



## **CALTECH/MIT VOTING TECHNOLOGY PROJECT**

A multi-disciplinary, collaborative project of  
the California Institute of Technology – Pasadena, California 91125 and  
the Massachusetts Institute of Technology – Cambridge, Massachusetts 02139

**TITLE      Measuring the Effects of Voter Confidence on Political  
Participation:  
An Application to the 2006 Mexican Election**

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**Key words:**

**VTP WORKING PAPER #75  
June 2009**

# **Measuring the Effects of Voter Confidence on Political Participation: An Application to the 2006 Mexican Election**

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## **Abstract**

In this paper we study the causal effect of voter confidence on participation decisions in the 2006 Mexican Election. Previous research has shown that voter confidence was a relevant factor in explaining participation during the years of the PRI hegemony. An open question is whether this relationship is still significant after the democratic transition taking place in the years 1997-2000. Moreover, in the previous literature, this problem was studied in a regression framework. In this article we argue that, since voter confidence and participation decisions are affected by similar covariates, a regression approach may lead to results which are too model dependent, and do not account for the heterogeneity of effects across voters. To solve this problem, we use matching methods, and find that voter confidence has considerable effects on participation decisions, but substantially different in magnitude from those found using the usual regression approach.

June 20, 2009

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## Introduction

The relationship between voter confidence and political participation has long been a concern for scholars analyzing Mexican elections (Davis et al. 2004; Hiskey and Bowler 2005; Klesner 1997; Klesner and Lawson 2001; McCann and Dominguez 1998). Even though Mexico has a lengthy experience with the practice of elections, actual electoral competitiveness and political turnover is a recent phenomenon. Moreover, there are abundant accounts of massive electoral fraud during the 70-years hegemony of the Institutional Revolutionary Party (PRI) (Craig and Cornelius 1995; Lehoucq 2003).<sup>1</sup> In this context, it is not surprising that many segments of the electorate have doubts about the state of the country's democracy, or believe that votes have no effect on how "things are run" in Mexico (Ai Camp 2006; McCann and Dominguez 1998). Thus, in the case of Mexico, the definition of voter confidence is not limited to a voter's trust in the individual vote being counted, but is conceived as trust in the overall cleanness of the electoral process. According to previous research on the behavior of Mexican voters, voter confidence varies according to personal attributes such as socio-demographic characteristics, political attitudes, economic evaluations, or local context, and it significantly affects voters' participation

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<sup>1</sup> According to Craig and Cornelius (1995), some common electoral fraud techniques were "stuffing ballot boxes, intimidating potential opposition supporters, disqualifying opposition party poll watchers, relocating polling places at the last minute, manipulating voter registration lists, issuing multiple voting credentials to PRI supporters and organizing multiple voting by carruseles ("flying brigades" of PRI supporters, transported from one polling place to another)." Other violations mentioned by Lehoucq (2003) are: late opening of polling places, certification of results by a biased legislature, violations of vote secrecy, and vote buying.

decisions (Davis et al. 2004; Hiskey and Bowler 2005; Klesner and Lawson 2001; McCann and Dominguez 1998). However, as voters self-select into different levels of confidence, it is likely that estimation methods used in previous research might be problematic, as these methods may be highly dependent on modeling assumptions (Ho et al. 2007; King and Zeng 2005). In this paper, we use matching methods to test the hypothesis that voter confidence has a positive causal effect on turnout, and a negative causal effect on the willingness to participate in post-electoral demonstration against official election results. The advantage of the matching approach, relative to what has been previously done in the Mexico case, is that it allows us to control for the non-random assignment of voters into confidence categories based on their observable attributes, but in such a way that results are consistent with heterogeneity of causal effects across voter characteristics, and are less dependent on model specification.

Additionally, the study of voter confidence has recently become of much more interest to scholars studying political behavior, in particular in the U.S. There have been a string of recent papers looking at voter confidence in the U.S., focusing on how variables like partisanship, race and ethnicity, method of voting, and voting technology have influenced the confidence of voters in recent U.S. elections (Alvarez, Hall and Llewellyn 2008a, b; Alvarez and Hall 2008; Atkeson and Saunders 2007; Hall, Monson and Patterson 2007, 2008; Hasen 2005; Herrnson et al. 2008a, b). While there has been speculation in the literature from the U.S. that voter confidence might affect voter turnout, there has not been substantial analysis to date of that question (Alvarez, Hall, and Llewellyn 2008a). We believe that our work in this paper might provide spark new research in a number of nations on the causal connection between voter confidence and turnout.

Our paper proceeds as follows. In the next section we examine the electoral context surrounding the 2006 presidential election. Next, we turn to a discussion of the data we use, and

the matching procedures we employ. After that, we discuss our results, and then our paper concludes with a brief discussion of how our results fit into the literature on voter confidence, and our suggestions for future research.

## **The 2006 Presidential Election**

We focus our analysis on the 2006 presidential election, the second one carried out after the alleged culmination of the country's democratic transition (Klesner and Lawson 2001; Lawson 2004, 2006), and first one held under a non-PRI government. There are several reasons why this is an interesting election to study. First, in spite of the success of electoral reforms in securing more fair and competitive races, and the victory of the PAN candidate in the 2000 presidential election, Hiskey and Bowler (2005) point out the importance of the sub-national context and the uneven pace of democratization across different regions of the country, warning about the possibility of "perpetuation or revival of old-style political bosses at the local level." Klesner (1997, page 29) writes that while electoral reforms were effective in guaranteeing more "cleaner and observed" elections in the north, where the PAN was the main opposition, the situation was different in the south "especially in rural localities where the opposition has no presence and the national media do not enter, where the PRD forms the PRI's major opposition." Therefore, we should not take for granted that all voters trust elections after the historical 2000 outcome. As Lawson (2006, page 3) writes "for most Mexicans, the PRI's defeat in 2000 represented the culmination of a long process of democratic transition... For the left, however, alternation in power between the old ruling party and the conservative PAN constituted only partial and cosmetic change."

Second, several events took place in the years and months preceding the 2006 presidential election, which may have significantly affected voter confidence. The first three accounts are drawn from Lawson (2006). First, the PAN and PRI joined forces in 2003 to name the councilors of the Federal Electoral Institute (IFE), “excluding those candidates proposed by the PRD” (Lawson 2004, page 9) and substituting “a number of distinguished academics and activists” by “a number of political unknowns and party hacks” (Lawson 2006, page 3). It is likely that this measure reduced voters’ confidence in the IFE, and in particular its ability to investigate campaign finance violations (Lawson 2004, page 9). Second, in 2005, the PRI and PAN again joined forces, this time to impeach the PRD presidential candidate López Obrador, an action which could have prevented the candidate from running in the election. Third, a broadcasting law was passed in 2006 which benefitted television channels covering the incumbent party. According to Lawson (2006, page 3), “in the leftist narrative, all of these events signaled a conspiracy between the government, the PAN, the old ruling party, leading businessmen, and now-perverted electoral authority to deprive their own candidate.” Fourth, the PRI presidential candidate, Roberto Madrazo, was not a new character in Mexico’s electoral-fraud discussion. In 1994, Madrazo was elected governor in the state of Tabasco, after an election which was considered suspicious by observers and outright fraudulent by the PRD, which refused to recognize the official results (McCann and Dominguez 1998). Given the history of party competition in Mexico, the events taking place in the years and months before the election, and the antecedents of the PRI candidate, we expect that many voters may have doubts about the fairness of the 2006 electoral process.

Up to the 2000 election, the fraudulent nature of the electoral process, and the need for electoral reform, was the main issue put forward by opposition candidates. Defeating the regime

was “the” issue for the opposition. As Huntington (1991, page 180) writes about elections under authoritarian regimes in the third-wave of democratization, “individuals and groups representing very different ideologies and with very different grievances against the regime came together to vote against the regime.” Apparently this was also the case in Mexico’s democratic transition (Craig and Cornelius 1995). As mentioned in the introduction, previous research has shown that voter confidence had a positive and significant effect on participation in elections held under PRI governments.<sup>2</sup> An open question is whether the electoral fraud issue still has significant effects on voters’ participation decisions, once turnover took place at the highest level of government.

## **Data and Methodology**

The data we use to study the causal effect of voter confidence on turnout proceeds from the Mexico 2006 Panel Study (Lawson 2007). Specifically, we use the 1776 survey responses corresponding to the Second Wave Panel Questionnaire, and complement our analysis with some responses to the First and Third Waves Panel Questionnaires. First wave interviews were conducted in October 2005, and second wave interviews were conducted in May 2006, approximately 7 ½ and 1 ½ months before Election Day, respectively. Third wave interviews were conducted after the election, in July 2006. In the Mexico 2006 Panel Study (MPS),

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<sup>2</sup> For an analysis of the effects of voter confidence on various measures of political engagement in the 2000 election, see Hiskey and Bowler (2005). Also, for a comparison of findings corresponding to the 1988 and 1991 elections, see McCann and Dominguez (1998), and for a comparison of findings corresponding to the 1991, 1994 and 2000 elections, see Klesner and Lawson (2001). Also, Davis et al. (2004) find similar results in the analysis of survey data corresponding to a fictitious 1998 election.

individuals were asked a closed-question about their belief in the cleanness of the elections, and could choose among the following options: “totally”, “somewhat”, “a little”, or “not at all” clean.<sup>3</sup> We label this question *voter confidence*, but unlike Hiskey and Bowler (2005) we do not recode these responses into binary categories. Doing so implies a strong assumption about the way respondents understand each category, and we find it leads to a loss of information.<sup>4</sup> Our aim in this paper is to learn about the causal effect of voter confidence on *turnout*, as well as participation in a potential challenge of official results (*protest*). The first outcome variable is coded one if the individual responds that he is “very likely” or “sure” to vote, and zero if he is “somewhat likely”, “little likely” or “will not to vote”.<sup>5</sup> The second outcome variable is coded one if the individual is willing to participate in a post-electoral demonstration against official results, and zero otherwise.<sup>6</sup> Causal effects are measured as the change in the probability of

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<sup>3</sup> The exact wording of the voter confidence question is: “How fair do you think elections will be this year: totally fair, more or less fair, a little fair, or not at all fair?”

<sup>4</sup> The binary categorization employed by Hiskey and Bowler (2005) assumes that while voters distinguish between “a little clean” and “somewhat clean”, they do not distinguish between “somewhat clean” and “totally clean”, or between “not at all clean” and “a little clean”. However, we find that an increase of voter confidence from “somewhat clean” to “totally clean” increases substantively the likelihood of turnout, and has a small negative effect on the likelihood of participating in a post-electoral challenge of official results.

<sup>5</sup> The exact wording of the turnout question is: “How likely is it that you will vote in this year elections: totally sure, very likely, somewhat likely, little likely or will not vote?”

<sup>6</sup> The exact wording of the protest question is: “Let’s suppose the election is over and IFE announces that candidate you voted for has lost. Your candidate rejects the result and calls on his



turnout or protest, as a function of the change in the perception of fairness of the electoral process.

Since each individual is exposed to a unique confidence category, it is impossible to compute individual level causal effects. Using experimental terminology, we say that each individual is treated with a unique degree of confidence in the electoral process. Unlike random experiments, individuals in the MPS sample self-select to the different treatments, by consciously or unconsciously choosing their level of confidence as a function of their personal characteristics, such as age, education, income or political attitudes. We use the standard term propensity score to refer to the probability that an individual is assigned to a particular confidence category, conditional on his or her personal characteristics. If additionally these attributes directly affect the decision to participate, an unbiased estimate of the causal effect may require that we condition the relationship between confidence and participation in all confounding factors. According to Morgan and Winship (2007), “the fundamental problem of causal inference requires that we focus on non-individual-level causal effects, maintaining assumptions about the treatment assignment and treatment stability that will allow us to give causal interpretations to differences in average values of different observed outcomes.”

To solve these issues, we can proceed in several ways. For instance, we can estimate a regression model, where the dependent variable is participation intention, and the independent variable of interest is confidence in the fairness of the election. Further, to block all back-door-paths, we may include as regressors all variables which simultaneously voter confidence and affect participation decisions. In previous studies of the effect of voter confidence on turnout in

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followers to join him in protest demonstrations. Would you join the demonstration to support your candidate or would you not join the demonstration?”

Mexico, authors have estimated logistic regressions, with voting intention as the dependent variable, and measures of voter confidence included among the regressors (Davis et al. 2004; Hiskey and Bowler 2005; Klesner and Lawson 2001; McCann and Dominguez 1998). In these models, authors control for other observable factors, which might have an effect on turnout – we represent the matrix of control variables with the letter  $X$ . Still, controlling for these explanatory variables might not resolve any estimation bias, because results are highly sensitive to model specification (Ho et al. 2007; King and Zeng 2005). According to King and Zeng (2005), an important cause of model dependence is that values of  $X$  observed in the control group might have null probability of being observed in the treatment group, or vice versa.<sup>7</sup> In that case, estimation results would depend on the way the model extrapolates outside the region of common support of  $X$  in both groups, and predicted effects in the regions located further from the center of the data would depend to a large degree on the model’s parametric specification. In addition, since voter confidence is introduced as an ordinal variable, instead of as a set of dummy variables, these regressions assume that the effects of different changes in voter confidence are proportional to each other. For instance, the usual regression specification assumes that if the coefficient associated with voter confidence is positive, then the effect of a drop in voter confidence from 3 to 1 will be negative and larger in magnitude than the effect of a decrease in

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<sup>7</sup> King and Zeng, (2005, page 135) define model dependence at any point as “the difference, or distance, between the predicted outcome values from any two possible alternative models. (...) By “plausible” alternative models, we mean models that fit the data reasonably well and, in particular, they fit about equally well around either the “center” of the data (such as a multivariate mean or median) or the center of a sufficiently large cluster of data nearest the counterfactual  $x$  of interest.”

voter confidence from 3 to 2. However, since individuals not necessarily distinguish between the meanings of two contiguous response categories, it might be the case that a fall in confidence from 3 to 1 has the same effect as a fall in confidence from 3 to 2. Last, none of the above mentioned authors include explicit interaction terms in their models, or discuss whether their model specification is consistent with potential interaction effects between the different pairs of independent variables.<sup>8</sup> According to Ai and Norton (2003), even if an interaction term is included in these non-linear models, it is difficult to come up with accurate measures of the interaction effects.<sup>9</sup> Therefore, in the presence of potential heterogeneity of causal effects within non-linear models, a better approach is to choose an estimation procedure which is consistent with this potential heterogeneity, and at the same time allows results to be less dependent on the model specification.

In this paper, we use matching methods to balance the distribution of covariates across treatments and control groups. According to Ho et al. (2007), the advantage of estimating the causal effects on matched samples is that once the relationship between treatment assignment and other covariates is broken down, estimated causal effects are less model dependent. There are two ways to compute causal effects with multi-valued treatments: first, split the data into

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<sup>8</sup> There has been debate in the political methodology literature about the need to include interaction terms in logit and probit models (Nagler 1991; Berry 1999).

<sup>9</sup> In relation to the estimation of interaction effects in logit and probit models, Ai and Norton (2003, p129) write that “the interaction effect requires computing the cross derivative or cross difference. Like the marginal effect of a single variable, the magnitude of the interaction effect depends on all the covariates in the model. In addition, it can have different signs for different observations, making simple summary measures of the interaction effect difficult.”

overlapping subsamples containing two treatments each, conduct matching within each subsample, and compute causal effects independently for each sample of pairwise matched data (Imbens 2000); second, construct a multi-dimensional instrument, such as a matrix containing the probabilities that each observation is assigned to every one of the treatments, match individuals with similar probability vectors (Imai and van Dyk 2004), estimate causal effects for the different types of individuals, and integrate across the population to obtain overall causal effects. One disadvantage of the first approach is that whenever we compute causal effects within a particular subsample, we assume that if individuals outside the subsample were to experience a similar adjustment, then treatment effects would not change. Another disadvantage is that the number of observations is smaller within each subsample, relative to the original data, and this may lead to less efficient results. Turning to the second approach, the main disadvantage is that when the number of covariates is large, it might be difficult to achieve balance without dropping a large number of observations. To obtain unbiased estimates, it is important that individuals with a given set of characteristics have a positive probability of being assigned to any of the treatments under consideration. Thus, although at first sight the simultaneous comparison of all treatment suggests a gain in efficiency relative to the pairwise approach – because we could potentially estimate effects using the whole sample – this advantage might be lost once observations are discarded to restrict the analysis to the common support of the covariates.

In the case of the Mexico Panel Study, we follow the pairwise matching approach, for two reasons. First, there is a modal confidence category (the third one, feeling “somewhat confident”) which emerges as a natural baseline, and we set as the control group in each pairwise comparison. Since most individuals lie within the control group, each subsample of pairwise data is large enough to compute reliable causal effects. Second, the number of covariates affecting the

participation decision is relatively large, so it would be difficult to achieve balance in multiple treatments, simultaneously, without dropping a large number of observations. Still, it is important to note that individuals experiencing low levels of confidence – considered when we compare individuals in the baseline category with those having “little” or “not at all” confidence in the cleanness of the election, might be different from those experiencing a high level of confidence – considered when we compare individuals in the baseline category with those having “total” confidence in the cleanness of the election.

To carry out the estimation, we use the MatchIt software package (Ho et al. 2004), implemented through R, to perform subclassification matching for each pair of confidence categories. Later, we compute causal effects by estimating binary logistic regressions within each subsample of matched data. This allows us to control for any remaining bias (Ho et al. 2007), as well as the correlation across observations created during the matching stage (Gelman and Hill 2006). In conducting subclassification matching and estimating the causal effects of voter confidence on voting intentions, we follow a series of steps: First, for each pair of confidence categories – 3 versus 1, 3 versus 2, and 3 versus 4, we construct subsamples containing the observations corresponding to the control and treatment groups. Second, within each subsample, we estimate a logit model of voter confidence to obtain the predicted probabilities that each individual is assigned to the treatment – i.e. propensity scores. The benefit of matching based on propensity scores instead of on each covariate, is that this allows us to balance the distribution of all covariates while at the same time avoiding the “curse of dimensionality” (Heckman et al. 1998; Rosenbaum and Rubin 1983; Rubin and Thomas 1996). Even though propensity scores are estimated using a parametric regression approach, this does not make our results more model dependent. The only objective of the estimated propensity scores is to balance the distribution of

covariates between the treatment and control group. Therefore, as long as they allow us to achieve this objective, we can say the parametric specification used to compute the propensity scores was adequate given our balancing purpose.<sup>10</sup> Third, within each subsample, we drop the observations outside the common support of the propensity scores, and classify observations into different subclasses, such that the number of treatment units is equal within each subclass. Subclassification matching is desirable in our study due to the large number of covariates, and the fact that several covariates have multiple values (Ho et al. 2007).<sup>11</sup> Fourth, we check for balance by comparing the distribution of covariates and propensity scores in the treatment and control groups, within each subclass. We do so by studying jitter plots of the propensity scores,

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<sup>10</sup> Ho et al. (2007, page 21) refer to this as the “propensity score tautology”: “The estimated propensity score is a balancing score when we have a consistent estimate of the true propensity score. We know we have a consistent estimate of the propensity score when matching on the propensity score balances the raw covariates. Of course, once we have balance on the covariates, we are done and do not need to look back. That is, it works when it works, and when it does not work, it does not work.”

<sup>11</sup> We also conducted nearest neighbor propensity score matching, using a 0.10-0.25 caliper, specifying exact matching for those covariates with poor balance in the subclassification case, and setting a maximum ratio of three control units per treatment observation. The problem with this approach is that since we consider several covariates – some of them taking many values, balance improvement was poor relatively to the subclassification case. Moreover, the alternative method implied discarding between 200 and 500 control units in each pairwise comparison, in addition to several treatment units. As a result, causal effects varied substantively between different matched obtain through the same nearest-neighbor matching algorithm.

as well as quantile-quantile (Q-Q) plots for the different covariates.<sup>12</sup> Also, for each covariate, we compute the difference in means between the treatment and control groups, and compare it with the original distance, as well as with the standard deviation of each variable. Ideally, the matching procedure should be “equal percent bias reducing” (Rosenbaum and Rubin 1983), in the sense that the reduction in the distance between means in the treatment versus control group should be similar across covariates. Moreover, according to Ho et al. (2007), a rule of thumb for checking balance, is making sure differences in means lie within a quarter of the standard deviation for each covariate. Fifth, we use the Zelig software package (Imai et al. 2004) to estimate causal effects in matched samples. We do so by specifying an ordered logit model of turnout within each subclass, and simulating the change in the probability of participation as a result of a change in voter confidence, setting all other variables at their mean levels. Finally, we compute causal effects by doing a weighted average of the changes in the probability of participation across subclasses.<sup>13</sup>

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<sup>12</sup> Due to space limits, we only report jitter plots, but Q-Q plots are available from the authors upon request.

<sup>13</sup> According to Ho et al. (2007) "estimating the treatment effects separately for each subclass, and then aggregating across subclasses, can increase the robustness of the ultimate results since the parametric analysis within each subclass requires only local rather than global assumptions." An alternative way of computing causal effects after conducting subclassification matching, is to estimate a weighted logistic regression in the matched data, where treatment observations have weight equal to one, and control observations weight according to the number of control observations within each subclass.

To minimize the loss of data caused by missing values in the covariates, we use the software package Mice (van Buuren and Oudshoorn 2000), implemented through R, to perform a multiple imputation of the missing values. This allows us to impute the missing values in *target* columns using the remaining covariates as predictors, using Gibbs Sampling.<sup>14</sup> We do not impute missing values in the participation or voter confidence variables, but drop all observations with missing values in either of both variables. Also, we do not include participation or voter confidence variables among the predictor columns for computing missing values on covariates.

## Results

Table 1 shows the frequency distribution of turnout and protest intentions, according to respondents' perceptions of the cleanness of the electoral process. Most individuals respond that they believe elections are "somewhat" clean. Starting from this baseline category, the proportion of individual participating increases with voter confidence, while the willingness to participate in protests against official results decreases. The opposite happens when we consider a decrease in voter confidence. On a scale from 1 to 4, the mean level of voter confidence in the cleanness of the elections is 2.72 (see Table 2), with 90% of the voters showing levels of confidence above 1, 67% showing levels of confidence above 2, and 14% showing levels of confidence equal to 4. Also, in the general population, 79% of the voters answer that they are very likely or sure to

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<sup>14</sup> The specific method we employ is "Predictive Mean Matching" (Rubin 1986).



vote, and 37% answer that they would be willing to participate in demonstrations against official results.<sup>15</sup>

### INSERT TABLES 1 AND 2

Table 3 shows the results of binary logistic regressions of turnout and willingness to participate in protests, estimated in the unmatched data set. According to the first model, perceptions of procedural fairness significantly affect turnout. Specifically, the probability of turnout decreases by 5 and 12 percentage points when voter confidence changes from “somewhat” to “a little” or “not at all”, respectively. Also, the probability of turnout increases by 4 percentage points when voter confidence increases from “somewhat” to “totally” clean. In addition, in line with Hiskey and Bowler’s (2005) findings, regional dummies (*south, north* and *center*) are not very useful for explaining turnout, although people living in the south are significantly less likely to vote. Moreover, variables such as *age, education, marital status (married)* and *church attendance* have positive and significant effects on turnout, as expected. Further, individuals with high *strength of partisanship* and *Fox approval* are more likely to

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<sup>15</sup> The mean respondent in our sample had 35% chance of living in Mexico State or the Federal District; between 35 and 45 years old; 54% chance of being female; almost completed high school; earned between 2600 and 3999 Mexican Pesos; had 50% chance of having dark brown skin; 56% chance of being married; attended church approximately once a month; had a weak partisanship, with 26% chance of being a PRD supporter, 23% of being a PRI supporter and 24% of being a PAN supporter; approved a little of Fox; believed that personal and economic conditions had remained about the same; believed that close to two of the three main candidates only focused in criticizing other candidates; and lived less than ten minutes away from her polling place.

participate, though once the strength of partisanship and approval of President Fox are controlled for, *PRI* and *PAN* supporters are significantly less likely to turnout relative to independent citizens. Additionally, greater perceptions of *negativity of the campaign*, or larger *time costs of voting*, significantly reduce voting intentions. Finally, individuals with more *trust in the news* are more likely to vote. Variables such as *income*, *white* race, evaluations of the *personal* and *national economy*, living in an *urban* region, *trust in family and friends*, and *PRD* partisanship, have no significant impact on turnout. In the case of participation in protests against official results, there is no significant effect of voter confidence, but there is a positive impact of age, female gender, strength of partisanship, *PRD* support and trust in the news. Also, there is a negative effect of education and perceptions of negativity of the campaign.

### **INSERT TABLE 3**

Table 4 shows covariate means for each category of voter confidence. Clearly, the unmatched sample is not balanced in the sense that the distribution of covariates varies systematically across levels of voter confidence. In line with expectations, there is a negative association between the proportion of individuals residing in the southern region of the country and voter confidence, while the opposite happens with individuals living in the north or center. Also, voter confidence has a positive relationship with education, income, white race, married status, church attendance, and evaluations of personal and national economy, but a negative relationship with female gender. In addition, in line with the “winners’ effect”, individuals who approved of Fox have larger confidence in the electoral process. Further, voter confidence increases with the proportion of individuals of *PRI* or *PAN* supporters, but decreases with *PRD* partisanship. Finally, and again as expected, voter confidence is increasing in the average level of trust in family and friends, and trust in the news, but decreasing in perceptions of negativity of

the campaign and in the average time it takes to mobilize to the polling place. Note that several of these variables should have a simultaneous impact on voter confidence and participation intentions. Therefore, it is important to control for these potentially confounding factors in the specification of the political participation models.

#### **INSERT TABLE 4**

For each pair of confidence categories, we use individuals “somewhat” confident in the cleanness of the election as the control group. Then, within each subsample of pairwise unmatched data, we estimated binary logistic regressions to compute propensity scores – the likelihood that each individual is assigned to the treatment category. After that, we drop observations outside the common support of the propensity scores across the control and treatment groups, and separated observations into four or six subclasses – depending on the pairwise comparison, such that the distribution of propensity scores was relatively homogeneous within each subclass. Figure 1 shows “jitter” plots where each observation is located along the horizontal dimension determined by the propensity score. Unmatched observations appear in the upper and lower part of the figures – for the treatment and control groups, respectively. Also, vertical lines indicate the limits between the different subclasses. In general, the likelihood an individual is assigned to a high confidence category increases significantly with north residency, age, education, trust in family and friends, trust in the news, Fox approval, strength of partisanship, PRI and PAN party ID, and evaluation of the national economy. Differently, the likelihood of being assigned to a high confidence category decreases with female gender, south residency, urban locality and time cost of voting.

#### **INSERT FIGURE 1**

To assess the quality of our matching we compared covariate means in the treatment and control groups. When differences are small enough (relative to the standard deviation or the original distance), it is usually said there has been a balance improvement. As mentioned in the previous section, a rule of thumb is that differences in means should lie within a quarter of a standard deviation for each covariate. Table 5 shows covariate means, as well as the percentage balance improvement. This indicator represents the absolute decrease in distance, as a proportion of the original difference in means between the treatment and control group. To ensure a reduction in selection bias, it is important for the matching procedure to be equal percentage bias reducing. Even though the percentage reduction in bias was very similar across most covariates, this was not the case with respect to marital status in the 3 versus 1 comparison, age in the 3 versus 2 comparison, and PRD partisanship and negativity of the campaign in the 3 versus 4 comparison, where bias improvement was small or worsened. According to these figures, our subclassification matching procedure produces a balance improvement in most covariates. Specifically, balance improvement is large and above 70% in nearly all cases. Also, differences in means in the matched data sets are always within or very close to a quarter of the standard deviation – except for negativity of the campaign within one subclass of the 3 versus 4 comparison.

#### **INSERT TABLE 5**

In order to control for any remaining bias, we compute causal effects by estimating regression models in the matched samples. Then, making use of the coefficients found on the basis of these regression models, we compute the average treatment effects by simulating the changes in the probability of turnout and participation in protests, as a function of an increase in the confidence in the cleanness of the electoral process. For ease of comparison, we present the

average causal effect for each pair of confidence categories in the unmatched data, next to the causal effects estimated in matched samples. Interestingly, while the effect of an increase in voter confidence appears to be relatively linear in the case of the unmatched data set, this does not seem to be the case in the pairwise matched samples. In the latter, the effect of a decrease in confidence from 3 to 1 is similar to the effect of a decrease from 3 to 2 – both in the case of turnout, as well as in the case of participation in demonstration against election results. When voter confidence increases from “somewhat” to “totally clean”, we find that turnout has a larger magnitude effect in pairwise matched data (0.10 versus 0.04), and something similar happens with protest effects (-0.04 versus -0.02), although in the latter case voter confidence has a negative effect. Differently, when voter confidence falls from “somewhat” to “not at all” clean, turnout effects have a smaller effect in pairwise matched data (-0.07 versus -0.12), and something similar happens with protest effects (0.03 versus 0.05), although in the latter case voter confidence has a positive effect.<sup>16,17</sup> As a result, in the pairwise matched data set, effects

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<sup>16</sup> Recall that voter confidence had no significant effect in the probability of participating in protests, in the unmatched data set. However, in the case of the 3 versus 2 and 3 versus 4 pairwise comparisons, it does have a significant effect within some subclasses of matched data. Still, effects are not significant in most subclasses, so our results are not as robust as in the case of turnout effects.

<sup>17</sup> Note that we compare the results obtained in pairwise matched data sets, with those obtained with a logit estimation in unmatched samples, where voter confidence is introduced as a 4-point ordinal regressor. We use the latter as a basis of comparison because it resembles the approach previously used in the literature. If instead of this we compare our results with those obtained in pairwise unmatched samples – i.e., where separate logit models are estimated within each

are very similar in the 3 versus 1 and 3 versus 2 comparison. Last, we find that within each matched subsample, the causal effect of voter confidence on participation decisions varies significantly across subclasses, suggesting that indeed there is large heterogeneity of the effects across voters.

## INSERT FIGURE 2

### Discussion

Through the application of matching methods to the analysis of voter behavior in the last Mexican presidential election, we show that an increase in perceptions of fairness in the cleanness of the election raises the probability that an individual is “very likely” or “sure” to vote, while a decrease has the opposite effect. Differently, an increase in voter confidence causes a fall in the probability a voter is willing to participate in post-electoral demonstrations against official results, while an increase slightly increases the likelihood of participation. Further, relationships between voter confidence and both measures of political participation are not linear. For instance, causal effects are very similar when voter confidence decreases from

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pairwise subsample, before performing matching, we find the following effects: In the turnout case, -0.05 (in the 3 versus 1 comparison), -0.06 (in the 3 versus 2 comparison) and 0.09 (in the 3 versus 4 comparison). These effects are closer to the ones obtained after matching, though still of lower magnitude. However, they suggest that the similarity of the effects in the 3 versus 1 and 3 versus 2 comparisons is a result of conducting pairwise comparison, and not of the matching procedure. In the case of participation in protests, effects in pairwise unmatched samples are 0.00 (in the 3 versus 1 comparison), 0.03 (in the 3 versus 2 comparison) and -0.05 (in the 3 versus 4 comparison), and not significant.

“somewhat” to “a little” clean, as when it decreases from “somewhat” to “not at all” clean. A possible explanation is that individuals are not able to clearly distinguish between the meanings of contiguous response categories – in this case, between “not at all” and “a little” clean. Most interestingly, we found that for the same pair of confidence categories, effects on participation intentions differ broadly across the subclasses determined by the propensity scores. This implies that causal effects do in fact vary according to the level of the other covariates. The advantage of using matching methods is that our results are less model dependent, and are consistent with heterogeneity of effects across voters – and we do not need to resort to less efficient solutions, like measuring effects by specifying a regression on a set of dummy variables for voter confidence, or including interaction terms between different pairs of covariates.

Still, our analysis is not only important for the methodological advances, but also in substantive terms. We find that confidence in the procedural fairness of the election is still a relevant factor for explaining voter behavior, even after the end of the PRI hegemony, and it noticeably affects participation decisions. After the events following the announcement of the 2006 official results, concerns about electoral fraud gained new salience and our analysis may serve to hypothesize about the impact of these events on future turnout rates. After the close victory of the PAN candidate Felipe Calderón, the PRD candidate Andrés Manuel López Obrador challenged the results, alleging that the election had been stolen through electoral fraud, requesting recounts of the votes, and organizing mass mobilizations against the official results. Comparing pre- and post-election answers to the question about perceptions of the cleanness of the election, we observe that the number of individuals choosing “totally” clean increased in the post-election survey, and so did the number of individuals choosing “not at all” clean, indicating that citizens became more polarized with respect to their views of the system (see Table 6). This

motivated us to estimate an ordered logit model of the relationship between change in voter confidence across the pre- and post-election surveys (see Table 7). The result is that the change in the perceptions of fairness of the election was negatively correlated with age, PRD affiliation and pre-election trust in the news; and was positively correlated with PAN affiliation and Fox approval. Thus, polarization is apparently explained by PRD supporters losing their confidence in the system, and PAN and Fox supporters showing the opposite pattern of behavior.

#### **INSERT TABLES 6 AND 7**

What might be the consequence of this change in voter confidence for future Mexican elections? According to our results (reported in Tables 8a and 8b), holding everything else constant and assuming voter confidence remains at post-election levels, PRD participation should fall in 2012, while PAN participation should increase. Specifically, assuming that before the 2006 election all voters thought the election would be “somewhat” clean, we expect the probability that a voter turns out should decrease by 3.5 percentage points in the case of PRD partisanship, should increase by 4.6 percentage points in the case of PAN partisanship, and should remain the same in the case of PRI partisanship.<sup>18</sup> Since causal effects do not vary largely by party ID (see table 8.b), differences in predictions are a result of the unequal pattern of flow of confidence observed among voters of different partisanship (see table 8.a). While 50% of PAN supporters experience an increase in voter confidence, 60% of PRD supporters experience a

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<sup>18</sup> For the purpose of this calculation, we assumed that in the pre-election survey voters thought the election would be “somewhat” clean. We do so because our models use the 3<sup>rd</sup> category as the basis of comparison. Note that in the pre-election survey, the average level of confidence among PRI supporters was 2.8 (s.d. 0.8), among PAN supporters was 2.9 (s.d. 0.8), and among PRD supporters was 2.7 (s.d. 0.8), suggesting our assumption is not unrealistic.



decrease in their trust in the procedural fairness of the electoral system. Since the size of the effect of an increase in voter confidence is larger than the size of the effect of a decrease in voter confidence, we expect PAN supporters to experience an increase in the likelihood of voting, exceeding the fall in the likelihood of voting experienced by PRD supporters.

### **INSERT TABLES 8a and 8b**

Also, our conclusion adds to the argument of McCann and Dominguez (1998), that perceptions of fraud among opposition supporters alienated them from the electoral process, and ended up hurting the electoral opportunities of their favorite candidates. We find that it is not only the case that lower confidence in the electoral system, among a particular group of voters, hurts the latter because they turn-out to vote with a lower probability. But also, when another group of voters experiences an increase in turnout as a result of the same even – in this case the 2006 post-electoral conflict, this further hurts the first group because voters with opposite preferences participate in larger numbers.

A question that remains to be answered is whether there is also a relationship between voter trust in the cleanness of the election, and voter choice. McCann and Dominguez (1998), test whether low confidence voters participated and voted for the opposition in the 1988 and 1994, but do not find evidence in favor of this hypothesis. Still, these elections were held during the period of PRI rule, when Mexican elections were considered mostly non-competitive. It makes sense that in such a context, opposition voters preferred to abstain, or to engage in other types of political activity, rather than turn out to vote contributing to legitimize the regime they opposed, with no chance of affecting the outcome. After 2000, even though a large proportion of voters still have doubts about the fairness of electoral outcomes, it is probable that they perceive elections to be more competitive than they were in 1988 or 1994, and therefore may face greater

incentives to participate and express their dissatisfaction with the state of the system by casting a ballot at the polls. For that reason, an interesting line of research would be to proceed with the study of voter choice in 2006, and specifically on how it was affected by the voters' view of the electoral system.

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## Tables and Figures

**Table 1: Participation by Level of Confidence in the Electoral Process (unmatched data set)**

Cleanness of the Electoral Process	Turnout		Protest	
	0	1	0	1
<b>1 (not at all)</b>	51 (32.3%)	107 (67.7%)	97 (62.6%)	58 (37.4%)
<b>2 (a little)</b>	109 (29.0%)	267 (71.0%)	223 (60.8%)	144 (39.2%)
<b>3 (somewhat)</b>	172 (19.6%)	706 (80.4%)	544 (63.6%)	311 (36.4%)
<b>4 (totally)</b>	16 (6.7%)	223 (93.3%)	160 (67.5%)	77 (32.5%)
	348 (21.1%)	1303 (78.9%)	1024 (63.4%)	590 (36.6%)

Note: Correlation between confidence and voting: 0.1792 (N=1651); correlation between confidence and protest: -0.0345 (N=1614).

**Table 2: Descriptive statistics (unmatched data set)**

	<b>Mean</b>	<b>Standard Error</b>	<b>Min</b>	<b>Max</b>
<b>turnout</b>	0.79	0.41	0	1
<b>protest</b>	0.37	0.48	0	1
<b>confidence</b>	2.72	0.83	1	4
<b>confidence above 1</b>	0.90	0.30	0	1
<b>confidence above 2</b>	0.67	0.47	0	1
<b>confidence above 3 (=max)</b>	0.14	0.35	0	1
<b>south</b>	0.27	0.44	0	1
<b>north</b>	0.16	0.37	0	1
<b>center</b>	0.22	0.41	0	1
<b>age</b>	2.39	0.98	1	5
<b>female</b>	0.54	0.50	0	1
<b>education</b>	4.77	2.53	1	9
<b>income</b>	4.34	2.75	1	10
<b>white</b>	0.18	0.38	0	1
<b>married</b>	0.56	0.50	0	1
<b>church attendance</b>	3.17	1.15	1	5
<b>personal economy</b>	3.13	0.92	1	5
<b>national economy</b>	3.27	1.04	1	5
<b>urban region</b>	0.65	0.48	0	1
<b>strength of party ID</b>	0.99	0.74	0	2
<b>PRD</b>	0.26	0.44	0	1
<b>PRI</b>	0.23	0.42	0	1
<b>PAN</b>	0.24	0.42	0	1
<b>Fox approval</b>	3.41	1.31	1	5
<b>negativity of campaign</b>	1.78	0.87	0	3
<b>time cost of voting</b>	2.32	1.16	1	7
<b>trust family &amp; friends</b>	2.58	0.87	1	4
<b>trust news</b>	2.74	0.85	1	4

N=1776. Note: Except for turnout and protest, this table shows post-imputation statistics, and includes individuals who do not respond to turnout or protest questions.



**Table 3: Binary Logit Coefficients (unmatched data set)**

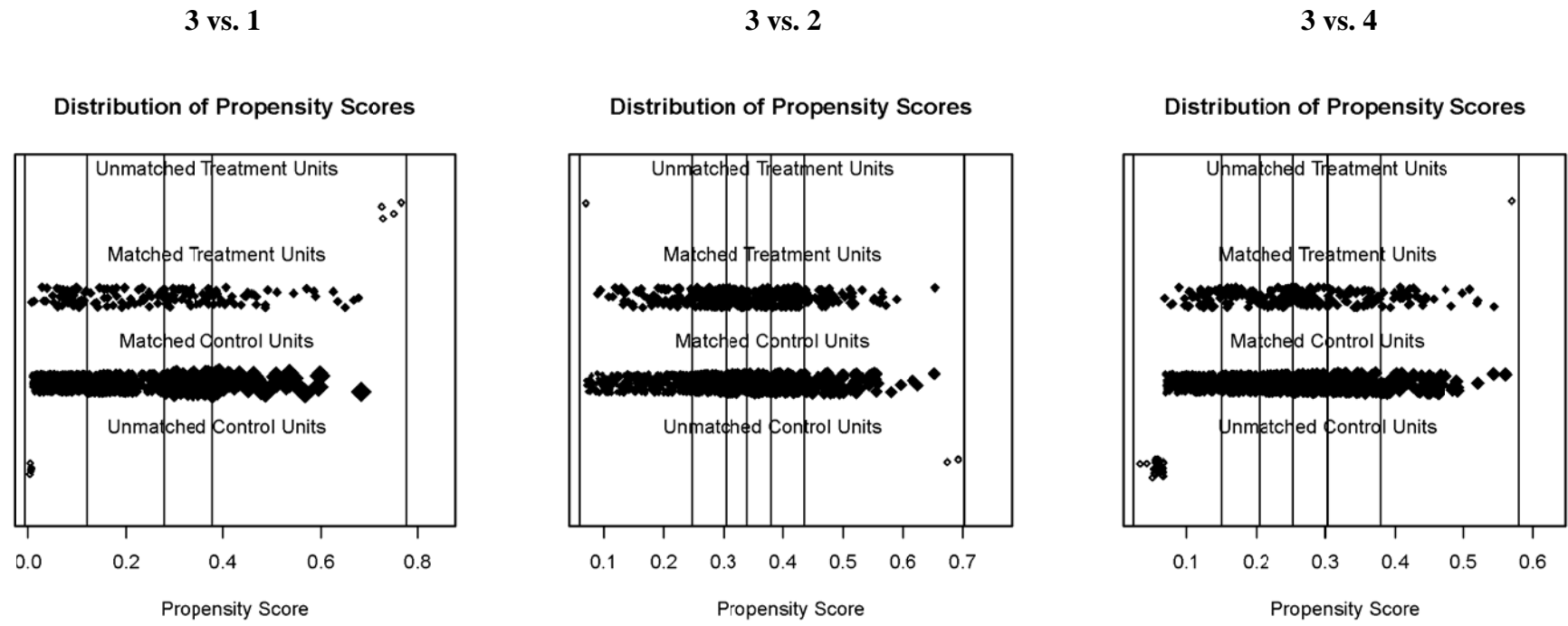
	<b>Turnout</b>	<b>Protest</b>
<b>intercept</b>	-3.40**	-1.23**
<b>confidence</b>	0.36**	-0.10
<b>south</b>	-0.37*	0.06
<b>north</b>	-0.27	0.20
<b>center</b>	-0.01	-0.02
<b>age</b>	0.54**	0.17**
<b>female</b>	0.18	0.21*
<b>education</b>	0.27**	-0.11**
<b>income</b>	0.02	0.02
<b>white</b>	-0.10	-0.16
<b>married</b>	0.44**	-0.12
<b>church attendance</b>	0.11*	0.07
<b>personal economy</b>	-0.04	-0.12
<b>national economy</b>	-0.03	0.09
<b>urban region</b>	0.16	-0.07
<b>strength of party ID</b>	0.77**	0.60**
<b>PRD</b>	-0.46	0.80**
<b>PRI</b>	-0.52*	0.01
<b>PAN</b>	-0.57*	0.11
<b>Fox approval</b>	0.19**	-0.05
<b>negativity of campaign</b>	-0.16**	-0.17**
<b>time cost of voting</b>	-0.11*	0.02
<b>trust family &amp; friends</b>	-0.02	0.00
<b>trust news</b>	0.15*	0.14**
<b>N</b>	1651	1614

**Table 4: Covariate Means (unmatched data set)**

	<b>Cleanness of the Electoral Process</b>			
	<b>1 (not at all)</b>	<b>2 (a little)</b>	<b>3 (somewhat)</b>	<b>4 (totally)</b>
<b>south</b>	0.27	0.32	0.22	0.18
<b>north</b>	0.06	0.08	0.19	0.28
<b>center</b>	0.20	0.21	0.23	0.25
<b>age</b>	2.47	2.34	2.32	2.51
<b>female</b>	0.58	0.58	0.54	0.40
<b>education</b>	4.13	4.71	5.03	5.35
<b>income</b>	3.58	4.09	4.52	5.14
<b>white</b>	0.15	0.17	0.19	0.24
<b>married</b>	0.56	0.52	0.56	0.61
<b>church attendance</b>	2.98	3.10	3.19	3.25
<b>personal economy</b>	2.87	3.04	3.15	3.27
<b>national economy</b>	2.77	3.20	3.33	3.41
<b>urban region</b>	0.70	0.63	0.67	0.71
<b>strength of party ID</b>	0.94	0.95	0.99	1.15
<b>PRD</b>	0.34	0.30	0.25	0.23
<b>PRI</b>	0.18	0.22	0.23	0.25
<b>PAN</b>	0.14	0.21	0.25	0.31
<b>Fox approval</b>	2.94	3.21	3.47	3.74
<b>negativity of campaign</b>	1.95	1.81	1.74	1.74
<b>time cost of voting</b>	2.54	2.44	2.29	2.13
<b>trust family &amp; friends</b>	2.39	2.43	2.67	2.78
<b>trust news</b>	2.35	2.68	2.83	2.92

N=1651. Note: This table shows statistics for individuals answering the turnout question.

**Figure 1: Distribution of Propensity Scores and Construction of Subclasses**



Note: Figures correspond to matched data used in turnout model.

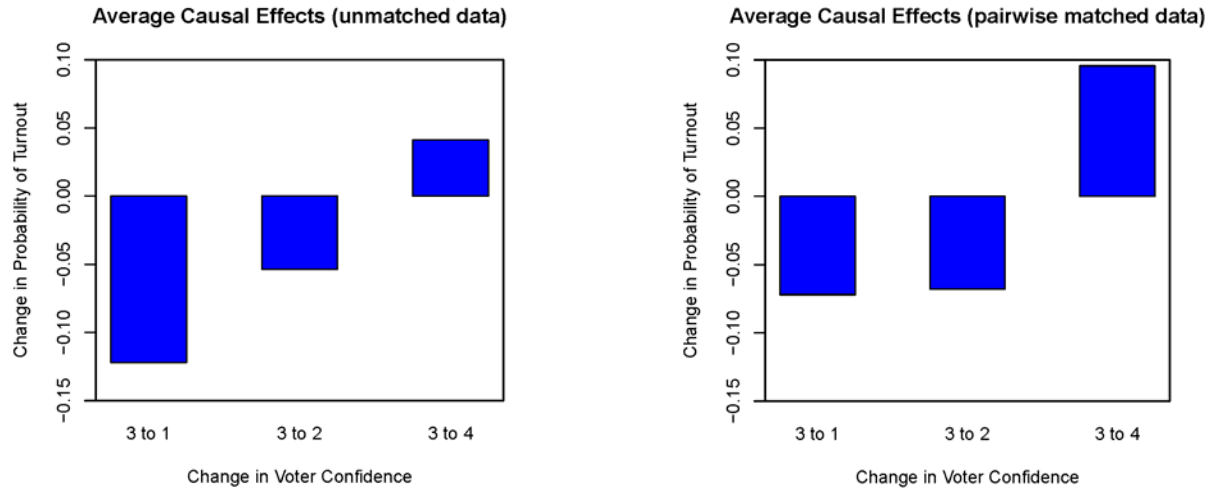
**Table 5: Balance Improvement with Subclassification Matching**

3 vs. 1				3 vs. 2				3 vs. 4			
	treated	control	% improv.		treated	control	% improv.		treated	control	% improv.
<b>female</b>	0.58	0.58	100	<b>pers. econ.</b>	3.04	3.04	98	<b>urban</b>	0.71	0.71	97
<b>PRI</b>	0.18	0.18	99	<b>center</b>	0.21	0.21	98	<b>st. party id</b>	1.15	1.15	97
<b>church att.</b>	3.01	3.00	98	<b>income</b>	4.08	4.07	98	<b>female</b>	0.40	0.40	97
<b>PRD</b>	0.34	0.34	98	<b>church att.</b>	3.10	3.09	98	<b>time cost</b>	2.13	2.13	97
<b>education</b>	4.19	4.22	96	<b>female</b>	0.58	0.58	98	<b>age</b>	2.50	2.51	95
<b>trust news</b>	2.38	2.42	91	<b>PRD</b>	0.30	0.31	97	<b>trust news</b>	2.92	2.91	94
<b>neg. camp.</b>	1.93	1.95	91	<b>trust f&amp;f</b>	2.42	2.43	97	<b>income</b>	5.16	5.12	93
<b>trust f&amp;f</b>	2.42	2.45	90	<b>neg. camp.</b>	1.81	1.81	97	<b>trust f&amp;f</b>	2.77	2.77	93
<b>Fox approv.</b>	2.97	3.03	89	<b>north</b>	0.08	0.08	96	<b>north</b>	0.28	0.27	91
<b>income</b>	3.63	3.76	87	<b>PAN</b>	0.21	0.21	96	<b>nat. econ.</b>	3.40	3.40	91
<b>nat. econ.</b>	2.81	2.90	83	<b>nat. econ.</b>	3.20	3.19	94	<b>pers. econ.</b>	3.27	3.26	89
<b>pers. econ.</b>	2.90	2.95	83	<b>Fox approv.</b>	3.20	3.22	93	<b>Fox approv.</b>	3.74	3.71	89
<b>times cost</b>	2.52	2.47	80	<b>time cost</b>	2.45	2.44	93	<b>center</b>	0.25	0.25	89
<b>south</b>	0.28	0.27	80	<b>married</b>	0.52	0.52	92	<b>south</b>	0.18	0.19	88
<b>PAN</b>	0.14	0.17	79	<b>south</b>	0.32	0.31	90	<b>white</b>	0.24	0.25	86
<b>center</b>	0.19	0.19	79	<b>st. party id</b>	0.95	0.96	88	<b>education</b>	5.36	5.31	82
<b>north</b>	0.07	0.09	78	<b>education</b>	4.70	4.75	86	<b>church att.</b>	3.25	3.24	82
<b>urban</b>	0.70	0.71	76	<b>trust news</b>	2.68	2.70	83	<b>married</b>	0.61	0.60	81
<b>white</b>	0.14	0.15	74	<b>PRI</b>	0.22	0.21	77	<b>PAN</b>	0.31	0.30	75
<b>age</b>	2.45	2.49	72	<b>white</b>	0.17	0.16	74	<b>PRI</b>	0.25	0.25	71
<b>st. party id</b>	0.95	0.97	55	<b>urban</b>	0.63	0.64	72	<b>PRD</b>	0.23	0.25	22
<b>married</b>	0.55	0.57	-1434	<b>age</b>	2.34	2.32	2	<b>neg. camp.</b>	1.75	1.76	-1375

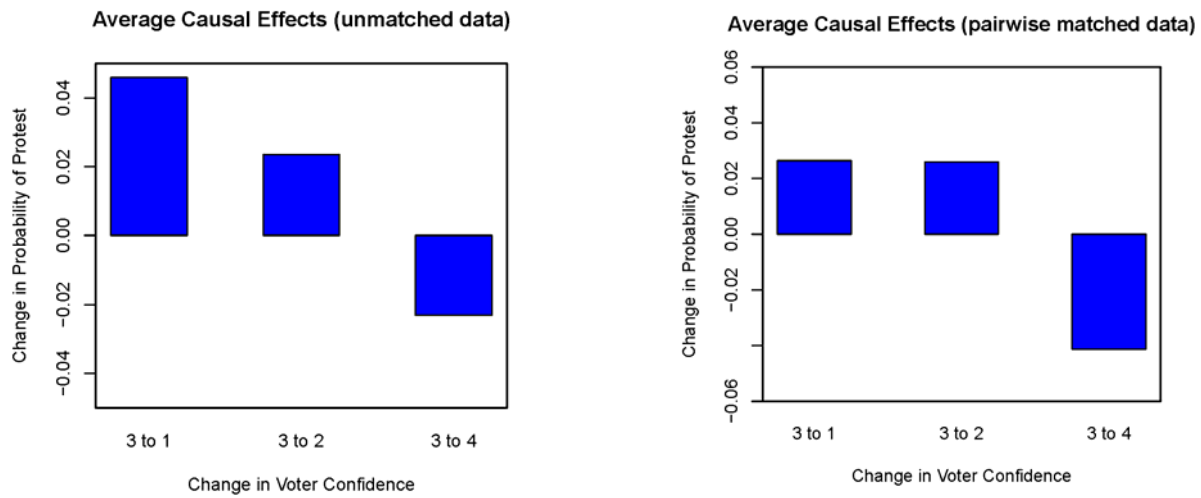
Note: Balance improvement in matched data used in turnout model.

Figure 2: Causal Effects before and after Subclassification Matching

**Turnout Effects**



**Protest Effects**



**Table 6: Pre- and Post-Electoral Perceptions of Cleanness of the Electoral Process**

	<b>1 (not at all)</b>	<b>2 (not very)</b>	<b>3 (more or less)</b>	<b>4 (totally)</b>	<b>pre-election totals</b>
<b>1 (not at all)</b>	<b>58 (54%)</b>	14 (13%)	23 (21%)	12 (11%)	164 (100%)
<b>2 (a little)</b>	76 (27%)	<b>72 (26%)</b>	100 (35%)	34 (12%)	384 (100%)
<b>3 (somewhat)</b>	88 (13%)	136 (20%)	<b>313 (46%)</b>	148 (22%)	894 (100%)
<b>4 (totally)</b>	16 (8%)	33 (16%)	57 (28%)	<b>97 (48%)</b>	240 (100%)
<b>post-election totals</b>	244	267	508	301	1277

**Table 7: Ordered Logit Coefficients**

	<b>Coefficient</b>
<b>south</b>	-0.10
<b>north</b>	0.06
<b>center</b>	0.15
<b>age</b>	-0.18**
<b>female</b>	0.07
<b>education</b>	-0.02
<b>income</b>	-0.04
<b>white</b>	0.14
<b>married</b>	-0.05
<b>church attendance</b>	-0.04
<b>personal economy</b>	0.02
<b>national economy</b>	0.09
<b>urban region</b>	0.02
<b>strength of party ID</b>	-0.07
<b>PRD</b>	-1.01**
<b>PRI</b>	-0.17
<b>PAN</b>	0.70**
<b>Fox approval</b>	0.16**
<b>negativity of campaign</b>	0.00
<b>time cost of voting</b>	0.05
<b>trust family &amp; friends</b>	0.05
<b>trust news</b>	-0.15**
<b>N</b>	1277

Note: The dependent variable is the difference between the pre- and post- electoral perceptions of cleanness of the electoral process.

**Table 8.a: Flow of Voter Confidence (for partisan individuals with pre-electoral confidence =3)**

**Post-electoral Confidence in the Cleanness of the Electoral Process**

	<b>1 (not at all)</b>	<b>2 (not very)</b>	<b>3 (more or less)</b>	<b>4 (totally)</b>
<b>PRI</b>	13 (8%)	32 (20%)	99 (61%)	19 (12%)
<b>PAN</b>	5 (3%)	18 (11%)	61 (36%)	85 (50%)
<b>PRD</b>	53 (30%)	53 (30%)	63 (35%)	9 (5%)

**Table 8.b: Causal Effects of Voter Confidence on Turnout (by party ID)**

	<b>3 to 1</b>	<b>3 to 2</b>	<b>3 to 4</b>
<b>PRI</b>	-6.9%	-6.2%	10.8%
<b>PAN</b>	-7.5%	-6.0%	10.9%
<b>PRD</b>	-7.6%	-5.8%	10.8%

Note: Effects are computed by simulating changes in the likelihood of turnout as a result of a change in voter confidence, and fixing partisanship at the desired values.