e_B < 0$ and $e_A = e_C = 0$, the negative campaign reduces the votes for B among type B voters. Only voters with a sympathy greater than $s'_B \geq -e_B > 0$ vote for party B. The other type B voters, with $s^i_B < s'_B$, will be indifferent between voting for party A or C. If instead negative campaigning produces negative effects for both the target and the attacker, both parties A and B will lose some votes among their supporters. And these votes will all go to party C. This effect is what we call the positive externality (for party C) from negative campaigning (by party B). Finally, let us consider the perhaps unlikely case in which negative campaigning induces positive effects for both the target and the attacker, i.e., $e_A > 0$, $e_B > 0$ and $e_C = 0$. With respect to our baseline situation of positive campaigning, in which every voter voted for her party type, in this case some type C voters will switch party. Which party they will turn to depends on the relative size of the effects. Suppose that this is greater for the attacker, i.e., $e_B > e_A > 0$. Then type C voters with a sympathy lower than $s_C < \widehat{\delta}_B + e_B - \widehat{\delta}_C = e_B > 0$ will vote for B. Moreover, some type A voters will also switch to party B if their sympathy is lower than $s_A < \widehat{\delta}_B + e_B - \widehat{\delta}_A - e_A = e_B - e_A > 0$. The results for these ten cases in terms of vote changes are summarized in Table 1.

We now consider an environment with only two parties, A and B, and a negative campaign run by party B against party A. As before, this negative campaign can give raise to an effect for the target, a change in e_A, and/or an effect for the attacker, a change in e_B. We also keep the same working assumptions regarding the realization of the shocks ($\widehat{\delta}_A = \widehat{\delta}_B = \widehat{\delta}$) and the baseline positive campaigning ($e_A = e_B = 0$). In this environment, eleven cases may arise depending on the (three by three) combinations on the effects for the target and the attacker, as well as—if they go in the same direction—on which of the two effects is larger.

		Attacker (B)		
		Positive	Zero	Negative
Target (A)	Positive	Case I: $\Delta B > \Delta A$ A votes ↓ B votes ↑ C votes ↓ Case II: $\Delta B < \Delta A$ A votes ↑ B votes ↓ C votes ↓	A votes ↑ B votes ↓ C votes ↓	A votes ↑ B votes ↓ C votes ↓
	Zero	A votes ↓ B votes ↑ C votes ↓	No effect	A votes ↓ B votes ↑ C votes ↑
	Negative	A votes ↓ B votes ↑ C votes ↓	A votes ↓ B votes ↑ C votes ↑	A votes ↓ B votes ↓ C votes ↑

Table 1: Predictions for Three Candidates Election for Different Combinations of Target and Backlash Effect (A = Target; B = Attacker; C = Other Candidate)

It is easy to see that if the negative campaign creates only a negative effect for the target ($e_A < 0$ and $e_B = 0$), some of the type A voters (with $s_A < -e_A$) will switch from party A to party B. On the contrary, if a negative effect emerges only for the attacker ($e_A = 0$ and $e_B < 0$), some of the type B voters (with $s_B < -e_B$) will switch from party B to party A. But if negative campaigning produces only negative effects ($e_A < 0$ and $e_B < 0$), the relative magnitude of the effects will matter. For a larger target effect ($e_A < e_B < 0$), some of the type A voters (with $s_A < -e_A + e_B > 0$) will switch from party A to party B. Viceversa, if the effect is larger for the attacker ($e_B < e_A < 0$), some of the type B voters (with $s_B < -e_B + e_A > 0$) will switch from party B to party A. The results for the two parties environment are summarized in Table 2.

In our field and survey experiments, we test whether the negative campaigning by a challenger has a negative effect on the incumbent vote share (the *target effect*), a negative effect on the same challenger (the *backlash effect*), and a positive effect on the other challenger (the *spillover effect*).

		Attacker (B)		
		Positive	Zero	Negative
Target (A)	Positive	Case I: $\Delta A > \Delta B$ A votes ↑ B votes ↓ Case II: $\Delta A < \Delta B$ A votes ↓ B votes ↑	A votes ↑ B votes ↓	A votes ↑ B votes ↓
	Zero	A votes ↓ B votes ↑	No effect	A votes ↑ B votes ↓
	Negative	A votes ↓ B votes ↑	A votes ↓ B votes ↑	Case I: $\|\Delta A\| < \|\Delta B\|$ A votes ↑ B votes ↓ Case II: $\|\Delta A\| > \|\Delta B\|$ A votes ↓ B votes ↑

Table 2: Predictions for Two Candidates Election for Different Combinations of Target and Backlash Effect (A = Target; B = Attacker)

3 Field Experiment in Cava de' Tirreni

3.1 Experimental Design

Our field experiment examines the effects of negative vs. positive electoral campaigning in an election with three main candidates, an incumbent and two challengers. The experiment took place during the 2015 municipal election in Cava de' Tirreni, a midsize town (around 55,000 inhabitants) in the South of Italy. The incumbent major, Marco Galdi, was supported by a center-right coalition, while the two main challengers were supported, respectively, by a center-left coalition and by three (centrist) civic lists (that is, party lists which have no official connection with a national political party and campaign on local issues). Our treatment consisted of positive and negative messages administered on behalf of Armando Lamberti, the candidate supported by the civic lists, through door-to-door canvassing and the delivery of electoral materials to mailboxes. During the three weeks prior to the election, a campaign team of twenty young volunteers (Figure OA.1 in the Online Appendix shows their group pic-

ture), wearing blue t-shirts with the symbols of the three civic lists and the slogan "Lamberti for Mayor,"knocked on doors of private residences and buzzed private residences' intercoms, to engage in personal interaction with eligible voters. Volunteers presented Mr. Lamberti's ideas and handed electoral materials. Alternatively, electoral materials were just left in the mailboxes of the eligible voters who could not be engaged in personal interactions. While being largely exploited in the United States, as part of "get out the vote" strategies, canvassing represented a novelty for Italian politics.[3] We approached Mr. Lamberti and proposed him to run an experiment using canvassing as an electoral campaign tool. He accepted and decided to launch a campaign called "Around the city listening to citizens." The volunteers were provided by the candidate and underwent a one-day training stage with one of the authors and with our field manager.

We randomized our negative vs. positive treatments using canvassing and electoral materials (flyers and hangers) left in the mailboxes. Positive canvassing emphasized Mr. Lamberti's ideas, while the negative one concentrated on the incumbent wrong-doing in office. The positive and negative version of the electoral material look identical: light blue, portraying the candidate, the symbols of the three civic lists and a city monument (see Figures OA.2 and OA.3 in the Online Appendix). The slogans clearly differ, but the topic and even their length (in Italian) are the same. The positive message reads "Let's Put Ourselves on the Line. In the next 5 years, with Lamberti: more dialogue with the citizens; more competence and transparency; more health and local services,"while the negative reads "Together to Take the City Back. In the past 5 years, with Galdi: too much old politics; too much waste of resources and too high taxes; too much debt on the citizens."[4] And similarly for the hangers, which only report the first part of the slogan (see Figures OA.4 and OA.5 in the

[3]To our knowledge, Cantoni and Pons (2020) present the only other canvassing experiment run in Italy. They compare the effect on turnout of canvassing done by paid volunteers vs. canvassing done by local candidates to the city council. Their testing ground is a 2014 municipal election in a midsize town in Northern Italy (38 precincts).

[4]Being a real-world campaign, in which all messages had to be approved by the candidate,

Online Appendix). When canvassing, the script provided to the volunteers to approach the voters was the same in the positive and negative version. But the discussion that followed once (and if) the volunteers gained personal access to the voters, differed depending on the treatment.

All these tools were designed by professionals under our direction and in collaboration with the Lamberti's campaign. Clearly, the informational treatments coexisted with the real overall campaign, and therefore their effects (if any) operated at the margin. However, our canvassing was the only door-to-door campaigning implemented in Cava by any candidate.[5]

the texts cannot be as sharp as in a lab or survey experiment. This can be seen as a particular case of the usual trade-off between internal and external validity when doing (field) experiments with politicians. However, to validate our operationalization of the two informational treatments (negative vs. positive), we ran both ex-ante and ex-post validity tests. Ex ante, we randomly assigned the two messages on the flyers to 50 university students, who did not know anything about politics in Cava de' Tirreni. We then asked them to give their subjective assessment of the candidate's attitude in the campaign message: that is, whether he was mainly campaigning against other candidates or emphasizing his own proposals for the city. For the 25 students who received the positive flyer, the average evaluation of the candidate's message as negative was 0.24 (s.d. 0.436). For the 25 students who received the negative flyer, the same evaluation was 0.44 (s.d. 0.507). Ex post, we ran a post-electoral survey of 857 voters in Cava de' Tirreni, belonging to the different treatment groups of the canvassing campaign, and asked them the same question on whether they perceived our candidate's campaign as negative or not. In the positive treatment group, the average evaluation of the candidate's message as negative was 0.225 (s.d. 0.420). In the negative treatment group, the same evaluation was 0.346 (s.d. 0.479). Despite the small sample sizes, all of these group means are statistically different between each other at the 10% significance level.

[5]As discussed above, Mr. Lamberti approved all the campaign messages, paid for the electoral materials and provided us with the volunteers. However, in order to avoid con-

Our randomization was done at electoral precinct level. The 55 electoral precincts were randomly assigned to tree groups: positive treatment (18 precincts with 15,925 eligible voters), negative treatment (18 precincts with 15,424 eligible voters), and control group (19 precincts with 15,174 eligible voters), which did not receive any treatment. Table A.1 (Panel A) in the Appendix reports the ex-ante balance tests of predetermined variables at the precinct level. The available variables refer to the previous election for mayor in Cava de' Tirreni in 2010. They include the number of eligible voters (absolute and by gender), the vote share of the winner, of the main challenger, and of the third challenger. For all of these predetermined variables, our precinct-level randomization is perfectly balanced. Moreover, as shown in Table OA.6 in the Online Appendix, all of these predetermined variables are perfectly balanced also when comparing each treatment group to the control group.[6]

In their canvassing diary, the volunteers reported on a daily basis which streets were covered and how, that is, whether by canvassing or by leaving electoral materials in the mailbox. We can then construct a variable capturing the intensity of our treatment. We define as intensively treated those precincts in which at least 50% of the streets were reached by the volunteers. This occurred in 30 of the 36 treated precincts. Results reported in Table A.1 (Panel B) in the Appendix show that the intensity of our treatment was ex-post balanced between the negative and positive treatment. As this intensity might be endogenous, this is an important result and allows us to perform an additional heterogeneity analysis on the

tamination in the experimental design, our field manager directed the volunteers without informing the candidate about the randomization outcome, so that he could not infer which precincts were receiving a certain treatment as opposed to the other.

[6]Besides the t-tests reported in the two tables, we also ran F-tests on the joint significance of the predetermined variables with respect to the probability of belonging to the different treatment groups. The p-values corroborate the validity of the randomization and are as follows: 0.920 (negative group as opposed to positive group); 0.759 (negative group as opposed to control group); 0.858 (positive group as opposed to control group).

precincts that received a more intense treatment.

3.2 Experimental Results

Table 3 presents estimates for the effect of negative vs. positive campaigning on actual voting outcomes (see also Figure OA.8 in the Online Appendix). The unit of observation is a precinct. We consider four electoral outcomes: turnout and the incumbent (i.e., the target) vote share in Panel A; the treated challenger (i.e., the attacker) and the main untreated challenger (i.e., the idle candidate) vote shares in Panel B. For each outcome variable, expressed in percentage points, we provide estimates for the effect of negative (vs. positive) campaigning without (column 1) and with controls (column 2), and of intense negative campaigning (vs. positive) without controls (column 3).

A clear spillover effect emerges from our empirical analysis (see Panel B): the vote share of the main untreated challenger increases by more than 3 percentage points in those precincts where the other challenger run a negative campaign. This result is robust to including controls or using the intense measure of our treatment, and the statistical significance increases. Considered that in the 36 precincts receiving either negative or positive canvassing, the incumbent vote share is 24.5, the attacker 14.7, and the idle candidate 29.4, the spillover effect on the latter amounts to an impact of about 11-15% depending on the specification. Going negative has instead no statistically significant effect on the incumbent (the target) nor on the treated challenger (the attacker), although both signs are negative and these zero results might also depend on the small sample size.[7]

[7]To accommodate for the fact that the outcome variables depend on each other and the error terms in the different regressions might be correlated, we also ran Seemingly Unrelated Regression (SUR) models. As the set of control variables is the same in all regressions, coefficients are unaffected and the OLS estimators are both consistent and efficient, but SUR allows us to perform additional tests. The first result is that error terms are indeed correlated as the Breusch-Pagan test of independence has a p-value of 0.001. The second

	Panel A					
	Turnout			Incumbent Vote Share		
	(1)	(2)	(3)	(1)	(2)	(3)
Negative Campaign	-0.722	-0.111		-0.357	-0.077	
	(2.09)	(1.09)		(1.42)	(1.17)	
Int. Negative Campaign			-1.793			-1.013
			(2.39)			(1.67)
Constant	69.977***	-13.735	70.608***	24.683***	83.968	25.080***
	(1.16)	(53.69)	(1.41)	(1.19)	(86.61)	(1.44)
Baseline Treatment	Positive	Positive	Positive	Positive	Positive	Positive
Controls		✓			✓	
Observations	36	36	30	36	36	30
R-Squared	0.003	0.789	0.019	0.002	0.319	0.014

	Panel B					
	Treated Challenger Vote Share			Main Untreated Challenger Vote Share		
	(1)	(2)	(3)	(1)	(2)	(3)
Negative Campaign	-0.840	-0.629		3.670*	2.730**	
	(1.29)	(1.11)		(1.83)	(1.14)	
Int. Negative Campaign			-0.803			4.490**
			(1.55)			(2.17)
Constant	15.147***	75.865*	15.090***	27.592***	-151.085**	27.256***
	(0.88)	(39.48)	(1.14)	(1.40)	(60.49)	(1.77)
Baseline Treatment	Positive	Positive	Positive	Positive	Positive	Positive
Controls		✓			✓	
Observations	36	36	30	36	36	30
R-Squared	0.012	0.402	0.010	0.105	0.684	0.136

Table 3: Field Experiment, The Effect of Negative Campaigning on Actual Vote Shares. LPM estimates. SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$
Controls in columns (2) include Winner's, Main Challenger's and Third Candidate's Voter Shares, Turnout Rate, Percentage of Female Voters and Total Voters in the 2010 election.

result is that the effect of negative vs. positive campaigning is jointly different from zero (p-value=0.065) for the incumbent's, opponent's, and idle candidate's vote shares, pointing to the joint presence of not only a spillover effect, but also a target and a backlash effect. The third result is that the spillover effect is still more robust than the others, as pairwise joint tests are statistically significant at a 5% level only when the idle candidate's vote share

To disentangle whether the spillover effect is due to the negative or the positive campaign, we estimate separately the effect of each campaign against the control group. The results, presented in Table OA.7 in the Online Appendix, show that the spillover effect is entirely driven by the negative campaign. In all specifications (with or without controls or using the intense measure of our treatment), the idle candidate gains more than 3 percentage points if the treated challenger goes negative with respect to the control group. Instead, the positive campaign by the treated challenger has no significant effect on the idle candidate. Our field experiment thus provide strong causal evidence of a positive spillover from negative campaigning in favor of a third, idle candidate. However, it does not allow to identify the drivers of this positive spillover. Does the third candidate gain votes because of a contemporaneous reduction in the voters' valuation for both the target and the attacker, as our theory suggests? Or do voters, who are convinced by the negative campaign not to vote for the incumbent, strategically decide to vote for the third candidate, who may have more chances of winning the election? The latter explanation cannot be ruled out since, in our municipal elections, the treated challenger (the attacker) ended up being a distant third in vote shares and did not manage to enter the runoff. Hence, strategic voting considerations may be a potential channel driving our results. Finally, voters reached by the different treatment may be moved in their response by ideological considerations.

4 Survey Experiment

4.1 Experimental Design

As we discuss in this section, we followed the conceptual framework developed in Section 2 and designed a survey experiment to test the existence of a spillover effect on a third candidate from negative (vs. positive) campaigning in a controlled environment. The survey experiment complements the field experiment discussed in the previous section, since it allows

is one of the included outcomes (available upon request).

us to control and manipulate the number and the personal characteristics of the candidates, to measure the relative size of the target effects, of the backlash effect, and of the spillover effect, and to eliminate the possibility of strategic voting motives from individual electoral choices. As argued with our conceptual framework, to gauge the relative size of the target and of the backlash effect, we need to run an election with two candidates. On the other hand, measuring the spillover effect requires an electoral race with (at least) three candidates. We, thus, run two versions of a fictitious electoral race for mayor: one with three and one with two candidates.

We recruited 2,971 subjects through the database of volunteers maintained by an established Italian polling firm, Ce&Co. Respondents to our survey were presented with a fictitious scenario. They were asked to imagine they just moved to a town in the Center of Italy—to which we gave the imaginary name of *Castelgufo*—where elections for mayor were about to be held. We provided some background information on this town, which was portrayed as small and touristic, with local firms in food and textile industries. Moreover, we added that the political debate had been composed and that the most discussed issues had been local transportation—especially between the center of the town and the suburbs—tourism, and closing the city center to traffic.

In the three-candidate race, all candidates for mayor (listed in a random order) belonged to civic lists, so that no ideological component could be attached to them. They were described as married males in their forties with children. Their last names were chosen to be similar: Baldi, Landi, and Vanni. Baldi was told to be the incumbent major. Participants were reminded that the electoral system was first-past-the-post, Castegufo being an Italian city with less than 15,000 inhabitants. Moreover, they were told that, according to polls, all candidates had similar winning probability. This last information was provided in order to solicit sincere voting and to avoid the strategic voting behavior that might have been present in our field experiment.

For each candidate, the respondents were shown a video, in which the candidate presented

his electoral program. These candidates being fictitious, we used professional actors to record the videos. Three different actors interpreted the characters of the three candidates in addressing the voters with their electoral programs, according to scripts that we designed and that are available, in their English translation, in the Online Appendix. For the incumbent (Baldi) and one of the opponents (Vanni), we shot only one video with a positive message, which was shown to all the respondents. For the other opponent (Landi), we instead produced three videos: one video with a positive message and two videos with a negative message against the incumbent.[8] The two videos with the negative message differed only in the voice tone and body language used by the actor to deliver the same message: in one version the video was delivered with a neutral tone and body language, while in the other version, the video was delivered with an aggressive tone and body language (e.g., shouting and pounding the fists on the table). We then randomized the three videos across our respondents. Those in the 'negative' treatment group (506 subjects) were shown the video with the negative message and a neutral tone; those in the 'aggressive' treatment group (510 subjects) were shown the video with the negative message and an aggressive tone; whereas those in the control group (504 subjects) were shown the video with the positive message. All respondents were provided with the same initial information regarding the city and the election. Respondents in the control group watched three videos (one for each candidate in a random order), all with positive messages; whereas respondents in the two treatment groups watched, again in a random order, two videos with a positive message (from Baldi and Vanni) and one with a

[8]The positive video started with the line "with my City Council, Castelgufo will be a city for all citizens" and then continued with the candidate's policy proposal to boost tourism and economic activity. The negative video started with the line "it is the fault of the incumbent mayor Alessandro Baldi if we now have two types of citizens in Castelgufo: the lucky ones (...) and the forgotten ones" and then continued with the policy errors of the incumbent with respect to the same issues tackled in the positive video. See the Online Appendix for the full script texts.

negative message (from Landi).[9]

An almost identical setup was used for the two-candidate race. In this case, we dropped the third candidate, Vanni, who was idle—that is, neither attacking the incumbent nor being attacked. Respondents were thus left with only two electoral choices: the incumbent (Baldi) and the opponent (Landi). Respondents in the control groups (468 subjects) were shown videos with positive messages from both, whereas those in the treatment groups were exposed to the positive ad by the incumbent and to either the negative/neutral ad (478 subjects) or the negative/aggressive ad (505 subjects) by the opponent.

After being shown the videos, participants were asked what candidate they preferred as mayor for Castelgufo as well as a series of questions to measure their perception of the treated challenger (Landi). In particular, we asked about the perceived political ideology of the candidate, about the perceived success of a potential government led by the candidate, whether they expected the candidate to cooperate or compete with other municipalities from the same county to access funds from the central government, and, as validation of our experimental manipulation, whether they believed the candidate had run a positive campaign, centered around the town's problems, or a negative campaign, aimed at diminishing the opponent(s).[10] Finally, we used a set of state-of-the-art qualitative questions and games from laboratory experiments to elicit participants' economic and social preferences: political ideology (with self-placement on a conservative-liberal scale), trust (with a qualitative ques-

[9]All the videos are available at `https://tinyurl.com/castelgufo`, with English subtitles.

[10]In the survey with two candidates, the percentage of respondents who thinks Landi has run a negative campaign is 8% in the positive treatment, 49% in the negative and neutral treatment, and 61% in the negative and aggressive treatment. In the survey with three candidates, the same percentages are, respectively, 11%, 57%, and 64%. In both cases, the difference between the positive and the negative treatments is statistically significant at the 1% level according to a test of proportions.

tion on who can be trusted), competitiveness (with a real effort task subjects can decide to be paid for either with an individual piece-wise rate or with a tournament, as in Niederle and Vesterlund, 2007), risk aversion (with the choice among six lotteries, as in Eckel and Grossman, 2002), and propensity to cooperate with others (with a qualitative question on what matters most to be successful in life and with contribution to a linear public good game in groups of four members, as in Isaac and Walker, 1988).[11]

The two-candidate survey lasted on average 17 minutes, while participants took on average 21 minutes to complete the three-candidate survey. For their participation, subjects received a flat fee of 1.20 euros, plus a component related to performance in the experimental tasks and games used to elicit economic and social preferences (the average additional payment being 1.90 euros). Tables A.2 and A.3 in the Appendix report summary statistics and balance tests for the personal characteristics of the survey participants across the six experimental treatments. All predetermined variables are perfectly balanced.[12]

4.2 Experimental Results

Tables 4 and 5 present estimates for the effect of different campaign modes on vote intentions (see also Figure OA.9 in the Online Appendix). Tables 6 and 7 show results for the effect of different campaign modes on voters' perception of the candidate whose campaign we

[11]Full instructions are available in the Online Appendix.

[12]Besides the t-tests reported in the two tables, we also ran F-tests on the joint significance of the predetermined variables with respect to the probability of belonging to the different treatment groups. The p-values corroborate the validity of the randomization and are as follows. For two candidates (corresponding to Table A.2): 0.301 (negative group as opposed to aggressive group), 0.974 (positive group as opposed to aggressive group), 0.833 (positive group as opposed to negative group). For three candidates (corresponding to Table A.3): 0.802 (negative group as opposed to aggressive group), 0.901 (positive group as opposed to aggressive group), 0.900 (positive group as opposed to negative group).

manipulate. Tables 4 and 6 focus on elections where the incumbent is challenged by a single candidate, while Tables 5 and 7 focus on elections with three candidates. The unit of observation is a participant and each participant answers each question only once

	Incumbent's Vote Share					
	(1)	(2)	(3)	(4)	(5)	(6)
Negative Campaign	0.078**	0.077**	0.078**			
	(0.03)	(0.03)	(0.03)			
Aggressive Campaign				0.135***	0.136***	0.133***
				(0.03)	(0.03)	(0.03)
Constant	0.462***	0.414***	0.293**	0.540***	0.554***	0.400***
	(0.02)	(0.08)	(0.10)	(0.02)	(0.08)	(0.10)
Baseline Treatment	Positive	Positive	Positive	Negative	Negative	Negative
Demographics		✓	✓		✓	✓
Preferences			✓			✓
Observations	946	946	946	983	983	983
R-Squared	0.006	0.012	0.026	0.019	0.022	0.047

Table 4: Survey Experiment, 2 Candidates, The Effect of Negative Campaigning on Vote Intentions. LPM estimates. SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

In all elections, we ask participants to express a preference for one of the available candidates. No abstention or indifference is allowed. Consider elections with two candidates. In the control treatment where both candidates campaign positively, the challenger receives 54% of the stated preferences.[13] In elections where the challenger adopts a negative message but maintains a neutral tone, this share drops to 46%. The support for the challenger decreases even further, to 32.5%, when he delivers the negative message with an aggressive tone. These average treatment effects are statistically different from zero, even when controlling for demographic characteristics as well as for economic and social preferences elicited with experimental games.

These results show that voters evaluate negatively a politician who attacks another candidate—that is, that there is a backlash effect—and that this effect trumps any possible

[13]This corresponds to the complement to one of the coefficient of the constant in column 1 in Table 4.

negative target effect, due to the negative information the message conveys. In elections with two candidates, a voter who is negatively impressed by the attacker has no choice but to express a preference for the target, even if she has learnt something new and unfavorable about the latter. To assess the existence of spillover effects on other candidates, we studied elections with three candidates. In the control treatment, in which all three candidates campaign positively, the vote share of the treated challenger is 29.4%. This drops to 17% when this challenger attacks the incumbent with a neutral tone and to 14.9% when he uses an aggressive tone. The main beneficiary of the change in preferences is the idle challenger, who is neither attacking nor receiving the attack. This candidate sees his vote share grow from 35.9% with positive campaign to 53% with negative and neutral campaign to 54.4% with negative and aggressive campaign. For both the treated challenger and the untreated challenger, the difference between the positive campaign and any type of negative campaign is statistically significant, whereas the difference between the two type of negative campaigns is not. The incumbent vote share, on the other hand, is statistically indistinguishable across the three treatments.

To summarize, negative (as opposed to positive) campaigning produces a backlash effect, as it reduces the attacker's vote share. With two candidates, it increases the target's vote share. With three candidates, a spillover effect emerges, as the idle candidate vote share increases.[14]

[14]As we have done in the field experiment, to accommodate for the fact that the outcome variables depend on each other and the error terms in the different regressions might be correlated, we also ran Seemingly Unrelated Regression (SUR) models. As the set of control variables is the same in all regressions, coefficients are unaffected and the OLS estimators are both consistent and efficient, but SUR allows us to perform additional tests. Error terms are indeed correlated as the Breusch-Pagan test of independence has a p-value of 0.001. However, confirming the results from Table 5, the effect of negative vs. positive campaigning is jointly different from (the p-values for the three spefications in columns 1, 2 and 3 are

Our survey experiment is designed to investigate the mechanism behind this sizeable treatment effects. In each treatment, we ask participants three sets of questions to solicit their perception of the treated challenger. We ask them whether they believe the candidate would be more likely to cooperate or compete with neighboring municipalities to win access to funds from the central government, what they believe his ideological position to be on a scale between 'left' and 'right,' and whether they think a city government led by him would be successful or not. In the two-candidate election, when the challenger adopts a negative message (pooling together neutral and aggressive tones), the belief that he is a cooperative type decreases of 5.4 percentage points, the belief that he will make a good mayor drops of around 16.2 percentage points, and the belief that he is ideologically extreme grows of 11.6 percentage points. As shown in Table 6, the differences between each pair of treatments are statistically significant, with the exception of the difference between positive and negative with neutral tone for the belief on the propensity to cooperate. In the election with three candidates, the treatment effects of going negative have similar magnitudes (see Table 7). However, in this case, it suffices to adopt a negative message with a neutral tone to be considered less cooperative. Delivering the negative message with an aggressive tone, as opposed to a neutral tone, does not depress further the belief that the attacker would be a good mayor.

To summarize these additional findings, negative (as opposed to positive) campaigning increases voters' beliefs that the attacker is competitive, rather than cooperative, that he would not be a good mayor, and that he is ideologically extreme. With two candidates, all treatment effects are stronger when the message is delivered with an aggressive tone. With three candidates, only the effect on the treated challenger's perceived ideology is stronger when the message is delivered with an aggressive tone.

0.001); while the effect of negative vs. aggressive campaign is not (the p-values for the three specifications in columns 4, 5 and 6 are, respectively, 0.6598, 0.6769, and 0.6691).

	Panel A: Incumbent's Vote Share					
	(1)	(2)	(3)	(4)	(5)	(6)
Negative Campaign	-0.047	-0.047	-0.046			
	(0.03)	(0.03)	(0.03)			
Aggressive Campaign				0.007	0.008	0.010
				(0.03)	(0.03)	(0.03)
Constant	0.347***	0.246**	0.217*	0.300***	0.228**	0.209*
	(0.02)	(0.08)	(0.10)	(0.02)	(0.07)	(0.09)
Baseline Treatment	Positive	Positive	Positive	Negative	Negative	Negative
Demographics		✓	✓		✓	✓
Preferences			✓			✓
Observations	1010	1010	1010	1016	1016	1016
R-Squared	0.003	0.022	0.029	0.000	0.006	0.012

	Panel B: Treated Challenger Vote Share					
	(1)	(2)	(3)	(4)	(5)	(6)
Negative Campaign	-0.124***	-0.124***	-0.127***			
	(0.03)	(0.03)	(0.03)			
Aggressive Campaign				-0.021	-0.020	-0.020
				(0.02)	(0.02)	(0.02)
Constant	0.294***	0.345***	0.458***	0.170***	0.180**	0.265***
	(0.02)	(0.07)	(0.09)	(0.02)	(0.06)	(0.07)
Baseline Treatment	Positive	Positive	Positive	Negative	Negative	Negative
Demographics		✓	✓		✓	✓
Preferences			✓			✓
Observations	1010	1010	1010	1016	1016	1016
R-Squared	0.021	0.032	0.047	0.001	0.006	0.019

	Panel C: Untreated Challenger Vote Share					
	(1)	(2)	(3)	(4)	(5)	(6)
Negative Campaign	0.171***	0.171***	0.173***			
	(0.03)	(0.03)	(0.03)			
Aggressive Campaign				0.013	0.013	0.011
				(0.03)	(0.03)	(0.03)
Constant	0.359***	0.409***	0.326**	0.530***	0.593***	0.526***
	(0.02)	(0.08)	(0.10)	(0.02)	(0.08)	(0.10)
Baseline Treatment	Positive	Positive	Positive	Negative	Negative	Negative
Demographics		✓	✓		✓	✓
Preferences			✓			✓
Observations	1010	1010	1010	1016	1016	1016
R-Squared	0.029	0.032	0.038	0.000	0.001	0.005

Table 5: Survey Experiment, 3 Candidates, The Effect of Negative Campaigning on Vote Intentions. LPM estimates. SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Treated Challenger Cooperative					
Negative Campaign	-0.000	-0.004	-0.008			
	(0.03)	(0.03)	(0.03)			
Aggressive Campaign				-0.105***	-0.102**	-0.093**
				(0.03)	(0.03)	(0.03)
Constant	0.590***	0.723***	0.789***	0.590***	0.658***	0.720***
	(0.02)	(0.08)	(0.10)	(0.02)	(0.08)	(0.10)
Baseline Treatment	Positive	Positive	Positive	Negative	Negative	Negative
Demographics		✓	✓		✓	✓
Preferences			✓			✓
Observations	944	944	944	983	983	983
R-Squared	0.000	0.007	0.019	0.011	0.019	0.039

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel B: Treated Challenger Good Mayor					
Negative Campaign	-0.136***	-0.131***	-0.134***			
	(0.03)	(0.03)	(0.03)			
Aggressive Campaign				-0.050*	-0.051*	-0.048*
				(0.03)	(0.03)	(0.03)
Constant	0.400***	0.490***	0.643***	0.264***	0.226**	0.258**
	(0.02)	(0.08)	(0.09)	(0.02)	(0.07)	(0.09)
Baseline Treatment	Positive	Positive	Positive	Negative	Negative	Negative
Demographics		✓	✓		✓	✓
Preferences			✓			✓
Observations	946	946	946	983	983	983
R-Squared	0.021	0.038	0.053	0.003	0.005	0.019

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel C: Treated Challenger Extreme					
Negative Campaign	0.085***	0.086***	0.085***			
	(0.02)	(0.02)	(0.02)			
Aggressive Campaign				0.059**	0.060**	0.059**
				(0.03)	(0.03)	(0.03)
Constant	0.113***	0.101*	0.181**	0.199***	0.202***	0.180**
	(0.02)	(0.06)	(0.07)	(0.02)	(0.07)	(0.09)
Baseline Treatment	Positive	Positive	Positive	Negative	Negative	Negative
Demographics		✓	✓		✓	✓
Preferences			✓			✓
Observations	946	946	946	983	983	983
R-Squared	0.014	0.015	0.034	0.005	0.006	0.012

Table 6: Survey Experiment, 2 Candidates, The Effect of Negative Campaigning on Voters' Perception of Treated Challenger. LPM estimates. SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Treated Challenger Cooperative					
Negative Campaign	-0.089***	-0.088***	-0.091***			
	(0.03)	(0.03)	(0.03)			
Aggressive Campaign				-0.027	-0.030	-0.031
				(0.03)	(0.03)	(0.03)
Constant	0.562***	0.529***	0.574***	0.472***	0.535***	0.627***
	(0.02)	(0.08)	(0.10)	(0.02)	(0.08)	(0.10)
Baseline Treatment	Positive	Positive	Positive	Negative	Negative	Negative
Demographics		✓	✓		✓	✓
Preferences			✓			✓
Observations	1010	1010	1010	1016	1016	1016
R-Squared	0.008	0.012	0.017	0.001	0.008	0.019

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel B: Treated Challenger Good Mayor					
Negative Campaign	-0.150***	-0.151***	-0.153***			
	(0.03)	(0.03)	(0.03)			
Aggressive Campaign				0.012	0.012	0.013
				(0.03)	(0.03)	(0.03)
Constant	0.341***	0.305***	0.455***	0.192***	0.225***	0.350***
	(0.02)	(0.07)	(0.09)	(0.02)	(0.06)	(0.08)
Baseline Treatment	Positive	Positive	Positive	Negative	Negative	Negative
Demographics		✓	✓		✓	✓
Preferences			✓			✓
Observations	1010	1010	1010	1016	1016	1016
R-Squared	0.029	0.035	0.049	0.000	0.004	0.015

	(1)	(2)	(3)	(4)	(5)	(6)
	Panel C: Treated Challenger Extreme					
Negative Campaign	0.114***	0.114***	0.115***			
	(0.02)	(0.02)	(0.02)			
Aggressive Campaign				0.049*	0.048*	0.046*
				(0.03)	(0.03)	(0.03)
Constant	0.093***	0.215***	0.186**	0.208***	0.219***	0.193**
	(0.02)	(0.06)	(0.07)	(0.02)	(0.07)	(0.08)
Baseline Treatment	Positive	Positive	Positive	Negative	Negative	Negative
Demographics		✓	✓		✓	✓
Preferences			✓			✓
Observations	1010	1010	1010	1016	1016	1016
R-Squared	0.026	0.036	0.041	0.003	0.006	0.013

Table 7: Survey Experiment, 3 Candidates, The Effect of Negative Campaigning on Voters' Perception of Treated Challenger. LPM estimates. SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

5 Conclusion

The use of negative advertising in electoral campaigns is puzzling. Some people have a visceral reaction to ads attacking political opponents. Many argue that negativity is bad for democracy, because it pushes people away from the voting booths. Even political scientists provide little empirical evidence to endorse its effectiveness, since, besides harming the targeted politician, negative ads may have a backlash effect on the attacker. And yet, going negative remains popular among political strategists. The use of negative ads in US elections has however changed since the "Citizens United v. Federal Election Commission" Supreme Court decision in 2010, which abolished restrictions on campaign advertising by outside groups. Candidates are leaving to independent groups the task of attacking their opponents. Two possible justifications have been put forward for this novel strategy: attacks by independents are more credible to voters or they produce less backlash effects for the candidate.

Our paper studies the effect of using negative (vs. positive) campaigning in elections with more than two candidates. In an electoral race with multiple candidates, attacking an opponent may create a backlash effect on the attacker and a positive spillover for other candidates, who refrained from going negative. To test this hypothesis, we ran a large scale field experiment during an electoral campaign for mayor in Italy and a survey experiment in a fictitious electoral campaign for mayor. In our field experiment, we randomized negative vs. positive canvassing at the precinct level and found a strong, positive spillover effect on the idle candidate. In the survey experiment, we created a controlled environment, with no ideological components and no incentives for strategic voting. Results from this experiment confirm the existence of a strong, positive spillover effect and of a sizable backlash effect, which goes against the attacker. Our empirical evidence is robust across different environment (midsize Italian city and fictitious town), methodology (field and survey), and campaigning instruments (canvassing and video ads). With more than two candidates, negative campaigning of one candidate against another creates a positive spillover effect in favor

of the idle candidate (i.e., neither the target nor the attacker).

Our findings also imply that in multi-candidate campaigns there is room for collusion among politicians, as one of them may negatively target a rival by favoring another (idle) candidate, who may then reward the attacker with some side payment (e.g., offering him the vice presidency in a presidential election) after winning the race. This collusive strategy, however, is hard to enforce and faces serious commitment problems. On the contrary, the strategy of having independent groups running the negative ads is less costly, as long as those groups are not fully identified with the true attacker, re-creating a backlash effect. From this perspective, our experimental evidence helps to explain why the strategy of having Super PACs attack rivals has gained momentum in recent U.S. electoral campaigns.

Our results have important implications also for multi-party systems. Indeed, our field experiment was run in a multi-party environment, in which each of the three main candidates belonged to a different party. Our findings suggest that in multi-party systems negative campaigning should be less popular, since every party (or candidate) has an incentive to refrain from attacking other candidate (most likely the incumbent) and to free-ride on negative campaigning done by other parties.

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A Appendix: Additional Tables

Panel A: Pre-Treatment Variables					
	(1)		(2)		
	Positive		Negative		Differences & T-Tests
Variable	N	Mean/SE	N	Mean/SE	(1)-(2)
2010 Winner's Vote Share	18	0.612	18	0.604	0.008
		(0.0204)		(0.018)	(0.027)
2010 Main Challenger's Vote Share	18	0.351	18	0.363	-0.012
		(0.020)		(0.185)	(0.027)
2010 Third Candidate's Vote Share	18	0.037	18	0.033	0.004
		(0.004)		(0.003)	(0.004)
2010 Turnout Rate	18	0.715	18	0.706	0.008
		(0.010)		(0.020)	(0.022)
Percentage of female voters	18	0.515	18	0.517	-0.002
		(0.003)		(0.004)	(0.005)
Total Male voters	18	415.389	18	411.833	3.556
		(18.608)		(15.876)	(24.460)
Total Female voters	18	439.556	18	440.889	-1.333
		(17.014)		(17.143)	(24.153)
Total Voters	18	854.944	18	852.722	2.222
		(35.332)		(32.294)	(47.867)

Panel B: Post-Treatment Variables					
	(1)		(2)		
	Positive		Negative		Differences & T-Tests
Variable	N	Mean/SE	N	Mean/SE	(1)-(2)
Treatment Intensity	18	0.749	18	0.805	-0.056
		(0.053)		(0.053)	(0.075)

Table A.1: Field Experiment, Balance Tests for Treatments.
The value displayed in the last column is the differences in the means across the treatments. ***, **, and * indicate significance at the 1%, 5%, and 10% level according to t-tests.

	(1)		(2)		(3)			
	2 & Aggressive		2 & Negative		2 & Positive		Differences & T-Tests	
Variable	N	Mean/SE	N	Mean/SE	N	Mean/SE	(1)-(2)	(1)-(3)	(2)-(3)
Male	505	0.503	478	0.506	468	0.506	-0.003	-0.003	-0.000
		(0.022)		(0.023)		(0.023)	(0.032)	(0.032)	(0.033)
Age	505	47.905	478	47.215	468	48.605	0.689	-0.700	-1.389
		(0.729)		(0.718)		(0.730)	(1.023)	(1.032)	(1.024)
High School Diploma	505	0.850	478	0.885	468	0.865	-0.035	-0.016	0.020
		(0.016)		(0.015)		(0.016)	(0.022)	(0.022)	(0.022)
South & Islands	505	0.349	478	0.364	468	0.357	-0.016	-0.008	0.007
		(0.021)		(0.022)		(0.022)	(0.031)	(0.031)	(0.031)
Large Municipality (100k+)	505	0.319	478	0.291	468	0.323	0.028	-0.004	-0.032
		(0.021)		(0.021)		(0.022)	(0.029)	(0.030)	(0.030)
Risk Aversion	505	3.893	478	3.872	468	3.872	0.021	0.021	0.001
		(0.064)		(0.071)		(0.071)	(0.095)	(0.096)	(0.100)
Cooperative	505	0.752	478	0.699	468	0.722	0.054*	0.030	-0.023
		(0.019)		(0.021)		(0.021)	(0.028)	(0.028)	(0.030)
Competitive (Tournament)	505	0.279	478	0.274	468	0.291	0.005	-0.011	-0.017
		(0.020)		(0.020)		(0.021)	(0.029)	(0.029)	(0.029)
Overconfidence	505	-0.119	478	-0.073	468	-0.090	-0.046	-0.029	0.017
		(0.056)		(0.061)		(0.060)	(0.083)	(0.082)	(0.086)
Public Good Contribution	505	10.663	478	10.544	468	10.944	0.119	-0.281	-0.401
		(0.234)		(0.259)		(0.254)	(0.348)	(0.345)	(0.362)
Trusting	505	0.109	478	0.157	468	0.126	-0.048**	-0.017	0.031
		(0.014)		(0.017)		(0.015)	(0.022)	(0.021)	(0.023)
Liberal	505	0.309	478	0.343	468	0.327	-0.034	-0.018	0.016
		(0.021)		(0.022)		(0.022)	(0.030)	(0.030)	(0.031)

Table A.2: Survey Experiment, Balance Tests for Treatments with 3 Candidates.
The value displayed in the last three columns are the differences in the means across the treatments. ***, **, and * indicate significance at the 1%, 5%, and 10% level according to t-tests.

	(1)		(2)		(3)			
	3 & Aggressive		3 & Negative		3 & Positive		Differences & T-Tests	
Variable	N	Mean/SE	N	Mean/SE	N	Mean/SE	(1)-(2)	(1)-(3)	(2)-(3)
Male	510	0.506	506	0.498	504	0.502	0.008	0.004	-0.004
		(0.022)		(0.022)		(0.022)	(0.031)	(0.031)	(0.031)
Age	510	44.878	506	44.427	504	45.448	0.452	-0.570	-1.022
		(0.601)		(0.630)		(0.644)	(0.870)	(0.881)	(0.901)
High School Diploma	510	0.888	506	0.899	504	0.903	-0.011	-0.015	-0.004
		(0.014)		(0.013)		(0.013)	(0.019)	(0.019)	(0.019)
South & Islands	510	0.351	506	0.356	504	0.347	-0.005	0.004	0.009
		(0.021)		(0.021)		(0.021)	(0.030)	(0.030)	(0.030)
Large Municipality (100k+)	510	0.353	506	0.314	504	0.351	0.039	0.002	-0.037
		(0.021)		(0.021)		(0.021)	(0.030)	(0.030)	(0.030)
Risk Aversion	510	3.782	506	3.929	504	3.853	-0.147	-0.071	0.076
		(0.066)		(0.065)		(0.067)	(0.093)	(0.094)	(0.093)
Cooperative	510	0.761	506	0.741	504	0.784	0.020	-0.023	-0.043
		(0.019)		(0.019)		(0.018)	(0.027)	(0.026)	(0.027)
Competitive	510	0.302	506	0.285	504	0.272	0.017	0.030	0.013
		(0.020)		(0.020)		(0.020)	(0.029)	(0.028)	(0.028)
Overconfidence	510	-0.143	506	-0.053	504	-0.181	-0.090	0.037	0.127
		(0.057)		(0.057)		(0.057)	(0.080)	(0.081)	(0.081)
Public Good Contribution	510	10.735	506	10.496	504	10.571	0.239	0.164	-0.075
		(0.246)		(0.241)		(0.239)	(0.344)	(0.343)	(0.340)
Trusting	510	0.120	506	0.119	504	0.123	0.001	-0.003	-0.004
		(0.014)		(0.014)		(0.015)	(0.020)	(0.021)	(0.021)
Liberal	510	0.312	506	0.328	504	0.319	-0.016	-0.008	0.009
		(0.021)		(0.021)		(0.021)	(0.029)	(0.029)	(0.029)

Table A.3: Survey Experiment, Balance Tests for Treatments with 3 Candidates.
The value displayed in the last three columns are the differences in the means across the treatments. ***, **, and * indicate significance at the 1%, 5%, and 10% level according to t-tests.

Positive Spillovers from Negative Campaigning
Online Appendix

September 2, 2020

Table of Contents

Appendix I. Field Experiment

Treatment

Our treatments consisted of positive and negative canvassing. During the three weeks prior to the election, a campaign team of volunteers (see figure C1), supporters of Armando Lamberti, knocked on doors of private residences, and buzzed private residences' intercoms (see figure C2), to engage in personal interaction with eligible voters. These personal interactions featured the campaign volunteers soliciting the voters to communicate their ideas about what the new mayor should do for Cava de' Tirreni. These ideas would then be reported to the candidate, Armando Lamberti. Volunteers then took the opportunity to present to these voters Armando Lamberti's ideas, and to distribute electoral material. Electoral material was also left in the mailboxes of other eligible voters, who were not engaged in personal interactions. These electoral materials are at figures C3 to C6. The following sections present respectively the general instructions provided to the volunteers for the canvassing, the script for the initial approach (two options) and the positive and negative messages.

Canvassing Instructions to the Volunteers

General norms to be followed:

- In order to get in touch with the voters and establish a dialogue, it is important to look cheerful, trustful (do not keep your hands in the pocket, do not lean on the wall, no chewing-gums, etc.) and nice. You have to let the voters know that you are not attempting to sell anything, nor you are asking for money, and that you are there to listen to their ideas.

- Avoid assuming aggressive behaviors, even if the person opening the door is clearly aggressive and rude, or if she/he states not to approve Lamberti as a candidate. Just say goodbye and leave.

What to do if the front door of the apartment building is closed:

- If there is a doorman, first convince him/her to let you in the building for the canvassing. It might help starting the canvassing from him/her first. If you succeed, it is likely that he/she will let you in and warn the residents of your arrival. This will likely increase your chances of interviewing a greater number of voters.

- If there is no doorman, you will have to call on the intercom. In order to convince the person to let you in the building you will have to introduce yourselves with one of the introductions you find below.

Once inside the apartment building, how to get personal access to the voters:

- After having entered the building, you have to convince the person to open the door of his/her apartment! Ring the doorbell and when someone answers start introducing yourselves with one of the introductions you find below. The main advantage at this point is that they will see you through the peephole, and they will see your t-shirts.
- If a person, most likely an elderly, decides not to open the door but continues to talk to you from the other side of the door, you can still try to do the canvassing, as described below. You can slid the material under the door.

To enter or not to enter into an apartment:

- You do not need to enter into an apartment for the canvassing. You can give your introductions, listen to their ideas or complaints by remaining on the corridor outside the apartment's door.
- Do not ask to enter into the apartment, people may get frightened. Instead, if you notice that the person is frightened or suspicious, state clearly that you can talk standing at the door.
- If the person invites you to enter, you have two options: (i) If you know the person or he/she looks trustful to you, and you are at least two people, you can enter the apartment and do the canvassing inside; (ii) If you do not feel safe, state that the rules impose you not to enter. If he/she insists, greet him/her and leave.

Canvassing Script I

Good morning/afternoon,

As you can see from our t-shirts, we are young supporters of the candidate mayor Professor Armando Lamberti.

As you might have learned from the newspapers, or as you might have heard from friends of from the streets, Professor Lamberti has promoted an electoral campaign called 'Around the City Listening to Citizens', in order to listen to the ideas and needs of the citizens of the municipality of Cava. We are the volunteers, who 'Listen to Citizens', and we are interviewing people door-to-door.

IF NECESSARY: We know that your time is important and we are not attempting to sell anything, nor we are asking for money. We would like to know what you think the new mayor should do in order to improve the situation in the neighborhood or in your household. Your opinion is fundamental, and Professor Lamberti wants to know which are the priorities to be addressed for the citizens of Cava.

If there is someone else here at home we would also like to talk to him/her in order to collect as many opinions as possible. Once every two or three days, we young supporters meet Professor Lamberti to tell him the citizens' opinions and let him know what really people need.

QUESTION: What is in your opinion the most important issue the new mayor should address? OR ALTERNATIVELY: If you were the mayor, what is the first thing you would do?

Canvassing Script II

Good morning/afternoon,

We are the volunteers, who 'Listen to Citizens'. Have you ever heard of the campaign promoted by the candidate mayor Armando Lamberti to hear the opinions of the citizens of Cava?

As you can see from our t-shirts, we are young supporters of the candidate mayor Professor Armando Lamberti and we would like to know from you what you think of the situation in your neighborhood or in your household, and what the new mayor should do in order to improve the situation.

IF NECESSARY: We know that your time is important and we are not attempting to sell anything, nor we are asking for money. We would like to know what you think the new mayor should do in order to improve the situation in the neighborhood or in your household. Your opinion is fundamental, and professor Lamberti wants to know which are the priorities to be addressed for the citizens of Cava.

If there is someone else here at home we would also like to talk to him/her in order to collect as many opinions as possible. Once every two or three days, we young supporters meet Professor Lamberti to tell him the citizens opinions and let him know what really people need.

QUESTION: What is in your opinion the most important issue the new mayor should address? OR ALTERNATIVELY: If you were the mayor, what is the first thing you would do?

Possible Reactions

There are different tones of possible welcoming, after the opening of the door:

- VERY NEGATIVE WELCOMING (They do not let you speak, they interrupt you, they refuse to open the door or answer that they not have time, or are not interested): Just say thank you, goodbye and leave.
- NEGATIVE WELCOMING (They let you talk, but only in part; they do not open the door and talk from the other side of the door; they say that politicians are all crooks, and that they do not know Lamberti, and vote for XY). You can try one of the following three options: (i) Thank you. We understand that you might not trust politicians, but for us it is still important to know your opinion. What is in your opinion the most important issue the new mayor should address? (ii) Thank you. Even if you do not know Lamberti, for us it is still important to know your opinion. What is in your opinion the most important issue the new mayor should address? (iii) Thank you. Even if you will vote for XY, for us it is still important to know your opinion. What is in your opinion the most important issue the new mayor should address?
- POSITIVE WELCOMING (they let you talk, you arrived successfully to the question in script I or II): After having listened to the answer to your question and having noted it down, you can deliver the following positive or negative message.

Positive Canvassing

How to start:

- Give the person a flyer with the positive message.
- Start from the topic most closely related to the one proposed by the person. Start by stating that that topic is also very important to Professor Lamberti.
- After having talked about the initial topic (the one that is most closely related to the topic proposed by the person), continue BRIEFLY with the two other messages.

Script for the three messages (Only suggestive: you do not need to state everything)

- Dialogue with the citizens: The initiative 'Around the City Listening to Citizens', that brought us here, is just one of the many initiatives Mr Lamberti is planning in order to collect the opinions of the citizens and to dialogue with them, with the goal of taking aware decisions. His dream is that of an inclusive municipality, where every citizen is

seen as an important resource. FOR SUB-MUNICIPALITIES (FRAZIONI): This is especially true for the hamlets, which must feel part of the project of creating a unique municipality: Cava. This can be accomplished also through the promotion of public transportation.

- Competency and transparency: in his professional life as a professor of public law and as a member of several regional cabinets, Professor Lamberti has gained a great experience as an administrator, but he has always been very sensitive towards transparency. It is fundamental for him that citizens are aware of his actions and of the decision taken by his cabinet. The main objective is to reduce the burden of bureaucracy and costs, while increasing transparency in the procedures.

- More public services: Professor Lamberti has always been an active promoter of the improvement of the quality and quantity of health care services. He has always promoted Cava's hospital, and he has also proposed to improve the assistance to citizens by using regional funds that are already available. The project aims at including specialized doctors, a front desk, a nursey, pediatricians, and the launch of the 'Health Center (Casa della salute)', which will be conducting important functions (counseling in support of families, home assistance). The hospital should return to assist acute patients that need hospitalization and those who need emergency interventions, with an emergency service that will remain active 24 hours a day and with wards for cardiology, orthopedics, radiology, intensive care, surgery, pediatrics and the analytical laboratory. FOR SUB-MUNICIPALITIES: this means especially increasing the number of services here in hamlets with health centers and other specialized services of assistance to citizens.

How to finish:

- After having briefly talked about the three themes, ask the person if she/he has any comments. If yes, let the person talk and kindly end the discussion; leave the campaign material, greet him/her and leave.

- If the person interrupts you while you are giving your short presentation, let them him/her talk, try with kindness and BREVITY to talk about all three points. Kindly end the conversation, leave the campaign material, greet him/her and leave.

How to end the conversation if the person wants to continue with the discussion: You can invite him/her to visit Lamberti's committees, which are located in via Verdi. State that the person can meet professor Lamberti and the candidate counselors there.

IMPORTANT: Avoid talking too much if the person is not interested. Better to be brief and avoid getting people bored

Negative Canvassing

How to start:

- Give the person a flyer with the negative message.
- Start from the topic most closely related to the one proposed by the person. Start by stating that over the past five years that issue has not been addressed by Galdi's cabinet.
- After having talked about the initial topic (the one that is most closely related to the topic proposed by the person), continue BRIEFLY with the two other messages.

Script for the three messages (Only suggestive: you do not need to state everything)

- Too much old politics: Galdi's administration has been absent from people's life. Instead of listening to citizens and try to assist their needs, it kept politics distant from people. With Galdi's administration, Cava established a record of cabinets' turnovers: nine turnovers. The main interest of the administration was to keep its 'seats' instead of addressing the citizens' needs. FOR SUB-MUNICIPALITIES: This is especially true for sub-municipalities that joined Cava recently. Lamberti proposes a different style, starting from this initiative of the 'Around the City Listening to Citizens', which brought us here today.
- Too much waste of public money and too many municipal taxes: Galdi's administration pursued a series of wrong public expenditure choices that did not benefit the citizens of Cava. The renovation of the Abbro square with the famous chess-board created many troubles to citizens and waste of public resources. Municipal taxes also increased. For an average household, total municipal taxes increased by 250 Euro per year over the five years of Galdi's administration.
- Too much debt burdening citizens: the purchase of the 'ex-COFIMA' plant by the municipality has raised the level of the municipal debt. The interests on the debt for the purchase of the plant are equal to 1,000 Euro per day. This represents a considerable waste of money, especially because the plant is not yet being used.

How to finish:

- After having briefly talked about the three themes, ask the person if she/he has any comments. If yes, let the person talk and kindly end the discussion; leave the campaign material, greet him/her and leave.

- If the person interrupts you while you are giving your short presentation, let them him/her talk, try with kindness and BREVITY to talk about all three points. Kindly end the conversation, leave the campaign material, greet him/her and leave.

- What to do if the person criticizes your statements about the Galdi's administration? (i) Let him/her talk and interrupt him/her with courtesy; (ii) You can say that the situations you are talking about are complex political and economic issues, and that there can be many different opinions. State that according to you Galdi's administration could have handled certain situations in a better way; (iii) Do not be aggressive and do not attempt to impose your opinion; (iv) Avoid continuing the conversation on Galdi's administration. Kindly greet the person, leave the campaign material and leave.

How to end the conversation if the person wants to continue with the discussion: You can invite him/her to visit Lamberti's committees, which are located in via Verdi. State that the person can meet Professor Lamberti and the candidate counselors there.

IMPORTANT: Avoid talking too much if the person is not interested. Better to be brief and avoid getting people bored.

Figures and Tables

Figure OA.2: Positive flyer

Figure OA.3: Negative flyer

Figure OA.4: Positive hanger

Figure OA.5: Negative hanger

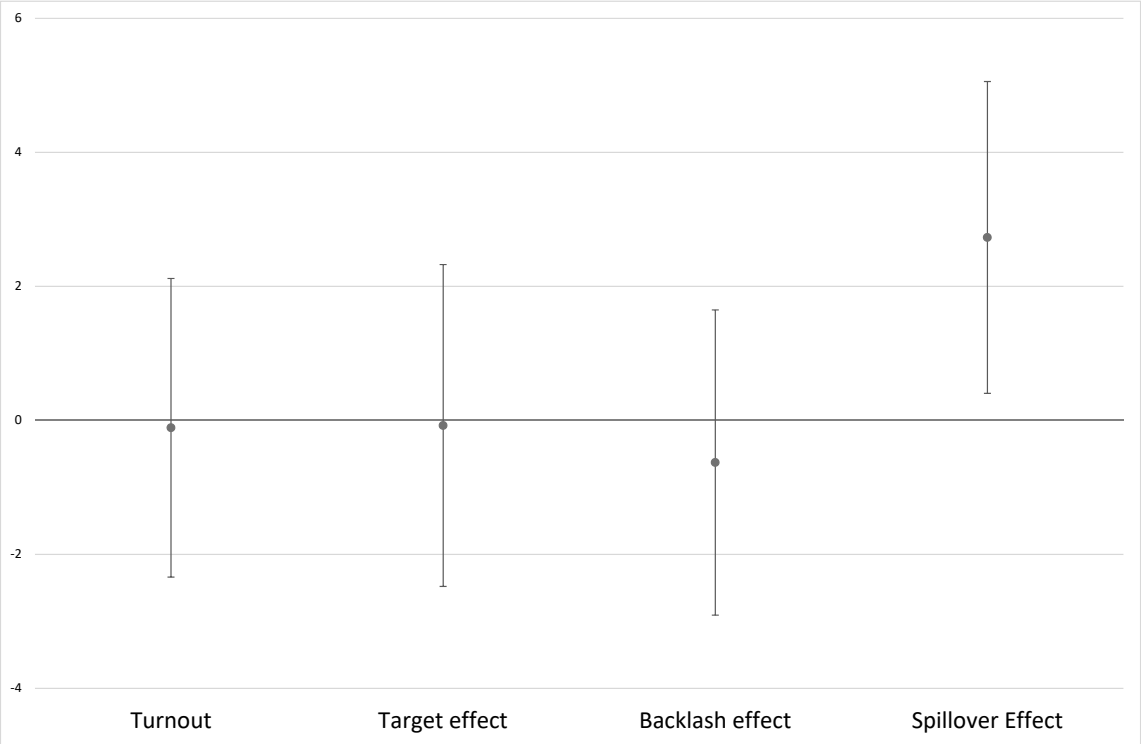

Figure OA.6: Field Experiment Results, The Effect of Negative Campaigning on Turnout, Incumbent Voter Shares (Target Effect), Treated Challenger (Backlash Effect) and Untreated Challenger (Spillover Effect). LPM estimates of vote share variations in percentage points, with controls including Winner's and Main Challenger's Voter Shares, Turnout Rate, Percentage of Female Voters and Total Voters in the 2010 election. Confidence intervals built using robust standard errors from estimates in columns 2 of Table 3.

Panel A: Pre-Treatment Variables					
		(1)		(2)	
		Positive		Negative	Differences & T-Tests
Variable	N	Mean/SE	N	Mean/SE	(1)-(2)
2010 Winner's Vote Share	18	0.612	18	0.604	0.008
		(0.0204)		(0.018)	(0.027)
2010 Main Challenger's Vote Share	18	0.351	18	0.363	-0.012
		(0.020)		(0.185)	(0.027)
2010 Turnout Rate	18	0.715	18	0.706	0.008
		(0.010)		(0.020)	(0.022)
Percentage of female voters	18	0.515	18	0.517	-0.002
		(0.003)		(0.004)	(0.005)
Total Male voters	18	415.389	18	411.833	3.556
		(18.608)		(15.876)	(24.460)
Total Female voters	18	439.556	18	440.889	-1.333
		(17.014)		(17.143)	(24.153)
Total Voters	18	854.944	18	852.722	2.222
		(35.332)		(32.294)	(47.867)

Panel B: Post-Treatment Variables					
		(1)		(2)	
		Positive		Negative	Differences & T-Tests
Variable	N	Mean/SE	N	Mean/SE	(1)-(2)
Treatment Intensity	18	0.749	18	0.805	-0.056
		(0.053)		(0.053)	(0.075)

Table OA.1: Field Experiment, Balance Tests for Treatments.
The value displayed in the last column is the differences in the means across the treatments. ***, **, and * indicate significance at the 1%, 5%, and 10% level according to t-tests.

	(1) Positive		(2) Negative		(3) Control Group		Differences & T-Tests		
Variable	N	Mean/SE	N	Mean/SE	N	Mean/SE	(1)-(2)	(1)-(3)	(2)-(3)
2010 Winner's Vote Share	18	0.612 (0.020)	18	0.604 (0.018)	19	0.587 (0.023)	0.008 (0.027)	-0.025 (0.031)	-0.017 (0.030)
2010 Main Challenger's Vote Share	18	0.351 (0.020)	18	0.363 (0.185)	19	0.376 (0.023)	-0.012 (0.027)	0.025 (0.031)	0.013 (.030)
2010 Turnout Rate	18	0.715 (0.010)	18	0.706 (0.020)	19	0.720 (0.008)	0.008 (0.022)	0.006 (0.013)	0.014 (0.021)
Percentage of female voters	18	0.515 (0.003)	18	0.517 (0.004)	19	0.520 (0.004)	-0.002 (0.005)	0.005 (0.005)	0.003 (0.006)
Total Male voters	18	415.389 (18.608)	18	411.833 (15.876)	19	397.315 (15.116)	3.556 (24.460)	-18.073 (23.855)	-14.518 (21.908)
Total Female voters	18	439.556 (17.014)	18	440.889 (17.143)	19	430.052 (14.488)	-1.333 (24.153)	-9.503 (22.264)	-10.836 (22.358)
Total Voters	18	854.944 (35.332)	18	852.722 (32.294)	19	827.368 (28.709)	2.222 (47.867)	-27.576 (45.300)	-25.354 (43.102)

Table OA.2: Field Experiment, Balance Tests for Treatments.
The value displayed in the last 3 columns are the differences in the means across the treatments and control. SEs in parentheses.
***, **, and * indicate significance at the 1%, 5%, and 10% level according to t-tests.

	Turnout	Incumbent Vote Share	Treated Challenger Vote Share	Main Untreated Challenger Vote Share
Int. Negative Campaign	-0.837	-1.757	-1.432	3.707*
	(1.986)	(1.93)	(1.67)	(2.03)
Int. Positive Campaign	-0.029	-1.549	-0.557	-0.482
	(2.269)	(2.21)	(1.91)	(2.32)
Constant	70***	25.888***	15.58***	27.966***
	(1.23)	(1.20)	(1.03)	(1.26)
Baseline Treatment	No Camp.	No Camp.	No Camp.	No Camp.
Model	2SLS	2SLS	2SLS	2SLS
Observations	55	55	55	55
R-Squared	0.010	0.006	0.011	0.100

Table OA.3: Field Experiment, The Effect of Intense Negative Campaigning on Actual Vote Shares. Complier average causal effect (CACE) obtained running a 2SLS regression in which treatment assignment is the instrumental variable predicting treatment intensity. SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

	Panel A			
	Turnout		Incumbent Vote Share	
	(1)	(2)	(1)	(2)
Negative Campaign	-0.744	0.368	-1.562	-2.516**
	(1.94)	(1.03)	(1.77)	(1.18)
Positive Campaign	-0.023	0.409	-1.205	-2.570*
	(1.45)	(0.99)	(1.99)	(1.51)
Constant	70***	24.416	25.888***	94.074
	(0.87)	(36.79)	(1.59)	(68.10)
Baseline Treatment	No Camp.	No Camp.	No Camp.	No Camp.
Controls		✓		✓
Observations	55	55	55	55
R-Squared	0.004	0.745	0.017	0.492
Random Inference p-Values:				
Negative Campaign variable	0.329	0.371	0.166	0.027
Positive Campaign variable	0.484	0.323	0.225	0.014

	Panel B			
	Treated Challenger Vote Share		Main Untreated Challenger Vote Share	
	(1)	(2)	(1)	(2)
Negative Campaign	-1.273	-0.322	3.295*	3.762***
	(1.63)	(1.45)	(1.82)	(1.19)
Positive Campaign	-0.433	0.329	-0.374	0.969
	(1.59)	(1.49)	(1.97)	(1.30)
Constant	15.58***	85.166	27.966***	-117.97**
	(1.33)	(79.46)	(1.39)	(46.28)
Baseline Treatment	No Camp.	No Camp.	No Camp.	No Camp.
Controls		✓		✓
Observations	55	55	55	55
R-Squared	0.014	0.316	0.081	0.665
Random Inference p-Values:				
Negative Campaign variable	0.170	0.391	0.022	0.000
Positive Campaign variable	0.359	0.387	0.407	0.150

Table OA.4: Field Experiment, The Effect of Negative Campaigning on Actual Vote Shares. LPM estimates. SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Controls in columns (2) include Winner's and Main Challenger's Voter Shares, Turnout Rate, Percentage of Female Voters and Total Voters in the 2010 election. p-values of one-sided tests from running 1,000 placebo estimates with permutation methods and evaluating where the baseline estimate falls in the empirical distribution of these simulated (placebo) estimates.

Appendix II. Survey Experiment

Figures and Tables

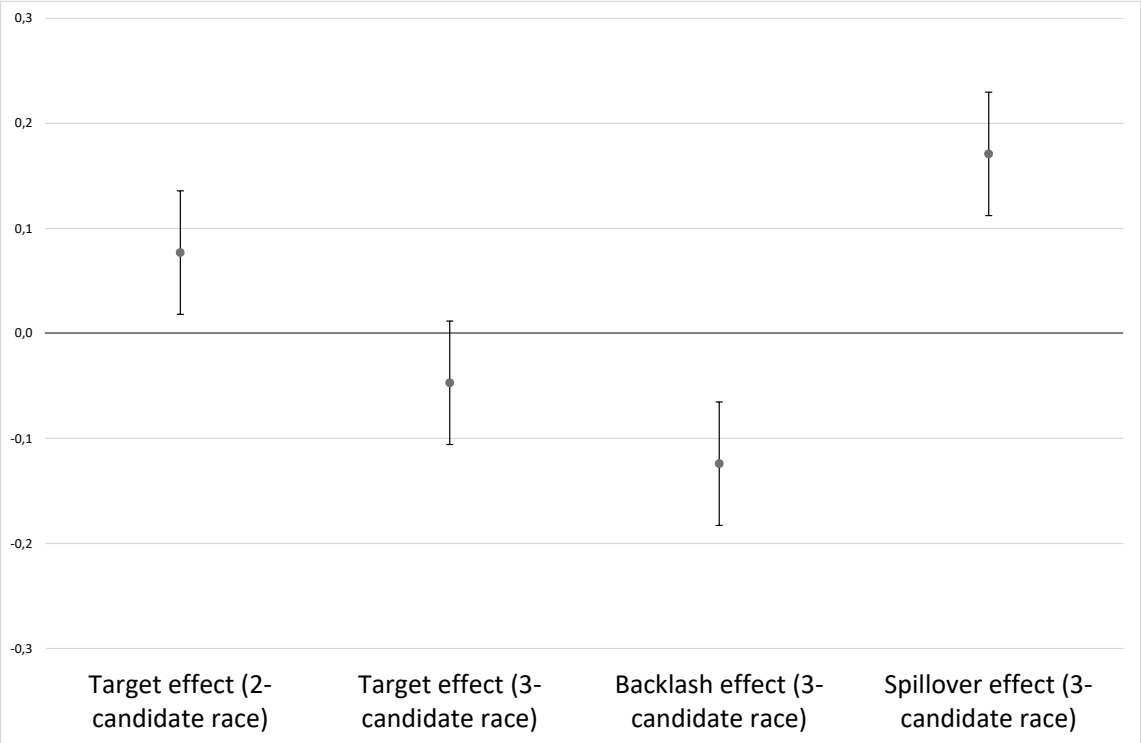

Figure OA.7: Survey Experiment Results, The Effect of Negative Campaigning on Incumbent Voter Shares (Target effect) in 2-candidate race, on Incumbent Voter Shares (Target effect) in 3-candidate race, on the Treated Challenger (Backlash effect) in 3-candidate race and Untreated Challenger (Spillover effect) in 3-candidate race. LPM estimates of vote share variations in percentage points with controls including Male, Age, High School Diploma, South Islands, Large Municipality (100k+). Confidence intervals built using robust standard errors from estimates in columns 2 of Table 4 (Target effect in 2-candidate race) and of Table 5 (Target, Backlash and Spillover effects in 3-candidate race).

	(1)		(2)		(3)			
	2 & Aggressive		2 & Negative		2 & Positive		Differences & T-Tests	
Variable	N	Mean/SE	N	Mean/SE	N	Mean/SE	(1)-(2)	(1)-(3)	(2)-(3)
Male	505	0.503	478	0.506	468	0.506	-0.003	-0.003	-0.000
		(0.022)		(0.023)		(0.023)	(0.032)	(0.032)	(0.033)
Age	505	47.905	478	47.215	468	48.605	0.689	-0.700	-1.389
		(0.729)		(0.718)		(0.730)	(1.023)	(1.032)	(1.024)
High School Diploma	505	0.850	478	0.885	468	0.865	-0.035	-0.016	0.020
		(0.016)		(0.015)		(0.016)	(0.022)	(0.022)	(0.022)
South & Islands	505	0.349	478	0.364	468	0.357	-0.016	-0.008	0.007
		(0.021)		(0.022)		(0.022)	(0.031)	(0.031)	(0.031)
Large Municipality (100k+)	505	0.319	478	0.291	468	0.323	0.028	-0.004	-0.032
		(0.021)		(0.021)		(0.022)	(0.029)	(0.030)	(0.030)
Risk Aversion	505	3.893	478	3.872	468	3.872	0.021	0.021	0.001
		(0.064)		(0.071)		(0.071)	(0.095)	(0.096)	(0.100)
Cooperative	505	0.752	478	0.699	468	0.722	0.054*	0.030	-0.023
		(0.019)		(0.021)		(0.021)	(0.028)	(0.028)	(0.030)
Competitive (Tournament)	505	0.279	478	0.274	468	0.291	0.005	-0.011	-0.017
		(0.020)		(0.020)		(0.021)	(0.029)	(0.029)	(0.029)
Overconfidence	505	-0.119	478	-0.073	468	-0.090	-0.046	-0.029	0.017
		(0.056)		(0.061)		(0.060)	(0.083)	(0.082)	(0.086)
Public Good Contribution	505	10.663	478	10.544	468	10.944	0.119	-0.281	-0.401
		(0.234)		(0.259)		(0.254)	(0.348)	(0.345)	(0.362)
Trusting	505	0.109	478	0.157	468	0.126	-0.048**	-0.017	0.031
		(0.014)		(0.017)		(0.015)	(0.022)	(0.021)	(0.023)
Liberal	505	0.309	478	0.343	468	0.327	-0.034	-0.018	0.016
		(0.021)		(0.022)		(0.022)	(0.030)	(0.030)	(0.031)

Table OA.5: Survey Experiment, Balance Tests for Treatments with 2 Candidates.
The value displayed in the last three columns are the differences in the means across the treatments. ***, **, and * indicate significance at the 1%, 5%, and 10% level according to t-tests.

	(1)		(2)		(3)			
	3 & Aggressive		3 & Negative		3 & Positive		Differences & T-Tests	
Variable	N	Mean/SE	N	Mean/SE	N	Mean/SE	(1)-(2)	(1)-(3)	(2)-(3)
Male	510	0.506	506	0.498	504	0.502	0.008	0.004	-0.004
		(0.022)		(0.022)		(0.022)	(0.031)	(0.031)	(0.031)
Age	510	44.878	506	44.427	504	45.448	0.452	-0.570	-1.022
		(0.601)		(0.630)		(0.644)	(0.870)	(0.881)	(0.901)
High School Diploma	510	0.888	506	0.899	504	0.903	-0.011	-0.015	-0.004
		(0.014)		(0.013)		(0.013)	(0.019)	(0.019)	(0.019)
South & Islands	510	0.351	506	0.356	504	0.347	-0.005	0.004	0.009
		(0.021)		(0.021)		(0.021)	(0.030)	(0.030)	(0.030)
Large Municipality (100k+)	510	0.353	506	0.314	504	0.351	0.039	0.002	-0.037
		(0.021)		(0.021)		(0.021)	(0.030)	(0.030)	(0.030)
Risk Aversion	510	3.782	506	3.929	504	3.853	-0.147	-0.071	0.076
		(0.066)		(0.065)		(0.067)	(0.093)	(0.094)	(0.093)
Cooperative	510	0.761	506	0.741	504	0.784	0.020	-0.023	-0.043
		(0.019)		(0.019)		(0.018)	(0.027)	(0.026)	(0.027)
Competitive	510	0.302	506	0.285	504	0.272	0.017	0.030	0.013
		(0.020)		(0.020)		(0.020)	(0.029)	(0.028)	(0.028)
Overconfidence	510	-0.143	506	-0.053	504	-0.181	-0.090	0.037	0.127
		(0.057)		(0.057)		(0.057)	(0.080)	(0.081)	(0.081)
Public Good Contribution	510	10.735	506	10.496	504	10.571	0.239	0.164	-0.075
		(0.246)		(0.241)		(0.239)	(0.344)	(0.343)	(0.340)
Trusting	510	0.120	506	0.119	504	0.123	0.001	-0.003	-0.004
		(0.014)		(0.014)		(0.015)	(0.020)	(0.021)	(0.021)
Liberal	510	0.312	506	0.328	504	0.319	-0.016	-0.008	0.009
		(0.021)		(0.021)		(0.021)	(0.029)	(0.029)	(0.029)

Table OA.6: Survey Experiment, Balance Tests for Treatments with 3 Candidates.
The value displayed in the last three columns are the differences in the means across the treatments. ***, **, and * indicate significance at the 1%, 5%, and 10% level according to t-tests.

	N	Mean	SD	Median	Min	Max
Vote Baldi	2971	0.44	0.50	0	0	1
Vote Landi	2971	0.32	0.47	0	0	1
Vote Vanni	1520	0.48	0.50	0	0	1
Landi Cooperative	2969	0.52	0.50	1	0	1
Landi Good Mayor	2971	0.27	0.44	0	0	1
Landi Extreme	2971	0.19	0.39	0	0	1
Male	2971	0.50	0.50	1	0	1
Age	2971	46.4	15.1	45	17	92
High School Diploma	2971	0.88	0.32	1	0	1
South & Islands	2971	0.35	0.48	0	0	1
Large Municipality (100k+)	2971	0.33	0.47	0	0	1
Risk Aversion	2971	3.87	1.50	4	1	6
Cooperative	2971	0.74	0.44	1	0	1
Competitive (Tournament)	2971	0.28	0.45	0	0	1
Overconfidence	2971	-0.11	1.29	0	-3	3
Public Good Contribution	2971	10.7	5.45	10	0	20
Trusting	2971	0.13	0.33	0	0	1
Liberal	2971	0.32	0.47	0	0	1

Table OA.7: Survey Experiment, Descriptive Statistics, All Treatments

Scripts from Videos

Baldi (Incumbent)

Good morning! With the commitment of our City Council and with the help of our fellow citizens, in few years Castel Gufo has become an attractive tourist destination. We created a large pedestrian area inside the Old Town's walls, freeing the city center from traffic and pollution. We provided to all tourists a walk into the heart of city. It is always a pleasure to see plenty of tourists visiting our castle and crowding restaurants and bars in the city center. Precisely because tourism creates employment and generates revenues for the hotels, restaurants and for local tradition industry. Indeed, we will continue to draw from these local traditions, such as the Raptor's festival and Hare's festival With Alessandro Baldi we will continue to promote the beauty of our city. Simply Castelgufo. Give value to the beauties of our city. Vote Alessandro Baldi.

Landi (Treated Challenger), Positive Message

Good morning! With my City Council, Castel Gufo will be a city for all citizens. Thanks to our castle and to the beauty of our territory, we will be able to attract lots of tourists to Castel Gufo. My City Council will launch an important project of social and-economic aggregation outside the city's historic walls. For those who work or live in the city center, my commitment is to continue to incentivize tourism, which represents an important source of income for the citizens of Castel Gufo. Outside the historic walls, we plan to build a modern shopping center that will provide jobs to people living in our suburbs. We will also improve the public transportation service that connects the suburbs to the city center. Furthermore, we will also improve the garbage collection in the suburbs. Francesco Landi will be everyone's Mayor, inside and outside the Castel Gufo's walls. Look ahead for a city tailored to everyone's needs. Vote Francesco Landi

Landi (Treated Challenger), Negative Message

Good morning! It is the fault of the incumbent mayor Alessandro Baldi, if we now have two types of citizens in Castel Gufo: the lucky ones, who live within Old Town's walls, and the others, the forgotten ones, who live in the city suburbs and have less opportunities to find a job and face greater difficulty to move with public transportation. Since the city center was pedestrianized and public transportations were reduced, the car traffic outside the city center has tripled. Nowadays, tourists visit only the Old Town and, because of this, small commercial activities are going out of business. Nevertheless, the actual mayor refuses to

approve the project of a modern shopping mall. Also the garbage collection has worsened in the suburbs. Overflowing garbage cans can be seen everywhere. Alessandro Baldi has been the mayor of the Old Town's lobbies and not the mayor of all citizens of Castel Gufo Let's make a change. Stop to a city only for a few. Vote Francesco Landi

Vanni (Untreated Challenger)

Good morning! If I will be elected, the project my City Council has for Castel Gufo is to put our city at the center of a network of small cities in our province, which will join effort to strengthen public transportation, to optimize garbage collection, to rationalize healthcare and to develop tourism in our area, also through the creation of a modern shopping mall. Castel Gufo has the right historic features to be at center of our local community. The castle will host the administrative headquarter of our community, and our hospital, in the borough of Bosco Rapace, will be a part of a multisite hospital complex that will include the other three hospitals of the province and several clinics. I am confident that this network of services will increase employment for our citizens in the administration and in healthcare sector and it also improve the quality of the local public services. Remember, with Lorenzo Vanni, Castel Gufo and its citizens will be at the center of our local community. Citizens first. Let's put Castelgufo at the center of our province. Vote Lorenzo Vanni.

Survey Instructions

You have just moved to Castel Gufo, a town of about 14 thousand inhabitants in central Italy and in a few days there will be municipal elections. Castel Gufo is a town that lives on tourism and small food and textile industries of local importance. In recent years, during the term of office of the outgoing mayor, the chronicle of Castel Gufo has not recorded major events. The most accessible debate concerned the road network and the development model of the city's tourism. In the historical centre, a large pedestrian area has been created from which citizens and tourists have benefited positively. However, traffic outside the city walls has increased and connections between the centre and the hamlets have become slower. In the elections that will take place in a few days, the main candidates for the mayor's seat are three, all belonging to civic lists:

- Alessandro Baldi, outgoing mayor, 44 years old, married with two children;
- Francesco Landi, 48 years old, married with a son;
- Lorenzo Vanni, 46 years old, married with a son.

According to surveys, the election will be decided at the last vote, since each candidate has the support of about a third of the electorate. So, your vote could be decisive: choose carefully! Now we'll show you a video for each candidate prepared for their election campaign, so that you can make an informed choice. Make sure that the sound on your computer, tablet or smartphone is active and high enough and, if possible, wear earphones.

CAND_CHOICE_P1 Which candidate do you prefer for mayor of Castel Gufo?

- ◦ Alessandro Baldi
- ◦ Francesco Landi
- ◦ Lorenzo Vanni

CAND_CONF_P1 Attention! Please read the text of this question carefully. Notice that it is different from the previous one. Now try to put yourself in the shoes of the candidates. Which of the three candidates do you think is most likely to win the election?

- ◦ Alessandro Baldi
- ◦ Francesco Landi
- ◦ Lorenzo Vanni
- ◦ The three candidates are equally convinced that they will win

Q203 We are interested in your opinion about the candidate Francesco Landi, from the List Together for Castel Gufo.

LANDI_IDEOLOGY How would you define Franceco Landi's political position?

- ◦ Left-wing (1)
- ◦ Center-left (2)
- ◦ Center (3)
- ◦ Center-right (4)
- ◦ Right-wing (5)
- ◦ Independent (6)
- ◦ Do not know (7)

LANDI_IDEOLOGY2 If Francesco Landi is elected mayor, what probability do you assign to these events? Indicates 5 numbers between 0 and 100 that add up to 100.

His council will promote left-wing policies: _____ (1)

His council will promote centre-left policies:_____(2)

His council will promote central policies : _____ (3)

His council will promote centre-right policies: _____ (4)

His council will promote right-wing policies: _____ (5)

Total: _____

LANDI_VALENCE If Francesco Landi is elected mayor, what probability do you assign to these events? Indicates 5 numbers between 0 and 100 that add up to 100.

Francesco Landi's mandate will be very good: _____ (1)

Francesco Landi's mandate will be fine: _____ (2)

The mandate of Francesco Landi will go on average: _____ (3)

Francesco Landi's mandate will go wrong: _____ (4)

Francesco Landi's mandate will go very wrong: _____ (5)

Total: _____

LANDI_COOP After the elections, municipalities in the region will have the opportunity to participate in a regional call for proposals for public funds. In case Francesco Landi is elected mayor, which of the following two options you believe will be chosen by his council:

- Cooperate with other municipalities of the province to participate in the regional call with a joint project (1)
- Competing with other municipalities in the province by participating in the regional call with a project exclusively for Castel Gufo (2)

LANDI_CAMPAIGN Which of these two statements on Francesco Landi's election campaign do you find most convincing?

- ◦ He carried out a positive campaign, focused on the problems of the city (1)
- ◦ He has carried out a negative campaign, aimed at belittling his main opponents (2)

Q314 We are interested in your opinion about the candidate Alessandro Baldi, from the Open City List.

Q315 How would you define Alessandro Baldi's political position?

- ◦ Left-wing (1)
- ◦ Center-left (2)
- ◦ Center (3)
- ◦ Center-right (4)
- ◦ Right-wing (5)
- ◦ Independent (6)
- ◦ Do not know (7)

Q316 If Alessandro Baldi is elected mayor, what probability do you assign to these events? Indicates 5 numbers between 0 and 100 that add up to 100.

His council will promote left-wing policies: _____ (1)

His council will promote centre-left policies:_____(2)

His council will promote central policies : _____ (3)

His council will promote centre-right policies: _____ (4)

His council will promote right-wing policies: _____ (5)

Total: _____

Q317 If Alessandro Baldi is elected mayor, what probability do you assign to these events? Indicates 5 numbers between 0 and 100 that add up to 100.

Alessandro Baldi's mandate will be very good: _____ (1)

Alessandro Baldi's mandate will be fine: _____ (2)

The mandate of Alessandro Baldi will go on average: _____ (3)

Alessandro Baldi's mandate will go wrong: _____ (4)

Alessandro Baldi's mandate will go very wrong: _____ (5)

Total: _____

Q318 After the elections, municipalities in the region will have the opportunity to participate in a regional call for proposals for public funds. In case Alessandro Baldi is elected mayor, which of the following two options you believe will be chosen by his council:

- ◦ Cooperate with other municipalities of the province to participate in the regional call with a joint project (1)
- ◦ Competing with other municipalities in the province by participating in the regional call with a project exclusively for Castel Gufo (2)

Q319 Which of these two statements on Alessandro Baldi's election campaign do you find most convincing?

- ◦ He carried out a positive campaign, focused on the problems of the city (1)
- ◦ He has carried out a negative campaign, aimed at belittling his main opponents (2)

Q68 In this second part of the questionnaire, we ask you to answer a series of questions about yourself and your political opinions. We ask you to read these questions carefully and answer them carefully. Besides being anonymous, your answers in this second part of the questionnaire do not affect your earnings. Click to start with the second part of the questionnaire.

SUB_SEX Are you male or female?

- ◦ Male (1)
- ◦ Female (2)

SUB_IDEOLOGY If you had to define your political position with a single word, would you define yourself as...?

- ◦ Left-wing (1)
- ◦ Center-left (2)
- ◦ Center (3)
- ◦ Center-right (4)
- ◦ Right-wing (5)
- ◦ Independent (6)

SUB_TRUST Which of these statements do you agree with the most?

- ◦ Most people can be trusted (1)
- ◦ It's better not to trust completely, you're never too careful (2)
- ◦ You can only trust your family (3)

SUB_COOP To succeed in life, it is more important...

- ◦ Being better than others (1)
- ◦ Knowing how to work with others (2)

Q255 When important news comes out, people often go online to get up-to-date details about what's going on. We want to know which websites people trust to get this information. We also want to know if people pay attention to the instructions. To prove you've read so far, ignore the question and select Il Sole 24 Ore and Donna Moderna as your two answers.

When an important news breaks out, which news website do you visit first? Name just one.

- ☐ Corriere della Sera (1)
- ☐ La Repubblica (2)
- ☐ La Stampa (3)
- ☐ Rai News (4)
- ☐ Huffington Post Italia (5)
- ☐ Il Fatto Quotidiano (6)
- ☐ Sky TG24 (7)
- ☐ Il Sole 24 Ore (8)
- ☐ Ansa (9)
- ☐ Dagospia (10)

☐ Il Sole 24 Ore (11)

☐ TGCOM24 (12)

☐ Il Messaggero (13)

☐ Il Giornale (14)

☐ Donna Moderna (15)

☐ Oggi (16)

☐ Il Manifesto (17)

☐ Il Foglio (18)

Q87 In the rest of the questionnaire, you will have the opportunity to earn a sum of points that we will add to the 120 points that you will earn for your participation.

Your earnings in this third part of the questionnaire will depend partly on your choices, partly on the choices of the other participants and partly on random.

In this third part of the questionnaire, we ask you to participate in some games.

The method we will use to determine your payment is different in each game. Therefore, if you want to earn more points, please pay attention and read the instructions on each page carefully!

You will find out your results in each game when you are awarded the points quota for the games.

Q88 Game 1 - Fixed Payment

In Game 1, we ask you to find out how many times the letter F appears in a row of 50 randomly selected letters. You'll have exactly 90 seconds to find the number of F in a series of these lines.

Here is an example:

How many F's are there in the line below?

USAJJDKWXMLUCNMQFOORAZNXFTYEDUPFTABPALKTWVFQFRTGAW

You will earn 3 points for each line for which you correctly identify the number of F's within the 90 seconds. Your payment will not decrease if you give a wrong answer to a line.

We call this payment scheme "Fixed Payment".

The lines to be resolved are on the next page. When you are ready, click the >> button. From that moment on, you will have exactly 90 seconds. At the end of the 90 seconds, the computer will automatically proceed to the instructions for Game 2.

Q121 Game 2 - Tournament

This time we ask you to find out how many times the letter D appears in a row of 50 randomly selected letters. You will have exactly 90 seconds to find the number of D in a series of these lines.

Unlike Game 1, in Game 2, your payment depends on your performance relative to that of a group of other participants. Each group is made up of 4 people. The other 3 members of your group are randomly selected from the participants in this questionnaire.

In Game 2, the group member who correctly solves the most lines will receive 12 points for each correct line. The other three group members will not receive any points. If there are draws, the winners will equally divide the 12 points for each correct line.

As before, the lines are on the next page. When you are ready, click the ¿¿ button. From that moment on, you will have exactly 90 seconds. At the end of the 90 seconds, the computer will automatically proceed to the instructions for Game 3.

Q154 Game 3 - Choice

This time you have 90 seconds to find out how many times the letter L appears in a row of 50 randomly selected letters.

In this game, you can choose how you want to be paid: Fixed Payment or Tournament.

If you choose Fixed Payment, you will receive 3 points for each line correctly resolved.

If you choose Tournament, your performance in Game 3 will be compared to the performance of the other 3 members of your group in Game 2. Game 2 is the one you have just completed. If you correctly solve more lines than these 3 participants did in Game 2, you will receive a payment 4 times higher than the Fixed Payment, i.e. 12 points for each exact answer. If in this game you do not give more exact answers than the other members of your group in Game 2, you will not receive any payment for this game. If there are draws, the winners will equally divide the 12 points for each correct line.

As before, the lines are on the next page. When you are ready, click the ¿¿ button. From that moment on, you will have exactly 90 seconds. At the end of the 90 seconds, the computer will automatically proceed to the instructions for the next part of the questionnaire.

SUB_COMP How do you want to get paid in Game 3?

- Fixed payment (0)
- Tournament (1)

SUB_CONF This question concerns your performance in Game 2 (the Tournament).

What do you think about your ranking in your group in terms of the number of exact answers?

Choose a number from 1 (which means "I think I was the first, or the best, in my group of four") to 4 (which means "I think I was the fourth, or the worst, in my group of four").

If you correctly guess your position in the ranking, you will receive 20 points.

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)

SUB_RISK Game 4

In this Game 4, we ask you to choose one of six lotteries. Each lottery makes you win a high amount with a 50% chance and a low amount with a 50% chance.

The computer will randomly determine whether you will be paid the high or low amount of the lottery you have chosen. In particular, the computer will pull a virtual coin: if this coin falls on your head, you will receive the high amount of the lottery you have chosen; if the coin falls on the cross, you will receive the low amount. Which lottery do you prefer among these 6?

- Lottery 1: 28 points with 100% probability (1)
- Lottery 2: 36 points with 50% probability and 24 points with 50% probability (2)
- Lottery 3: 44 points with 50% probability and 20 points with 50% probability (3)
- Lottery 4: 52 points with 50% probability and 16 points with 50% probability (4)

- Lottery 5: 60 points with 50% probability and 12 points with 50% probability (5)
- Lottery 6: 70 points with 50% probability and 2 points with 50% probability (6)

SUB_COOP Game 5

For this last Game 5, you will be assigned to a group of four people. The groups will be formed randomly by the computer.

We'll give you 20 additional points and ask you to decide how to use them.

You can put the 20 points in your personal account or invest them - all or part of them - in a common project. Any points not invested in the common project will automatically be placed in your personal account.

For every point you put in your personal account, you earn exactly one point. For example, if you put 20 points in your personal account - and invest 0 in the joint project - you get exactly 20 points. If you put 6 points in your personal account, you get 6 points from your personal account (and you get additional earnings from the joint project, as described below).

Contrary to the personal account, everything you invest in the joint project generates earnings for all members of the group. You will also benefit from the points invested in the joint project by other group members.

More precisely, your earnings from the joint project are calculated as follows: sum of the investments in the joint project of the members of your group divided by 2.

Consider these examples:

1. If the sum of your investments and the investments of the other group members is equal to 60, each group member - including you - earns $60/2 = 30$ points from the joint project.
2. If the sum of your investments and the investments of the other group members is equal to 10, each group member - including you - earns $10/2 = 5$ points from the joint project.

Your total points for this game will be equal to:

Points earned from your personal account + Points earned from the joint project.

How many points out of a total of 20 do you want to invest in the common project?