

The Cost of Public Financing: Crowding Out in the Context of Political Campaigns

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Abstract:

Public financing for political campaigns is gaining popularity in the United States, with the goal of limiting candidates' reliance on large donations from wealthy donors. An unintended consequence of these policies is crowding out, which economists have studied extensively in the context of donations to charity but not in the context of political campaigns. This paper provides the first evidence of the consequences of public financing for campaigns by studying Seattle's Democracy Vouchers program, which enables voters to donate government-funded vouchers to political campaigns. I estimate that each dollar of government spending reduced private contributions by \$0.29. Crowding out was substantial but incomplete, indicating that public financing has an efficiency cost and that donors behave similarly in political and charitable settings. However, large contributions decreased and small contributions increased. This shift in the composition of contributions is consistent with the program's goal, a success that comes at the cost of crowding out.

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1 Introduction

Policies that provide public financing for political campaigns have gained popularity in the United States in the past decade. Between 2010 and 2018, 14 states and 24 municipalities began providing public financing with the goal of limiting candidates' reliance on large, private donations from wealthy citizens (Lau 2019). When evaluating these programs, policymakers should consider whether they achieve this goal and at what cost. Public financing could crowd out donations that would have been made otherwise, as it does in the context of charitable contributions (Andreoni 1990, Andreoni and Payne 2003, Payne 1998, Abrams and Schmitz 1978, Abrams and Schmitz 1984). A high degree of crowding out would suggest that public financing is inefficient in the context of campaign finance, as a similar level of funding for campaigns could have been achieved without taxation (Roberts 1987). However, the loss of efficiency resulting from crowding out could be considered justified if public financing reduces the importance of large, private contributions.

One of the 24 municipalities to begin providing public financing for campaigns was Seattle, which implemented the Democracy Vouchers program in 2017. In this paper, I study the Democracy Vouchers' effects on campaign finance to determine both the extent of crowding out and how the program affected the composition of contributions. By examining the effects of Seattle's campaign finance reform, this paper provides insight into the effects of the broader movement towards public financing. To my knowledge, this paper is the first to study the effects of public financing for political campaigns on private contributions.

Starting with the 2017 municipal election, every registered voter in Seattle received \$100 worth of Democracy Vouchers. Voters can donate vouchers to any candidate for city council, mayor, or city attorney, as long as that candidate has opted in to the program. Candidates who receive vouchers cannot accept more than \$250, or \$500 for mayoral candidates, from any individual donor. When the program was implemented, the number of small donations

in Seattle more than tripled, from 8,200 in 2015 to over 25,000 in 2017 (Kliff 2018). 84% of Seattle's donors in 2017 had never given to any campaign in the past; of those new donors, 71% donated with a Democracy Voucher (Friedenbach 2017). These statistics suggest that many Democracy Voucher donors would not have made cash donations in the absence of the program, limiting crowding out. I empirically test this stylized fact.

I begin by developing a model of crowding out in the context of political campaigns. I then use difference-in-differences to study the Democracy Vouchers' effects. Because Seattle is the only treated group in my sample, I use the method developed by Ferman and Pinto (2019) for inference. The first main result is that Democracy Vouchers partially crowd out private donations. Crowding out would be complete, or one-for-one, if each dollar of government spending replaced one dollar that an individual would have donated. I find that vouchers increased total campaign contributions by 132.9%, indicating that each dollar of Democracy Voucher spending reduces cash contributions by \$0.29.

The second main result is that Democracy Vouchers reduce candidates' reliance on large contributions by increasing small donations while decreasing large donations. This shift makes candidates more reliant on voucher donors and small cash donors for funding, which may make candidates more responsive to the desires of less wealthy voters. Small contributions increase by more than 100% and large contributions decrease by over 60%. Specifically, contributions \$100 and under increased by 174.2% and contributions \$250 and under increased by 128.1%, while contributions over \$250 decreased by 63%. When I restrict the sample to candidates for city council, I find that contributions over \$100 decreased by 90.65% and contributions over \$250 decreased by 95.6%. Contributions between \$100 and \$250 to city council candidates decreased by 69.9%. I find stronger evidence of decreases in large contributions to city council candidates because they were subject to a \$250 individual contribution limit if they accepted vouchers, while the limit for mayoral candidates was \$500. I also find suggestive evidence of a

1.7% increase in voter registration. An increase in voter registration would enlarge the pool of potential Democracy Voucher donors. I am unable to show a causal relationship between the Democracy Vouchers program and the number of donors or the number of candidates in each election (see Appendix for descriptive evidence).

My paper is the first to study crowding out in the context of campaign finance. The literature on how government funding affects individuals' donations has focused on non-profit organizations, which apply for government grants and also solicit contributions from individuals. Andreoni (1990) develops a model to explain the absence of one-for-one crowding out of charitable donations. His model, extended by Payne (1998), allows the extent of crowding out to depend on whether most of the utility from donating comes from the total amount the charity receives or from the "warm glow" of donating. "Warm glow" refers to utility the individual gains from the act of making a donation, and could explain the absence of complete crowding out when non-profit organizations receive government grants.

My setting allows for an interesting extension of these crowding out models, as it is distinct from the non-profit setting in two key ways. First, individuals rather than the government decide how to allocate government funding across candidates. Individuals may experience a "warm glow" from allocating vouchers, causing individuals who enjoy donating to reduce their cash donations and therefore increasing the extent of crowding out. Vouchers also eliminate the separate processes for fundraising from the government and from individuals, which Andreoni and Payne (2003) argue are a major cause of crowding out as charities make less of an effort to fundraise from individuals when they receive a government grant.

Second, government funds are being given to political candidates rather than nonprofits. This setting allows me to learn whether donors to political campaigns behave the same way as donors to charity, contributing to the literature on political donors' behavior. Abrams and Schmitz (1978) and Abrams and Schmitz (1984) find that crowding out in the context of chari-

table donations is substantial but incomplete: each \$1 increase in government transfers reduces individual charitable donations by about \$0.28 or \$0.30, respectively. These estimates are nearly identical to mine, indicating similarities in donation behavior in charitable and political settings and suggesting that the “warm glow” individuals could experience from allocating government funding does not exacerbate crowding out.

This paper also contributes to the literature on the relationship between political and charitable donors’ behavior by providing evidence that these two types of donors behave similarly in terms of crowding out. Yildirim et al. (2020) find empirical evidence that individuals treat political and charitable contributions as substitutes, which is consistent with my finding that individuals may have the same response to government financing in both settings. Ansolabehere et al. (2003) find that individuals treat campaign contributions as consumption goods rather than strategic investments. Treating campaign contributions as strategic investments would likely cause individuals to respond to government funding differently in my setting than in the nonprofit setting, because donations to nonprofits are not strategic investments. Bouton et al. (2019) develop the theory that individuals who contribute small amounts to campaigns have strategic, rather than altruistic or consumption, motives. Gordon et al. (2007) also find evidence of an investment motive, although their setting involves corporate executives making contributions much larger than Seattle allows in municipal elections. Because public financing leads to incomplete crowding out in the nonprofit setting and I find the same effect on political campaigns, my results are the most consistent with the characterizations of political contributor behavior in Yildirim et al. (2020) and Ansolabehere et al. (2003).

2 Background

Nine months before the 2017 and 2019 local elections, every registered voter in Seattle received four Democracy Vouchers in the mail. In each of the following months, vouchers were

mailed to all voters who registered in the past month, with the last batch of vouchers mailed on October 1. A voter can donate a voucher by mailing it to an eligible campaign. Voters have discretion over whether to send all four vouchers to the same campaign and whether to use fewer than four vouchers. Vouchers can be returned at any point before the general election, and candidates can spend them either in the August primary election or in the November general election (Seattle Municipal Code 2021). Vouchers are only available for Seattle’s municipal elections,² which are held every odd-numbered year. Like all campaign donations, voucher donations are publicly available: the city of Seattle publishes a list of voucher donors and the campaign that received each voucher.

Seattle’s voters approved the Democracy Vouchers program in a 2015 ballot initiative, which includes 10 years’ worth of funding from a property tax increase of \$3 million per year. The tax affects both commercial and residential properties, and the average Seattle homeowner pays about \$8.00 per year to fund the program (City of Seattle 2021). The tax increase is not large enough to pay for voucher donations by all of Seattle’s residents, likely due to the expectation that many voters will not use their vouchers. When a candidate reaches the expenditure limit, he or she must stop redeeming vouchers. These expenditure limits also reduce the probability that all vouchers will be redeemed. The value of unused vouchers remains in the program budget.

Seattle’s municipal campaigns are non-partisan, with the two best-performing candidates from the primary election competing in the general election. Candidates are required to collect at least 150 signatures and at least 150 donations of \$10 or more to qualify to receive vouchers. In addition, voucher recipients must accept an individual contribution limit³ of \$250, or \$500 for the office of mayor.⁴ The contribution limit is \$500 for all candidates who choose not to

2. Elections for city-level positions

3. The maximum amount that each donor can give to each campaign

4. For mayoral candidates only, that contribution limit includes Democracy Vouchers.

accept vouchers, a reduction from \$700 before 2017.⁵ Before the Democracy Vouchers program, 54% of total campaign funding came from donations larger than \$250; after the program was implemented, only 15.6% of campaign funding came from these large donations. Democracy Voucher recipients agree to campaign expenditure limits that range from \$150,000 to \$800,000, depending on the office (Seattle Municipal Code 2021). Before Democracy Vouchers were available, 31% of Seattle’s municipal campaigns exceeded the lowest expenditure limit of \$150,000 and 2% spent more than the highest limit of \$800,000. After vouchers became available, 22% of campaigns spent more than \$150,000 and 1% spent more than \$800,000.

In 2017, only 4.1% of voters participated in the program, equating to \$1,791,325 in total campaign contributions from Democracy Vouchers. Participation was higher in the 2019 election, with 7.7% of voters participating and candidates receiving \$3,515,275. This increase in participation could indicate that participation will continue to trend upward as awareness of the program increases over time. However, higher participation could also be a particular feature of the 2019 election.

[Table I Here]

Kliff (2018) found anecdotal evidence after the 2017 election that many voters were aware of the program, but were not interested enough in municipal elections to prioritize researching candidates and mailing in vouchers before the deadline. Others assumed the vouchers were junk mail and recycled them. Despite voters’ low rate of voucher use in 2017, candidates continued to opt into the voucher program in the 2019 election. The candidate participation rate in the voucher program increased from 44% in 2017 to 91% in 2019. Candidates received an average of \$45,387 in vouchers per campaign, constituting 46% of the average campaign’s total funding. Democracy Vouchers therefore became a significant source of funding for municipal campaigns. The remainder of the paper will explore both the extent of crowding out resulting from this

5. Candidates’ personal funds and certain in-kind contributions are exempt from these limits.

program and the program's effects on the composition of contributions.

3 Model

In this section, I develop a model of crowding out in the context of the Democracy Vouchers program. Effects on campaign finance depend on candidates' decisions of whether to accept vouchers, as well as on donors' behavior.

To model campaign contributions under the Democracy Vouchers program, I adapt a model from the literature on crowding out in the context of donations to charity. Models in this literature typically consider how government grants affect individuals' donations to charity (Andreoni 1990, Payne 1998, Andreoni and Payne 2003). I use this framework because it provides a model of contribution behavior in the presence of government financing, which I can extend to incorporate unique features of my setting. My model extends previous models in two key ways. First, I add the individual's decision of whether to allocate government funding into the model. In previously developed models, the government decides how much public funding to give to a charity, and the individual's only decision is how large her private donation to the charity will be. Second, I add the political candidate's decision of whether to accept government funding to the model. In existing models, recipients of government funding are charities that are all eligible to receive government funding and do not decide to opt into eligibility.

Following Andreoni (1990), I develop a model that encompasses the two extreme possibilities for donors' utility: pure altruism and pure egoism. If donors are purely altruistic, they only care about the total amount of money that their preferred candidate raises, denoted Q_j . If they are purely egoistic, their utility from donating comes only from the "warm glow" of making a donation, which does not depend on Q_j . Donors' donations enter the utility function twice, once on their own and once as part of Q_j , to encompass these two extremes and everything between them. In the crowding out literature (Andreoni 1990, Payne 1998), the extent of crowding

out depends on where donors are positioned between these two extremes. If all donors are purely altruistic, government grants completely crowd out private donations; if they are purely egoistic, no crowding out occurs.

I consider a population of n registered voters in Seattle. Each individual i decides whether to donate vouchers, cash or neither to her preferred candidate j , where the total number of candidates in the race is J . Individual i has income Y_i and vouchers v_i . In my setting, $v_i = \$100$, the total value of the individual's Democracy Vouchers. Individuals choose a cash donation c_i and a voucher donation d_i to maximize utility $u_i(x_i, d_i, c_i, Q_j)$, where x_i is consumption of other goods. Utility is strictly quasi-concave and twice differentiable, as is typical in models of crowding out (Andreoni 1990, Payne 1998, Bergstrom et al. 1986).

Three stages determine the total amount an individual donates. First, the individual's preferred candidate decides whether to accept Democracy Vouchers. Let $z_j = 1$ if candidate j accepts Democracy Vouchers, and zero otherwise. Second, the individual decides whether to use her vouchers, taking the candidate's decision as given. For the purpose of the model, the individual supports only one candidate and has two options: she can donate her full endowment of vouchers v_i to her preferred candidate or she can decide not to donate vouchers at all. Third, the individual chooses the amount of cash to donate, which can depend on whether she donated her vouchers. The individual decides whether to donate vouchers when she receives them in the mail, about ten months prior to the election. As less than 5% of cash donations have been made at this point, the typical individual decides whether to donate vouchers before choosing a cash donation amount.

In the third stage, individual i chooses a cash donation c_i to maximize utility. She takes as given her preferred candidate's decision of whether to use vouchers z_j , her voucher donation d_i , her income Y_i , and the amount all other individuals donate to her preferred candidate, R_{-i} . z_j determines the maximum cash donation, which is lower for candidates who choose $z_j = 1$. Her

problem is:

$$\max_{c_i} u_i(x_i, c_i, d_i, Q_j) \text{ subject to:}$$

$$Y_i = x_i + c_i \quad (1)$$

$$d_i = \begin{cases} v_i & \text{if } i \text{ donates her vouchers} \\ 0 & \text{otherwise} \end{cases} \quad (2)$$

$$x_i \geq 0, c_i \geq 0 \quad (3)$$

$$d_i + c_i + R_{-i} = Q_j \quad (4)$$

$$c_i \leq l_j, \text{ where } l_j = \begin{cases} l_{low} & \text{if } z_j = 1 \\ l_{high} & \text{if } z_j = 0 \end{cases} \quad (5)$$

Equation (5) shows that the maximum amount of the cash donation is lower if the candidate accepts vouchers. Differentiating with respect to c_i and solving yields an optimal cash donation function:

$$c_i^* = f(Y_i, d_i, R_{-i}) \quad (6)$$

Then the optimal cash donation can be found as a function of the exogenous parts of the maximand. I expect that $\frac{\partial c_i^*}{\partial Y_i} > 0$, so donors with higher incomes tend to make higher cash donations (Ansolabehere et al. 2003). $\frac{\partial c_i^*}{\partial R_{-i}}$ is negative if i is at all altruistic, and zero if i is completely egoistic. Let $\frac{\Delta c_i^*}{\Delta d_i}$ denote the change in f when d_i increases from 0 to v_i . The sign of $\frac{\Delta c_i^*}{\Delta d_i}$ is ambiguous, and determines the extent of crowding out. The existing literature on crowding out presents two possibilities: $\frac{\Delta c_i^*}{\Delta d_i} = 0$ if the donor is completely egoistic and $\frac{\Delta c_i^*}{\Delta d_i} < 0$ if the donor is at all altruistic. $\frac{\Delta c_i^*}{\Delta d_i} < 0$ for an egoistic donor in my setting if the “warm glow” from donating vouchers feels the same as the “warm glow” from donating cash.

A third possibility is “crowding in”: $\frac{\Delta c_i^*}{\Delta d_i} > 0$ if donating vouchers inspires the individual to increase her cash donation. This possibility arises because the individual plays a direct role in allocating government funds to candidates, unlike the process of charities receiving

government grants in the existing literature on crowding out (Andreoni and Payne 2003, Payne 1998, Andreoni 1990). The individual could become more enthusiastic about the candidate in the process of donating vouchers or could be inspired to make a cash donation by her preferred candidate's willingness to be more reliant on small donations, either of which would cause $\frac{\Delta c_i^*}{\Delta d_i} > 0$. Brooks (2000) and Heutel (2014) provide evidence that crowding in occurs at low levels of government subsidies in the nonprofit setting because these subsidies are a signal of quality for new nonprofits, but the reason for crowding in is different in my setting since individuals rather than the government are allocating government funds. Because the majority of Seattle's residents do not make any cash donations, I know that $c_i^* = 0$ for many registered voters, including some Democracy Voucher donors.

An increase in donations smaller than l_{low} when Democracy Vouchers become available would represent an increase in c_i^* , an increase in d_i^* that does not fully crowd out cash donations, or a combination for an individual whose preferred candidate chose $z_j = 1$. An increase in small donations could occur even if $\frac{\Delta c_i^*}{\Delta d_i} < 0$, as long as crowding out is incomplete.

A decrease in donations larger than l_{low} would indicate that for some i , the presence of Democracy Vouchers decreased c_i^* from a value greater than l_{low} to a value less than or equal to l_{low} . This could happen if $c_i^* > l_{low}$, but individual i 's preferred candidate chose $z_j = 1$, restricting the donation to $c_i^* \leq l_{low}$. It could also happen if $\frac{\Delta c_i^*}{\Delta d_i} < 0$, so i 's optimal cash donation decreases when i donates Democracy Vouchers.

In the second stage, individual i decides whether to donate vouchers, taking R_{-i} and the candidate's decision of whether to accept vouchers, z_j , as given. Then the individual chooses d_i^* to satisfy:

$$d_i^* = \operatorname{argmax}_{d_i} \{u_i(Y_i - c_i^*, v_i, c_i^*, v_i + c_i^* + R_{-i}), u_i(Y_i - c_i^*, 0, c_i^*, c_i^* + R_{-i})\} \quad (7)$$

This model allows for the possibility that $d_i^* = v_i$ when $c_i^* = 0$. A low-income voter who chooses not make a cash donation because her marginal utility from consumption of x_i is very

high might make a voucher donation because d_i does not trade off with consumption. Most individuals empirically choose $d_i = 0$, which suggests that for most, the dis-utility of effort from donating the vouchers exceeds the utility gain from donating. Another reason for an individual to choose $d_i = 0$ could be that her preferred candidate has chosen not to accept vouchers ($z_j = 0$). In the counterfactual case with no Democracy Vouchers, individuals automatically choose $d_i = 0$.

In the first stage, candidate j decides whether to accept Democracy Vouchers based on which option is expected to maximize her total funds Q_j .

$$E[Q_j|z_j = 1] = E[\sum_{i=1}^n c_i^*|z_j = 1] + E[\sum_{i=1}^n d_i^*|z_j = 1] \quad (8)$$

$$E[Q_j|z_j = 0] = E[\sum_{i=1}^n c_i^*|z_j = 0] \quad (9)$$

The candidate will choose $z_j^* = 1$ if and only if $E[Q_j|z_j = 1] > E[Q_j|z_j = 0]$. Total donations in the election $Q = \sum_{j=1}^J Q_j$. Then the change in Q when Democracy Vouchers become available depends on the number of candidates for whom $z_j^* = 1$, as well as the difference between $E[Q_j|z_j = 1]$ and $E[Q_j|z_j = 0]$. At least one candidate choosing $z_j^* = 1$ is a prerequisite for any crowding out to occur, because public financing only becomes available in this setting when candidates opt into receiving it. Candidates vary widely in the number of individuals who support them, making crowding out more likely if the candidates for whom $z_j^* = 1$ have many supporters. The difference between $E[Q_j|z_j = 1]$ and $E[Q_j|z_j = 0]$ depends on individuals' choices in the second and third stages: whether to donate vouchers to a candidate who has chosen to receive them, and how much cash to donate, with the voucher donation potentially crowding out part or all of the cash donation.

4 Data

I use data from King County, the county in Washington where Seattle is located, for all outcomes. I use the other cities in King County as my control group. King County is Washington's most populous county, containing 1/3 of the state's population. Five of Washington's ten largest cities are in King County (United States Census Bureau 2010). Both Seattle and the control cities have unusually high levels of political engagement: before Democracy Vouchers were available, Seattle's average voter turnout was 52.9% and the average in King County's other cities was 46.7%, both greatly exceeding the national average of 27% turnout in local elections (Hajnal 2018). Local economic shocks to Seattle affect the entire county, as Seattle is the county's largest city and economic center (Haughwout et al. 2002). Economic shocks affect the amount of disposable income available for cash donations, making the cities surrounding Seattle a useful control group.

I use data from the odd-numbered years from 2009 to 2019. I only use data from odd-numbered years because Seattle holds municipal elections in these years, and they are therefore the only years when Democracy Vouchers can be used. Federal elections and Washington's statewide are held in even-numbered years, and I exclude these elections because they garner much more attention, higher voter participation and more donations than local elections. King County holds county-wide elections in odd-numbered years, so voters in every city in my sample have an election in which they can participate in the years in my sample. However, seven of the 39 cities in King County do not hold municipal elections in odd-numbered years. Those seven cities are included in voter registration data, but not in campaign finance data.

I use King County's publicly available data on campaign contributions to measure the Democracy Vouchers' impact on campaign finance. These data include all cash and voucher donations to campaigns in King County. I adjust the contributions for inflation by converting all contributions to 2019 dollars. When the outcome is a dollar amount, I always use 2019

dollars. However, in parts of my analysis I use restrictions such as “donations under \$100”, and for these restrictions I use the original amount rather than adjusting for inflation. I use the original amount for these restrictions because the value of each voter’s Democracy Vouchers was not adjusted for inflation from 2017 to 2019, and because the distribution of donations shows that voters are always most likely to donate a nominal dollar amount ending in zero or five.

I began with data on 581,135 campaign contributions. Restricting my sample to candidates for mayor, city council and city attorney in all cities removed 119,913 observations. Accounting for corrections removed 3,641 more observations.⁶ I also removed data on the 6,959 Democracy Vouchers that were returned to the city blank or assigned to an invalid campaign. After these restrictions, I have a sample of 446,981 contributions. Each observation in these data is a contribution from an individual to a campaign. I also have campaign-level data on 813 campaigns from 2009-2019. In these data, each observation is one candidate’s campaign in one election. The campaign-level data show the total amounts of contributions and expenditures for each campaign. I aggregate all campaign finance data to the city-year level for my analysis.

[Figure I Here] [Figure II Here]

Figure I and Figure II are histograms showing the distribution of contribution size in Seattle before and after the Democracy Vouchers program. In each histogram, the leftmost bar shows contributions of \$25 or less as a percent of the total number of contributions. Figure I shows that when Democracy Vouchers became available, contributions of \$25 or less increased from under 15% of all contributions to nearly 80% of all contributions. The percent of contributions in all

6. After reporting a contribution, campaigns can issue a correction, saying the amount initially reported was incorrect and providing the correct amount. I adjusted the contributions to reflect the corrected amount, rather than the original amount. In 3,641 cases, the corrected amount was zero, and I removed the contributions that were corrected to zero.

bins to the right decreased when vouchers became available, showing a shift in the distribution of contributions that aligns with the program’s goal.

I use census tract-level demographic data from American Community Survey five-year estimates to obtain demographic characteristics of each city, including age, gender, race, income, education and total population. Census tract boundaries are different than city boundaries, allowing one tract to span multiple cities. The demographic characteristics I use for each city are therefore weighted averages of the census tracts that overlap with that city, where the weights are determined by the percent of area that overlaps. For example, if 20% of City 1 is in Census Tract A, 50% is in Census Tract B and 30% is in Census Tract C, then City 1’s demographics are a weighted average of Tracts A, B and C with a weight of 0.2 given to A, 0.5 given to B and 0.3 given to C. I use geographic area because I cannot observe the percent of the city’s population that resides in each census tract. I create these estimates at the precinct rather than the city level for the voter registration analysis. [Table II](#) compares city-level averages of demographic variables, as well as the number of registered voters and voter turnout, between Seattle and the other cities in King County. This table uses data from 2015, the year of the last election before Democracy Vouchers became available. In section 5, I describe the fixed effects and controls I include to ensure that my results are not driven by demographic differences between Seattle and the control cities.

[[Table II](#) Here]

Elections in King County are coordinated at the county level. Voters in each city in the county elect county-level officials as well as city-specific officials. Each city is divided into precincts, which are the smallest level at which elections are organized. Precinct-level data provides the finest available geographic variation in voter registration.

To measure voter registration, I use precinct-level data from King County for the odd-numbered years from 2009 to 2019. King County election officials provided these data upon my

request. For each precinct, I am able to observe the number of registered voters and the percent of registered voters who cast a ballot in each municipal election. King County has about 2,550 precincts in each election in the data, with the exact number ranging from a minimum of 2514 in 2013 to a maximum of 2,611 in 2019. Each precinct has an average of 466 registered voters. The voter registration data contain 15,318 observations, one for each precinct in each year. All registered voters in all precincts in Seattle received Democracy Vouchers in both 2017 and 2019.

Precinct boundaries are re-drawn between elections, typically resulting in minor changes to a few precincts. I can always observe the city in which a precinct is located, and precinct boundaries are drawn so that they never span multiple cities. Therefore, the changes in precincts over time do not interfere with my analysis, but they do mean that I am unable to use precinct fixed effects when I estimate the vouchers' effect on voter registration.

5 Methodology

My main specification is as follows:

$$\ln(Y_{ct}) = \beta_0 + \beta_1 \text{Seattle}_c + \beta_2 \text{Voucher}_t + \beta_3 \text{Seattle}_c * \text{Voucher}_t + \gamma_c + \psi_t + \theta X_{ct} + \epsilon_{ct}$$

Y_{ct} is the outcome in city c in election year t . Seattle_c is an indicator for whether city c is Seattle. Voucher_t is an indicator for whether Democracy Vouchers were available in Seattle in election year t . X_{ct} is a vector of city demographic controls, including race, gender, age, education, income, and total city population. β_3 is the coefficient of interest. I include city and year fixed effects, and I cluster at the city level.

To measure the vouchers' effects on campaign finance, I use four outcomes: total campaign contributions, total campaign expenditures, amount of small contributions, and amount of large contributions. Each of these outcomes is a dollar amount measured at the city-year level. I

perform the small and large contribution analyses for my entire sample, as well as for a sample restricted to candidates for city council. I do not restrict the sample to mayoral candidates or city attorney candidates because the only elections for these offices in my sample were held in 2009, 2013 and 2017. Omitting 2013 for an event study would leave only one pre-period, which is insufficient to establish parallel trends. The vast majority of campaigns in the data (88.19%) are for city council. 10.95% are for mayor and 0.86% are for city attorney. [Figure III](#) shows that 75% of total campaign funding went to city council candidates, 22% went to mayoral candidates and 3% went to city attorney candidates.

[[Figure III](#) Here]

I log the financial dependent variables due to a skewed distribution of residuals when the dependent variables are not logged. I also examine Democracy Vouchers' effects on voter registration, which enlarges the pool of potential voucher donors. I use precinct-level analysis for this outcome. I do not perform the campaign finance analysis at the precinct level because donations to any campaign can come from anywhere in the city, not only from the precinct in which the candidate is running. For voter registration only, my specification is:

$$Y_{pct} = \beta_0 + \beta_1 Seattle_{pc} + \beta_2 Voucher_t + \beta_3 Seattle_{pc} * Voucher_t + \gamma_c + \psi_t + \theta X_{pct} + \epsilon_{pct}$$

Y_{pct} is voter registration in precinct p in city c in election year t . $Seattle_{pc}$ is an indicator for whether Seattle is the city in which precinct p is located. $Voucher_t$ is an indicator for whether Democracy Vouchers are available in year t . X_{pct} is a vector of precinct-level demographic controls, including race, gender, age, education, income, and total precinct population. β_3 is the coefficient of interest. I use city and time fixed effects, and I cluster at the city level.

I use the method that Ferman and Pinto ([2019](#)) developed for difference-in-differences with one treated group, recognizing that the standard cluster-robust variance estimator does not perform well in the case of only one treated group (Ferman and Pinto [2019](#), Conley and Taber [2011](#),

Donald and Lang 2007). The Ferman and Pinto (2019) method is robust to heteroskedasticity, while the two other methods developed for difference-in-differences with one treated group (Conley and Taber 2011, Donald and Lang 2007) rely on homoskedasticity assumptions that would cause them to under-reject the null hypothesis in my setting (Ferman and Pinto 2019). The wild bootstrap, often used when the number of clusters is small, can perform well with few treated groups except in the case of only one treated group (MacKinnon and Webb 2017, Roodman et al. 2019).

With one treated group, the standard difference-in-differences estimator is equal to the difference-in-differences estimand plus a second difference in differences: the difference in the pre-post difference in average errors between the treated and control groups (Conley and Taber 2011). As the number of control groups grows large, the pre-post difference in average errors for the control groups shrinks to zero. However, with only one treated group, the pre-post difference in average errors for the treated group does not disappear, making the difference-in-differences estimator inconsistent. Obtaining a consistent estimator of the difference-in-differences estimand in this setting requires using information from the control group to estimate the pre-post difference in average errors for the treatment group (Conley and Taber 2011). Ferman and Pinto (2019) allow for heteroskedasticity when they estimate the average errors of the treatment group. They use estimated heteroskedasticity to rescale the pre-post difference in the control groups' average residuals, making the control groups' average residuals informative about the treated group's pre-post difference in average errors (Ferman and Pinto 2019).

I use event studies to assess the plausibility of the parallel trends assumption for difference-in-differences. The event study regressions have the following form:

$$\ln(Y_{ct}) = \beta_0 + \beta_1 Seattle_c + \gamma_t + \sum_{\substack{j=2009 \\ j \neq 2015}}^{2019} \beta_j Seattle_c \mathbf{1}(t = j) + \psi_c + \theta X_{ct} + \epsilon_{ct}$$

Y_{ct} is the outcome in city c in year t . $Seattle_c$ is an indicator for whether city c is Seattle, γ_t is a year fixed effect, and ψ_c is a city fixed effect. Logs and precinct-level analysis are used

for an outcome if they were used in the difference-in-differences regression, so each event study matches the corresponding difference-in-differences regression. 2015 is the omitted year because the Democracy Vouchers program started in 2017. I use the Ferman and Pinto (2019) method to obtain p-values for the event study, and I calculate confidence intervals using those p-values.

6 Results

[Table III Here]

6.1 Total Campaign Contributions and Expenditures

I examine the Democracy Vouchers' effects on total campaign contributions and expenditures to determine how the program affected the total cost of elections. These two outcomes are closely linked but are not quite equal, as candidates do not always spend the full amount they receive in contributions. Table III displays the results for total campaign contributions and expenditures.

I find a 132.9% increase in total campaign contributions. This estimate is significant at the 5% level. Seattle's pre-treatment average was \$3,806,355. For total campaign expenditures, I find an even larger increase of 167.4%. The pre-treatment average was \$3,872,484. If Democracy Vouchers merely crowded out privately funded donations, total campaign contributions would not change under the program. The large increase in total campaign contributions shows that the Democracy Vouchers program caused many donations that would not have been made in the program's absence. The increase in expenditures verifies that campaigns spent the additional funding they received under the Democracy Vouchers program.

The estimated increase in total campaign contributions indicates that each dollar of Democracy Voucher spending decreased cash donations by \$0.29, demonstrating that crowding out from Democracy Vouchers was present but incomplete. Crowding out from Democracy Vouch-

ers is nearly identical in magnitude to crowding out in the context of charitable contributions (Abrams and Schmitz 1978, Abrams and Schmitz 1984). Therefore, the potential “warm glow” that egoistic individuals could experience from donating vouchers does not lead to more crowding out than is seen when government funding comes in the form of grants. Either egoistic individuals do not experience the same “warm glow” from donating vouchers as from donating cash, or individuals tend to be altruistic rather than egoistic in the context of donations to political campaigns.

The increases in campaign contributions and expenditures indicate that the Democracy Vouchers program made municipal elections more expensive overall, which may seem contrary to its goal of fighting the power of big donations. However, the next two sections provide evidence that the increase in total campaign contributions was driven by an increase in small rather than large donations, which is consistent with the program’s goal.

6.2 Small Contributions

Because the Democracy Vouchers program restricts the size of contributions for program participants and provides a new source of small contributions, it may affect the the amounts of campaign contributions that came in the form of small contributions and large contributions. I first define small contributions as contributions less than or equal to \$100, the value of each voter’s Democracy Vouchers. This category includes all Democracy Voucher donations as well as cash donations of \$100 or less.⁷ I replicate my analysis with \$250 as the cutoff for a small donation. I chose \$250 as the cutoff because 89% of Democracy Voucher recipients can only accept individual donations of \$250 or less, as described in Section 5.

I find that the Democracy Vouchers program increases the amount of funding from donations of \$100 and under, as well as the amount of funding from donations of \$250 and under. This

7. If one individual donates all four Democracy Vouchers to a candidate as well as \$250 in cash, the \$250 donation appears as a separate observation in the campaign contribution data.

finding aligns with the fact that the average contribution in Seattle decreased by more than 75% under the program, from \$194.00 before 2017 to \$46.90 in the 2017 and 2019 elections. The increase in small donations is consistent with the program’s goal of making candidates more reliant on small rather than large contributions.

Table III displays my results for these outcomes. First, I examine the vouchers’ effects on contributions of \$100 and under and find an increase of 174.2%. This estimate is significant at the 5% level, and Seattle’s pre-treatment average was \$644,258. When I restrict my analysis to candidates for city council, I estimate an increase of 121.7% that is significant at the 10% level. Seattle’s pre-treatment average was \$455,297.

Second, I estimate the vouchers’ effects on contributions of \$250 and under. I estimate that Democracy Vouchers increased these contributions by 128.1%. This estimate is statistically significant at the 10% level, and the pre-treatment average is \$1,314,929. This result is informative about the behavior of donors who would have given \$250 or less in the absence of vouchers. If these donors substituted vouchers for their cash donation, giving \$100 in vouchers and \$150 in cash, I would not see a change in the amount of contributions of \$250 or less. Therefore, this result provides further evidence that Democracy Vouchers did more than crowd out cash donations. When I restrict this analysis to city council candidates, the pre-treatment average is \$884,754, and I find a statistically insignificant increase of 56.3%.

Together, the results suggest that most of the increase in small contributions came from an increase in donations of \$100 or less. I find the strongest evidence of an increase in small contributions when I use \$100 as the cutoff. The new small donations include Democracy Vouchers and could also include individuals who chose to make a cash donation of \$100 or less as a result of the program. In terms of the model, these could be individuals for whom $\frac{\Delta c_i^*}{\Delta d_i} > 0$, potentially because their preferred candidate’s willingness to turn down large donations inspired them to donate their own money. This group could also include individuals for whom $\frac{\Delta c_i^*}{\Delta d_i} < 0$

and who would have made a larger contribution in the absence of Democracy Vouchers.

6.3 Large Contributions

I find evidence that the amount of campaign funding coming from large donations decreases when Democracy Vouchers are available, which is consistent with the program’s goals. I perform this analysis with both \$250 and \$100 as the cutoff for a large donation. I also estimate the change in contributions between \$100 and \$250. My results appear in [Table III](#).

I find a 62.98% decrease in contributions of more than \$250. Seattle’s pre-treatment average was \$1,574,640. This estimate is statistically significant at the 10% level. For contributions of more than \$100, I find a statistically insignificant decrease of 50.4%. When I restrict my sample to candidates for city council, I find a 90.7% decrease in contributions over \$100 and a 95.6% decrease in contributions over \$250. Pre-treatment averages were \$1,401,703 and \$972,246, respectively. Both estimates are significant at the 1% level.

The decrease in contributions over \$250 provides insight into the types of candidates that chose to accept Democracy Vouchers: if the only candidates who accepted vouchers were those who would not have received any contributions over \$250 in the absence of the program, then I would not find a decrease in contributions over \$250. Candidates who expected to receive contributions over \$250 if they chose $z_j = 0$ decided that choosing $z_j = 1$ would maximize their total funds despite the decrease in the individual contribution limit, showing that they expected a compensating increase in small donations if they chose $z_j = 1$ and accepted the \$250 contribution limit.

I also examine changes in donations between \$100 and \$250. When I include all candidates in my analysis, the parallel trends assumption does not hold, as seen in [Table AI](#). However, when I restrict my sample to city council candidates, the parallel trends assumption is not violated and I find a 69.9% decrease that is significant at the 5% level. The pre-treatment average in

Seattle was \$429,456. Contributions under \$250 are unaffected by the lower contribution limit for candidates who accept Democracy Vouchers. The decrease in contributions between \$100 and \$250 is therefore evidence that for some donors, $\frac{\Delta c_i^*}{\Delta d_i} < 0$. These donors could be altruistic, gaining more utility from the total amount of funding their preferred candidate receives than from the act of making a donation. This group of donors could also include egoistic donors who experience a “warm glow” from donating vouchers that replaces the “warm glow” they used to gain from donating cash. The total decreases in donations over \$100 and donations over \$250 are likely due to a combination of donors for whom $\frac{\Delta c_i^*}{\Delta d_i} < 0$ and donors whose optimal cash donation exceeds the \$250 limit, but who are restricted by the limit. I cannot determine whether $\frac{\Delta c_i^*}{\Delta d_i} < 0$ for these limit-restricted donors.

Overall, I find that large contributions decreased under the Democracy Vouchers program. Because large contributions decreased, small contributions increased, and total contributions increased, I conclude that the increase in small contributions more than compensated for the decrease in large contributions and drove the increase in total contributions. While elections became more expensive, campaigns became less dependent on large contributions under the Democracy Vouchers program, diminishing the influence of wealthy donors.

One concern about these results is that the decreases in total contributions over \$100 and total contributions over \$250 may be driven by the decrease in the cap on campaign contributions from individuals from \$700 to \$500 for non-voucher recipients, and not by the Democracy Vouchers program. I use robustness checks to examine this possibility in Section 7 and conclude that the decrease is at least partially driven by the Democracy Vouchers program, and does not solely result from the decrease in the contribution cap.

Another concern is that wealthy donors may have substituted their contributions to Political Action Committees (PACs), which are independent entities that can spend unlimited amounts as long as they do not directly coordinate with a candidate’s campaign. I attempted

to determine whether PAC spending changed under the Democracy Vouchers program, but the parallel trends assumption did not hold. Even if I could estimate the change in overall PAC spending, the estimate would not be very informative due to data limitations. Although King County provides data on PAC spending in each election, these data do not include the specific city where the PAC spent money, the candidate the PAC supported or opposed, or whether the money was spent on a ballot initiative rather than a candidate. Therefore I can only draw conclusions about whether large cash donations made directly to campaigns decreased, and not about whether the decreases were partially driven by a shift to donating to PACs.

6.4 Voter Registration

Voter registration is relevant to campaign finance in this setting because only registered voters can use Democracy Vouchers. Registration is not required to make a cash donation, although the population of individuals who are both too politically disengaged to register to vote and politically engaged enough to make a cash donation is likely very small or nonexistent. Then an increase in voter registration represents an increase in n as defined in Section 3. Assuming that new registrants were not making cash donations in previous elections, the increase in voter registration will increase small and total contributions if new registrants use their Democracy Vouchers. New registrants fit into the model in Section 3 as individuals for whom $c_i^* = 0$ when vouchers are unavailable, and who may choose $d_i^* = v_i$ when vouchers are available. Then c_i^* for a new registrant will be unchanged if $\frac{\Delta c_i^*}{\Delta d_i} \leq 0$ and will increase if $\frac{\Delta c_i^*}{\Delta d_i} > 0$.

Individuals who are not registered to vote, but hear about the Democracy Vouchers program and want to participate, have an incentive to register so they can use the vouchers. After they register, these individuals are not guaranteed to sustain their enthusiasm long enough to actually use the vouchers they receive in the mail. Because candidates who sign up to receive Democracy Vouchers have more limited sources of funding aside from the vouchers, these

candidates' campaigns might make extra efforts to encourage voter registration. For example, volunteers for a candidate's campaign could hold a voter registration drive on a college campus. These efforts could also potentially increase voter registration, although registrants at a voter registration drive may or may not actually use their vouchers.

When an individual registers to vote in Washington, her voter registration remains active indefinitely unless she cancels it. The pool of individuals in Seattle who could potentially decide to register to vote in each election consists of American citizens who recently turned 18, recently moved to Seattle, or have been disinterested in past elections and chosen not to register. The vouchers do not affect the numbers of people turning 18 or moving to Seattle, and I control for age and the total population of each precinct. This suggests that the effect I find is driven by voters who were disinterested in registering until Democracy Vouchers became available.

[Table III](#) displays the estimated change in voter registration. I find suggestive evidence that the Democracy Vouchers program increases voter registration by an average of 7 voters per precinct. This result is significant at the 10% level and represents a 1.7% increase from the pre-treatment mean of 412 voters per precinct. This result demonstrates a small voter registration response to the Democracy Vouchers program. The increase in voter registration could partially account for the increase in small donations. I cannot identify new registrants in the contribution data, so I am unable to determine how many new registrants actually used their vouchers.

The increase in voter registration suggests that Democracy Vouchers increase voter engagement, because the new registrants are likely to be individuals who were disinterested in registering for previous elections. When vouchers motivate these voters to register, one possibility is that they could become more likely to vote, as registered voters automatically receive mail-in ballots in Washington. However, I find that Democracy Vouchers did not have a statistically significant effect on voter turnout, as shown in [Table III](#).

7 Robustness Checks

Because the law that implemented the Democracy Vouchers program also lowered the maximum contribution amount from \$700 to \$500, I expect that the reduction in the amount of contributions over \$250 is partially driven by the reduction in this cap. In an attempt to determine whether this cap reduction is the primary mechanism reducing the amount of contributions over \$250, I first use the amount of contributions over \$250 as my outcome, replacing all contributions over \$500 in the data with \$500. The result appears in [Table III](#). Individuals who donated more than \$500 prior to 2017 would most likely have donated \$500 if \$500 was the contribution limit. Coding these donations as \$500 allows me to test whether the decrease in the amount of donations over \$500 was driven by the decrease in the contribution cap. When I perform this robustness check, I find a 68.7% decrease that is statistically significant at the 5% level. This result is similar in magnitude to the one I found without top-coding.

Second, I use the amount of contributions between \$250 and \$500 as an outcome. The result appears in [Table III](#). I expect that individuals who prefer to donate more than \$500 donated exactly \$500 when the new contribution cap was imposed. Individuals who prefer to make donations between \$250 and \$500 (not including individuals who donate exactly \$500) should not be affected by the overall contribution cap being lowered from \$700 to \$500. Therefore, if I find a smaller amount of donations between \$250 and \$500, I can attribute that effect to the Democracy Vouchers. I estimate a 44% decrease. Although the magnitude of this estimate is fairly large and has the expected direction, it is imprecisely estimated and statistically insignificant.

Third, I attempt to use the number of contributions over \$250 as my outcome, rather than the amount. [Table AI](#) displays the result. I use this outcome because individuals switching from a donation of more than \$500 to a donation of \$500 in response to the new contribution cap would not lower the number of contributions over \$250. A decrease in the number of

contributions over \$250 should be driven by the Democracy Vouchers. However, the parallel trends assumption is not met for this outcome, so the difference-in-differences estimate is not informative.

Overall, the results of these robustness checks are consistent with the conclusion that the decrease in the amount of contributions over \$250 was at least partially driven by the Democracy Vouchers, and was not solely the result of the decrease in the cap on contributions to non-voucher recipients. Finding positive results or precisely estimated null results for these robustness checks would have cast doubt on the conclusion that large donations decreased due to the Democracy Vouchers program.

8 Conclusion

Unlike most forms of public financing, the Democracy Vouchers program allows the individuals who can make cash donations to allocate government funding that can supplement or replace their cash donations. The program allows me to examine whether individuals' involvement in allocating government funding causes them to behave differently than individuals in the existing literature on crowding out. I am able to study whether public financing crowds out private donations in the unique context of political campaigns, as opposed to the standard setting of a nonprofit partially funded by the government. I also examine the vouchers' effects on the composition of contributions. These are policy-relevant questions as policymakers increasingly favor the use of public financing for political campaigns, and as they decide how that public financing should be allocated.

My results show that Democracy Vouchers lead to incomplete crowding out of cash donations. Total campaign contributions increase by 132.9% under the program, with each dollar of spending on the Democracy Vouchers program reducing cash contributions by \$0.29. When I decompose the contributions by size, I find that Democracy Vouchers increased small dona-

tions and decreased large donations, which is consistent with the program’s goals. Together, my results show that public financing for campaigns can achieve its goal of limiting candidates’ reliance on large contributions, but achieving this goal comes at the cost of crowding out. I also find evidence that the Democracy Vouchers program led to a small increase in voter registration, enlarging the pool of potential voucher donors.

Because incomplete crowding out is also the outcome of public financing for charities, my results provide evidence that political donors behave the same way as donors to charity, at least when donations are in the hundreds rather than thousands of dollars. This similarity in behavior is consistent with the finding in Yildirim et al. (2020) that individuals treat political and charitable contributions as substitutes, rather than treating political contributions as strategic investments (Bouton et al. 2019, Gordon et al. 2007) and charitable contributions as consumption goods.

The magnitudes of my effects are remarkable considering both the low rate of voter participation in the program and the fact that vouchers were only available for municipal elections, which tend to interest voters less than statewide or federal elections. My results provide encouraging evidence that public finance programs can shift the composition of political contributions, making candidates more reliant on small rather than large donations.

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9 Tables

Table I: Voucher Donations Per Year

Year	Registered Voters	Voucher Users	% Participation	Vouchers Used	Total Value of Vouchers
2017	456,871	18,767	4.1	71,653	\$1,791,325
2019	475,690	36,704	7.7	140,611	\$3,515,275

Table II: 2015 Summary Statistics

	Control Cities		Seattle		Diff. in Means	Std. Error
	Mean	Std. Dev.	Mean	Std. Dev.		
Percent White	63.76	10.65	69.55	0.00	5.79	0.12
Percent Black	6.12	6.04	7.04	0.00	0.92	0.07
Percent Native American	0.66	0.57	0.68	0.00	0.02	0.01
Percent Pacific Islander	1.04	1.36	0.40	0.00	-0.65	0.02
Percent Asian	19.72	7.67	14.40	0.00	-5.32	0.09
Income (\$)	41,672	16,138	43,659	0.00	1,987	187
Education	0.77	0.03	0.85	0.00	0.08	0.00
Age	38.02	2.55	38.76	0.00	0.74	0.03
Contribution (\$)	186.45	264.70	160.61	370.27	-25.84	3.85
City Population	66,898	42,703	595,728	0.00	528,830	495

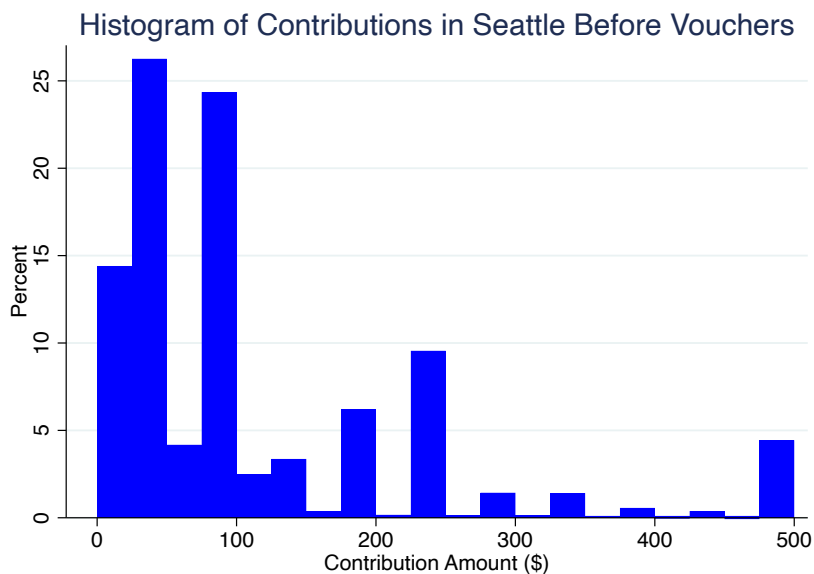
Control cities are all other cities in King County, WA besides Seattle. All summary statistics displayed are from 2015. All variables except Contribution (\$) are measured at the city-year level using data from the American Community Survey. Average contribution amount is measured using data on all contributions in King County from 2009-2019.

Table III: Results

Outcome	DiD Coefficient	Ferman & Pinto P-Value	Seattle Pre-Treatment Average	DiD Coefficient (Percent)
Total Contributions	0.845	0.035	3,806,355.800	132.856
Total Expenditures	0.984	0.029	3,872,484.300	167.435
Under \$100	1.009	0.004	644,258.060	174.236
Under \$100 (City Council)	0.796	0.065	455,297.970	121.652
Under \$250	0.825	0.078	1,314,929.100	128.110
Under \$250 (City Council)	0.447	0.283	884,754.630	56.322
Over \$100	-0.702	0.155	2,245,311.500	-50.438
Over \$100 (City Council)	-2.371	0.000	1,401,703.100	-90.663
Over \$250	-0.994	0.074	1,574,640.500	-62.981
Over \$250 (City Council)	-3.122	0.000	972,246.440	-95.592
Between \$100 and \$250 (City Council)	-1.200	0.037	429,456.660	-69.872
Voter Registration	7.171	0.077	412.075	
Amount Over \$250 (\$500 Topcoded)	-1.161	0.040	938,900.440	-68.674
Amount Between \$250 and \$500	-0.584	0.228	548,945.250	-44.215
Voter Turnout	3.524	0.133	53.327	

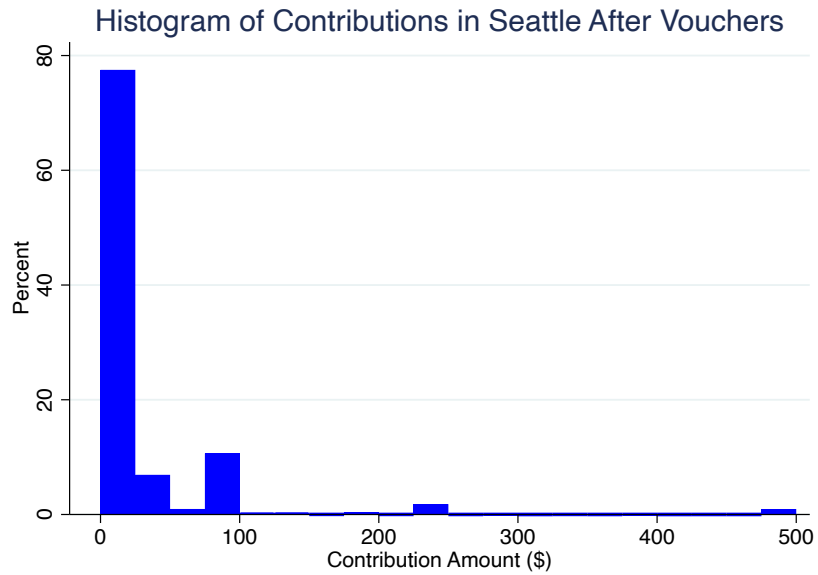
All dependent variables are logged except voter registration and voter turnout. Baseline averages are in original units. P-values are calculated using the method in Ferman and Pinto (2019). Demographic controls are included in all regressions. Event studies support the parallel trends assumption for all outcomes. The “DiD Coefficient (Percent)” column displays the interpretation of the difference-in-differences coefficient for all regressions with logged dependent variables.

10 Figures



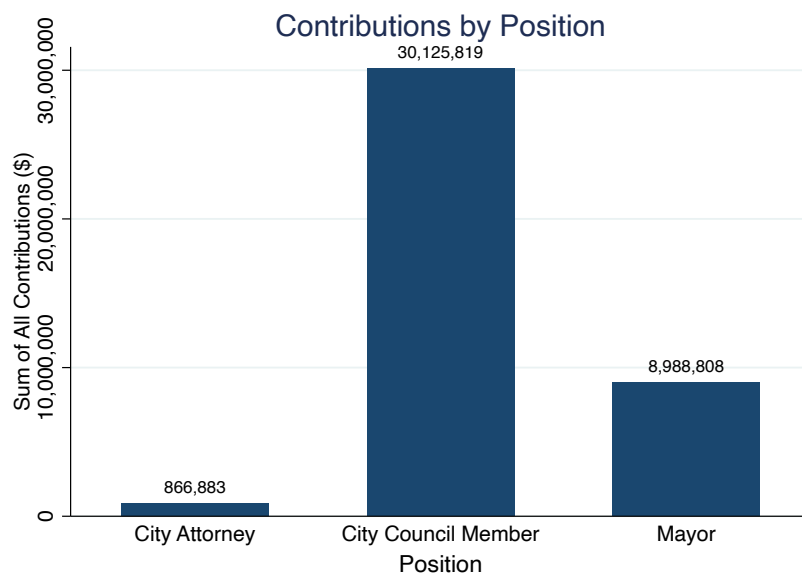
The bin width is \$25. This histogram shows the distribution of contribution sizes in Seattle's municipal elections between 2009 and 2015, before Democracy Vouchers became available. The number of contributions in each bin is used to calculate the percent of contributions in that bin.

Figure I: Histogram of Contributions Before Vouchers



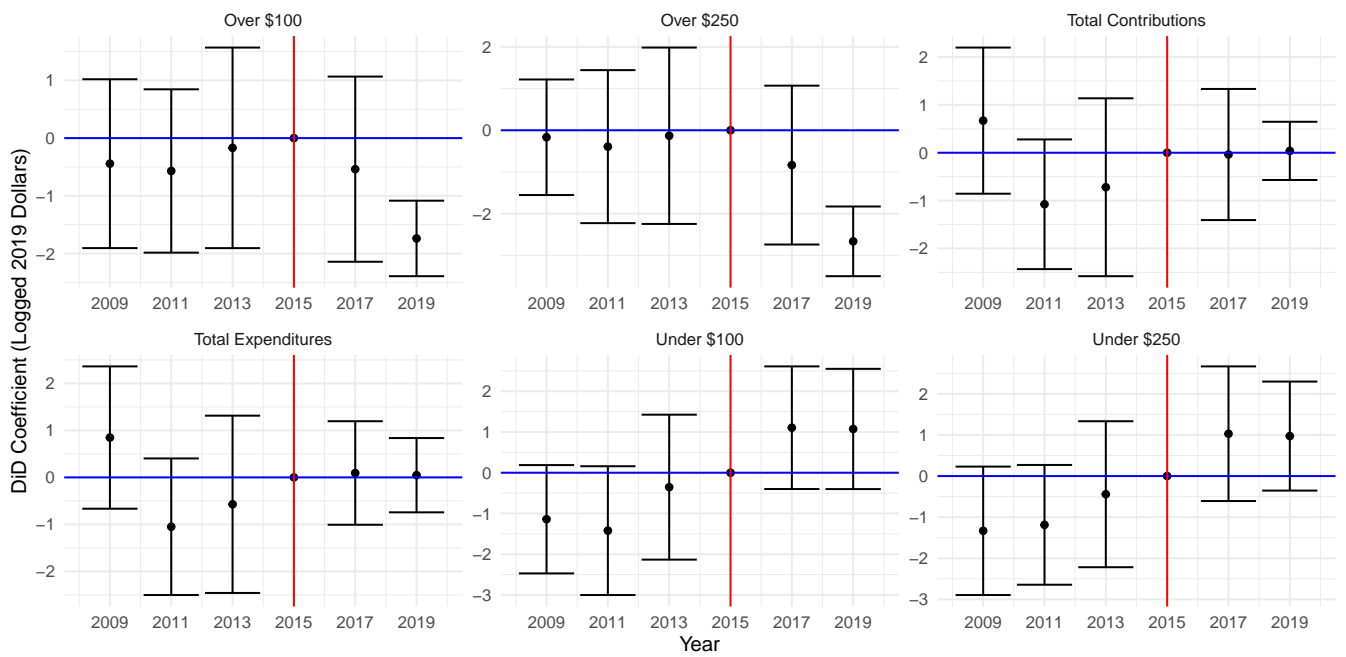
The bin width is \$25. This histogram shows the distribution of contribution sizes in Seattle’s 2017 and 2019 municipal elections, when Democracy Vouchers were available. The number of contributions in each bin is used to calculate the percent of contributions in that bin.

Figure II: Histogram of Contributions After Vouchers



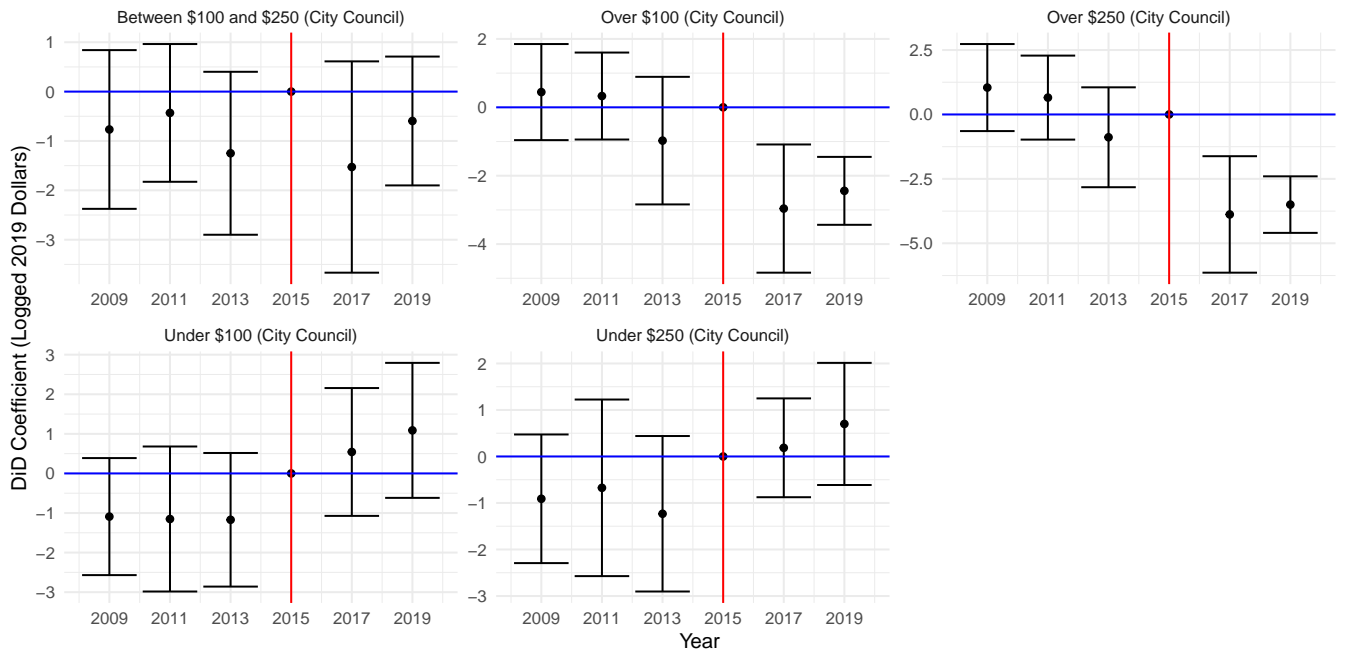
This figure shows the total dollar amount of contributions to candidates for mayor, city council, and city attorney in King County from 2009-2019. These are the three types of campaigns that became eligible to receive Democracy Vouchers in Seattle in 2017.

Figure III: Contributions by Position



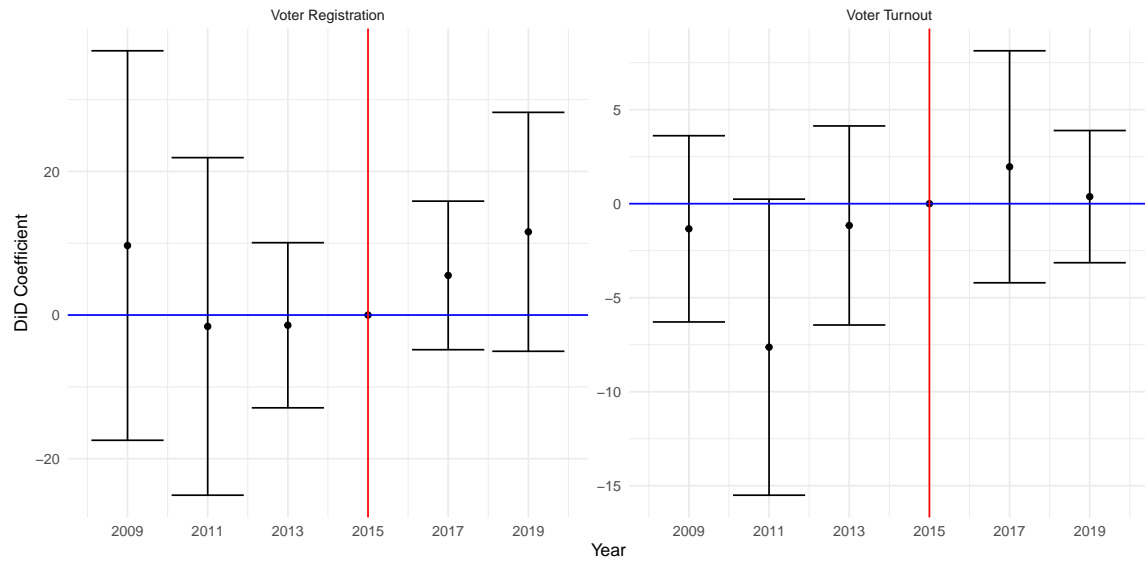
Demographic controls and city fixed effects are included in all event studies. P-values are calculated using the method in Ferman and Pinto (2019). Dependent variables are logged, and are measured at the city level. The full sample is used.

Figure IV: Event Studies for Campaign Finance



Demographic controls and city fixed effects are included in all event studies. P-values are calculated using the method in Ferman and Pinto (2019). Dependent variables are logged, and are measured at the city level. The sample is restricted to only include donations to candidates for city council.

Figure V: Event Studies for City Council Candidates Only



Demographic controls and city fixed effects are included in both event studies. P-values are calculated using the method in Ferman and Pinto (2019). Voter registration and voter turnout are measured at the precinct level. Voter registration is measured as the number of registered voters. Voter turnout is measured as the percent of registered voters who vote in the election.

Figure VI: Event Studies for Voter Registration and Turnout

Appendix for Online Publication

Table AI: Appendix Table

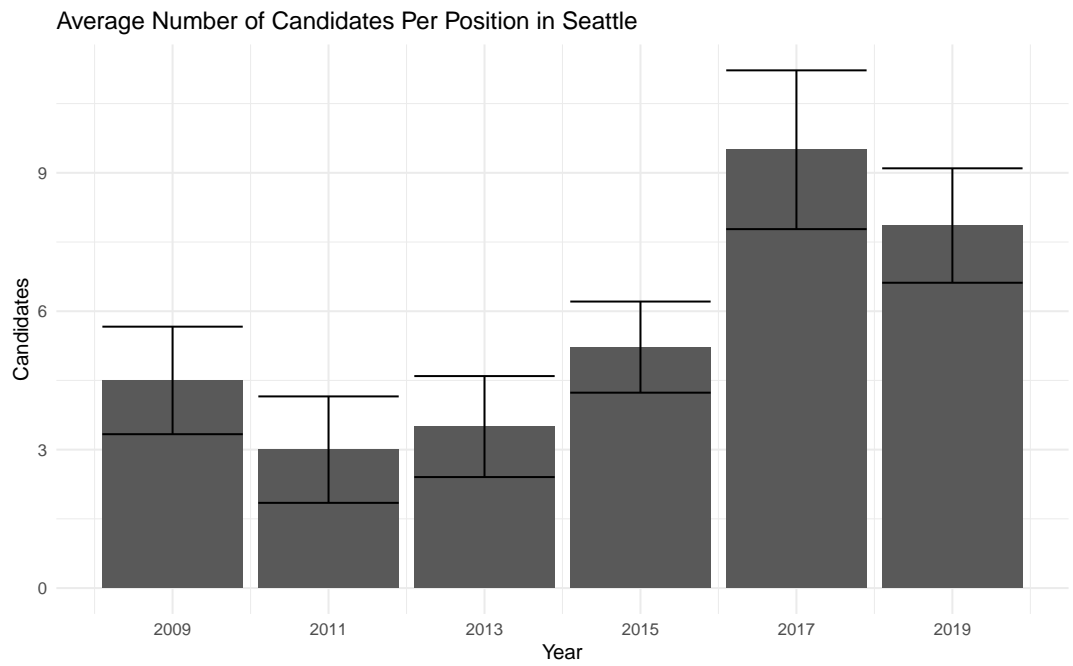
Outcome	DiD Coefficient	Ferman & Pinto P-Value	Parallel Trends?	Seattle Pre-Treatment Average
Between \$100 and \$250	-0.014	0.965	No	670,671.00
Number of Campaigns	-1.818	0.098	No	13.90
Number of Donors	35,106.738	0.000	No	9,675.60
Number Over \$250	-1,404.847	0.000	No	2168.40
Over \$25	-0.487	0.252	Yes	2824,834.30
Over \$25 (City Council)	-1.304	0.031	Yes	1,807,261.30
PAC Ballot Spending	1.314	0.000	No	1,989,205.30
PAC Campaign Spending	-1.463	0.077	No	20,376,602.00
Under \$25	3.471	0.000	No	64,735.29
Under \$25 (City Council)	3.065	0.000	No	49,739.76

All dependent variables are logged except number of campaigns, number of donors, and number of donations over \$250.

Baseline averages are in original units. P-values are calculated using the method in Ferman and Pinto (2019).

Demographic controls are included in all regressions.

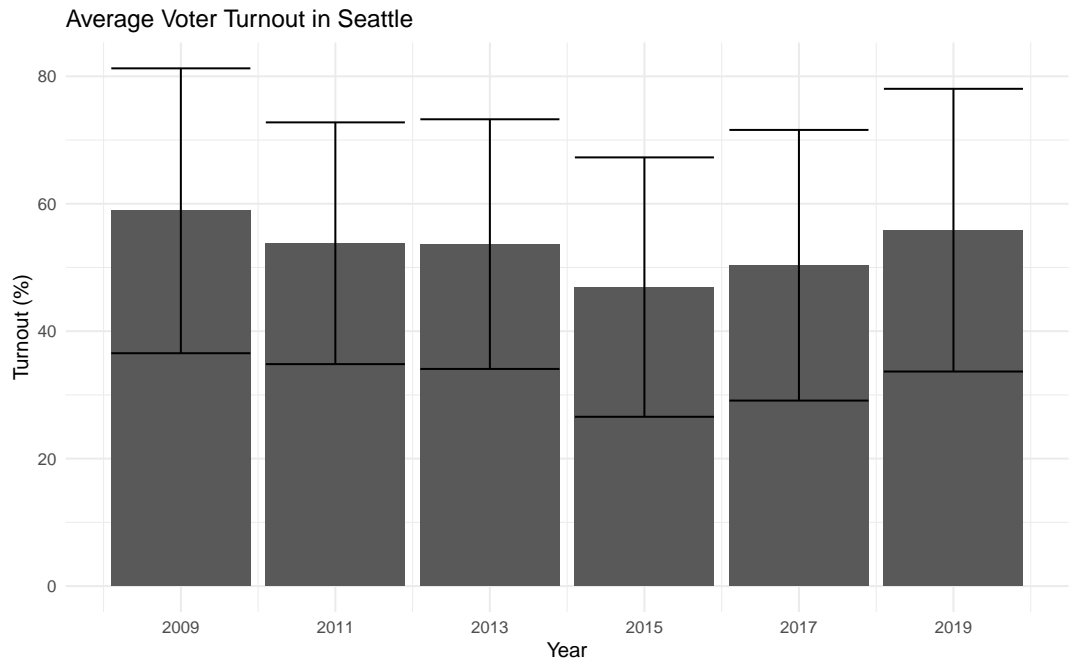
[Table AI](#) displays results for outcomes for which I find evidence that the parallel trends assumption does not hold, as well as estimated changes in the amount of contributions over \$25.



Black bars indicate Poisson confidence intervals.

Figure AI: Average Number of Candidates Per Position

Figure AI provides descriptive evidence of an increase in the number of candidates per position in Seattle's elections. While Poisson confidence intervals show a statistically significant increase in the number of candidates, I do not find parallel trends in the pre-treatment period for this outcome, and therefore I cannot provide causal analysis for this outcome.



Black bars indicate normal confidence intervals.

Figure AII: Average Voter Turnout in Seattle

Figure AII displays average voter turnout in Seattle’s municipal elections from 2009-2019.

This graph provides descriptive evidence that voter turnout did not change as a result of the program. Difference-in-differences regression analysis also shows that voter turnout did not change by a statistically significant amount.

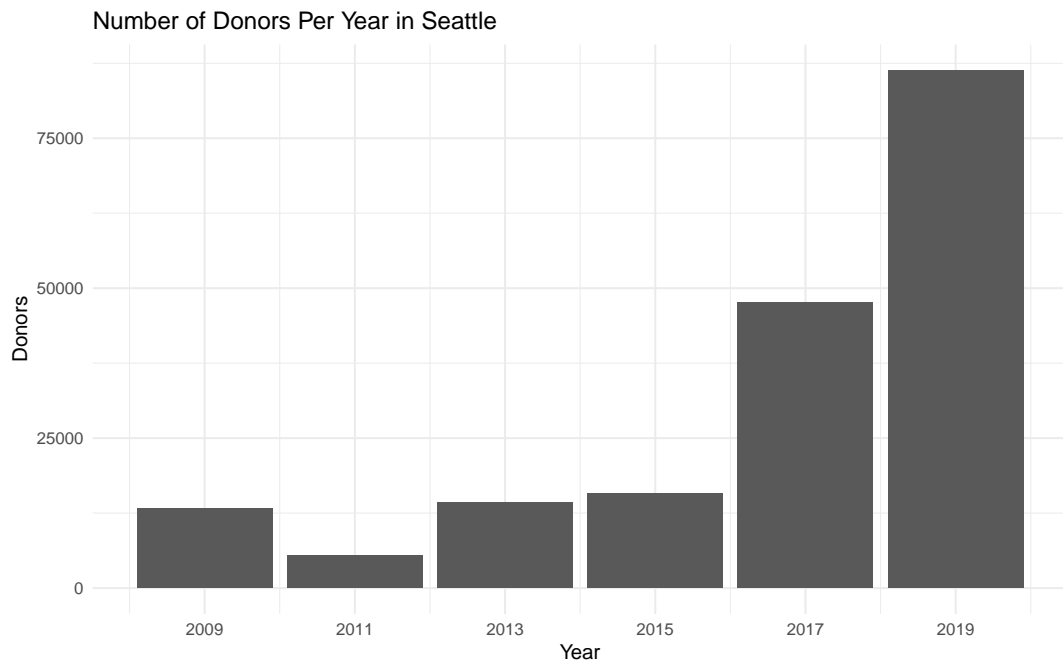
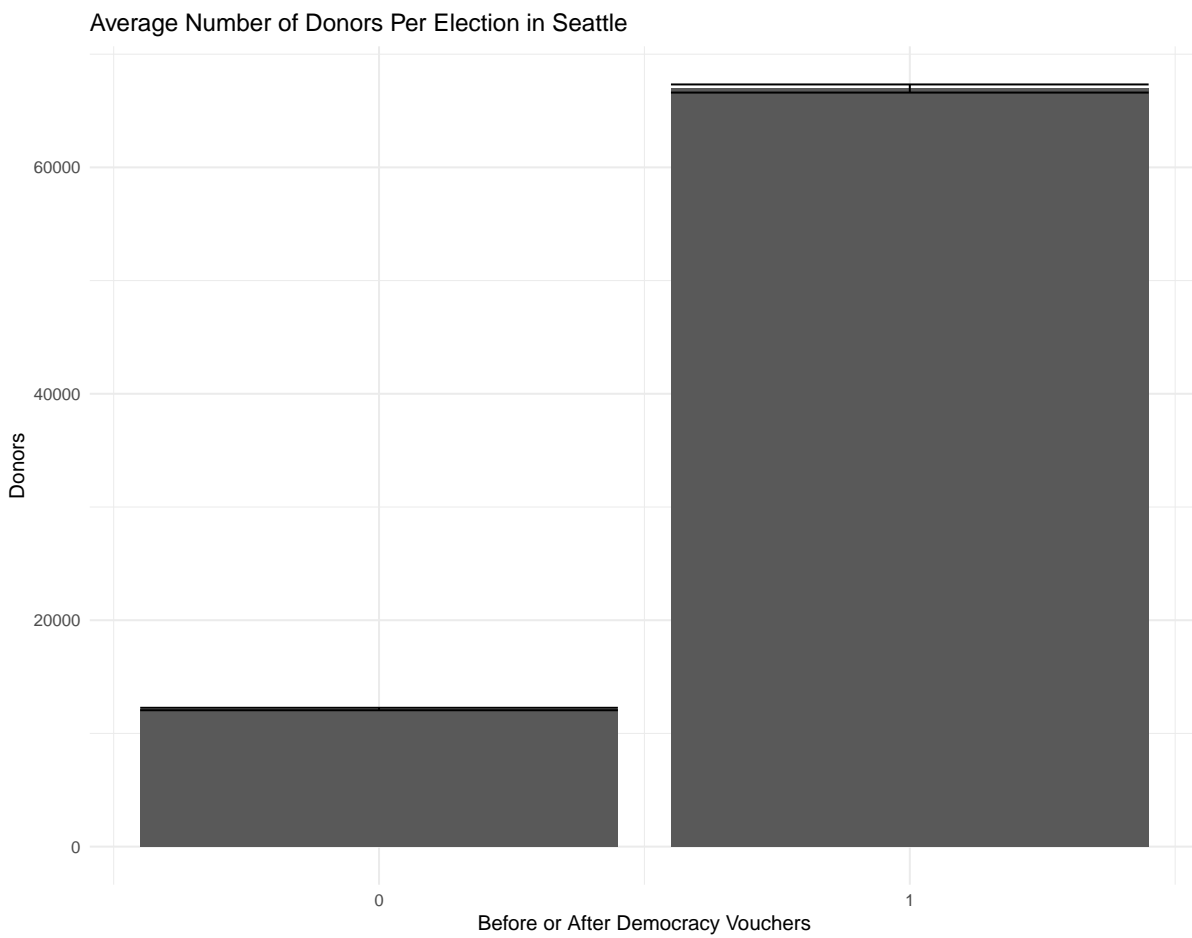


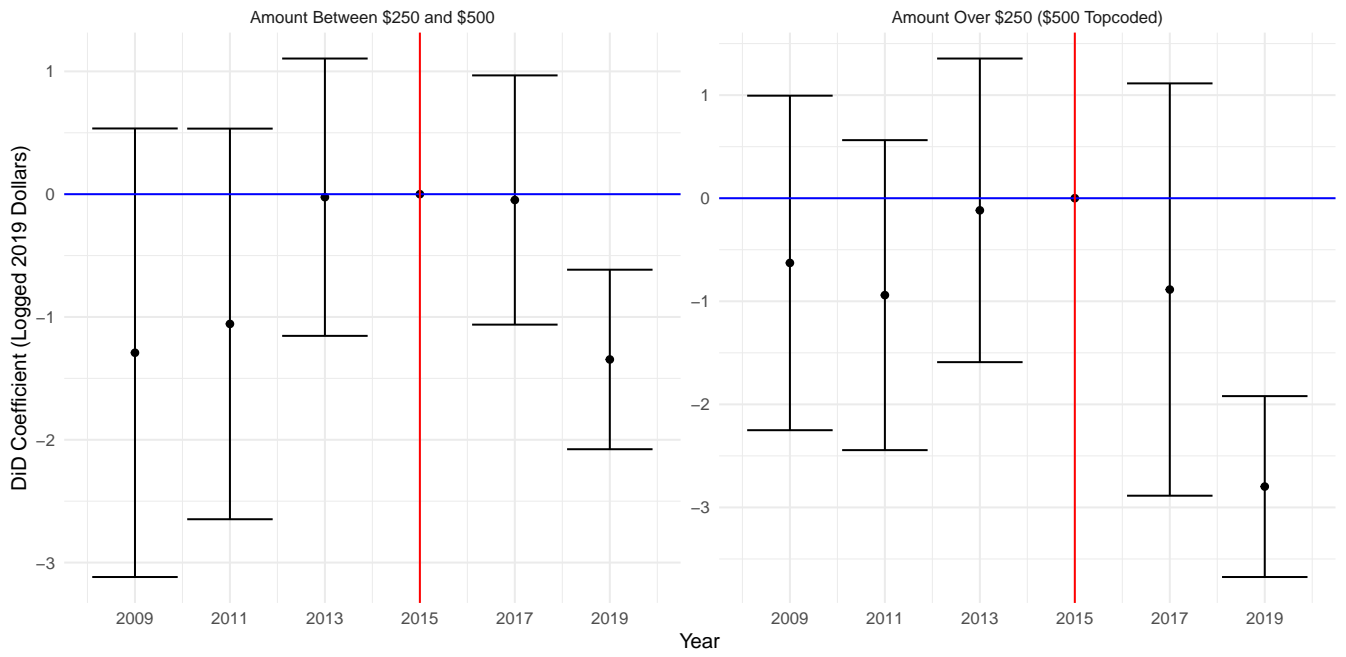
Figure AIII: Number of Donors Per Election



Black bars indicate Poisson confidence intervals.

Figure AIV: Average Donors Per Election

Figure AIII displays the best available count of the number of donors per year in each of Seattle’s municipal elections, and Figure AIV displays the average number of donors per election. The graphs show that the number of donors increased when Democracy Vouchers became available. However, these graphs should be interpreted with caution. The campaign contribution data do not include a donor ID that links multiple donations by the same donor. To estimate the number of donors per year, I defined each donor as a unique combination of name, address, and city. If a donor writes their name or address differently when submitting two different contributions, they appear in the data as two separate donors. The most concerning issue is that my data include addresses for cash donors but not for voucher donors, so a voucher donation and a cash donation made by the same person are less likely to be matched than two cash donations by the same person. Therefore, the increase in the number of donors when vouchers become available is likely partially the result of a data limitation, and I cannot determine the extent to which this matching problem drove the increase. Even if the donors counts are accurate, this graph still only provides descriptive rather than causal evidence, as I do not find evidence of parallel trends in the pre-treatment period for this outcome.



Demographic controls and city fixed effects are included in all event studies. P-values are calculated using the method in Ferman and Pinto (2019). Dependent variables are logged, and are measured at the city level. The full sample is used.

Figure AV: Event Studies for Robustness Checks