Returns to Political Contributions in Local Housing Markets

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Abstract

This paper investigates whether firms donate to political campaigns in order to influence supply in local housing markets. Using new data on campaign donors of U.S. mayoral candidates and a regression discontinuity design, I uncover three findings. Consistent with political favors, connection to the mayor causes residential development firms to sell more new housing units. Favors to donors lead to more housing units in a city, since mayors receiving more donations from residential developers double permits for new housing construction. But differences in policy between mayors are quantitatively more important than favors for determining local housing supply.

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"Like most situations, it's 20 percent technique, and 80 percent politics and communication."

Orientation to the Land Development Process, National Association of Home Builders

1 Introduction

The determinants of housing supply affect the welfare of local residents, where people work, and thereby even aggregate efficiency.[1] In the U.S., local governments regulate land use and housing construction. Mayors in many cities oversee this regulation of property development firms. Those same firms can donate money to mayoral candidates in local elections. Can campaign donations affect supply in local housing markets? One mechanism is donors earn private favors: political connection causes the mayor to intervene to benefit the donor's business.[2] Another mechanism is donors support policy platforms: candidates differ in their intended housing policies, and donation increases the probability the preferred candidate wins.[3] Which mechanism dominates affects allocative efficiency. If political connection enables firms to build unsuitable quantities or types of housing, the welfare of local residents may be harmed. Yet, in supply inelastic housing markets, the influence of developers may overcome opposition to expanding the local housing stock.

This paper investigates how property development firms in the U.S. influence local housing supply by giving campaign donations to the mayor. I proceed in three steps. First, I build a model of the local politics of housing supply. It underlines two mechanisms for donors to influence supply, buying favors and supporting policy, which can be estimated from campaign donations data. Second, I introduce the first large-scale dataset of campaign donations in U.S. mayor's races. Third, I exploit two regression discontinuity (RD) designs in close mayoral races that estimate the magnitude of these two mechanisms. A model-based decomposition weighs the relative importance of each mechanism in determining local housing supply.

My stylized model, based on Grossman and Helpman (1996), shows how electoral politics shapes new housing in a city. In the model, mayoral candidates compete for votes by exchanging favors for donations from construction firms. Local voters weigh candidate housing policy and campaign advertisements in deciding who to support. In equilibrium, firms donate to secure private

[1]Local residents can be harmed if new construction generates negative externalities (Quigley and Rosenthal, 2005; Gyourko and Molloy, 2015), affects property values (Fischel, 2005), and congests amenities and local public goods (Parkhomenko, 2019). If housing is a pre-requisite for participation in local labor markets, then the cost and availability of housing affects the distribution of labor across space (Glaeser and Gyourko, 2018). When the cost of housing dissuades workers from moving to jobs where they are most productive, it results in misallocation of labor and aggregate output losss (Duranton and Puga, 2019; Hsieh and Moretti, 2019).

[2]Buying favors is the mechanism in, for example, Ashworth (2006); Coate (2004a); Grossman and Helpman (1994, 1996); Prat (2002)

[3]Supporting policy has been studied, for example, by Coate (2004b). I refer to two review articles on campaign financing of federal elections by Ansolabehere et al. (2003); Stratmann (2005)

favors. But they also donate to help the candidate with the preferred policy platform win. Therefore, new housing permits in a city consist of two parts. One part is permits given as favors to political donors; the other is permits issued according to the mayor's housing platform. To facilitate empirics, the model generates two linear estimating equations. The first equation shows that campaign donors affect citywide supply through the election of a pro-development mayor, who attracted more construction donors. The second equation quantifies private favors, or the impact of political connection on a firm's housing production. Key parameters in these equations govern how campaign donors affect citywide supply and the relative importance of private favors versus policy platforms. I estimate these parameters using data on local political donors.

I introduce the first large-scale dataset of mayoral campaign donors in the U.S. There have been curiously little data on local interest groups in the U.S., limiting empirical research on urban politics. To surmount this limitation, I contacted local clerks from across the country and visited a board of elections for donor disclosure reports filed by mayoral candidates. They were manually digitized into micro-data recording the contributor, donation amount, recipient, municipal election, and where available the contributor's employer, occupation, and residential address. In all, the new dataset records $913,532$ donations made in $1,135$ mayoral races from 42 states from 1990 to 2019. Each donor in the residential construction industry is linked to data on its subsequent transactions of new properties. This data on property transactions combines the CoreLogic Deeds database, recording sales of residential properties, to comparative sales data from CoStar, which covers multi-family rental properties. To account for proxy contributors and shell companies, I trace donors to sellers through employees and affiliate entities.

With new data on donors to mayoral candidates, I apply a RD design to estimate private favors. In my setting firms have unobserved characteristics that affect both who they support and how much they build. Favors moreover are not directly observed, and agents may obfuscate measurement. I obtain consistent estimates by comparing donors of the mayor to donors of the runner-up in close mayoral elections. The winner of a close election is as-good-as randomly selected (Lee et al., 2004; Ferreira and Gyourko, 2009). If the narrowly elected mayor's donors subsequently enjoy more property sales, this may be attributed to their political connection. I find that donating to the mayor accelerates that firm's growth in new property sales by 1.1 units worth \$243.8 thousand every year. Over five years, politically connected donors sell over four times as many new residential properties as donors to the runner-up. These effects are concentrated among multi-family rental units. At face value, my baseline estimates suggest large private returns to political contribution. These estimates are, in addition, consistent across alternative measures, bandwidths, and robust data-driven specifications (Calonico et al., 2017).

Further tests suggest mayors relax regulation of housing projects by their donors, implying consequences for allocative efficiency. Firms that donate to the winner sell more properties only after a few years. The delay is consistent with the technical lag between regulatory authorization and final sale. Furthermore, the treatment effect is concentrated in cities where mayors exercise greater power and among donors that give more. My evidence does not suggest donation grants firms access to communicate information. If it were so, firms new to that city, which the local government may be unfamiliar with, should benefit more from donation. Instead, incumbent firms benefit more. In addition, private favors are greater for firms that exclusively build in the local market rather than firms with national operations. These findings suggest political favoritism steers production to less efficient firms.

I find evidence of political retaliation on firms that supported the runner-up candidate. Part of the gap in subsequent sales between donors to the winner and those to the runner-up is due to falling sales for donors to the runner-up. This result arises from comparing donors to the runner-up to firms that do not donate in a differences-in-differences design. It suggests political consequences for firms supporting the mayor's opponent in the election. Taking this effect into account substantially reduces the expected private returns to contribution. Otherwise, granting favors to political donors do not affect building opportunities for non-donor firms. In neighborhoods where politically connected firms are active, non-donor firms are unaffected. Investigating these spillovers from political favors further clarifies underlying mechanisms. Spillovers to firms that did not support the mayor, moreover, are important for assessing the net impact private favors have on citywide supply.

Even if politically connected firms produce more, does it matter for total market quantities? I estimate the second equation on the impact a pro-development mayor, who attracted more construction donations, has on citywide housing permits. I compare total permits issued under mayors with more construction donors to mayors with fewer. In a citywide rendition of the RD design, mayors with more construction donors increase new permits for residential units by 130% over five years. This increase is economically significant, as it represents 9% of the total housing stock of a city. However, that increase dwarfs the cumulative favors to political donors. In fact, pro-development mayors increase sales for even non-supporters, suggesting they pursue expansive policies on new housing overall.

The impact of a pro-development mayor consists of total favors promised to donors and candidate policy platform on housing. Putting the estimates of private favors to donors, spillovers to non-donors, and total impact together, I find that 70.1% of the effect of a pro-development mayor on permits is due to candidate policy. The remaining 29.9% is due to differences in net favors owed to donors. Though favors to donors expand new housing on net, it is the mayor's housing platform that matters for local supply. This decomposition is based on the effect of a pro-development mayor compared to non-development mayors. For absolute levels, I find that 10.2% of all permits in my sample of cities are favors to political donors. Across core-based statistical areas (CBSA), the share of favors tend to be higher in elastically supplied markets. This is consistent with political donation being a channel for delivering new supply to local housing markets. These findings are consequential for policymakers, as across the U.S., communities are debating limiting real estate developers from donating in local elections.[4] Such policies may close this political channel of new housing supply and further stress affordability. My decomposition suggests any reduction in supply operates through making pro-development mayors less competitive in local elections.

I contribute to a literature in which local issues have significant economic implications: regulation of land use and housing supply. The political economy of real estate development enjoys a tradition in the social sciences (Molotch, 1976). There is growing interest in the theory (Glaeser et al., 2005; Hilber and Robert-Nicoud, 2013) and empirics (Solé-Ollé and Viladecans-Marsal, 2012, 2013; Parkhomenko, 2019) of politics underlying land use regulations. This stems from the implications of inelastic housing supply on cost of living (Quigley and Rosenthal, 2005), migration (Ganong and Shoag, 2017), and even efficiency (Turner et al., 2014; Gyourko and Molloy, 2015; Hsieh and Moretti, 2019). In this paper, I show that local campaign donors shape housing supply through two channels, direct favors and electing mayors with pro-development policy. I show that relative to mayoral policy, favors are more modest, though still important, for determining housing supply in American cities.

This paper also contributes to a literature in political economy on the value of political connections to firms.[5] Extant work focuses on federal lobbying (Bombardini and Trebbi, 2019; Kang, 2015), federal campaign finance (Ansolabehere et al., 2003; Stratmann, 2005; Fowler et al., 2020), and in development (Olken and Pande, 2012; Ferraz and Finan, 2018; Colonnelli et al., 2020; Barbosa and Ferreira, 2019). Existing work has been facilitated by centralized data linked to administrative micro-data. But outside federal races, a comparable ecosystem generally is unavailable in the U.S. In this paper, I undertake primary data collection and linkage of local political constituencies. My new dataset enables research on the local political economy of a large, developed economy—the U.S. Moreover, this paper uncovers risks of political participation for firms. Developers who donate to the runner-up candidate experience declining sales. Whereas outsized returns to political contribution are characteristic of the literature (Bombardini and Trebbi, 2019), accounting for this downside substantially reduces returns.

[4]Los Angeles, CA (Reyes and Zahniser, 2019), the D.C. suburbs (Bonessi, 2020), and San Francisco, CA (Firm, 2019) limit individuals and firms in the real estate and construction industry from donating in local elections. New York City, NY (Keith Larsen and Engquist, 2021), Cincinnati, OH (Wetterich, 2021), and Scottsdale, AZ (Longhi, 2020) have considered similar measures.

[5]See Shleifer and Vishny (1994); Fisman (2001); Svensson (2003); Fisman and Svensson (2007); Decarolis et al. (2020); Akcigit et al. (2018); Faccio (2006); Duchin and Sosyura (2012); Zeume (2017); Akey (2015)

2 Institutional Context

This section describes the institutional context around local elections, campaign finance, and the regulatory process for approving new construction.

2.1 Local Elections and Campaign Finance

Candidates running for political office often must spend large sums on staff, operations, and advertisements. In the U.S., candidates are largely responsible for financing these expenses by soliciting private donors. Local races are no exception. According to my mayoral donors data, the average mayoral race attracts $\$644,062$ in total donations. That total, however, is driven by large, self-funded candidates. The median race raises just $\$54,009$. These donations fund outreach efforts, campaign events, and advertisements, which are important ways candidate compete to win votes.

States largely regulate campaign financing of local races. Counties and municipalities supplement those rules. Appendix Figure 10 shows how these rules vary across states. Generally, candidates running for office must open a candidate committee that receives and spends campaign donations, if any. These committees must also keep detailed records for disclosure. Appendix Figure 11 is an example of a committee disclosure report retrieved from microfiche. All contributions over a threshold must be reported on disclosure reports. For each contribution, a committee reports the donor's name, whether the donors is an individual, business, or political committee, the contribution date, and dollar amount. Some states require individual donors to disclose their occupation and employer for contributions over a threshold. Finally, donors typically cannot give more than a limit.

Committees file their disclosure reports to a government filing authority at regular deadlines throughout the election year. That authority is often local clerks, though it is sometimes state governments. After collecting these reports, the filing authority makes them available for public view at their facility or on their websites. Local media organizations keenly await the release of these disclosure reports. [6]

2.2 Local Permitting Process

Though federal and state governments play some role, local governments largely regulate land use and new construction in the U.S. (Gyourko and Molloy, 2015; NAHB). The rules and procedures around obtaining a building permit vary widely across localities.

[6] According to a reporter from the *Palm Beach Post*, articles reporting donations from real estate developers are a mainstay of local election coverage.

Generally, any new construction or major renovation to a building requires approvals from the local planning authority. The authority checks proposed projects for compliance with existing building codes and zoning regulations. During review, regulators may solicit feedback from technical experts and community members. Compliant proposals receive one or more permits; only then can development legally proceed. Over 98% of privately-owned residential structures in the U.S. fall under the jurisdiction of such a permitting authority (Bureau, 2012).

Market participants perceive this regulatory process as a major cost and risk to doing business. Entering the approval process requires investing in technical proposals, though the project may be rejected. Then, complying with environmental, structural, and land use regulations increases costs. Moreover, applicants accrue carrying costs while proposals are reviewed. Reviews take, on average, six months but can last as much as five years (Emrath, 2016). In a survey of builders and developers by the National Association of Home Builders (NAHB), an industry trade group, complying with regulation is alleged to cost almost a quarter of the sale price of a single family home (Emrath, 2016).

In some U.S. cities, mayors can intervene in the planning process.[7] Formally, the mayor may appoint and oversee regulators, decide bills altering regulation, and propose municipal budgets on development incentives and property taxes. The mayor may even override zoning rules for specific development projects, like in New York City (NYCEDC, 2019). Informally, the mayor can corral support for or opposition to development from local media, community members, and other organs of local government like city councils (Kim, 2019). They may be tacit gatekeepers to municipal programs for development, such as tax incentives and urban renewal initiatives. For these reasons, the NAHB advises that the mayor "[...] must be the community's visionary leader and be willing to implement the plan or it will bog down in NIMBY opposition when developments apply for approval" (NAHB).

Numerous anecdotal reports suggest mayors sway permitting for personal and political gain. A literature in urban sociology suspects an alliance between local government and developers, which shapes the built and economic environment (Molotch, 1976). Media coverage on what appears to be *quid pro quo* exchanges are not uncommon: mayors have allegedly solicited donations from developers facing regulatory delay (e.g., Mays (2019)), for access to tax-advantaged properties (e.g., Nagl (2019)), and for contracts to build housing projects (e.g., Nirappil (2019)).

[7]The role of mayors in permitting varies based on the form of local government, e.g., mayor-council versus council-manager, and executive responsibility, e.g., weak versus strong mayors. Particularly in mayor-council governments with strong mayors, they have formal and informal scope for intervening in the local permitting process.

3 Data

In this section, I describe the datasets used to implement the research design. The core of this section introduces the new campaign contributions data for U.S. mayoral races.

3.1 Local Campaign Finance Data

I assemble the first, large-scale dataset of campaign contributions in U.S. mayoral elections. Records of donations to mayoral campaigns exist in two forms. Some states and localities maintain databases of campaign donations to local political candidates. For these states, I contacted their board of election and arranged bulk downloads. In addition, I retrieved donations data for three dozen mayor's races from the National Institute for Money in State Politics.

The second form is campaign disclosure reports. They are held by local government clerks, municipal archives, and boards of elections. I searched local government websites and e-mailed clerks from across the country to retrieve images of these reports. Many reports for elections in Cook County, IL were retrieved by photographing microfiche records held by the Illinois Board of Elections. Assembled images of reports were then manually digitized into computer readable data.

In all, the dataset contains 1,049,728 contributions for $1,135$ municipal elections for mayor from 1990-2018.[8] Each contribution details the donation date, donor name, type, amount, recipient candidate, local election, and occasionally the donor's residential address, employer, and occupation. Appendix Table 11 presents summary statistics of donations in mayor's races. Average contribution amount is modest, around \$629, and appears driven by outliers. While the average candidate receives as much as \$332,716, the median candidate receives around \$21,200. Winners receive more donations than runners-up. Importantly, more than a quarter of elections are decided within a 5% electoral margin.

Manual data collection naturally creates a selected sample of mayoral races and cities. Cities in my dataset tend to be more urban, larger, more educated, and have fewer homeowners than the typical U.S. city. My dataset does cover at least one mayor's race from every CBSA with more than a million people. Appendix Section A.1 describes this data collection, including e-mail response rates by state, geographic coverage of data, and summary statistics.

Though my dataset is a selected sample of cities, my main empirical estimates are arguably internally valid. My primary estimation strategy compares donors to the winner to those of the

[8] To be included in the final dataset, either both candidates must have received donations or one of the candidates must have filed a report indicating they collected no campaign funds.

runner-up. With mayoral race fixed effects, the variation is within a city over a single mayoral election cycle. This avoids comparing donors who differ on some unobserved dimension due to the selection of cities in my data. The impact of a pro-development mayor is, I argue, internally valid as well due to the RD design. As long as close mayoral races are decided as-if randomly, cities that narrowly elected a pro-development mayor should be similar to the cities that did not.

3.2 CoreLogic and CoStar Outcomes Data

The ideal outcome data is regulatory permits received by construction donors. However, I do not have access to permits data containing the name of the firm.[9] I instead use data on sales of residential units from the CoreLogic and CoStar databases. Both record real estate transactions, with CoreLogic specializing largely in residential sales and CoStar on commercial real estate. Subsetting to sales of new residential construction, I add transactions and dollar sales undertaken by a firm in both datasets to examine the subsequent business outcomes of a donor.

For each residential sale, the deeds database in CoreLogic records the name of the seller and buyer, property address, dollar value of the sale, and building characteristics from the tax database. Following Driscoll (2018), I subset to sales of new construction in the following manner. I keep transactions listed as new home sales and arms-length transactions. Excluded are foreclosures, refinances, and home equity lines of credit. Observations missing parcel and county identifiers and sale dates are dropped. Finally, duplicate observations are removed and only the first sale since construction is retained. Like Driscoll (2018), I validate these new home sales by comparing it to the Building Permits Survey dataset from the Census Bureau.

Since CoreLogic focuses on owner-occupied residential structures, I also use commercial real estate data from CoStar. Its Sales Comp database describes sales of commercial properties, which include multifamily rental and condominium properties.[10] From this database, I include in subsequent analysis multifamily properties, like rentals and condominiums. I further subset to observations with at least one seller name, an arms-length sale, and a complete research status by CoStar analysts. To identify new developments, I keep the earliest sale of each property in CoStar.

To document business outcomes of a firm in a city over time, I collapse the transaction-level CoreLogic and CoStar dataset into seller-by-jurisdiction-by-year observations. I then pool the number

[9]Datasets on building permits that identify the firm exist. However, their coverage does not align with the markets for which I collected campaign contributions.

[10]In this paper, "residential properties" include both owner-occupied and rental properties pooling CoreLogic and CoStar.

and value of finished residential units sold across CoreLogic and CoStar. Each observation therefore records the count and value of business each developer or builder undertakes in a municipality in a given year.

3.3 Matching Local Campaign Finance Data to CoreLogic

The empirical design requires linking a local contributor to its subsequent business outcomes. Linking is difficult in this setting for a number of reasons. Firms may donate under misspelled and other names, such as through employees. They may in addition sell new construction via subsidiaries or shell companies. Moreover, there may exist complex "soft" networks such as relationships, family members, trusts, political committees, and legal entities unobservable to the researcher. I propose a data-engineering approach that links contributors and sellers accounting for misspellings and different names of firm personnel and subsidiaries. I do this by creating an intermediate link file that groups contributors and sellers under an overarching parent company. Though this approach will not fully account for "soft" political networks, I consider the implications of remaining measurement error on the empirical results in Section C.3.

First, I compile a dataset of affiliations of real estate and construction donors; an observation of this dataset may be as simple as, for example, the name of a company under one variable and the name of a subsidiary in a second. This dataset of related entities is comprised of other datasets. CoStar provides a dataset recording the true companies behind shell companies and stakeholder employees managing transactions. It compiles this data by employing research analysts who scan legal documents and news reports. From the Low Income Housing Tax Credit (LIHTC) database of affordable housing developers and the Corporate Affiliations dataset, I further obtain contacts, project names, and subsidiaries of construction firms. Additionally, my dataset of local contributors provides the employer name for 35% of contributions. Finally, to account for misspelled names of firms and individuals, I employ a fuzzy matching algorithm to create bilateral links of different spellings of firm and employee names, described in Appendix Section A.2.1.

The resulting dataset of firm-to-personnel, firm-to-firm, and fuzzy-matched string name pairs are divided into groupings using the NetworkX module in Python. Each group represents one economic entity. This results in a dataset of a list of firm names, employee names, and different spellings, each associated with a unique name of an overarching parent organization.

With this link file in hand, I merge the contributor data to the CoreLogic and CoStar outcome data. Recall that the contribution dataset contains the name of the donor, recipient mayoral candidate, and donation amount, all associated with a particular local election. The outcome dataset is identified by the name of the seller, year, and the municipal location of new construction. I link each contributor name to an identical name in the link file. With each contributor name now associated with a unique overarching parent organization, I collapse that linked contributor data up to the parent organization-election level. A similar exercise is performed for each seller in CoreLogic and CoStar.

Table 1: Summary Statistics on Mayoral Campaign Donors, Property Sellers, and Building Permits

	Matching Campaign Donors to Property Sellers								
				Donation (Thous.)		*Transactions/Yr.*		*Sales/Yr. (Thous.)*	
	All	Transacted	Mayoral Races	Mean	SD	Mean	SD	Mean	SD
Campaign Donors									
	563,605		1,476	$1.3	$222.7				
Property Sellers									
	1,031,255	83,445	1,264			0.3	4.3	$82.6	$1,325.4
Donor-Sellers									
	27,146	1,074	1,156	$1.4	$6.9	0.6	8.3	$163.0	$2,207.2
Recipient									
Both	1,589	88	29	$4.4	$14.2	1.8	17.7	$554.8	$5,593.6
Runner-up	6,945	312	381	$1.0	$3.3	0.6	6.2	$133.7	$1,549.5
Winner	18,528	668	744	$1.3	$6.9	0.5	7.6	$140.3	$1,881.3
Margin of Victory									
> 5%	21,550	806	908	$1.3	$6.6	0.5	6.8	$139.0	$1,816.8
≤ 5%	5,596	268	248	$1.6	$8.0	1.0	12.3	$255.4	$3,303.4

	Matching Mayoral Donations Data and Building Permits Survey						
	Juris.-Yr. Obs.	*Donations to Mayor (Thous.)*		*Share of Mayor's Donations*		*Permits/Yr.*	
	All	Mean	SD	Mean	SD	Mean	SD
Campaign Data							
	1,094	$493.6	$7,700.9	14.2%	16.3%		
BPS Data							
	724,322					81.8	506.6
Matched Campaign-BPS							
	986	$530.3	$8,010.5	15.1%	16.4%	501.5	1,688.9
Mayoral Constituency							
Non-Development	337	$274.6	$1,343.5	9.1%	11.5%	488.9	1,794.7
Pro-Development	486	$818.9	$11,125.1	19.8%	17.6%	586.3	1,815.7
Margin of Victory							
> 5%	726	$280.3	$1,117.1	15.4%	16.2%	444.4	1,626.4
≤ 5%	260	$1,228.3	$15,488.3	14.1%	17.0%	660.8	1,846.3

This table displays summary statistics for two datasets. The top table summarizes the merger between donors to mayoral campaigns and firms that transacted residential properties. Panel "Campaign Donors" examines donor-mayoral race-level data and "Property Sellers" examines firm-mayoral race data from CoStar and CoreLogic. "Donor-Sellers" represents matches between donors and sellers, with "Recipient" summarizing who the matched donor supported and with "Margin of Victory" dividing donors based on the ultimate margin of victory for that mayoral race. The first three columns tabulate observations, with "Transacted" recording the number of sellers that sold properties in that municipality within five years of the election. Column "Donation (Thous.)" summarizes individual donations in thousands of dollars, and "Transactions/Yr." and "Sales/Yr. (Thous.)" summarize sales by firms five years after the election in the same municipality. The bottom table summarizes the merger of total campaign donations in a mayor's race and subsequent citywide permits from the Building Permits Survey. Panel "Campaign Data" describes the sample of local races for which campaign finance data exist. "BPS Data" summarizes the Building Permits Survey data and "Matched Campaign-BPS" the merged sample between the two. Sub-panel "Mayoral Constituency" separates the mayor into those who were pro-development versus not. Column "Donations to Winner (Thous.)" describes all donations received by the mayor in thousands of dollars, "Share of Mayor's Donations" the share of a candidate's total contributions from the construction industry, and "Permits/Yr." the number of residential permits issued in the jurisdiction five years after the mayoral election.

With both datasets of local contributors and sellers at the parent organization-election level, I merge these datasets using the parent organization as the key. However, the outcome dataset only records actual sales of property and does not report on firms who made no sales. I impute a zero for firms who sold no properties over the sample period. Since most contributors are not developers, only contributors appearing at some time or place in the CoreLogic or CoStar dataset are imputed with 0.

3.4 Initial Descriptives

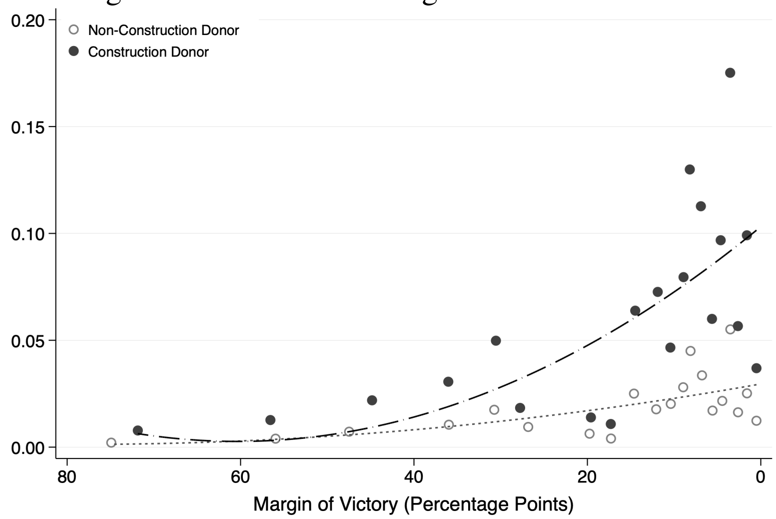
The resulting dataset is parent organization by race-level detailing contribution amounts to winner and runner-up, electoral margins for that election, and subsequent outcomes such as number and value of properties sold.

The top panel of Table 1 summarizes the merger between contributors and CoStar and CoreLogic outcomes. From over half a million contributors, $27,146$ were associated with a seller in CoreLogic or CoStar. 96% of these donors do not transact over the mayor's tenure. Firms in the matched sample tend to do more business than non-contributors. Important for the RD design, $5,596$ observations lie within a 5% vote margin. Interestingly, most donors do not donate to both winner and runner-up, even in close races. This matched dataset makes it possible to estimate the main specification, Equation 7.

The bottom panel of Table 1 summarizes the merger between mayoral races and the Building Permits Survey for the analysis on total housing supply. Importantly, some mayors disproportionately receive more money from the construction industry, on average 19.8% versus 9.1% of all money raised. Finally, the cities in this analysis permit more housing in total, which reflect the larger size of cities in our sample.

3.4.1 Donor Sorting

Figure 1: Fraction Donating to Both Candidates

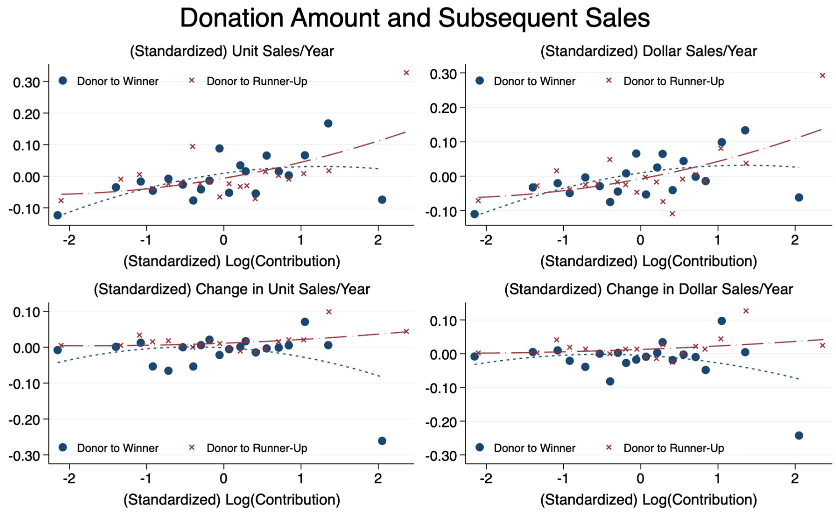


The figure displays the prevalence of campaign donors who donate to both frontrunners in mayor's races, against the ultimate margin of victory of that race. Each dot represents binned averages of the fraction of donors who supported both candidates. The black dots are donors from the construction industry and white dots are for all other donors. The lines are quadratic fits of data, with the black dashed line for construction donors and light gray line that for all other donors.

A remarkable feature of local campaign donors is exclusive sorting to one candidate. Table 1 shows that of matched contributors, around a quarter donate to both candidates. Figure 1 plots the probability of supporting both front runners against the ultimate electoral margin of victory. For both construction and non-construction donors, the probability of donating to both increases as the race becomes close (ex-post). Construction donors appear more likely to donate to both, suggesting they value being connected to the ultimate winner. However, even for close races, less than a tenth of construction firms donate to both. In this paper, I exploit this sorting for the experimental design. To compare donors to the winner to the runner-up in close races, there needs to be firms that donate only to one.

3.4.2 Donation and Subsequent Outcomes

Figure 2: Observed Relationship between Donation and Sales



Displayed is the observed relationship between log contribution amount and firm transactions of new construction over the mayor's tenure. Each figure plots binned averages of subsequent outcomes with fitted quadratic lines. Circles represent outcomes for donors to the winner and x's represent those for donors to the runner-up. Values have been residualized by mayoral race fixed effects.

Figure 2 displays the relationship between donation amount and subsequent sales for construction firms. These initial associations suggest a relationship between donations and subsequent outcomes. The top two figures show that donors to the winner appear to transact more than those to the runner-up. Both groups' sales of residential units increase with donation amount. The bottom two figures reproduce the relationship, but for year-over-year changes in sales. The quasi-experiment in this paper seeks to disentangle the causal impact of donating to the winner on subsequent outcomes.

3.5 Mayoral Races Data

For mayoral election margins, I use the municipal elections data from Ferreira and Gyourko (2009) with similar data from Jerch et al. (2017) and de Benedictis-Kessner et al. (2016). Each observation corresponds to the general election, and includes the names of the winner and runner-up, their vote tallies, and the date of the election. I drop observations prior to 1990 and remove elections with zero or negative vote counts. I drop elections that are non-competitive, i.e., elections that do not list both winner and runner-up and keep general elections. The margin of victory between the winner and runner-up is the difference between their vote shares.

4 Conceptual Framework

I present a model of the local electoral politics of housing supply based on Grossman and Helpman (1996).[11] Two candidates exogenously differ on policy towards permits for new housing. They compete in an election to become mayor of a city. They compete by advertising their candidacy to local voters. These advertisements are funded by contributions from a collective of construction firms. In return, each candidate commits to delivering private favors to the firms, which are permits for new housing.

The model distinguishes between two motivations firms have for making campaign donations: buying favors and supporting policy. Moreover, it transparently decomposes total citywide permits into three components. One component is permits issued from candidates' housing policy, the second is total favors to donors, and the third is spillovers to non-supporters. The model directly leads to two linear estimating equations. Estimating key parameters of those equations evaluates the impact campaign donors have on local housing supply. It also assesses the relative importance of private favors and policy platforms.

4.1 Environment

The timing of this political game is as follows. First, firms collectively propose an offer, $\{C^K, \Delta^K\}$, to each candidate K. An offer consists of a contribution $C^K \in \mathbb{R}^+$ the firms together give to the candidate and favors, $\Delta^K \in \mathbb{R}$, the candidate commits to firms in return. In the second stage, each candidate K accepts or rejects the offer. Upon acceptance, the firms donate C^K, the election occurs, and the donors receive Δ^K if candidate K wins.

4.1.1 Candidates

Two candidates $K \in \{\text{DEV}, \text{NON}\}$ running for mayor exogenously differ on policy toward permits for new housing represented by Q^K. Specifically, Q^K captures total permits a candidate promises to make available to all firms in the city, regardless of donation. Let candidate DEV be the pro-development candidate with $Q^{\text{DEV}} > Q^{\text{NON}}$. Candidates only want to win.

The only decision each candidate makes is whether to accept or reject an offer from the collective of construction firms. Accepting contributions from this lobby[12] lets candidates advertise, which

[11] My model makes two key departures. One, candidates differ exogenously on policy. Those differences affect the incentives of voters and the construction firms. Second, firms make a take-it-or-leave-it offer to the candidate, rather than a contribution schedule.

[12] In the following exposition I interchangeably use "lobby" to represent a collective of construction firms.

improves their electoral odds. In return, the candidate commits to delivering private favors Δ^K to the lobby, which are permits for new housing after the election. In the course of delivering favors to donors, there are spillover effects, $\tilde{\Delta}$, to non-supporters. These spillovers are governed flexibly by:

$$\tilde{\Delta}^K = \gamma\Delta^K$$

with $\gamma \in \mathbb{R}$. γ can be positive, as favors to donors may stimulate local development, creating business opportunities for non-donors. On the other hand, if favors include blocking competition to the donor, then γ would be negative. If candidate K wins the race, total housing units permitted in that city is then:

$$Y^K = Q^K + \Delta^K + \tilde{\Delta}^K \tag{1}$$

In any city, total permits issued under mayor K is the sum of the mayor's policy on permits, Q^K, favors to the lobby, Δ^K, and spillovers to non-supporters, $\tilde{\Delta}^K$.

4.1.2 Voters

The outcome of the election is decided by a median voter. That voter is drawn from the population of local voters. There are two types of voters, informed voters and uninformed voters.[13]

Informed voters make up $1-\alpha$ of the electorate. They have single-peaked preferences for total housing permits:

$$U\left(Q^K, \Delta^K, \tilde{\Delta}^K; \theta\right) = -\frac{1}{2}\left(\underbrace{Q^K + \Delta^K + \tilde{\Delta}^K}_{Y^K} - \theta\right)^2$$

They prefer that total permits for new housing construction be θ. Before picking a candidate, the voter observes an independent and identically and uniformly distributed shock with density f. Then the informed voter picks the candidate who delivers higher utility.

The second group is uninformed voters, who make up α of the electorate. Uninformed voters may hold policy preferences, but campaign advertising, funded by donations C^K, influences who they support. In particular, the probability an uninformed voter chooses candidate DEV is $\frac{1}{2} + h\left(C^{\text{DEV}} - C^{\text{NON}}\right)$, where h is the efficacy of advertising on swaying uninformed voters. The larger the difference in advertising expenditures, the more likely the uninformed voter supports the higher spending candidate. These voters are important, because only through them can campaign advertising change electoral odds.

[13] I follow the prevailing terminology of informed and uninformed voters used in Baron (1994); Grossman and Helpman (1996); Bombardini and Trebbi (2011)

Based on this voter behavior, the probability Candidate DEV wins the election is the total probability $\rho^{\text{DEV}}(\Delta, C; Q)$[14]:

$$\rho^{\text{DEV}}(\Delta, C; Q) = (1-\alpha)\underbrace{\left[\frac{1}{2} + f\left[U\left(Q^{\text{DEV}}, \Delta^{\text{DEV}}, \tilde{\Delta}^{\text{DEV}}; \theta\right) - U\left(Q^{\text{NON}}, \Delta^{\text{NON}}, \tilde{\Delta}^{\text{NON}}; \theta\right)\right]\right]}_{\text{Prob. Informed Voter Picks DEV}} + \dots$$

$$\dots + \alpha \underbrace{\left[\frac{1}{2} + h\left(C^{\text{DEV}} - C^{\text{NON}}\right)\right]}_{\text{Prob. Uninformed Voter Picks DEV}} \tag{2}$$

With probability $1-\alpha$, the decisive voter is a informed voter. Then the probability that informed voter picks candidate DEV is the first term of Equation 2. The alternative is the decisive voter is an uninformed voter with probability α. Then that uninformed voter picks candidate DEV with probability expressed as the second term of Equation 2.[15]

4.1.3 Construction Firms

Before the election, a lobby representing the collective of construction firms makes an offer to each candidate. An offer is a contribution C^K in exchange for post-election private favors Δ^K. The lobby sets offers to maximize its collective expected pay-off:

$$\max_{\{\Delta^{\text{K}}, C^K\}^{K=\{\text{DEV,NON}\}}} \Pi\left(\Delta^{\text{K}}, C^K\right) = \overbrace{\rho^{\text{DEV}}(\Delta, C; Q)}^{\text{Prob. DEV Wins}} \underbrace{\left[a\left(\Delta^{\text{DEV}} + \tilde{\Delta}^{\text{DEV}}\right) + bQ^{\text{DEV}}\right]}_{\text{Pay-off with DEV}} + \dots \tag{3}$$

$$\dots + \overbrace{\left[1 - \rho^{\text{DEV}}(\Delta, C; Q)\right]}^{\text{Prob. NON Wins}} \underbrace{\left[a\left(\Delta^{\text{NON}} + \tilde{\Delta}^{\text{NON}}\right) + bQ^{\text{NON}}\right]}_{\text{Pay-off with NON}} - \dots$$

$$\dots - \underbrace{C^{\text{DEV}} - C^{\text{NON}}}_{\text{Donations}}$$

Conditional on the mayor, the lobby benefits from two sources of permits for new construction. The first source of permits is favors from the mayor, Δ^K, plus any spillover effects, $\tilde{\Delta}^K$. $a > 0$ is thus akin to the unit margin on each of those permits. The second source is permits available to all

[14] Where $\Delta = \left\{\Delta^K, \tilde{\Delta}^K\right\}^{K\in\{\text{DEV,NON}\}}$, $C = \left\{C^K\right\}^{K\in\{\text{DEV,NON}\}}$, $Q = \left\{Q^K\right\}^{K\in\{\text{DEV,NON}\}}$

[15] Candidates can change the probability of their election by accepting certain offers. Notice that the probability of winning the election is additively separable in offers to each candidate. Therefore, the decision of one candidate to accept or reject an offer does not change the decision of the other candidate.

firms in the city according to the candidate's housing platform, Q^K. $b > 0$ absorbs both the unit margin on those permits and the fraction of permits Q^K the firms in the lobby expect to earn. While the lobby can negotiate Δ^K, it cannot change Q^K. Importantly, pre-election contributions C^K are sunk; the lobby cannot refund contributions if its beneficiary loses. To close the model, assume finally that if the firm offers nothing, i.e., $C^K = 0$, then firms earn a baseline level of favors such that $\underline{\Delta^K} \in \arg\max_{\Delta^K} \; U\left(Q^K, \Delta^K, \tilde{\Delta}^K; \theta\right)$.

However, the lobby needs to persuade the candidate to accept its offer in the second stage. Since candidates only care about winning, they accept any offer that improves their electoral odds over rejecting. That is, a candidate accepts an offer if and only if $\rho^K\left(\Delta^K, \Delta^{-K}, C^K C^{-K}\right) \geq \rho^K\left(\underline{\Delta^K}, \Delta^{-K}, 0, C^{-K}\right)$. This is equivalent to satisfying the following participation constraint for each candidate K:

$$C^K \geq \frac{(1-\alpha) f}{\alpha h}\left[U\left(Q^K, \underline{\Delta^K}, \underline{\tilde{\Delta}^K}; \theta\right) - U\left(Q^K, \Delta^K, \tilde{\Delta}^K; \theta\right)\right] \tag{4}$$

Intuitively, the candidate needs to be persuaded to accept contributions and any attendant favors over accepting nothing. This means compensating the candidate for the electoral penalty incurred from disbursing favors. Importantly, note whenever Inequality 4 binds, the contribution does not improve candidate K's probability of winning.

4.2 Equilibrium

The lobby solves its objective in Equation 3. To ensure offers are accepted by the candidate, the lobby needs to satisfy the participation constraint in Inequality 4 for each K. Before I characterize the equilibrium of this game, I define an assumption about functional forms:

Assumption 1. *Let* $\frac{1}{\alpha h} - \left(b - \frac{a}{1+\gamma}\right)\left(Q^{DEV} - Q^{NON}\right) > 0$

Proposition 1 describes the key features of the equilibrium of this political game.

Proposition 1. *A subgame perfect Nash equilibrium of this game exists, and:*

1. *The participation constraint (Inequality 4) for Candidate NON is binding, while that for Candidate DEV is weakly binding.*
2. *(Buying Favors) The lobby earns private benefits by donating to both candidates.*
3. *(Supporting Policy) Under Assumption 1, the participation constraint for Candidate DEV does not bind, and donation increases the probability Candidate DEV wins.*

Proofs are in Appendix B. The lobby donates to secure private favors of permits from both candidates, capturing the "buying favors" motivation. However, Candidate DEV's participation constraint, Inequality 4, binds only weakly. Under Assumption 1, the lobby can even earn the same favor by donating less. But in addition to purchasing favors, the lobby donates extra to increase the probability Candidate DEV wins. This is because the lobby prefers the pro-development mayor's policy Q^{DEV} over the opponent's. This captures the "supporting policy" motivation for the lobby. On the other hand, contributions to the non-development candidate secure favors but do not improve Candidate NON's electoral odds. The following Corollary describes the distribution of campaign contributions:

Corollary 1. *The pro-development candidate receives more money from the construction lobby than does the opponent.*

In empirical analyses, Corollary 1 helps identify the pro-development candidate. I now study what the equilibrium implies for citywide housing supply. The following proposition examines how the dual motivations for the lobby are mechanisms for supplying new housing in a city.

Proposition 2. *The political equilibrium in the lobbying game sets citywide new housing supply:*

1. *Based on the strength of spillovers, private favors to donors increase new housing permits.*
2. *The pro-development candidate oversees more new housing permits.*

When the lobby donates to a mayor, total housing increases regardless of candidate policy. The donation convinces the mayor to approve more permits than voters wish. Moreover, electing a pro-development mayor leads to more construction in the city. This is because if contributions were banned both candidates issue the same quantity of permits. Contributions compensate candidates to defy the informed voters' wishes.

In Appendix Section B I extend the model in two directions. First, I derive a multi-lobby case where each firm independently lobbies the candidate. In a second extension, I allow voters with different policy preferences depending on whether they are homeowners or renters.[16]

[16] In the model, the lobby supports both candidates. However, in the data most firms do not donate and those who do only donate to one. I do not take an analytical stand to rationalize the entry and sorting of donors to candidates. Plausibly, in the model with multiple lobbies, if a firm draws some candidate-by-firm-level shock, then some lobbies may conceivably donate to one, both, or neither. The appropriate shock makes giving to one or both candidates undesirable. The shock may be the consumption value (or, disamenities) of political participation, like social events and prestige (or, personality and unrelated policy mismatch, like education). Such consumption value or warm-glow are emphasized in the literature on federal campaign finance (Ansolabehere et al. (2003)) and on charitable giving (Sieg and Zhang (2012)).

4.3 Estimating Equations

The equilibrium directly leads to two estimating equations. The first city-level equation describes the impact local campaign donors have on citywide new housing through the election of a pro-development mayor. The second, firm-level estimating equation describes the magnitude of private favors to individual donors. Estimating the second equation decomposes two underlying channels: private favors and policy platforms.

Under mayor K, total housing permits consist of equilibrium favors, spillovers, and their policy platform. To guide empirics, I make further assumptions. Assume that favors earned by the lobby are allocated evenly among N^K donors to the winner: $\overline{\Delta^{K*}} = \frac{\Delta^{K*}}{N^K}$. Similarly, any spillovers are allocated evenly among the N^{-K} affected non-supporters $\overline{\tilde{\Delta}^{K*}} = \frac{\tilde{\Delta}^{K*}}{N^{-K}}$. Further assume average treatment effects between pro- and non-development mayors, i.e., $\overline{\Delta^{\text{DEV}*}} = \overline{\Delta^{\text{NON}*}} = \overline{\Delta^*}$ and $\overline{\tilde{\Delta}^{\text{DEV}*}} = \overline{\tilde{\Delta}^{\text{NON}*}} = \overline{\tilde{\Delta}^*}$. Now observed citywide permits Y_t after election t is:[17]

$$
\begin{aligned}
Y_t = \text{Pro-Dev}_t \times \Bigg[& \underbrace{\overline{Q^{\text{DEV}}} - \overline{Q^{\text{NON}}}}_{\text{Candidate Policy}} + \underbrace{\left(\overline{N^{\text{DEV}}} - \overline{N^{\text{NON}}}\right)\overline{\Delta^*}}_{\text{Private Favors}} + \underbrace{\left(\overline{N^{\text{NON}}} - \overline{N^{\text{DEV}}}\right)\overline{\tilde{\Delta}^*}}_{\text{Spillovers to Non-Supporters}} \Bigg] + \ldots \qquad (5) \\
\ldots + \overline{Q^{NON}} + \overline{N^{NON}}\,\overline{\Delta^*} + \overline{N^{DEV}}\,\overline{\tilde{\Delta}^*} + \tilde{\varepsilon}_t
\end{aligned}
$$

with $\tilde{\varepsilon}_t$ captures heterogeneity across different cities. The key treatment of interest, Pro-Dev $= \mathbb{I}\{K = \text{DEV}\}$, is the impact pro-development mayors have on total housing supply.

The impact of a pro-development mayor is comprised of the three components as in Equation 5. Suppose the total effect mainly consists of the favor and spillover components. Then private favors are the empirically relevant channel for donation to affect local supply. Otherwise, it is differences in policy between candidates that determine housing permits. In that scenario, donation does not change how candidates pursue regulation. The relevant margin of its impact on supply is electing certain candidates, who then pursue policies expanding housing permits.

To decompose the total impact into its constituent channels, I derive the second estimating equation on the magnitude of private favors. In addition to assuming that favors and spillovers are equally allotted among donors, I assume that new housing units produced by an individual construction firm i, y_t^i, come from two sources: permits as favors from the mayor and permits from the

[17] The citywide estimating equation comes from combining Equation 1 with the fact that observed housing permits are: $Y_t = \text{Pro-Dev}_t \times Y_t^{\text{DEV}*} + (1 - \text{Pro-Dev}_t) \times Y_t^{\text{NON}*}$

conventional regulatory process defined by the mayor's platform:

$$y_t^i = \text{Pro-Mayor}_t^i \times \overline{\Delta^*} + \left(1 - \text{Pro-Mayor}_t^i\right) \times \overline{\tilde{\Delta}^*} + \phi_t^i Q_t + \tilde{\zeta}_t^i \tag{6}$$

where $\text{Pro-Mayor}_t^i = \mathbb{I}\{i \text{ donated to mayor in election } t\}$. $\phi_t^i Q_t$ represents business from the conventional regulatory process, which is a share ϕ_t^i of the mayor's housing platform Q_t. $\tilde{\zeta}_t^i$ captures heterogeneity across cities and firms.

Decomposing policy and favors pose important policy implications. If a large share of new housing due to a pro-development mayor is favors to donors, then patronage plays an important role in supplying new housing units. Policy interventions like banning or limiting donations from developers would reduce new housing, even when the candidate wants to permit more. If on the other hand it is candidate policy that determines supply, then implications for policy intervention differ. Reducing the influence of real estate donors may still reduce housing supply. However, it would operate by making pro-development candidates less competitive in mayoral elections.

Empirically assessing the impact on citywide supply and the relative importance of each channel require estimating Equations 5 and 6. While candidate policy, Q^K, is unobserved, there is data on the number of donors, N^K, and total permits, Y. What remains is the magnitude of private favors, $\overline{\Delta^*}$, and any spillover effects on non-donors, $\overline{\tilde{\Delta}^*}$. I estimate them in Section 5. In Section 6, I estimate the total impact of a pro-development mayor. I then proceed to decompose that total effect into the favor and policy mechanisms in Section 7.

5 Evidence of Political Favors

This section outlines the empirical design and presents estimates on the impact of political connections on donor outcomes.

5.1 Research Design

The framework from Section 4 directly translates into my empirical strategy.[18] Sales of new residential properties originate from permits, which a construction firm obtains from two sources. The first is favors it earns from donating to the current mayor. If it did not support the mayor, it experiences a spillover. The second source is permits set by the mayor's housing policy. These are available to all firms that undergo the conventional regulatory approval process. Let $y_{c,p,t}^i$ be

[18] Based on the arguments in Lee et al. (2004) and Avis et al. (2017).

observed sales of all housing units for firm i after election year t, in period p, jurisdiction c. Expanding Equation 6, I have:

$$y^i_{c,p,t} = \text{Pro-Mayor}^i_{c,t} \underbrace{\left(\overline{\Delta^*} - \overline{\tilde{\Delta}^*}\right)}_{\beta} + \gamma_{c,p,t} + \underbrace{\phi^i_{c,p,t} Q_{c,p,t} + \tilde{\zeta}^i_{c,p,t}}_{\zeta^i_{c,p,t}}$$

where $\text{Pro-Mayor}^i_{c,t}$ indicates if firm i backed the elected mayor and $\phi^i_{c,p,t} \in [0,1]$ is the firm's market share of candidate platform on permits $Q_{c,p,t}$. $\gamma_{c,p,t}$ are fixed effects for mayoral race (c,t) and period (p). In practice, I do not observe how much of a firm's business $y^i_{c,p,t}$ arise from permits via net private favors, $\overline{\Delta^*} - \overline{\tilde{\Delta}^*}$, or via the conventional regulatory process, $\phi^i_{c,p,t} Q^K$.

The model underlines how candidate policy, $Q_{c,p,t}$, firm market share, $\phi^i_{c,p,t}$, and political support, $\text{Pro-Mayor}^i_{c,t}$, affect firm sales, $y^i_{c,p,t}$. However, $\phi^i_{c,t} Q^K_{c,p,t}$ is unobserved. This is because data on $y^i_{c,p,t}$ does not distinguish between permits from a conventional regulatory process from permits from private favors. These unobservables confound a simple comparison of firms that donated to the mayor to firms that did not. Firms that donated to the runner-up may have different business opportunities, captured by $\phi^i_{c,t}$, than firms that sort to the winner. Moreover, firms that donate to neither candidate differ on unobservables that drive both its political entry decision and its subsequent business outcomes. In addition to these confounders highlighted by the model, others include candidate ability, autocorrelated firm shocks, and measurement error.

Arguably the first-best setting to assess benefits from political contributions is via randomized experiment. One set of firms is randomly treated with donation to the mayor, while other firms are not. The randomization restores conditional mean independence between firm outcomes and its donation. I approximate that ideal experiment by comparing donors to winners and donors to runners-up in close elections. When election margins are narrow, the winning candidate is decided as-if randomly (Ferreira and Gyourko, 2009; Lee et al., 2004). For political contributors that gave money to one candidate but not to the other, close elections randomize which contributor ultimately donated to the official in power.

That intuition is crystallized in a RD design. For firm i donating to mayoral candidate j, let $MV^i_{c,t}$ be the difference in vote shares between candidate j and her opponent, $MV^i_{c,t} = VoteShare^j_{c,t} - VoteShare^{-j}_{c,t}$. $\text{Pro-Mayor}^i_{c,t}$ indicates whether firm i supported the winner, so $\text{Pro-Mayor}^i_{c,t} = \mathbf{1}\left\{MV^i_{c,t} \geq 0\right\}$. Assuming local continuity of the conditional expectation functions, the difference at the cut-off is the causal impact of donating to the mayor on subsequent business. I estimate conditional expectation functions with local linear regression:

$$y^i_{c,p,t} = \text{Pro-Mayor}^i_{c,t}\beta + MV^i_{c,t}\eta_p + \gamma_{c,p,t} + \zeta^i_{c,p,t} \tag{7}$$

η_p are linear polynomial coefficients for each period. To constrain multiple hypothesis testing, I follow the main set-up and specification in Colonnelli et al. (2020). They exploit a similar within-city RD design to assess the scope for patronage in municipal jobs in Brazil. My dataset is a panel of donors five years after each mayoral election and pools all races decided within a 5 percent margin of victory.[19] $\gamma_{c,p,t}$ are period-municipality-election year fixed effects. The main departure from Colonnelli et al. (2020) is I use year-over-year changes in outcomes for firm i as $y^i_{c,p,t}$. The coefficient of interest is β on Pro-Mayor$^i_{c,t}$, which is the impact of having donated to a mayoral candidate on donor outcomes.

The panel dataset used to estimate Equation 7 records $16,851$ observations. The effective number of observations is the number of donors, $3,906$. Essentially, in each close race, donors to the winner are the treated observations and those to the runner-up are control. Since firm sales, particularly in construction, is persistent, standard errors are clustered at the firm level to account for autocorrelation. I also cluster by mayoral race, to account for correlation of donors within in the years after a mayor's race in that jurisdiction. For races in the RD sample, a few have mayors that hold office consecutively. In Appendix Figure 21, I show that the results are robust to double clustering by firm and mayor.

RD designs require potential outcomes be locally continuous around the discontinuity. Absent treatment, expected outcomes of the treated population would have been continuous across the discontinuity. Similarly, expected outcomes for the untreated should be continuous at the discontinuity. Covariate imbalance across the discontinuity implies the RD estimate reflect other factors besides the intended treatment. Appendix C tests the continuity of the empirical density around the discontinuity as well as covariate balance of city, firm, and candidate characteristics.

5.2 Main Results

I present the core empirical findings on the impact of political contributions on donor outcomes. Table 2 and Figure 3 present the RD estimates. The RD estimate implies that supporting the mayor accelerates growth of new residential sales by 1.18 units per year. They translate into \$243.8 thousand dollars more sales per year.

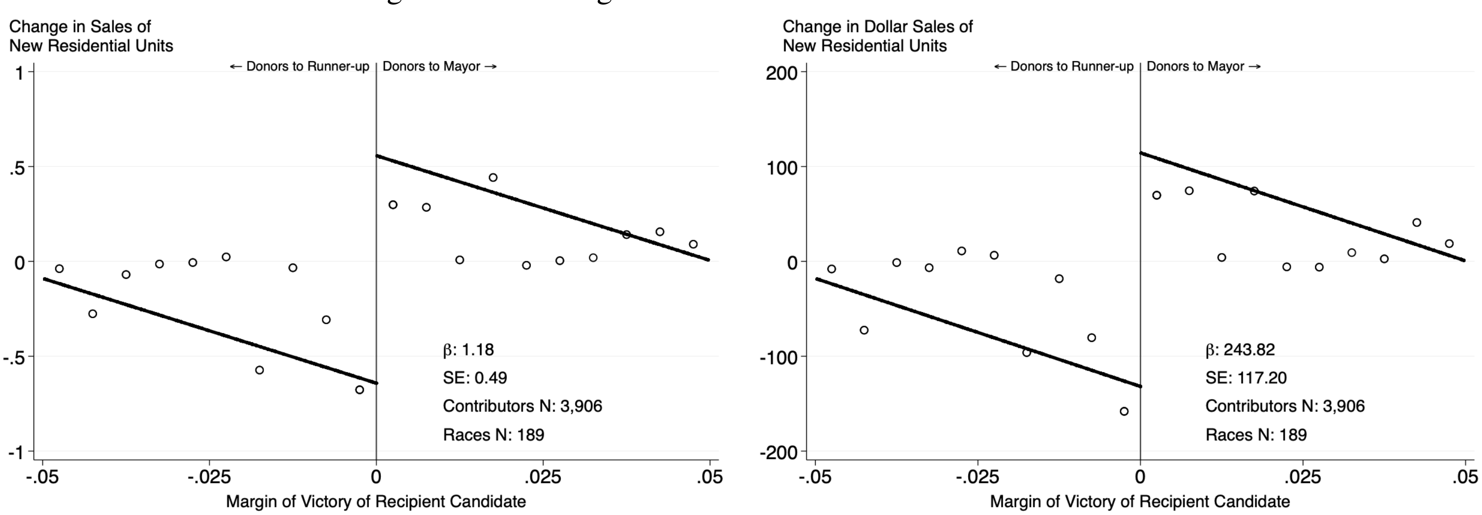
[19] A firm may donate to both candidates; the baseline specification excludes donors to both.

Table 2: RD Estimates on Donating to the Mayor on Sales of New Properties

	Change Res. Units Sold	Change Res. Val. Sold (Thous. USD)
	(1)	(2)
Pro-Mayor$^{i}_{c,t}$	1.184**	243.8**
	(0.490)	(117.2)
R^2	0.0375	0.0410
N: Panel	16,851	16,851
N: Contributors	3,906	3,906
N: Races	189	189
Base Mean	1.1	263.6
MV Window	5%	5%
Specification	RD	RD

Displayed are estimates of the impact of supporting the mayor on subsequent firm sales of new residential construction. The dependent variable in the first column is year-over-year change in residential transactions, and the second year-over-year change in dollar sales. All specifications are estimated on a stacked panel dataset of five years after the election. All regressions include mayoral election-by-period fixed effects. Standard errors are displayed in parentheses, and they are robust to heteroskedasticity and double clustered by donor and mayoral election.

Figure 3: RD Design on Firm Contributions and Outcomes



Displayed is the impact of political connection on sales of new residential construction from a regression discontinuity design around close mayoral elections. The left-hand plot displays on the vertical axis year-over-year changes in total transactions of new construction and the right-hand plot displays year-over-year change in dollar sales. The horizontal axis plots the ultimate electoral margin of victory of the candidate the firm supported, focusing on a bandwidth of five percentage points. Displayed are fitted linear regressions around the discontinuity along with twenty equidistant bins of average values. In each plot, the right hand side corresponds to donors to the winner and the left those to the runner-up. Outcomes\ are residualized with mayoral race-by-year fixed effects.

Since these estimates are based on year-over-year changes in outcomes, I compare the treatment effect to mean outcomes before the mayor enters office. Donors transact an average of 1.1 units worth $263.6 thousand per year before the new mayor enters office. By the fifth year, donors to the mayor have sold 17.7 more units worth a total of $3.7 million. This represents increasing sales of units by 322% and dollar sales by 277% compared to the control group. In Figure 21 I show this is robust to alternative specifications, including data-driven bandwidths with bias-corrected confidence intervals (Calonico et al., 2017).

5.2.1 Mechanisms

I assess the underlying mechanism for the main firm-level results. First, I investigate whether improvements in donor outcomes are attributable to regulatory discretion. If mayors are easing the permitting process for preferred allies, then any effect on sales should be delayed. This is because the average time to secure regulatory approval is 6.6 months (Emrath, 2016), between regulatory authorization and completion is 7.7 months for single-family or 16.2 months for multi-family homes, (Census of Construction, 2020), and between completion and sale is 1.6 months[20]. Though timing varies across locations and over the business cycle, favors should appear as new sales at least a year and a half to two years after the mayor intervenes on behalf of a donor.

Indeed, Figure 20 plots the coefficients from estimating dynamic RD estimates:

$$y^i_{c,p,t} = \sum_{s=-4}^{5} \tau_s \text{Pro-Mayor}^i_{c,t} \mathbf{1}\{s = p\} + \eta_p MV^i_{c,t} + \gamma_{c,p,t} + \varepsilon^i_{c,p,t} \tag{8}$$

where τ_s is the RD estimate for s periods since the election year. With $y^i_{c,p,t}$ at the annual frequency, τ_s maps the impact of political contribution before and over the course of a mayor's tenure. The plots do show that donors to the winner transact more sales three to five years after the mayor enters office. This is consistent with the technical lag between regulatory favors and sales.

[20] These time ranges are for 2018

Table 3: Mechanism Results on Firm Sales of New Residences

	Ch. Res. Units Sold			Ch. Res. Val. Sold (Thous. USD)		
	(1)	(2)	(3)	(4)	(5)	(6)
Pro-Mayor$^{i}_{c,t}$	-0.769			-122.0		
	(0.707)			(162.4)		
Log(Contribution$^{i}_{c,t}$)	-0.184			-33.15		
	(0.143)			(28.70)		
Pro-Mayor$^{i}_{c,t}\times$ Log(Contribution$^{i}_{c,t}$)	0.336**			62.85*		
	(0.142)			(33.73)		
Pro-Mayor$^{i}_{c,t}\times$ 1st Quintile		0.850**			194.2*	
		(0.399)			(99.38)	
Pro-Mayor$^{i}_{c,t}\times$ 2nd Quintile		1.134**			241.8*	
		(0.540)			(129.3)	
Pro-Mayor$^{i}_{c,t}\times$ 3rd Quintile		1.135*			197.2	
		(0.630)			(134.4)	
Pro-Mayor$^{i}_{c,t}\times$ 4th Quintile		0.944***			158.2*	
		(0.332)			(92.46)	
Pro-Mayor$^{i}_{c,t}\times$ 5th Quintile		2.125**			451.4*	
		(0.923)			(231.9)	
Pro-Mayor$^{i}_{c,t}\times$ Post$_{p}$			0.458*			123.6*
			(0.258)			(69.07)
Runner-up$^{i}_{c,t}\times$ Post$_{p}$			-0.494**			-106.1**
			(0.225)			(49.07)
R^2	0.0378	0.0377	0.00352	0.0412	0.0413	0.0114
N: Panel	16,851	16,851	535,801	16,851	16,851	535,776
N: Contributors	3,906	3,906	57,609	3,906	3,906	57,608
N: Races	189	189	189	189	189	189
Base Mean	1.1	1.1	0.5	263.6	263.6	127.2
MV Window	5%	5%	5%	5%	5%	5%
Specification	RD	RD	Decomp.	RD	RD	Decomp.

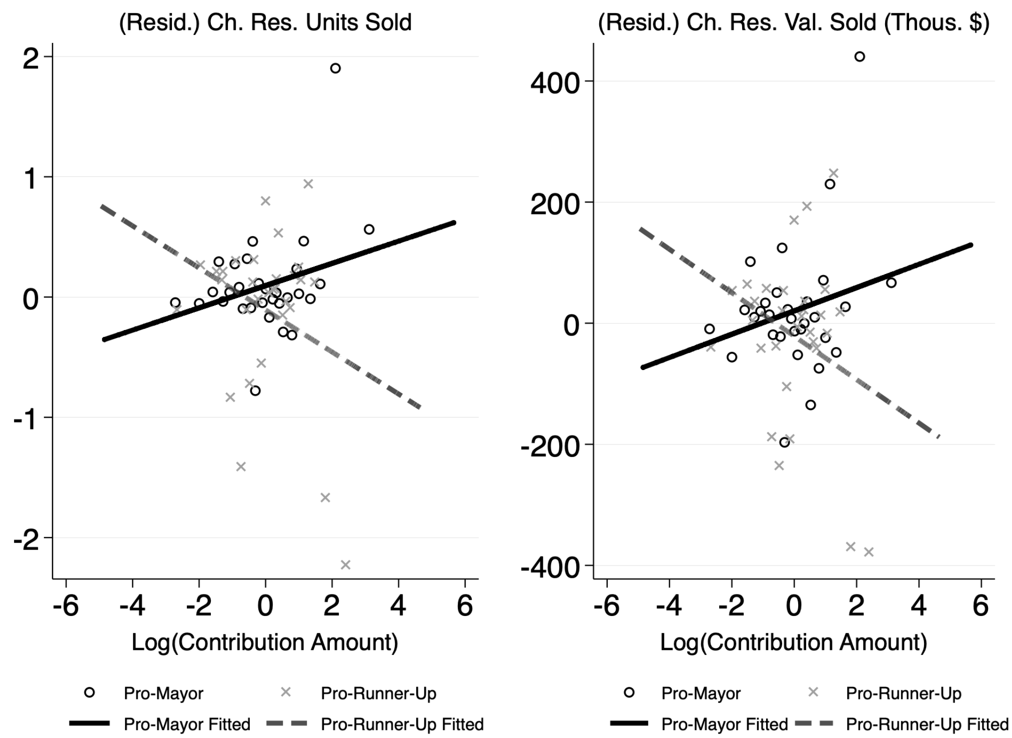
Displayed are estimates on mechanisms underlying the impact of supporting the mayor on subsequent sales of new residential construction. The first three columns feature year-over-year change in residential transactions, and the latter three examine year-over-year change in dollar sales. All specifications are estimated on a stacked panel dataset of five years after the mayoral election. All regressions include mayoral race-by-period fixed effects. Standard errors are displayed in parentheses, and they are robust to heteroskedasticity and double clustered at the donor and mayoral race level.

To measure whether donation size affects business outcomes, I estimate:

$$y^i_{c,p,t} = \text{Pro-Mayor}_{c,t}\beta_1 + \left[\text{Pro-Mayor}_{c,t} \times C^i_{c,t}\right]\beta_2 + \dots \\ \dots + C^i_{c,t}\beta_3 + MV^i_{c,t}\eta_p + \gamma_{c,p,t} + \varepsilon^i_{c,p,t} \tag{9}$$

$C^i_{c,t}$ is how much donor i gave, so the coefficient on the interaction $\text{Pro-Mayor}_{c,t} \times C^i_{c,t}$ estimates the impact of an additional dollar of contribution on firm outcomes. Note that though the RD impact of donating to the mayor, $\text{Pro-Mayor}_{c,t}$, I argue is causally identified, $\text{Pro-Mayor}_{c,t} \times C^i_{c,t}$ may still be confounded by donor unobservables correlated with donation size.

Figure 4: Effect of Donation Amount on Subsequent Outcomes



Displayed are the RD-implied relationship between outcomes of donors and log donation amount. The RD estimate is based on a sample of donors within five percent margins of victory between winner and runner-up. The plot displays fitted linear regressions locally around the discontinuity along with thirty bins of average outcome values. Outcome and log contribution variables are residualized with mayoral race fixed effects.

Columns 1 and 4 of Table 3 display the RD estimate interacted with the contribution amounts as in Equation 9. With the interaction, the coefficient on just supporting the mayor becomes indistinguishable from 0. Rather, the effect appears to depend on the contribution amount, where a 10% increase in donation amount ($\sim$ \$32.3) accelerates subsequent sales by \$628.5. Figure 4 plots this relationship between log contribution amount and subsequent outcome of winners versus runners-up. Columns 2 and 5 of Table 3 show a similar exercise, but with quintiles of donation amounts. Both sets of results suggest favors scale with the size of donation.

5.3 Sorting on Policy Preferences

I investigate whether sorting on policy preferences explain the baseline RD results. Mayoral candidates may differ on development policy. Firms in turn hold different preferences across development policy. As a result, firms sort to candidates whose policy is the best match for the firm. In this case, donor firms benefit when their beneficiary becomes mayor, because the mayor's policies better match the firm's business. Crucially in this view, donor firms benefit even absent their connection to the mayor.

For example, suppose one candidate favors developing the east side of the city and another favors developing the west. Some local firms specialize in one of those two sides of the city. Then firms specializing in the eastern side has an incentive to support the east-side candidate. If that east-side candidate wins, east-side firms benefit. That benefit is not because firms leveraged their political connection, but because the candidate's policies secularly benefit where the firm happened to specialize.

I evaluate whether sorting on spatial policy preferences underlie my RD results. If candidates differ on which neighborhoods to develop, then non-donor firms should have higher sales in those neighborhoods as well. Since I do not know candidates' development platforms, I examine the area of the city where the politically connected firm built after the election. If spatial policy sorting explains my results, then those preferred areas should experience a secular increase in construction overall.

I pursue a differences-in-differences strategy examining zip code-level new construction in a city. Consider a dataset that stacks, for each mayoral election and zip code in the city, years before and after the election year. Let $Y_{c,n,p,t}$ be total sales of new housing in neighborhood n of city c, p years after election t. I estimate:

$$Y_{c,n,p,t} = Post_p \times \text{Connected\_Zip}_{c,n} + \gamma_{c,p,t} + \eta_n + \varepsilon_{c,n,p,t} \tag{10}$$

where $\gamma_{c,p,t}$ are election-by-period fixed effects and η_n are zip code fixed effects. $Post_p$ indicates the post-period years after the election, and $\text{Connected\_Zip}_{c,n,t}$ indicates zip codes, n, that hosted new buildings by donor developers after the election. Intuitively this differences-in-differences design compares $\text{Connected\_Zip}_{c,n}$ zip codes to others in the city around the time the mayor enters office. If mayors differ spatially on development policy and donors sort on that policy, then neighborhoods favored by donating developers should experience more construction across the board. In this case, we expect $Post_p \times$ Connected_Zip$_{c,n,t}$ would be positive. Only races decided within a 5 percent margin of victory are included in this analysis.

Table 4: DD Estimates Evaluating Sorting on Spatial Policy

	Ch. Res. Units Sold			
	(1)	(2)	(3)	(4)
Connected Zip$_{c,n}\times$ Post$_t$	-1.112	-0.303	-0.280	0.753
	(3.840)	(3.439)	(3.761)	(3.242)
Dep. Var Mean	63.48	63.2	63.49	63.2
Margin of Victory	5.0%	5.0%	5.0%	5.0%
FE	Year	Year $\times$ Election	Year Zip	Year $\times$ Election Zip
N: Panel	17,649	16,710	17,648	16,710
N: Zip Codes	1,408	1,284	1,407	1,284
N: Elections	234	147	234	147

Displayed are estimates of the impact of supporting the mayor on subsequent firm sales of new residential construction. The dependent variable in the first column is year-over-year change in residential transactions, and the second year-over-year change in dollar sales. All specifications are estimated on a stacked panel dataset of five years after the election. All regressions include mayoral election-by-period fixed effects. Standard errors are displayed in parentheses, and they are robust to heteroskedasticity and double clustered by donor and mayoral election.

Table 4 reports estimates of coefficient $Post_p \times$ Connected_Zip$_{c,n}$ in Equation 10. Consistent with the main specification, the outcome variable is year-over-year change in sales of new residential units in zip code n. Across specifications, the estimate for $Post_p \times$ Connected_Zip$_{c,n}$ is quantitatively small and statistically indistinguishable from 0. This is seen across different specification of fixed effects. [21] These results suggest zip codes where donor firms build do not experience higher building overall. It is inconsistent with mayors differing on development policy across space in a city.

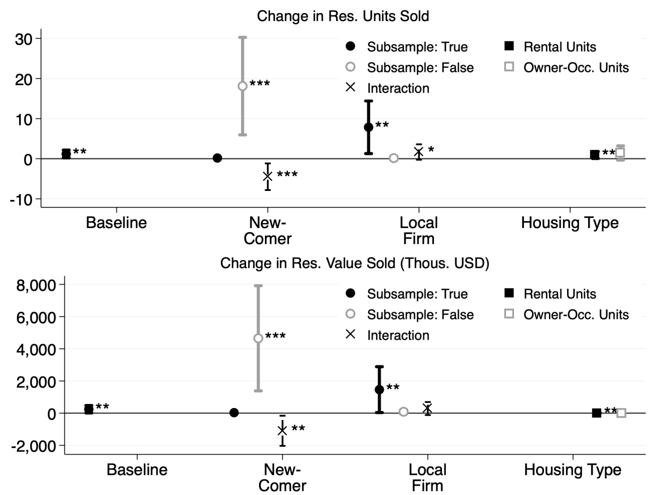
5.4 Heterogeneity

I examine heterogeneity in the main treatment effect of donating to the mayor. The conceptual framework predicts that the magnitude of favors varies along three dimensions. The first dimension is donor characteristics, which has implications for allocative inefficiency of political discretion. Second, characteristics of the candidate, such as incumbency, may lead to more generous favors. The third dimension is by city or election characteristic. The model suggests favors are larger in localities with more uninformed voters, where campaign advertising is more effective, and where voter preferences are more idiosyncratic.

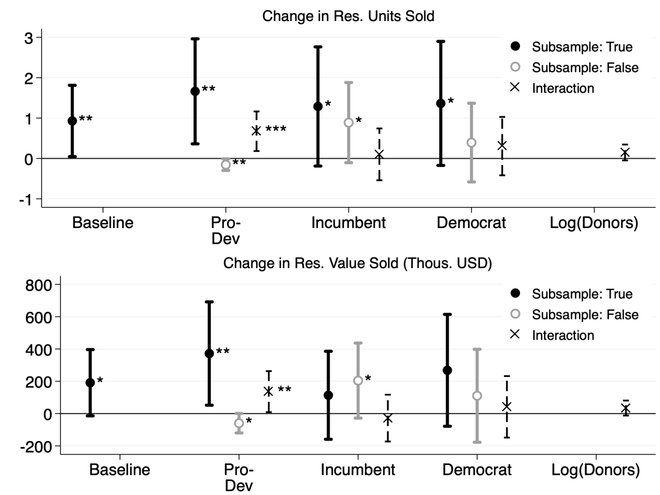
[21] Note that the number of observations and election change as I include different fixed effects. For example, cities with a single zip code fall out of the sample with the inclusion of election fixed effects.

Figure 5: Heterogeneity in Treatment Effect of Supporting the Mayor

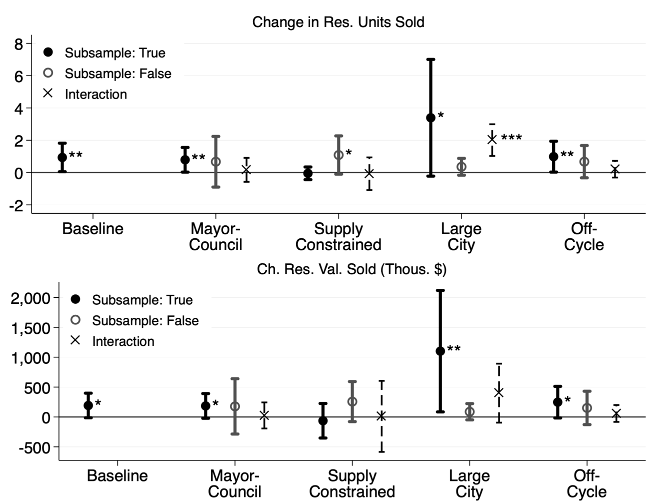
Panel A: Firm Characteristics



Panel B: Candidate Characteristics



Panel C: City Characteristics



Displayed are RD estimates on the impact of donating to a mayor along several dimensions of heterogeneity. The black coefficient is the RD estimate for the subsample where the characteristic is true, and the gray coefficient is for the subsample where the characteristic is false. The third coefficient is the interaction of the characteristic on the RD coefficient, pooling across two samples. The RD estimate is based on a sample of donors within five percent margins of victory between winner and runner-up. All outcomes are in year-over-year changes in transactions or dollar sales of new construction after the election.

I assess how the treatment effect varies by characteristics of localities, donors, and candidates. Figure 5 displays the RD coefficients from estimating Equation 7 separately on the subsample where the characteristic is true, subsample where the characteristic is false, and full sample with the characteristic interacted with Pro-Mayor$^{i}_{c,t}$.[22]

Panel A displays heterogeneity along firm characteristics. I first test for an informational channel underlying the private favors I measure. If political donation gives firms access to communicate private information, then I would expect an effect among firms new to that city. "Newcomer" indicates a firm that had never sold buildings in that city before the election. In fact, private favors are concentrated among incumbent firms, suggesting against an informational channel for private favors. "Local Firm" indicates a firm that only ever transacted in the city where it also donated to mayoral candidates. Both the subsample and interaction of local firms are positive and different from 0 at least at 10% significance. This suggests that patronage is valuable to smaller firms that are exclusive to a single market. Moreover, as the final two estimates under "Housing Type" attest, private favors are concentrated among sales of multi-family rental units. This is consistent with political donation incentivizing politicians to override local opposition from homeowners (Fischel, 2005). These heterogeneity results suggest mayoral discretion steers production toward incumbent, local firms, implying allocative inefficiency.

Panel B of Figure 5 examine heterogeneity by candidate characteristics. I find that pro-development mayors deliver larger favors than non-development ones. This is consistent with model predictions, as pro-development mayors receive both higher campaign contributions and deliver more favors. I do not find evidence of heterogeneity by other candidate characteristics, such as incumbency, party, or number of donors.

Finally, Panel C of Figure 5 surfaces relevant heterogeneity by city characteristics. Cities with more powerful mayors, e.g., those with mayor-council government and those that handle permitting and building codes, are associated with higher estimated returns. It reinforces the mechanism that mayors exercise discretion to award political supporters. They also support the Progressive Era rationale behind council-manager governments: concentrating discretionary power in a single executive spawns patronage and political machines (Shafritz, 1977). The treatment effect also appears large and interaction precisely estimated for large cities in my sample. This finding contrasts with Campante and Do (2014), who show that large populations around state capitols sustain media coverage, and the attendant public attention dissuades corruption. Finally, I do not find heterogene-

[22] Interacting the RD estimate and testing the interaction coefficient against 0 is the preferred statistical inference. In practice, however, the RD estimator with an interaction exacts demands on data and is likely underpowered. Regardless, as in many treatment-effect research designs, interactions on even causally estimated treatment effects may still be confounded.

ity by local regulatory burden as measured by the Wharton Residential Land Use Regulation Index. Effects are also concentrated among off-cycle election years.

Heterogeneity of regulatory discretion directly speaks to policy implications. First, campaign donations do not appear to communicate information. Instead, they steer production to arguably less efficient, local firms. These effects are concentrated among cities where mayor exercise discretionary power, suggesting clientelism is associated with institutional arrangements of a city. Reforms, such as changing government form or federalizing building code regulation, tampers patronage, at least by mayors. I consider policy implications, and how heterogeneity affects any prescriptions, in Section 7.

5.5 Spillovers

Looking beyond direct benefits to donors, I measure any spillovers on firms that did not support the mayor. As the conceptual decomposition in Section 4.3 shows, the impact of favors on citywide housing supply depends on any effect on non-donor firms. I study two possible spillovers: effects on donors to the runner-up and effects on firms that do not donate.

Equation 7 measures the gap in subsequent business outcomes between donors to the winner and donors to the runner-up. As such, firms supporting the winner may be earning favors. It may also be that donors to the runner-up see declining sales. To try to decompose these effects, I use non-contributing firms as control in the following specification:

$$\begin{aligned} y^i_{c,p,t} = &\left[\text{Pro-Mayor}^i_{c,t} \times \text{Post}_p\right]\beta_1 + \left[\text{Runner-up}^i_{c,t} \times \text{Post}_p\right]\beta_2 \ldots \\ &\ldots + \text{Pro-Mayor}^i_{c,t}\beta_3 + \text{Runner-up}^i_{c,t}\beta_4 + MV^i_{c,t}\eta_p + \gamma_{c,p,t} + \varepsilon^i_{c,p,t} \end{aligned} \tag{11}$$

I estimate Equation 11 on a panel dataset 5 years before and after the election year. Importantly, the dataset includes all firms that donated as well as firms that sold properties in that city at some point. The estimate on $\text{Pro-Mayor}^i_{c,t} \times \text{Post}_{c,p,t}$ is the impact of supporting the mayor relative to control firms who did not donate. Similarly, $\text{Runner-up}^i_{c,t} \times \text{Post}_{c,p,t}$ is the impact on supporters of the runner-up.

The specification is effectively a differences-in-differences design in close races. Non-contributing firms comprise the control group. A single specification compares this control group to two treatment groups. One treatment group is made of donors to the winner. Donors to the runner-up make up the second treatment group. Using only close races maintains comparability of these two treatment groups. But the key identification assumption is now parallel trends between firms that donate and firms that do not.

Columns 3 and 6 of Table 3 presents estimates from this decomposition. Estimates are imprecise, as the specification requires interacting a differences-in-differences design on a RD coefficient. Nevertheless, sales for donors to the mayor grow 0.46 units or $123.6 thousand more every year. Interestingly, there appears to be a negative impact on donors to the runner-up. After the election, these firms' sales shrink by 0.49 units every year, corresponding to $106.1 thousand change in sales, compared to non-donors.

Taking this decomposition into account reduces benefits accrued to donors to the mayor. Moreover, this decomposition suggests firms face political risk in local races. That is, in close races, firms might support the wrong candidate and risk losing business. Ex-ante, there is roughly half probability the firm supports the mayor, receiving benefits. But the other, equally likely realization is the firm donates to the mayor's opponent and sees sales shrink. Therefore, the total expected increase in sales from donation is just $320 thousand by year five. It is an order of magnitude lower than the results in the main specification in Section 5.2.

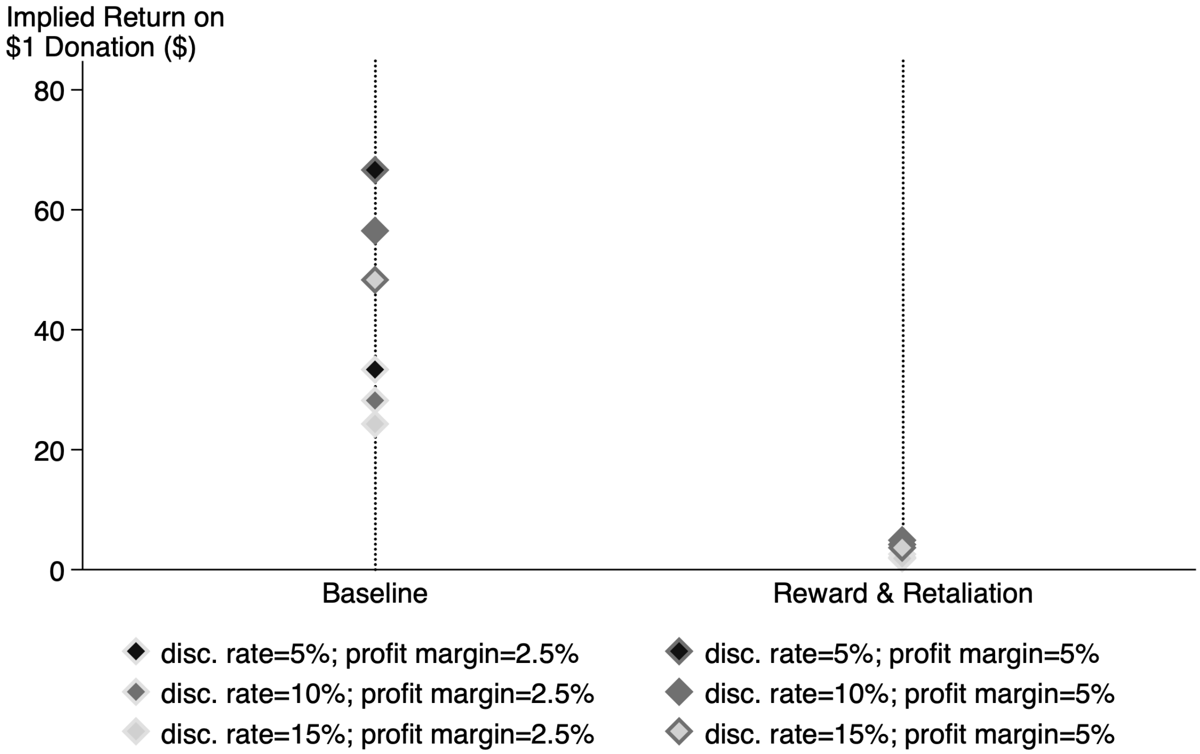
A second channel that may affect non-donors is if mayors block competitors to their donors. I indirectly test this channel, looking at competition to the donor from other firms with a similar product characteristic. I focus on one product characteristic important to property development firms: location. For each donor, I calculate sales made by other firms in the local zip codes where the donor sold properties. In addition, if mayors reduce competition, one may expect higher mark-up's where the donor builds. I approximate mark-ups by examining hedonic residential price and rent indices from Zillow in the local zip code where the donor firm is active. These results are in Appendix Table 18. They do not suggest mayors reduce competition for their donors.

I calculate the implied returns to political contribution. I make two assumptions to calculate the return accrued to the developers I study. Since my RD design estimates the impact on total sales, I make assumptions about margins. As the RD estimate is an effect over time, I specify an appropriate discount rate. Figure 6 plots the implied return to a dollar contribution under various assumptions. Using the baseline RD estimate from Section 5.2, returns range as large as $24 – $66. However, accounting for negative effects from donating to the runner-up shrinks estimated returns. The opposing panel in Figure 6 displays returns using the estimate decomposing effects on donors to the mayor and the runner-up. The return on a dollar contribution range shrink to $1.7 – $4.7.

5.6 Impact on Neighborhood Property Values

My regression discontinuity design suggests mayors advance housing projects undertaken by their campaign donors. This risks allocative inefficiency if the quality and quantity of housing is unsuitable to members of the community. For example, residents and voters may entrust the local

Figure 6: Implied Return to Political Contribution



Displayed are implied returns to donating a dollar to candidates for mayor. Each diamond corresponds to returns calculated under an assumed discount rate and profit margin. The left panel displays the implied return using the baseline RD estimate comparing donors to the winner to donors to the runner-up. The right panel calculates the return when donating to the runner-up leads to declining business outcomes.

government to preserve property values. If developments built by connected developers reduce neighborhood property values, then it harms the net worth of local residents.

I assess the impact of housing developments by politically connected developers on housing values. I rely on the fine geographic variation within a city. Specifically, I study how neighborhood - defined as zip code - housing value indices respond when politically connected developers sell new units. However, merely comparing zip codes hosting a politically enabled development to zip codes without has endogeneity issues. If price appreciation coincides with margins, profit-maximizing developers ought to select into zip codes with rising prices.

Therefore, I use a differences-in-differences design. Using zip code-year level data stacked around each election, let:

$$V_{c,n,p,t} = \text{Connected}_{c,n,t} + \text{Post}_p + \text{Connected}_{c,n,t} \times \text{Post}_t + \gamma_{c,n,p,t} + \varepsilon_{c,n,p,t}$$

for city c, zip code n, year p and election year t. $V_{c,n,p,t}$ is a price index for all residential properties in that zip code p years after election year t. For consistency, I standardize all indices. $\text{Connected}_{c,n,t}$ is an indicator for a zip code hosting property sales by a connected developer. Post_t is a post-election year time dummy. For controls, $\gamma_{c,n,p,t}$ are year, zip code, and/or election fixed effects. The coefficient of interest is in the interaction $\text{Connected}_{c,n,t} \times \text{Post}_t$. If new housing or apartments by developers that donated to the mayor reduce property values, then $\text{Connected}_{c,n,t} \times \text{Post}_t$ should be negative. Standard errors are clustered by city.

Table 5 collects the estimate of the impact of politically enabled housing developments on neighborhood property values. I use housing price indices built by the Federal Housing Finance Agency and Zillow. I also examine rental prices from the Zillow Observed Rent Index. Across dependent variables and fixed effects specifications, I do not find evidence that immediate neighborhood property values decline. The estimates range from 0.2% of a standard deviation for rents to at most 10% of a standard deviation. None of these estimates are statistically different from 0. These results do not suggest that real estate developers push through developments that negatively affect property values.[23]

[23]There may be other negative effects on local residents not capitalized into housing prices. For example, traffic congestion, environmental degradation, and crowding of public goods and amenities would plausibly harm local residents. A comprehensive analysis would study these other local economic outcomes.

Table 5: Impact of Residential Developments by Connected Developers on Neighborhood Property Values

	FHFA		ZHVI		ZORI	
	(1)	(2)	(3)	(4)	(5)	(6)
Connected $\text{Zip}_{c,n} \times \text{Post}_t$	0.0985	0.0880	0.0517	0.0478	-0.00153	-0.00665
	(0.0904)	(0.0875)	(0.0691)	(0.0683)	(0.0458)	(0.0475)
Margin of Victory	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
FE	Year; Zip	Year; Election; Zip	Year; Zip	Year; Election; Zip	Year; Zip	Year; Election; Zip
N: Panel	9,589	9,589	9,374	9,374	1,002	1,002
N: Zip Codes	1,120	1,120	1,158	1,158	208	208
N: Elections	180	180	168	168	38	38

This table presents estimates on the impact of residential developments by political connected developers on neighborhood residential property values. These estimates are based on a differences-in-differences design. The dataset used for estimation is a zip code-year level dataset stacked around the election year. The treated zip codes, indicated by Connected $\text{Zip}_{c,n}$, are those in which connected developers sold housing after the election. Control zip codes are other zip codes in the city that did not host a development by a politically connected developer. Post_t indicates years after the election year. Dependent variables of interest are standardized housing value indices. FHFA correspond to the Housing Price Index published by the Federal Housing Finance Agency. ZHVI is the Zillow Home Value Index and ZORI is the Zillow Observed Rent Index. All three indices are standardized to so they are mean-zero and have unit standard deviation. “Margin of Victory” displays the electoral margin for an observation to be included in estimation. Row “FE” specifies fixed effect controls. Election fixed effects indicate if the observation belonged to a city c in election year t. “N: Panel” tabulates the number of zip-year observations, “N: Zip Codes” tabulates the total number of zip codes, and “N: Elections” the total number of mayoral elections in data used for analysis. Standard errors are clustered by city.

6 Consequences for Local Housing Supply

If firms can influence mayors to increase its own individual supply, can there be consequences for local market quantities? I investigate the total impact of the sum of favors, spillovers, and policy on local new housing supply. These citywide aggregate effects serve as the final component for decomposing the relative importance of buying favors and supporting policy.

6.1 Citywide Design

I first translate the model predictions of aggregate effects from Section 4. Let $Y_{c,p,t}$ be total permits issued in a municipality:

$$Y_{c,p,t} = \text{Pro-Dev}_{c,t} \times \underbrace{\left[\overline{Q^{\text{DEV}}} - \overline{Q^{\text{NON}}} + \left(\overline{N^{\text{DEV}}} - \overline{N^{\text{NON}}}\right)\overline{\Delta^*} + \left(\overline{N^{\text{NON}}} - \overline{N^{\text{DEV}}}\right)\overline{\tilde{\Delta}^*}\right]}_{B} + \dots$$

$$\dots + \underbrace{\overline{Q^{NON}} + \overline{N^{\text{NON}}}\,\overline{\Delta^*} + \overline{N^{\text{DEV}}}\,\overline{\tilde{\Delta}^*} + \tilde{\varepsilon}_{c,p,t}}_{\varepsilon_{c,p,t}}$$

The policy of non-development candidate, $\overline{Q^{NON}}$, is unobserved. $E\left[\text{Pro-Dev}_{c,t}\varepsilon_{c,p,t}\right] \neq 0$, because within the model, the election of a pro-development mayor is correlated with the policy stature of the non-development candidate. In general, cities with pro-development mayors differ on many other factors, such as local market and political conditions.

Similar to the approach in Section 5.1, I examine races where final election margins were within 5 percent margins of victory. But rather than comparing firms, I compare all citywide permits for new residential construction under a mayor supported by the construction industry. Since contributors to the mayor individually builds and sells more residences, candidates with more construction donors may permit more residences in aggregate. To embed this intuition in a regression specification, for each race c,t, define $MV_{c,t} = VoteShare^{\text{Dev}}_{c,t} - VoteShare^{\text{NON}}_{c,t}$ and $\text{Pro-Dev}_{c,t} = \mathbf{1}\{MV_{c,t} \geq 0\}$. Focusing again on average treatment effects, I estimate:

$$Y_{c,p,t} = \text{Pro-Dev}_{c,t}B + MV_{c,t}H_p + \Gamma_{c,p,t} + \varepsilon_{c,p,t} \tag{12}$$

on a race-year dataset with $Y_{c,p,t}$ denoting city-wide new housing construction. H_p are coefficients governing the slope of the linear polynomial. $\text{Pro-Dev}_{c,t}$ is an indicator for if the winning candidate received more contributions from construction than the runner-up. $\Gamma_{c,p,t}$ are period, county, and election-year fixed effects. Standard errors are robust to heteroskedasticity and clustered at the jurisdiction level. The coefficient of interest is Pro-Dev$_{c,t}$, which captures the impact of a pro-development mayor on new construction of residential structures in the city.

Equation 12 categorizes, for each mayoral race, the winner and runner-up as either pro- or non-development. I rely on Corollary 1, which shows the candidate with more total donations from construction is pro-development. I therefore assign as pro-development the candidate who received more money from the construction industry.

Close races randomize the candidate that becomes mayor. Any differences in new housing construction between two tenures can therefore be ascribed to that mayor. The identification strategy accounts for typical confounders, such as pre-existing city differences, economic fluctuations, or local institutions. However, it may not account for characteristics of candidates correlated with attracting donations from the construction industry. For example, if pro-development candidates are more likely to be Democrat, then Pro-Dev$_{c,t}$ may capture ideological differences related to partisanship.

Which of these candidate characteristics determines citywide permits is not necessary for consistency with the model. The model simply specifies a candidate who is more likely to make available more permits to all firms. A candidate who issues more permits due to party affiliation or unobserved ideology nonetheless qualifies as pro-development in the set-up of the model.

6.2 Citywide Results

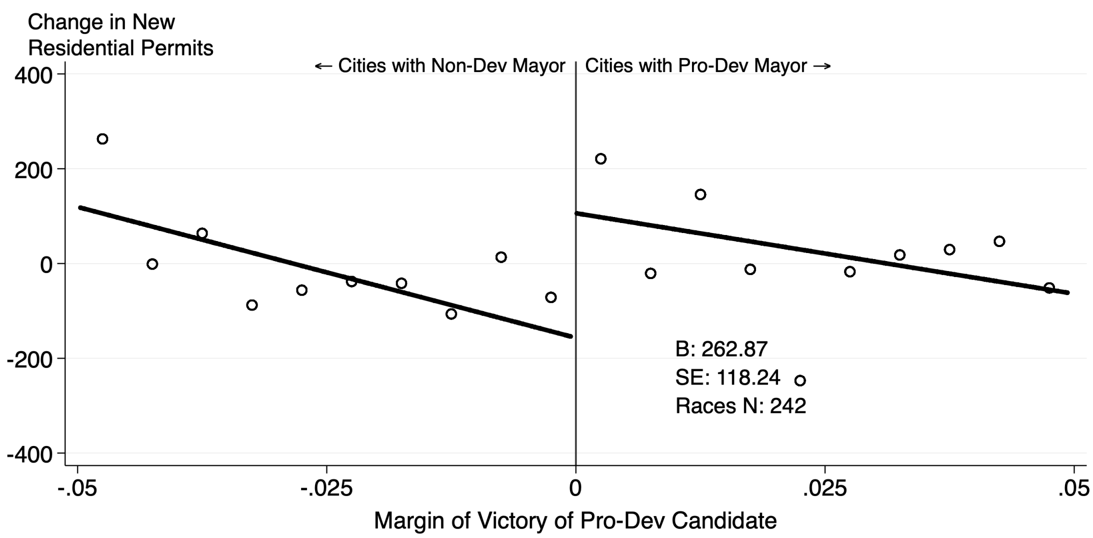
Table 6 presents the RD estimate of interest in Equation 12. The estimate on Pro-Dev$_{c,t}$ suggests pro-development mayors substantially expand permits for new housing construction. This is seen in Figure 7, which compares citywide permits between pro- and non-development mayors within a five percent margin of victory. New permits accelerate at 261.5 issued per year, compared to a baseline of 584.8. This represents a 1.2% increase in the existing housing stock, every year. Columns 3 and 4 show that the effects are similar for the level of new permits in a city. By year five, the cities with pro-development mayors would have permitted $6,712.5$ permits, on average, compared to control cities at $2,790.0$. This represents a 129.5% increase by year five. Since the average city in my sample has $41,096$ housing units total, a pro-development mayor expands the existing housing stock by 9.3% by year 5.

Table 6: RD Results on Citywide Residential Permits

	Change in Total Permits
	(1)
Pro-Dev$_{c,t}$	297.0**
	(148.8)
R^2	0.577
N: Panel	862
N: Races	189
Ch. N: Donors	84.4
Share of Stock	0.013
Base Mean	555
GEO FE	CBSA
× Pd. FE	NO
Controls	NO

Displayed is the estimate of the impact of a pro-development mayor on permits for new residential construction. The dependent variable is year-over-year change in total permits issued over the mayor's tenure. Pro-development is defined as receiving more contributions from construction firms. All specifications are estimated on a stacked panel dataset of cities five years after the mayoral race. Standard errors are displayed in parentheses and are robust to heteroskedasticity and clustered at the jurisdiction level.

Figure 7: RD Design on Citywide Residential Permits



Displayed is the impact of pro-development mayors on permits for new residential construction from a regression discontinuity design around close mayoral elections. The vertical axis displays the year-over-year changes in total permits for new housing units, focusing on a bandwidth of five percentage point margin of victory. The right hand side corresponds to cities that elected a pro-development mayor and the left those that elected a non-development one. Displayed are fitted linear regressions around the discontinuity along with twenty equidistant bins of average values. Outcome variables are residualized with CBSA and election year fixed effects.

In Figure 22 I examine the robustness of citywide results using different outcomes, specifications, and controls. To partially address residual, candidate-level confounders, some of the robustness analyses control for incumbency, Democrat affiliation, whether the candidate ran in the prior mayoral race, the number of donors who are local residents, and total donations from local residents.

6.2.1 Mechanisms

These estimates show that the candidate with more construction constituents causally impact market level quantities in the housing market. However, there are multiple possible mechanisms. One possibility is mayors with more construction constituents have committed to more private favors. Mechanically, the sum of micro-favors aggregate to more total permits. Alternatively, private favors may be redistributing permits away from non-donors. That would dampen any impact the sum of private favors have on total permits. Moreover, the model implies that candidates that receive more construction donations have a pro-development policy orientation. They may permit more not just because they owe more donors, but because their housing policy is expansive.

I test whether mayors with more construction donors pursue different policy. To do this, I study the impact of pro-development mayors on non-donors. If a pro-development mayor causes firms who did not donate to produce more, then these mayors broadly pursue policy that affects all. Using the stacked panel data on annual sales of donor and non-donor firms, I estimate:

$$\begin{aligned} y^i_{c,p,t} = \text{Pro-Dev}_{c,t}\beta_1 &+ \left[\text{Pro-Dev}_{c,t} \times \text{Pro-Mayor}^i_{c,t}\right]\beta_2 + \dots \\ &\dots + \left[\text{Pro-Dev}_{c,t} \times \text{Runner-up}^i_{c,t}\right]\beta_3 + \dots \\ &\dots + \text{Pro-Mayor}^i_{c,t}\beta_4 + \text{Runner-up}^i_{c,t}\beta_5 + MV_{c,t}\eta_p + \Gamma_{c,p,t} + \varepsilon_{c,p,t} \end{aligned} \tag{13}$$

for firm i, jurisdiction c, annual period p, and election cycle t. Since the non-donors are the excluded baseline, $\text{Pro-Dev}_{c,t}$ is the impact of a pro-development mayor on sales of non-donors. Similarly, the interactions $\text{Pro-Dev}_{c,t} \times \text{Pro-Mayor}^i_{c,t}$ and $\text{Pro-Dev}_{c,t} \times \text{Runner-up}^i_{c,t}$ capture the impact of the pro-development mayor on donors to the winner and those to the runner-up, respectively. A positive coefficient on $\text{Pro-Dev}_{c,t}$ alone is evidence the pro-development candidate permits more, because they pursue policy that generally expands supply. Note that $\Gamma_{c,p,t}$ are CBSA, election-year, and period fixed effects. Standard errors are robust to heteroskedasticity and double clustered by firm and race.

The estimates in Table 6 suggest the sum of private favors from Section 5 do not fully account for the large increase in new permits in Table 6. The coefficient on $\text{Pro-Dev}_{c,t}$ is positive. Pro-development donors lead even non-donors to build and transact more. This evidence is consistent with mayors pursuing different regulatory policy toward land use. Firms in the construction industry may rally behind a candidate, because that candidate's policy is more favorable to their business interests.

7 Discussion

I have estimated the magnitude of private favors, spillover effects, and the total impact of pro-development mayors. Now I proceed to decompose which political channel is empirically relevant for determining local housing supply.

7.1 Decomposition

7.1.1 Impact of Pro-Development Mayor

Equation 5 shows that the impact of a pro-development mayor is composed of three objects. One is the difference in policy, the second the difference in total favors, and the third spillover to non-donor firms. Importantly, the difference in the number of donors, $\left(N^{\text{DEV}} - N^{\text{NON}}\right)$ is observed, and favors and spillovers, $\overline{\Delta^*}, \overline{\tilde{\Delta}^*}$, are estimated in Section 5. Net new permits due to favors are therefore $\left(N^{\text{DEV}} - N^{\text{NON}}\right)\left(\overline{\Delta} - \overline{\tilde{\Delta}}\right)$. Its share of total citywide permits is $\frac{\left(N^{\text{DEV}} - N^{\text{NON}}\right)\left(\hat{\overline{\Delta}} - \hat{\overline{\tilde{\Delta}}}\right)}{\hat{B}}$.

The RD coefficient in Table 6 is the total impact of a pro-development mayor, $\hat{B}$. The table also reports how many more construction donors are connected to the pro-development mayor, $\left(N^{\text{DEV}} - N^{\text{NON}}\right)$.[24] Taking the preferred RD estimate of $\hat{\overline{\Delta}} = 0.458$ and $\hat{\overline{\tilde{\Delta}}} = -0.494$ from Table 3, I have that discretion leads to 78.2 more permits per year when pro-development mayors come to power. It represents 29.9% of all extra units approved by a pro-development mayor. Therefore, 70.1% of the impact is due to candidate policy platform on new housing. Though favors are a channel supplying new units to the market, differences in candidate policy quantitatively matters more. Arguably, firms make donations to support policy, i.e., to help the candidate with the desired housing policy win.

7.1.2 Prevalence of Favors

I ascertain what fraction of new construction is favors to political donors. I use the model to decompose the impact of a pro-development mayor into policy and favors. Equation 14 transforms total permits from the model in Equation 5 into the share due to clientelism:

$$\varphi_{c,t} = \frac{N^K_{c,t}\hat{\overline{\Delta}} - N^{-K}_{c,t}\hat{\overline{\tilde{\Delta}}}}{Y_{c,t}} \tag{14}$$

[24]To be in line with other estimates, I estimate the difference in the number of supporters via the RD design in Equation 12

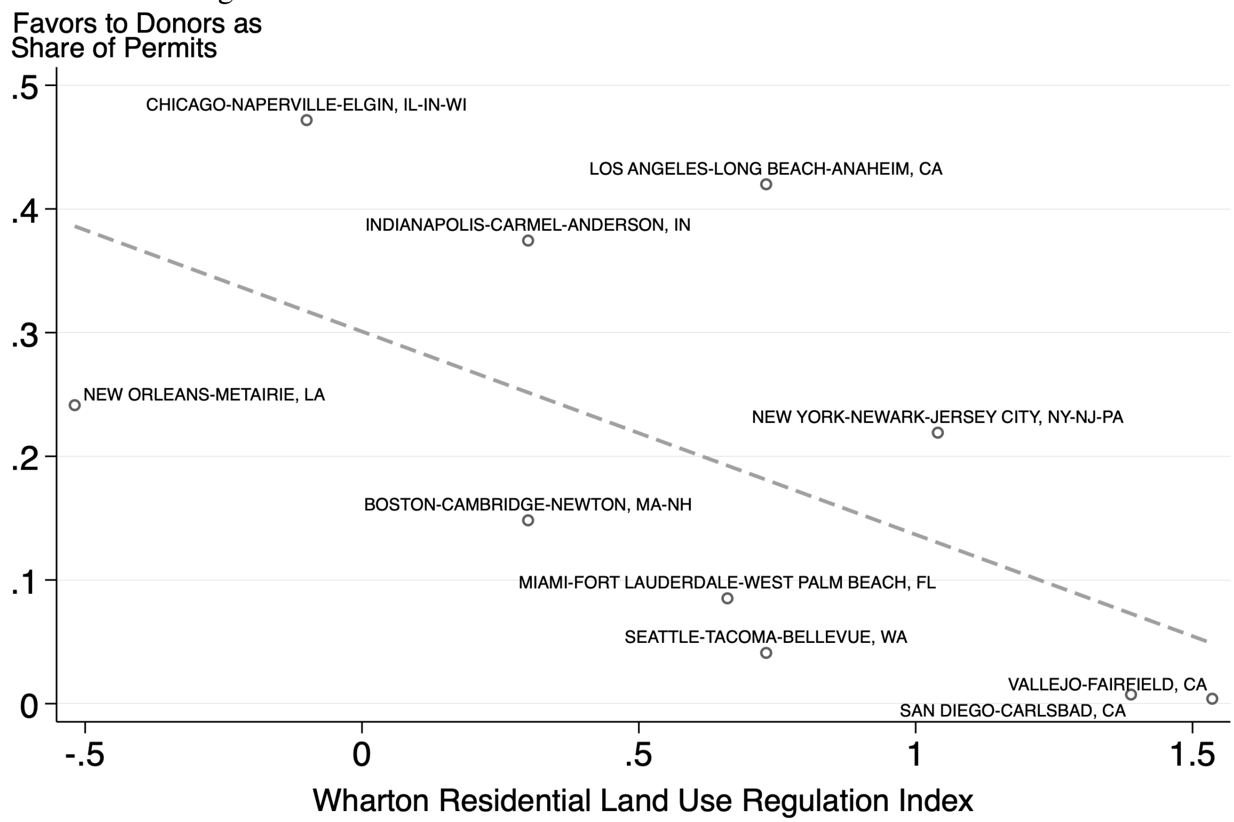
Importantly, the number of donors to the mayor (runner-up), N^K $\left(N^{-K}\right)$, and total permits issued, $Y_{c,t}$, are observed. Discretionary favors to supporters of the mayor, $\hat{\Delta}$, and penalty for supporting the runner-up, $\hat{\bar{\Delta}}$, are estimated from Section 5.

Figure 8 displays the population-weighted average share of permits and new sales attributed to patronage, $\varphi_{c,t}$. To avoid extrapolating the RD estimate, I only calculate shares for races in the RD sample within 5% margin of victory. Across mayoral races in that sample, 10.2% of all permits arise from political discretion. This discretion includes both favors to donors and reductions to donors of the runner-up. The share is higher for actual sales, 17.0%, because not all permits ultimately lead to construction and sale.

7.1.3 Favors Across Markets

I examine how the prevalence of favors differs across markets in the U.S. If cities with institutional safeguards have less patronage, then it supports interventions that constrain local authorities. On the other hand, if patronage is more prevalent in supply constrained cities, then reducing lobbying, which may reduce new housing units, can be more economically costly. The aggregate output consequences of lobbying in housing supply regulation hinge both on local constraints and labor markets. Lobbying that increases housing in San Francisco, for example, is more likely to increase output than in beach vacation destinations in New Jersey.

Figure 8: Share of Political Favors in Observed Permits and Sales



Displayed is the preponderance of political favors as mean share of new housing permits issued across municipalities in each CBSA. The horizontal axis displays the restrictiveness of local land use regulation as measure by the Wharton Residential Land Use Regulation Index. The dashed line is a linear fit between the WRLURI and the share of favors.

Therefore the bottom panel of Figure 8 displays population-weighted mean shares by CBSA. Only displayed are CBSA's that have at least four mayoral races in the RD sample. The community where patronage makes up the highest share of permits is the Chicago-Naperville-Elgin metropolitan area. In general, CBSA's in or near supply constrained markets exhibit less patronage, like Seattle-Tacoma-Bellevue, WA and San Diego-Carlsbad, CA. On the one hand, there may be a causal relation: local institutions that reduce patronage may contribute to housing production. It may just as well be, however, that policies like a ban on developer contributions have the most impact where supply is already elastic.

7.2 Policy Implications

Discretion in land use regulation poses at least two welfare consequences that motivate policy intervention. In one view, the well-being of local voters should be the policy objective . Politically connected firms that influence the mayor may be distorting regulation away from the social optimum. Voters entrust the local government to manage the negative externalities from construction

(Glaeser and Gyourko, 2018) and local public goods (Hamilton, 1975). Yet, frictions in the political process drive a wedge between voter preferences and mayoral policy. In my conceptual framework, that friction is uninformed voters, who are swayed by campaign spending. Policy interventions studied in the literature include contribution limits (Kawai, 2014), expenditure limits (Avis et al., 2017), and public financing of campaigns (Ashworth, 2006). Concerns about cronyism propelled Progressive Era initiatives such as the council-manager form of government (Shafritz, 1977). Recently, the city of Los Angeles banned campaign donations from the real estate industry in 2019 for these reasons. Similar proposals are being debated across American communities.

However, in a second view, lobbying may be socially desirable by overriding local voters. It is unique to my setting of regulation of land use and housing supply. Agglomeration benefits lead to spatial variation in the marginal products of labor (Duranton and Puga, 2004). But inelastic housing supply in productive markets may hinder labor from allocating where it is most productive. Recent work suggests substantial output loss from inelastic housing supply (Hsieh and Moretti, 2019; Glaeser and Gyourko, 2018). If lobbying relaxes regulation over the wishes of local voters, who may not fully internalize agglomeration benefits (Duranton and Puga, 2019), constrained markets may be gaining much-needed housing. Conversely, reducing lobbying, like the ban in Los Angeles, may unintentionally restrict local housing supply even further. Ascertaining the impact of campaign finance limits or bans on developers requires a different estimation approach. Policy invariant primitives or key elasticities, such as how campaign policy affects electoral competitiveness, are beyond the scope of this paper.

8 Conclusion

Does local politics shape the built environment and the economy of cities and regions? This paper finds that residential construction firms donate money to mayors in the U.S to influence local housing supply. The first mechanism through which this operates is private favors. A RD design exploiting close mayoral races shows donating to the mayor directly benefits a firm's business. The evidence is consistent with patronage delivering private returns by marginally influencing land use regulation. The other channel is donation helps elect the candidate with policies donors like. The money helps that candidate win the election. Mayors attracting more construction donors more than double permits for new housing. Taking these two estimates together, a model-based decomposition suggests the policy channel dominates. More than two-thirds of the impact of a pro-development mayors is due to policy differences.

To enable this analysis, I introduce to my knowledge the first large-scale dataset of campaign donations to mayoral candidates in the U.S. The new dataset surface tantalizing patterns in the local political economy of U.S. cities. A constituency who is prominent in this dataset as well as urban economic theory is local homeowners. In my dataset, local residents on average make up 40% of all contributions. I have their names, zip code of residence, and occasionally their occupation, employer, and complete home address. If linked to data on property deeds, one may examine if homeownership affects local political participation. Interestingly, the most frequent contributors to local mayoral races include Waste Management and Republic Services, who provide waste disposal services to municipalities in the U.S. Local media reports certainly allege wrongdoing in this industry. Why do city service providers contribute in local politics? Does their political participation affect local public goods?

The empirical quantities I estimate using my novel micro-data are necessary for the analysis of welfare and policy. In the politics of housing supply, welfare analysis poses an interesting subtlety. Political discretion in regulation may make local voters worse off, but influence that expands local housing supply may boost aggregate output. To consider both forces, the right conceptual framework ought to pair an urban political game with mobile labor across cities (Parkhomenko, 2019). Empirically, researchers need to know the impact of contributions on electoral outcomes, like the price of a vote. Variation in state and local campaign finance laws and limits can hypothetically be one route. These tools enable studying the impact of policy reforms, such as contribution limits and public financing of campaigns, on economic outcomes, like housing.

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Appendix

A Data

A.1 Local Campaign Contributions

I describe the cities in my dataset and how they compare to cities for which I do not have data. I link jurisdictions in my campaign finance dataset to a master list of municipalities from Gyourko et al. (2019). The master list describes the demographics of 55,269 municipalities in the U.S. Table 7 describes the cities in the campaign dataset as well as those in the RD design. The average jurisdiction has just under 100,000 inhabitants.

To compare jurisdictions in my dataset to a typical one, I follow Gyourko et al. (2019) and estimate a logistic regression. The dependent variable is either inclusion in my dataset or inclusion in the RD sample. The regressors are characteristics such as population, percent of owner-occupied housing, percent of inhabitants above 65, percent below 18, median household income, median house value, and percent with a bachelor's degree or more. Table 8 shows that cities in my dataset tend to be larger than the typical city, though there is no statistically significant difference for inclusion in the RD sample. My cities also tend to have fewer owner-occupied housing, have fewer older people, are less white, and are more educated than the average U.S. city. Interestingly, there do not appear to be meaningful differences in median household income or house value. These patterns persist for the RD sample, as well. I also map the communities in my dataset and the RD sample in Figure 9. Consistent with previous patterns, data is mainly available around coastal and urban markets. The sum of these facts suggests cities covered by my data tend to be in or adjacent to major metropolitan areas.

Table 7: Campaign Contribution Data Jurisdiction Characteristics

	Contributions Data (1)	Contributions Data: Metro (2)	RD Sample (3)	RD Sample: Metro (4)
	mean	mean	mean	mean
Population (in 1000s)	96.47	100.54	115.23	120.67
Pct. Owner-Occupied Housing	61.74	61.47	58.51	57.54
Pct. Pop 65+	13.07	12.95	12.49	12.43
Pct. Pop <18	24.12	24.03	23.88	23.72
Pct. White	60.54	60.08	59.69	58.61
Median Household Income (1000s)	58.50	59.27	55.26	55.52
Median House value (100,000s)	2.31	2.37	2.23	2.30
Pct. Bachelor's Degree +	30.01	30.64	29.36	29.99
Observations	722	692	219	209

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Table 8: Campaign Contribution Selection of Jurisdictions

	Contributions Data		RD Sample	
	(1)	(2)	(3)	(4)
Population (in 1000s)	0.00867**	0.00734**	0.00171	0.00152
	(0.00353)	(0.00308)	(0.00155)	(0.00140)
Pct. Owner-Occupied Housing	-0.0194***	-0.0210***	-0.0228***	-0.0261***
	(0.00363)	(0.00394)	(0.00334)	(0.00350)
Pct. Pop 65+	-0.0253**	-0.00921	-0.0443***	-0.0240**
	(0.0101)	(0.00805)	(0.0133)	(0.0101)
Pct. Pop <18	-0.00789	-0.00638	-0.0154	-0.0150
	(0.00883)	(0.0102)	(0.00994)	(0.0112)
Pct. White	-0.0232***	-0.0228***	-0.0219***	-0.0225***
	(0.00456)	(0.00473)	(0.00683)	(0.00663)
Median Household Income (1000s)	0.000493	-0.0000279	-0.00373	-0.00474
	(0.00469)	(0.00476)	(0.00492)	(0.00537)
Median House value (100,000s)	0.0429	0.00102	0.0667	0.0223
	(0.0545)	(0.0609)	(0.0463)	(0.0529)
Pct. Bachelor's Degree +	0.0279***	0.0278***	0.0278***	0.0292***
	(0.00553)	(0.00610)	(0.00539)	(0.00560)
Constant	-1.688***	-1.468***	-1.991***	-1.680***
	(0.435)	(0.452)	(0.437)	(0.429)
N: Jurisdictions	55269	36950	55269	36950
Metro Sample	NO	YES	NO	YES

Standard errors in parentheses

Displayed are

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

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Figure 9: Campaign Finance Data across U.S.

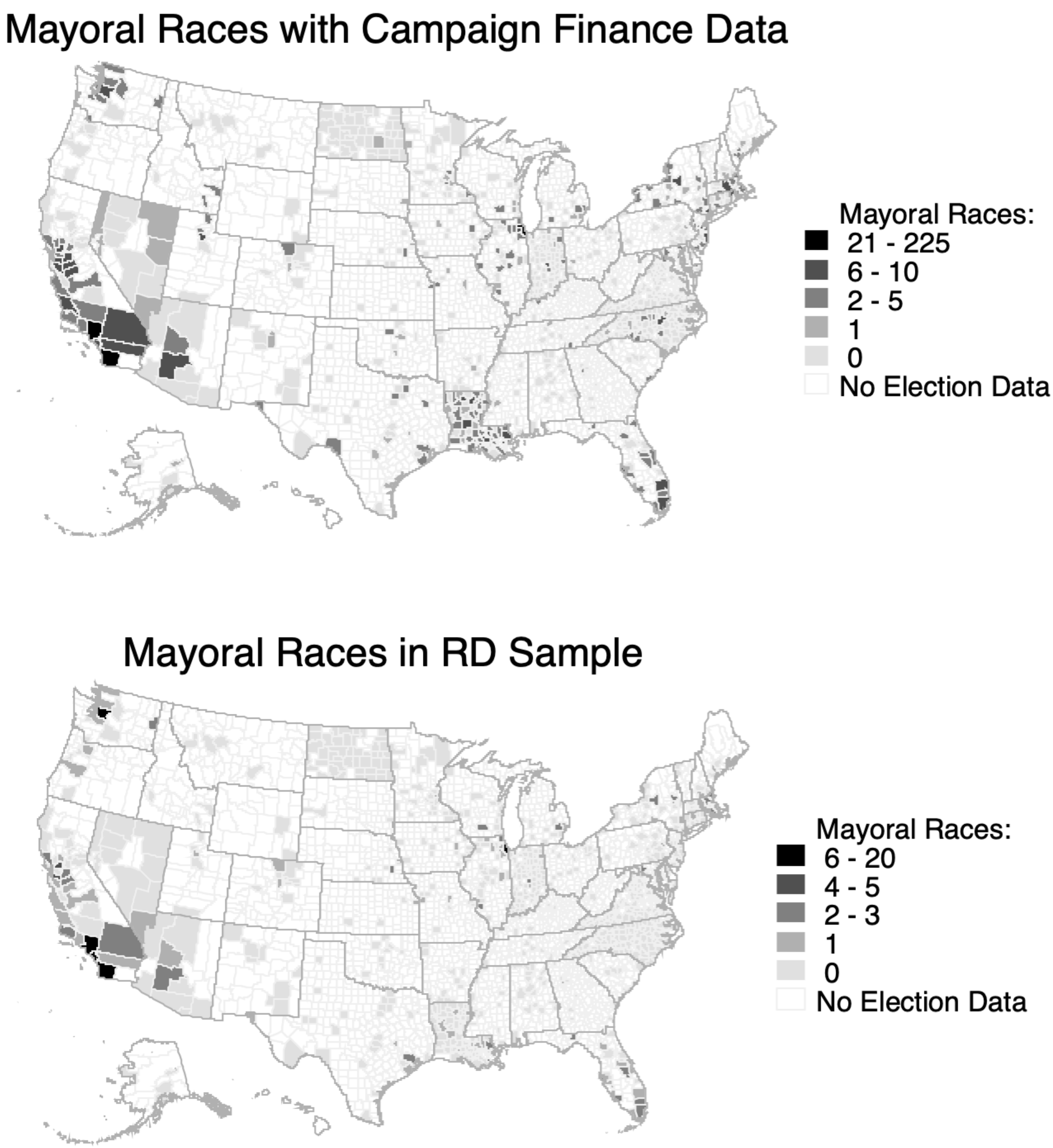
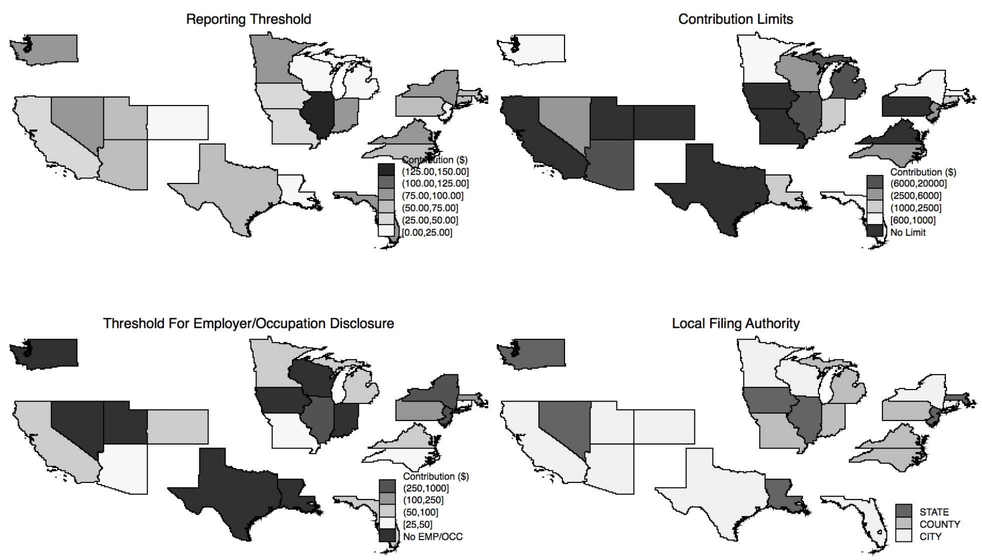
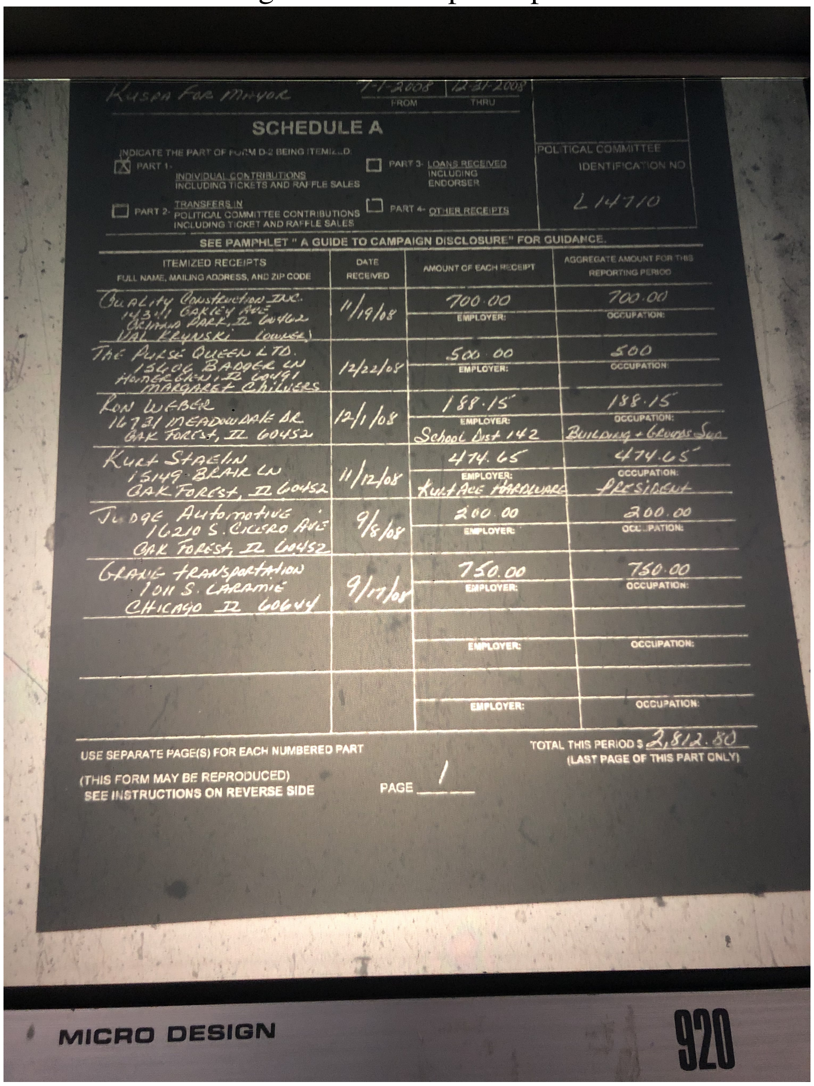


Figure 10: U.S. Local Campaign Finance Law



Source: State Campaign Finance Handbooks.

Figure 11: Example Report



KUSPA FOR MAYOR

7-1-2008 (FROM) 12-31-2008 (THRU)

SCHEDULE A

POLITICAL COMMITTEE IDENTIFICATION NO L14710

INDICATE THE PART OF FORM D-2 BEING ITEMIZED:

[X] PART 1- INDIVIDUAL CONTRIBUTIONS INCLUDING TICKETS AND RAFFLE SALES

[ ] PART 2- TRANSFERS IN POLITICAL COMMITTEE CONTRIBUTIONS INCLUDING TICKET AND RAFFLE SALES

[ ] PART 3- LOANS RECEIVED INCLUDING ENDORSER

[ ] PART 4- OTHER RECEIPTS

SEE PAMPHLET " A GUIDE TO CAMPAIGN DISCLOSURE" FOR GUIDANCE.

ITEMIZED RECEIPTS FULL NAME, MAILING ADDRESS, AND ZIP CODE	DATE RECEIVED	AMOUNT OF EACH RECEIPT	AGGREGATE AMOUNT FOR THIS REPORTING PERIOD
QUALITY Construction INC. 14341 OAKLEY AVE ORLAND PARK, IL 60462 VAL KRYNSKI (OWNER)	11/19/08	700.00 EMPLOYER:	700.00 OCCUPATION:
THE PURSE QUEEN LTD. 15406 BADGER LN HOMERGLEN, IL 60491 MARGARET Chilvers	12/22/08	500.00 EMPLOYER:	500 OCCUPATION:
RON WEBER 16731 MEADOWDALE DR OAK FOREST, IL 60452	12/1/08	188.15 EMPLOYER: School Dist 142	188.15 OCCUPATION: BUILDING + GROUNDS SUP
KURT STAELIN 15149 BRAIR LN OAK FOREST, IL 60452	11/12/08	474.65 EMPLOYER: KURT ACE HARDWARE	474.65 OCCUPATION: PRESIDENT
JUDGE Automotive 16210 S. CICERO AVE OAK FOREST, IL 60452	9/8/08	200.00 EMPLOYER:	200.00 OCCUPATION:
GRANE transportation 1011 S. LARAMIE CHICAGO IL 60644	9/17/08	750.00 EMPLOYER:	750.00 OCCUPATION:
		EMPLOYER:	OCCUPATION:
		EMPLOYER:	OCCUPATION:

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Figure 12: Campaign Donations in Mayoral Races vs. Federal House Races

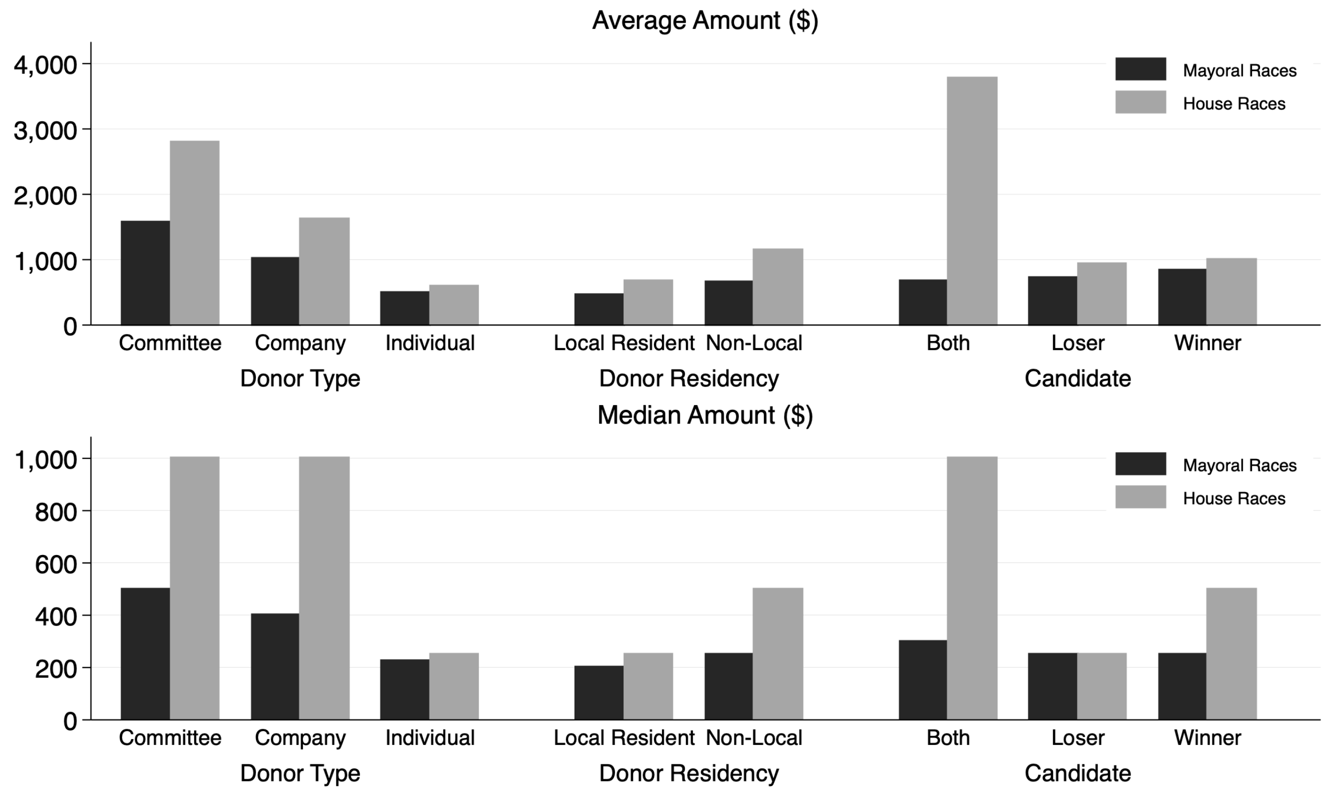

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Figure 13: Campaign Donations in Mayoral Races vs. Federal House Races

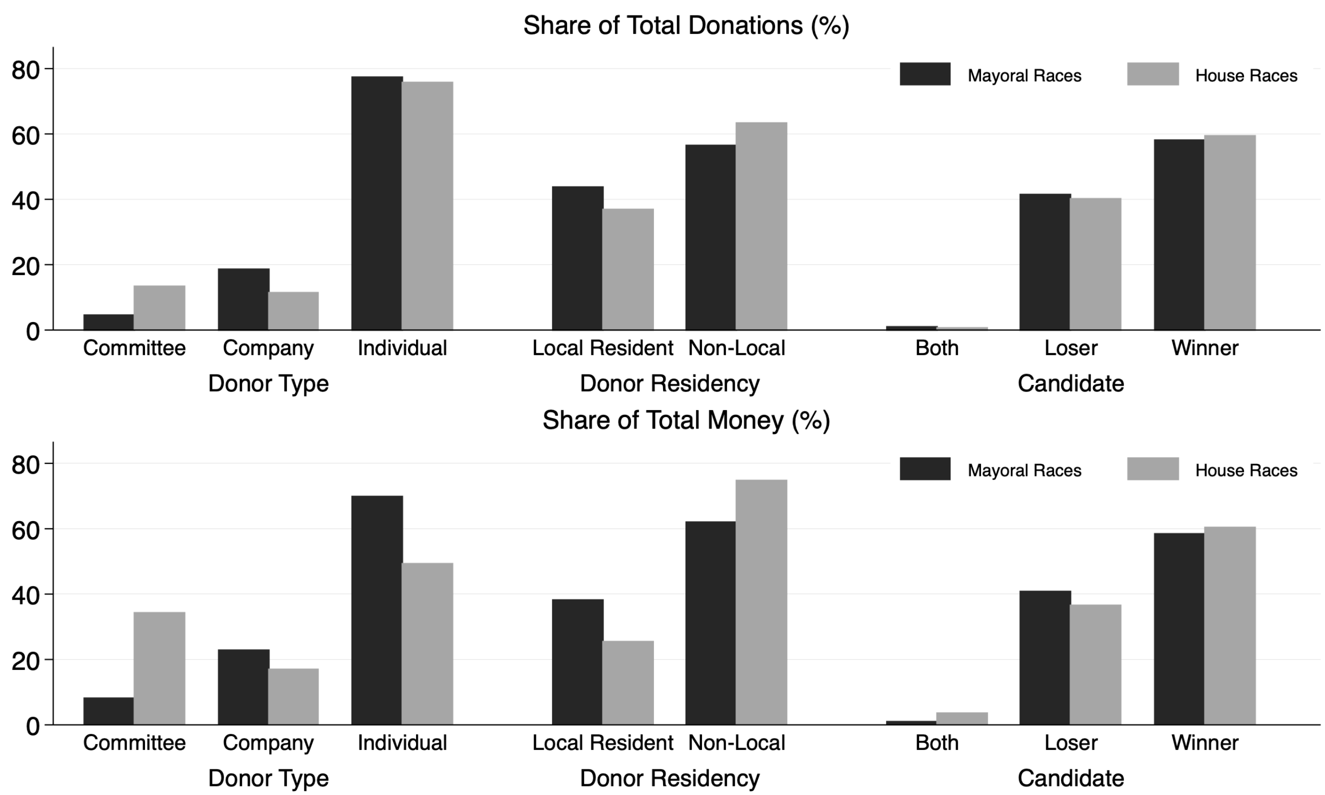

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Table 9: Local Clerks' E-mail Response Rates

	E-mailed	*Responded*		*Some Reports*		*Both Reports*	
	N	N	(%)	N	(%)	N	(%)
Municipality							
	1,097	685	62%	349	32%	314	29%
State							
CA	158	134	85%	110	70%	98	62%
LA	46	11	24%	0	0%	0	0%
NJ	20	16	80%	0	0%	0	0%
FL	54	46	85%	38	70%	38	70%
IN	102	56	55%	23	23%	20	20%
TX	39	35	90%	20	51%	19	49%
NC	206	84	41%	26	13%	23	11%

Displayed are summary of panel data.

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Table 10: Campaign Contribution Variable Availabilities

	Fraction Non-Missing	Count
Contributor Name	1.000	1,049,414
Contributor Zip	0.967	1,015,234
Contribution Type	1.000	1,049,414
Contributor Occupation	0.444	465,467
Contributor Employer	0.354	371,706
Contribution Amount	1.000	1,049,414
Contribution Date	0.934	980,002
Contribution Notes	0.009	9,436
Contributor City	0.521	546,262
Contributor Address	0.210	220,694
Contributor State	0.507	531,849
Contribution Type 2	0.068	71,816
Observations	1049414	

Table 11: Summary Statistics on Local Campaign Contributions

	Summary Statistics				*Contributions*	
	N	Mean	SD	Median	Mean Count	Received
Local Contribution						
	1,049,728	$629	$6,177	$250		
Recipient						
Winner	731,112	$636	$6,281	$250		
Runner-up	308,830	$607	$6,003	$250		
Candidate						
	2,278	$332,716	$4,086,404	$21,200	269	2,023
Outcome						
Winner	1,139	$462,165	$5,396,416	$27,963	357	1,028
Runner-up	1,139	$203,267	$2,063,304	$15,329	181	995
Mayoral Races						
	1,078	$644,062	$5,988,421	$54,009	496	1,080
Vote Margin						
$\geq 5\%$	779	$486,625	$2,879,060	$55,290	483	780
$<5\%$	299	$1,054,239	$10,379,389	$48,089	529	300

Displayed are summary statistics of local contributions to the top two mayoral candidates. Upper panel summarizes contribution-level data. Middle panel aggregates contributions to total received by each candidate. Lower panel summarizes total contributions per local race. Column "Mean Count" tabulates the average number of contributions received at each summary unit. Column "Received" tabulates the number of units receiving any contribution.

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A.2 Linking Contributors to CoreLogic

A.2.1 Fuzzy Linking Names

Since names in the contribution and CoreLogic datasets are dissimilar, I undertake a four-step fuzzy matching procedure:

1. Strip corporate tags (e.g., "LLC", "INC", etc.) and abbreviate industry signifiers (e.g., "builder" into "bld", "residential" into "res", etc.) from names of contributors, the name of their employers when available, and names of CoreLogic sellers.
2. Compare each name in the contribution data to a name in the CoreLogic data using the cosine similarity algorithm. For each pair of names, the algorithm generates a score between 0 and 1, with 1 indicating perfect match.
3. Categorize each link into three groups: invalid matches, unclear matches, and good matches. Thresholds for the similarity score generate these categories, and I determined each threshold by manually matching a subset of links, shown in Appendix Table **??**.
4. Manually assess unclear matches with internet search.

The final product of this procedure is a link between names of contributors and names of CoreLogic sellers of new construction. These links resulted from good matches and verified unclear matches.

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B Conceptual Framework

B.1 Baseline Derivations

B.1.1 Probability DEV Wins (Equation 2)

Proof. The informed voter picks candidate DEV if:

$$U\left(Q^{\text{DEV}},\Delta^{\text{DEV}}\right)-U\left(Q^{\text{NON}},\Delta^{\text{NON}}\right)\geq \varepsilon^{P}$$

where $\varepsilon^P \sim U\left[\frac{-1}{2f},\frac{1}{2f}\right]$. Therefore the probability informed voters pick candidate DEV is:

$$\begin{aligned}
\rho^{P} &= P\left\{\varepsilon^{P}\leq U\left(Q^{\text{DEV}},\Delta^{\text{DEV}}\right)-U\left(Q^{\text{NON}},\Delta^{\text{NON}}\right)\right\}\\
&= \frac{U\left(Q^{\text{DEV}},\Delta^{\text{DEV}}\right)-U\left(Q^{\text{NON}},\Delta^{\text{NON}}\right)-\left(-\frac{1}{2f}\right)}{\frac{1}{2f}-\left(-\frac{1}{2f}\right)}\\
&= f\left(U\left(Q^{\text{DEV}},\Delta^{\text{DEV}}\right)-U\left(Q^{\text{NON}},\Delta^{\text{NON}}\right)+\frac{1}{2f}\right)\\
&= \frac{1}{2}+f\left[U\left(Q^{\text{DEV}},\Delta^{\text{DEV}}\right)-U\left(Q^{\text{NON}},\Delta^{\text{NON}}\right)\right]
\end{aligned}$$

The probability of candidate DEV winning is the probability the representative voter prefers candidate DEV to NON.

$$\begin{aligned}
\rho &= \alpha\rho^{U}+(1-\alpha)\rho^{I}\\
&= \alpha\left(\frac{1}{2}+h\left(C^{\text{DEV}}-C^{\text{NON}}\right)\right)+(1-\alpha)\left(f\left[U\left(Q^{\text{DEV}},\Delta^{\text{DEV}}\right)-U\left(Q^{\text{NON}},\Delta^{\text{NON}}\right)\right]+\frac{1}{2}\right)\\
\rho &= \frac{1}{2}+\alpha h\left(C^{\text{DEV}}-C^{\text{NON}}\right)+(1-\alpha)f\left[U\left(Q^{\text{DEV}},\Delta^{\text{DEV}}\right)-U\left(Q^{\text{NON}},\Delta^{\text{NON}}\right)\right]
\end{aligned}$$

□

B.1.2 Candidate Participation Constraint (Inequality 4)

Proof. Since the candidate prefers to win at all costs, they only accept contributions insofar as it increases the probability of winning:

$$\rho\left(C^K, C^K\right) \geq \rho\left(C^K = 0, C^K\right)$$
$$\frac{1}{2} + \alpha h\left(C^K - C^K\right) + (1-\alpha) f\left[U\left(Q^K, \Delta^K\right) - U\left(Q^K, \Delta^K\right)\right] \geq$$
$$\frac{1}{2} + \alpha h\left(-C^K\right) + (1-\alpha) f\left[U\left(Q^K, \underline{\Delta}^K\right) - U\left(Q^K, \Delta^K\right)\right]$$
$$\alpha h\left(C^K\right) + (1-\alpha) f\left[U\left(Q^K, \Delta^K\right) - U\left(Q^K, \underline{\Delta}^K\right)\right] \geq 0$$
$$\alpha h C^K \geq (1-\alpha) f\left[U\left(Q^K, \underline{\Delta}^K\right) - U\left(Q^K, \Delta^K\right)\right]$$
$$C^K \geq \frac{(1-\alpha) f}{\alpha h}\left[U\left(Q^K, \underline{\Delta}^K\right) - U\left(Q^K, \Delta^K\right)\right]$$

□

B.1.3 Proposition 1

The equilibrium is a subgame-perfect Nash equilibrium of a two-stage, non-cooperative, political game. In the first stage, the lobby makes offers to each candidate. In the second stage, candidates accept or reject the offers. The election is realized, then the candidate implements favors.

Definition 1. An equilibrium is a pair of feasible favors $\left(\Delta^{\text{DEV}}, \Delta^{\text{NON}}\right)$ and contribution $C_j^{\text{DEV}}, C_j^{\text{NON}}$ for lobby j such that:

1. Δ^{DEV} (alternately, Δ^{NON}) maximizes ρ (alternately, $1-\rho$) given Δ^{NON} (alternately, Δ^{DEV}), C_j^{DEV}, and C_j^{NON};

2. $C_j^{K*} \geq 0$ for candidate $K \in \{\text{DEV}, \text{NON}\}$;

3. For lobby j, $\nexists$ feasible contributions $\tilde{C}_j^{\text{DEV}}$ and $\tilde{C}_j^{\text{NON}}$:

$$\tilde{\rho}\pi_j\left(\Delta^{\text{DEV}}\right) + (1-\tilde{s})\pi_j\left(\Delta^{\text{NON}}\right) - \tilde{C}_j^{\text{DEV}} - \tilde{C}_j^{\text{NON}}$$
$$> \rho\pi_j\left(\Delta^{\text{DEV}}\right) + (1-s)\pi_j\left(\Delta^{\text{NON}}\right) - C_j^{\text{DEV}} - C_j^{\text{NON}}$$

where Δ^{DEV} maximizes and Δ^{NON} minimizes::

$$(1-\alpha) f\left[U\left(Q^{\text{DEV}}, \Delta^{\text{DEV}}\right) - U\left(Q^{\text{NON}}, \Delta^{\text{NON}}\right)\right] + \alpha h\left(\tilde{C}_j^{\text{DEV}} - \tilde{C}_j^{\text{NON}}\right)$$

and:

$$\tilde{\rho} = (1-\alpha) f \left[W\left(\Delta^{\text{DEV}}, \Delta^{\text{DEV}}\right) - W\left(\Delta^{\text{NON}}, \Delta^{\text{NON}}\right)\right] + \alpha h \left(\tilde{C}_j^{\text{DEV}} - \tilde{C}_j^{\text{NON}}\right)$$

Now the proof of Proposition 1:

Proof. This is based on the arguments in Grossman and Helpman (1994). The lobbyist solves:

$$\max_{C^{\text{DEV}}, C^{\text{NON}}, \Delta^{\text{DEV}}, \Delta^{\text{NON}}} \Pi = \rho \pi \left(\Delta^{\text{DEV}}, Q^{\text{DEV}}\right) + (1-\rho) \pi \left(\Delta^{\text{NON}}, Q^{\text{NON}}\right) - C^{\text{DEV}} - C^{\text{NON}}$$
$$s.t. \quad C^K \geq \frac{(1-\alpha) f}{\alpha h} \left[U\left(\overline{\Delta^K}\right) - U\left(\Delta^K\right)\right]$$

which implies first-order conditions for $C^{\text{DEV}}, C^{\text{NON}}$:

$$\alpha h \left[\pi\left(\Delta^{\text{DEV}}, Q^{\text{DEV}}\right) - \pi\left(\Delta^{\text{NON}}, Q^{\text{NON}}\right)\right] = 1 - \lambda^A$$

$$\alpha h \left[\pi\left(\Delta^{\text{NON}}, Q^{\text{NON}}\right) - \pi\left(\Delta^{\text{DEV}}, Q^{\text{DEV}}\right)\right] = 1 - \lambda^B$$

Assuming for now $\pi\left(\Delta^{\text{DEV}}, Q^{\text{DEV}}\right) \neq \pi\left(\Delta^{\text{NON}}, Q^{\text{NON}}\right)$ it must be $\lambda^A > 0$ and/or $\lambda^B > 0$. Suppose $\lambda^A = 0$, then $\lambda^B > 0$. This means:

$$C_j^{\text{NON}*} = \frac{(1-\alpha) f}{\alpha h} \left[U\left(\underline{\Delta}^{\text{NON}}\right) - U\left(\Delta^{\text{NON}}\right)\right]$$

Substituting the constraint into the lobbyist objective function, the lobby now picks Δ^{NON} to maximize its expected utility, leading to:

$$\Delta^{\text{NON}} \in \arg\max \left\{(1-\rho) \pi \left(\Delta^{\text{NON}}, Q^{\text{NON}}\right) - \frac{(1-\alpha) f}{\alpha h} \left[U\left(\underline{\Delta}^{\text{NON}}\right) - U\left(\Delta^{\text{NON}}\right)\right]\right\}$$

Therefore:

$$\Delta^{\text{NON}*} = \frac{\theta - Q^{\text{NON}}}{1+\gamma} + \frac{\alpha h a (1-\rho)}{(1-\alpha) f (1+\gamma)^2}$$
$$C_j^{\text{NON}*} = \frac{(1-\alpha) f}{2 \alpha h} \left(\frac{\alpha h a (1-\rho)}{(1-\alpha) f (1+\gamma)}\right)^2$$

Candidate DEV is more complicated, as extra contributions above the participation constraint in-

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creases probability of election:

$$\Pi_j = \rho\pi\left(\Delta^{\text{DEV}}\right) + (1-\rho)\,\pi\left(\Delta^{\text{NON}}\right) - C^{\text{DEV}} - C^{\text{NON}}$$
$$\frac{\partial \Pi_j}{\partial \Delta^{\text{DEV}}} = \frac{\partial \rho}{\partial \Delta^{\text{DEV}}}\pi\left(\Delta^{\text{DEV}}\right) + \rho\frac{\partial \pi\left(\Delta^{\text{DEV}}\right)}{\partial \Delta^{\text{DEV}}} - \frac{\partial \rho}{\partial \Delta^{\text{DEV}}}\pi\left(\Delta^{\text{NON}}\right)$$
$$\Delta^{\text{DEV}} = \frac{\theta - Q^{\text{DEV}}}{1+\gamma} + \frac{\alpha h}{(1-\alpha)\,f\,(1+\gamma)^2}a\rho$$

Now expanding the FOC for C^{DEV}:

$$\rho^* = \frac{1}{2} + \frac{(1-\alpha)\,f\,(1+\gamma)^2}{2\alpha h a^2}\left[\frac{1}{\alpha h} - \left(b - \frac{a}{1+\gamma}\right)\left(Q^{\text{DEV}} - Q^{\text{NON}}\right)\right]$$

Now explicitly solving:

$$C_j^{\text{DEV}} = \frac{(1-\alpha)\,f\,(1+\gamma)^2}{2\,(\alpha h a)^2}\left[\frac{1}{\alpha h} - \left(b - \frac{a}{1+\gamma}\right)\left(Q^{\text{DEV}} - Q^{\text{NON}}\right)\right] + \frac{(1-\alpha)\,f}{2\alpha h}\left(\frac{\alpha h a \rho}{(1-\alpha)\,f\,(1+\gamma)}\right)^2$$

Check that the constraint does not bind:

$$C_j^{\text{DEV}*} - \frac{(1-\alpha)\,f}{2\alpha h}\left(\frac{\alpha h a \rho^*}{(1-\alpha)\,f\,(1+\gamma)}\right)^2 = \frac{(1-\alpha)\,f\,(1+\gamma)^2}{2\,(\alpha h a)^2}\left[\frac{1}{\alpha h} - \left(b - \frac{a}{1+\gamma}\right)\left(Q^{\text{DEV}} - Q^{\text{NON}}\right)\right]$$

So $\frac{1}{\alpha h} - \left(b - \frac{a}{1+\gamma}\right)\left(\Delta^{\text{DEV}} - \Delta^{\text{NON}}\right) > 0$. Check pay-offs differ:

$$\pi\left(\Delta^{\text{DEV}}\right) - \pi\left(\Delta^{\text{NON}}\right) = \frac{1}{\alpha h} > 0$$

□

B.1.4 Corollary 1: Contributions Raised by Candidates

Proof. Using the constraints:

$$\begin{aligned}
C_j^{\text{DEV}*} >& \frac{(1-\alpha) f}{\alpha h}\left[U\left(\overline{\Delta^{\text{DEV}}}\right)-U\left(\Delta^{\text{DEV}}\right)\right] \\
>& \frac{(1-\alpha) f}{\alpha h}\left[U\left(\overline{\Delta^{\text{NON}}}\right)-U\left(\Delta^{\text{NON}}\right)\right] \\
=& C_j^{\text{NON}*}
\end{aligned}$$

□

B.1.5 Proposition 2

Private favors to donors increase total new construction.

$$\begin{aligned}
\overline{\Delta}^K &= \Delta^K + q_j^{K*} \\
&= \theta + \frac{\alpha h}{(1-\alpha) f} a s^*
\end{aligned}$$

The pro-development candidate DEV receives more money from construction than their opponent, i.e., $C^{\text{DEV}} > C^{\text{NON}}$ Note that

$$\begin{aligned}
C_j^{\text{NON}} &= \frac{(1-\alpha) f}{\alpha h}\left[W\left(\overline{\Delta^{\text{NON}}}\right)-W\left(\Delta^{\text{NON}}\right)\right] \\
&< \frac{(1-\alpha) f}{\alpha h}\left[W\left(\overline{\Delta^{\text{DEV}}}\right)-W\left(\Delta^{\text{DEV}}\right)\right] \\
&< C_j^{\text{DEV}}
\end{aligned}$$

The pro-development candidate DEV oversees more total construction.

$$\begin{aligned}
\overline{\Delta^{\text{DEV}}}-\overline{\Delta^{\text{NON}}} &= \theta + \frac{\alpha h}{(1-\alpha) f} a s^* - \left(\theta + \frac{\alpha h}{(1-\alpha) f} a\left(1-s^*\right)\right) \\
&= \frac{1}{a}\left(\frac{1}{\alpha h}-(b-a)\left(\Delta^{\text{DEV}}-\Delta^{\text{NON}}\right)\right)
\end{aligned}$$

B.2 Multiple Lobbies

The baseline model studies a single lobby that represents construction firms. It abstracts away from how those firms join the lobby, contribute to it, and split any favors. I extend the baseline model to one where many firms lobby individually. The set-up is based on the multiple lobby case in Grossman and Helpman (1996).

Each lobby still exchanges contributions for private favors, but now there are N identical lobbies. Let $q^K_{j,N}$ be the favor to lobby j when there are N lobbies total and $q^K_N = \left\{q^K_{j,N}\right\}_{j=1,\ldots,N}$ and $q^K_{-l,N} = \left\{q^K_{j,N},\ldots,\bar{q}^K_{l,N},\ldots,q^K_{j,N}\right\}_{j\neq l}$. Assume absent contributions from l, $\bar{q}^K_{l,N} \in \arg\max_{q^K_{l,N}} \left\{(1-\alpha) fW\left(\Delta^{\text{DEV}}, q^A_N\right) + \alpha h \sum\right.$
Welfare of informed voters is:

$$W\left(\Delta^K, q^K_N\right) = -\frac{1}{2}\left(\Delta^K + \sum_j^N \Delta^K - \theta\right)^2$$

Now the probability of election is determined by the sum of contributions from all lobbies:

$$\tilde{s} = (1-\alpha)\underbrace{\left[\frac{1}{2} + f\left[W\left(\Delta^{\text{DEV}}, q^A_N\right) - W\left(\Delta^{\text{NON}}, q^B_N\right)\right]\right]}_{\text{Probability Informed Supports A}} + \alpha\underbrace{\left[\frac{1}{2} + h\left(\sum_j C^{\text{DEV}} - \sum_j C^{\text{NON}}\right)\right]}_{\text{Probability Uninformed Supports A}}$$

As a result, the participation constraint for a candidate to accept an offer from one lobby l:

$$C^K_l\left(q^K_N\right) \geq \frac{(1-\alpha) f}{\alpha h} W\left(\Delta^K, q^K_{-l,N}\right) + \sum_{j\neq l} C^K\left(q^K_{-l,N}\right) - \ldots$$
$$\ldots - \left[\frac{(1-\alpha) f}{\alpha h} W\left(\Delta^K, q^K_N\right) + \sum_{j\neq l} C^K\left(q^K_N\right)\right]$$

Satisfying the constraint means in equilibrium both candidates accept all offers.

Assumption 2. *Let* $\frac{1}{\alpha h} - \left(b - \frac{a}{N}\right)\left(\Delta^{DEV} - \Delta^{NON}\right) > 0$

Lobbies still donate to earn favors and to help Candidate DEV win, but now conditional on Assumption 2. When there are too many lobbies, Assumption 2 can fail and the motive to help Candidate DEV win is gone. With more lobbies, the sum of favors surpasses the bliss point of informed voters. Lobbies must contribute to offset that disutility, but the (quadratic) disutility outstrips the (linear) benefits of helping Candidate DEV.

This model with multiple lobbies naturally lends to a comparison with rent-seeking games. I consider a standard rent-seeking game one in which N lobbies expend sunk effort to earn a prize valued Q, with pay-offs:

$$V_{j,N}\left(C_{j,N};C_{-j,N}\right) = Q * s\left(C_{j,N};C_{-j,N}\right) - C_{j,N}$$

In both models, all contributions are sunk. Moreover, the probability of winning the election, s, is essentially a contest success function, $s\left(C_{j,N};C_{-j,N}\right)$, which maps effort to the probability of winning the prize. With too many lobbies (and under Assumption 2), rents dissipate much like in the standard rent-seeking game (Hindriks and Myles (2013)).

But that standard rent-seeking game is not exactly a reduced-form of my model. Whereas equilibrium contributions in the standard model fall with more competitors, equilibrium contributions to candidate NON actually rise in mine. This is because contributions need to compensate the candidate for the electoral penalty of disbursing more favors. Such electoral considerations constrain $C_{j,N}$ to Q.

Moreover, with multiple lobbies, there is coordination failure and multiplicity (Grossman and Helpman (1996)). Each lobby acts on beliefs, $\tilde{s}$, about the behavior of others. For example, each lobby might act on an arbitrary belief that others will give more to candidate NON. The equilibrium probability of election might coincide with those beliefs.

B.3 Homeowners vs. Renters

Fischel (2005) posits homeowners and renters have different incentives in regard to housing policy. Let r be the fraction of renters in the city. The rest are homeowners. Renters prefer:

$$U_R\left(\Delta^K,\Delta^K\right) = -\frac{1}{2}\left(\Delta^K + \Delta^K - \theta - R\right)^2$$

with $R > 0$. Homeowners prefer more restrictive policy than do renters, because new housing may reduce property values. Renters, on the other hand, may benefit from perhaps lower rents. But even renters dislike too much new housing, because local public goods and amenities may be congested.

Now the probability of election is:

$$s = (1-\alpha)\, r \underbrace{\left[\frac{1}{2} + f\left(U_R\left(\Delta^{\text{DEV}}, \Delta^{\text{DEV}}\right) - U_R\left(\Delta^{\text{NON}}, \Delta^{\text{NON}}\right)\right)\right]}_{\text{Probability Informed Renter Supports A}} + $$

$$\ldots + (1-\alpha)(1-r) \underbrace{\left[\frac{1}{2} + f\left(U\left(Q^{\text{DEV}}, \Delta^{\text{DEV}}\right) - U\left(Q^{\text{NON}}, \Delta^{\text{NON}}\right)\right)\right]}_{\text{Probability Informed Homeowner Supports A}} + \ldots$$

$$\ldots + \alpha \underbrace{\left[\frac{1}{2} + h\left(C^{\text{DEV}} - C^{\text{NON}}\right)\right]}_{\text{Probability Uninformed Supports A}}$$

Now the lobbyist must satisfy:

$$C^K \geq \frac{(1-\alpha) f}{\alpha h}\left[(1-r)\left[-\frac{1}{2}(rR)^2 + \frac{1}{2}\left(\Delta^{\text{DEV}} + \Delta^{\text{DEV}} - \theta\right)^2\right] + r\left[-\frac{1}{2}((r-1)R)^2 + \frac{1}{2}\left(\Delta^{\text{DEV}} + \Delta^{\text{DEV}} - \theta - R\right)^2\right.\right.$$

Surprisingly, equilibrium favors are unaffected by the fraction of renters or their preferences for more housing. Contributions, on the other hand, increase with the proportion of renters up to a point and then decline. Contributions increase with the gap in bliss points between homeowners and renters.

B.4 Estimating Framework

B.4.1 Firm-Level Impact

Data can be equated with equilibrium quantities via potential outcomes framework:

$$\begin{aligned}
y^i_{c,p,t} &= \text{Pro-Mayor}^i_{c,t}\varphi^i q^K_{c,p,t} + \left(1 - \text{Pro-Mayor}^i_{c,t}\right) * 0 + \phi^i Q^K_{c,p,t} \\
y^i_{c,p,t} &= \text{Pro-Mayor}^i_{c,t}\Delta^{i,K}_{c,p,t} + \phi^i Q^K_{c,p,t}
\end{aligned}$$

B.4.2 Jurisdiction-Level Impact

Let $Y_{c,p,t}$ be total permits issued in a municipality. First define N^{DEV} and N^{NON} the number of firms that donated to candidate DEV and B, respectively. Firms may donate to both.

$$Y_{c,p,t} = \text{Pro-Dev}_{c,t}\left(Q^A_{c,p,t} + q^A_{c,p,t}\right) + \left(1 - \text{Pro-Dev}_{c,t}\right)\left(Q^B_{c,p,t} + q^B_{c,p,t}\right)$$

Assuming pro-development mayors and non-development mayors deliver the same per-firm favor: $\frac{q^B_{c,p,t}}{N^{\text{NON}}} = \frac{q^A_{c,p,t}}{N^{\text{DEV}}} = \frac{q^K_{c,p,t}}{N^K}$, I have:

$$\begin{aligned} Y_{c,p,t} &= \text{Pro-Dev}_{c,t}\left(Q^A_{c,p,t} - Q^B_{c,p,t} + N^{\text{DEV}}\frac{q^K_{c,p,t}}{N^K} - N^{\text{NON}}\frac{q^K_{c,p,t}}{N^K}\right) + Q^B_{c,p,t} + q^B_{c,p,t} \\ &= \text{Pro-Dev}_{c,t}\left(Q^A_{c,p,t} - Q^B_{c,p,t} + \left(N^{\text{DEV}} - N^{\text{NON}}\right)\beta\right) + \chi_{c,t}\left(1-\rho_{c,t}\right) + \theta_{c,t} \end{aligned}$$

C Empirics

C.1 Robustness of RD Results

C.1.1 Optimal Bandwidth and Robust RD Estimator

In my specification to estimate favors to firms, I employ local linear regression on races decided within a 5 percent margin victory. This specification hews closely to that in Colonnelli et al. (2020). They also employ a close elections RD-design to evaluate patronage in local politics.

I show that my results are robust to optimal bandwidth and robust confidence intervals by Calonico et al. (2017). Table 12 presents estimates retrieved from the rdrobust Stata package. I present multiple specifications with different polynomial orders, kernels, and clustering specifications. Each specification also reports p-value's from the bias-adjusted, robust estimator. Across the board, optimal bandwidths are in fact wider than 5 percent. Importantly, the coefficient of interest is modestly attenuated but statistically significant.

C.1.2 Alternative Dependent Variables

The dependent variable of my firm-level RD design is sales of new construction by connected developers. In particular, I take year-over-year changes of the dependent variable. This specification improves the precision of my RD estimate. It removes firm-specific but time-invariant factors. Moreover, I organize the data into five-year panel around the election. Each observation is therefore at the election-donor-year level. Understanding the cumulative impact of political connection requires summing the effect across five years of the panel.

To improve transparency of my results, I present alternative specifications of the dependent variable. These alternative specifications include two changes. First, I collapse the dataset to the

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Table 12: RD Estimates using Optimal Bandwidths and Robust CI's

	(1)	(2)	(3)	(4)	(5)	(6)
Pro-Mayor$^{i}_{c,p,t}$	0.676***	0.823***	0.892***	0.869**	0.651***	0.644**
	(0.240)	(0.290)	(0.323)	(0.340)	(0.232)	(0.298)
Dep. Var Mean	.6	.72	.66	1.14	.6	.74
Poly. Order	1	2	3	1	1	1
BW	11.7%	17.2%	23.3%	5.0%	11.6%	14.1%
Kernel	Triangular	Triangular	Triangular	Triangular	Epanechnikov	Triangular
Cluster	ELECTION	ELECTION	ELECTION	ELECTION	ELECTION	FIRM
Controls						
Rob. P-value	0.005	0.005	0.007	0.100	0.005	0.034
N: Panel	49,730	56,630	70,030	19,530	49,545	53,395
N: Donors	9,946	11,326	14,006	3,906	9,909	10,679
N: Elections	422	545	630	189	416	487

Displayed are estimates of the impact of supporting the mayor on subsequent firm sales of new residential construction. The dependent variable in the first column is year-over-year change in residential transactions, and the second year-over-year change in dollar sales. All specifications are estimated on a stacked panel dataset of five years after the election. All regressions include mayoral election-by-period fixed effects. Standard errors are displayed in parentheses, and they are robust to heteroskedasticity and double clustered by donor and mayoral election.

election-donor level, summing firm sales across five years after the election. Second, I explore alternative specifications for the dependent variable to improve precision.

Table 13 presents three alternative specifications for the dependent variable. They are estimated on an election-donor level dataset. Column 1 sets the dependent variable as the sum of year-over-year changes across five years. The resulting estimate for Pro-Mayor$^{i}_{c,t}$ is the difference in sales between the donor to the mayor and runner-up at year five. Donors to the winner sell 5.01 more units than donors to the runner-up in year 5. This magnitude is consistent with the estimate from the main specification. Column 2 presents the dependent variable as the change from five years before the mayor's tenure. The resulting estimate is therefore the cumulative increase in sales by the mayor's donor firm. Column 2 shows that donors sell almost a dozen more new housing units. Finally, the dependent variable in column 3 is total residential units sold. It includes the lagged dependent variable as a control. The resulting estimate is significantly different from 0 but of smaller magnitude than in the primary specification.

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Table 13: RD Estimates using Alternative Dependent Variables

	YoY Ch. Tot. Res. Units Sold	Ch. Tot. Res. Units Sold	Tot. Res. Units Sold
	(1)	(2)	(3)
Pro-Mayor$^{i}_{c,t}$	5.014***	11.32**	8.985**
	(1.873)	(4.520)	(4.003)
Lag Tot. Res. Units Sold			0.652***
			(0.208)
Dep. Var Mean	4.44	-1.77	4.44
Margin of Victory	5.0%	5.0%	5.0%
Cluster	ELECTION	ELECTION	ELECTION
N: Panel	3,906	3,906	3,906
N: Donors	3,906	3,906	3,906
N: Elections	189	189	189

Displayed are estimates of the impact of supporting the mayor on subsequent firm sales of new residential construction. The dependent variable in the first column is year-over-year change in residential transactions, and the second year-over-year change in dollar sales. All specifications are estimated on a stacked panel dataset of five years after the election. All regressions include mayoral election-by-period fixed effects. Standard errors are displayed in parentheses, and they are robust to heteroskedasticity and double clustered by donor and mayoral election.

C.1.3 Density Tests

14: Observed Donors Around Discontinuity

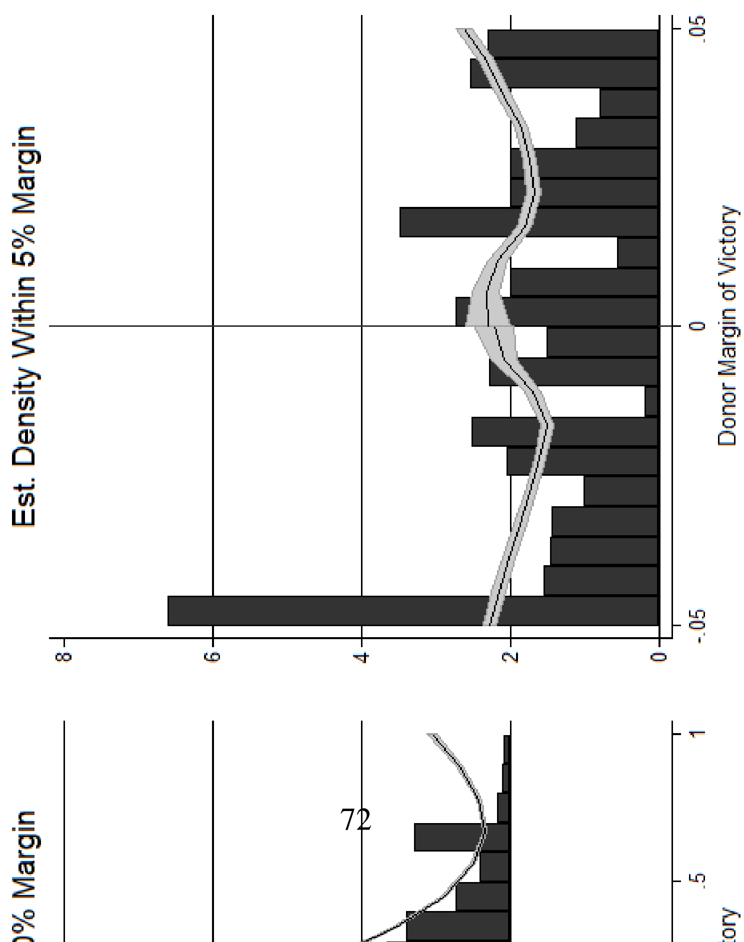

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Figure 15: Observed Races Around Discontinuity

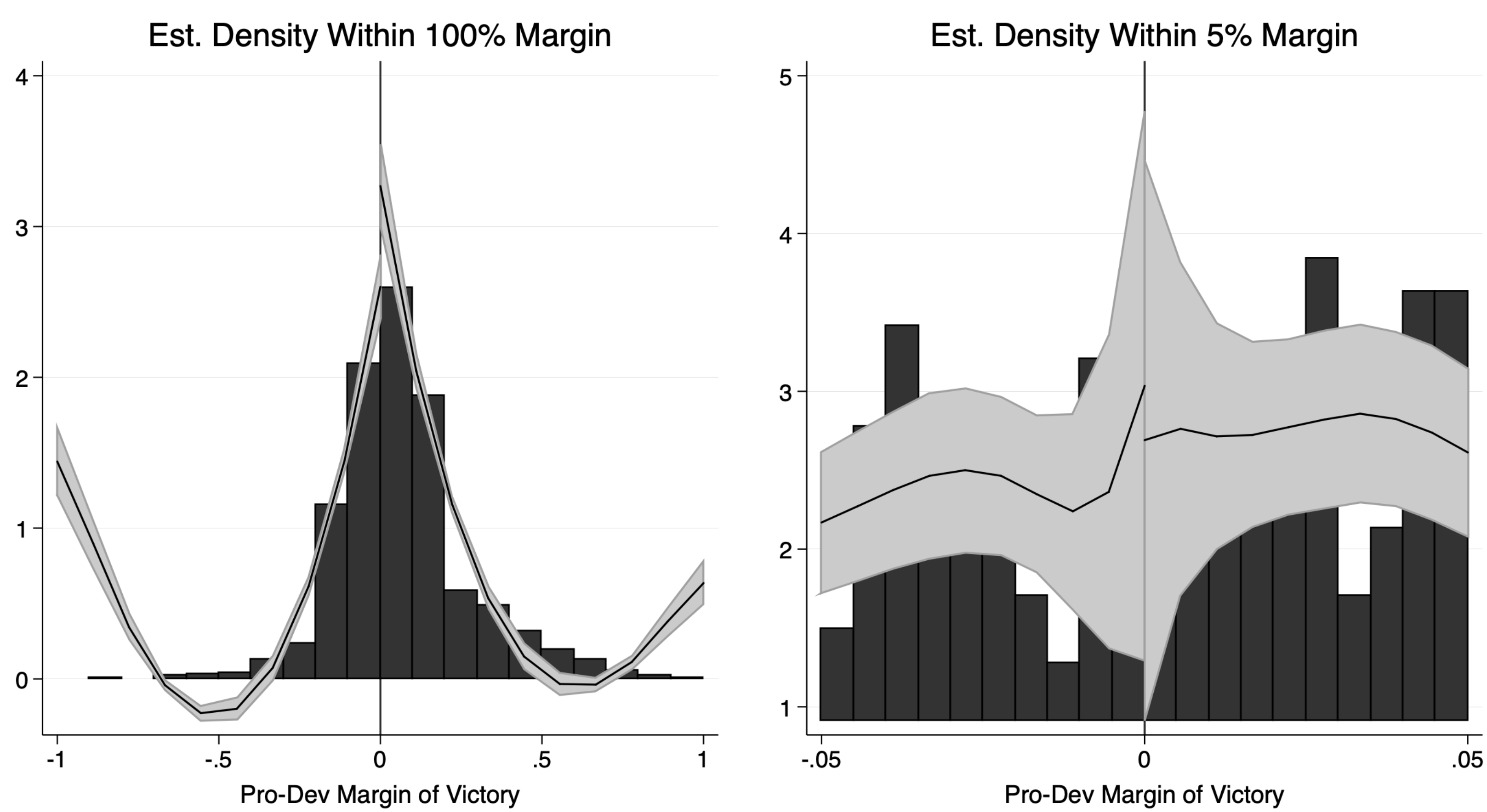

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Table 14: Density Tests

	Firm-Race Observations		
	Win	Loss	P-value (Density)
Full Sample	23,669	17,157	0.000
5% MV	4,735	2,303	0.767

	Race Observations		
	Win	Loss	P-value (Density)
Full Sample	936	589	0.011
5% MV	245	131	0.787

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Figure 16: Covariate Balance: Firm Characteristics

C.1.4

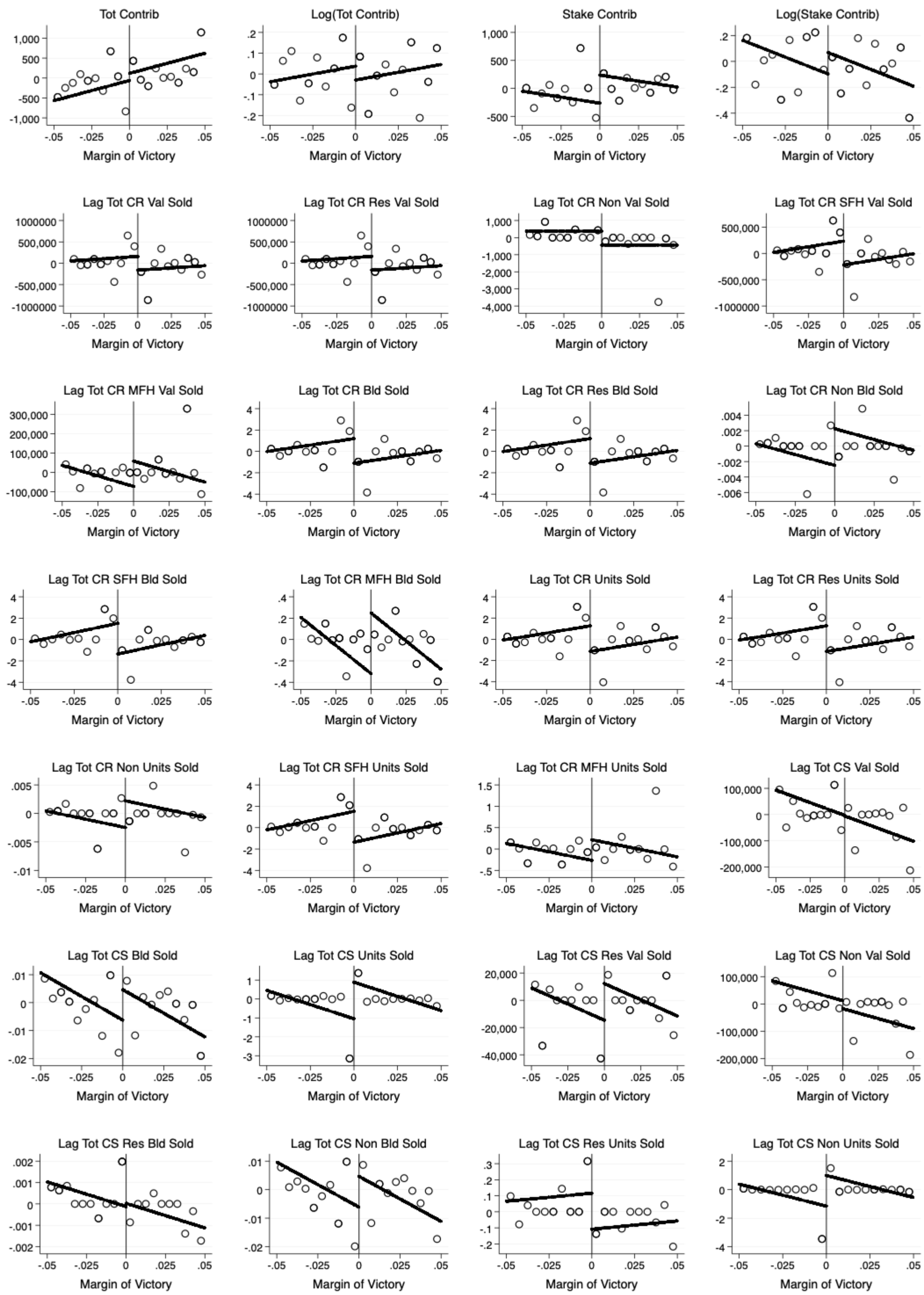

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Figure 17: Covariate Balance: Firm Characteristics

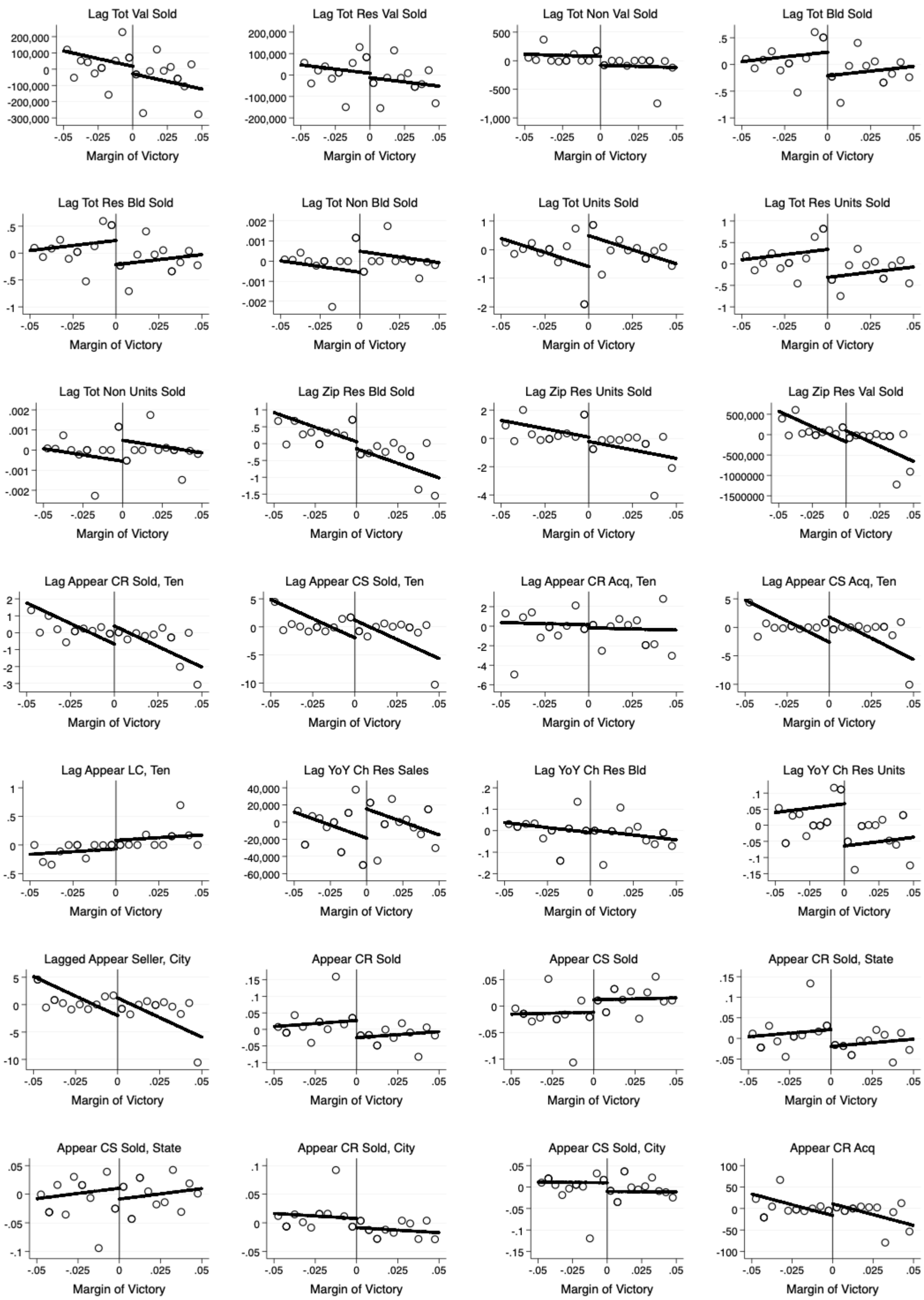

Table 15: Covariate Balance: Firm Characteristics

	Donor Covariate Balance					
	Coefficient	P-Value	Control Mean	Observations	Contributors	Elections
Lag Tot Res Val Sold	-12,224	.952	200,000	18,849	3,627	194
Lag Ch Tot Res Val Sold	-12,224	.952	200,000	18,781	3,626	194
Lag YoY Ch Tot Res Val Sold	3,802	.949	56,614	18,848	3,627	194
Lag Tot Res Units Sold	-.59	.548	.95	18,849	3,627	194
Lag Ch Tot Res Units Sold	-.59	.548	.95	18,781	3,626	194
Lag YoY Ch Tot Res Units Sold	-.2	.373	.31	18,848	3,627	194
Appear CR Sold	-.05	.134	.3	4,331	3,627	194
Appear CR Acq	.03	.442	.29	4,331	3,627	194
Appear CS Acq	.04	.389	.32	4,331	3,627	194
Appear CS Sold	.02	.362	.79	4,331	3,627	194
Appear CR Sold, State	-.04	.148	.26	4,331	3,627	194
Appear CR Acq, State	.04	.259	.22	4,331	3,627	194
Appear CS Acq, State	.01	.511	.23	4,331	3,627	194
Appear CS Sold, State	-.02	.668	.56	4,331	3,627	194
Appear LC, State	.01	.08	.02	4,331	3,627	194
Appear CR Sold, City	-.02	.482	.12	4,331	3,627	194
Appear CR Acq, City	0	.905	.12	4,331	3,627	194
Appear CS Acq, City	.01	.526	.12	4,331	3,627	194
Appear CS Sold, City	-.02	.651	.21	4,331	3,627	194
Appear LC, City	.01	.39	.01	4,331	3,627	194
N Entities	-3.23	.044	13.8	3,315	2,858	170
Fuzzy String Score	0	.993	.82	23	23	2
Tot Contributions	0	1	5,528	4,331	3,627	194
Log(Tot Contributions)	-.06	.745	5.82	4,331	3,627	194
Stakeholder	.02	.179	.86	3,761	3,205	134
Local Firm	-.07	.309	.24	943	800	106
Large Firm	0	.964	.07	4,331	3,627	194

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Figure 18: Covariate Balance: Candidate Characteristics

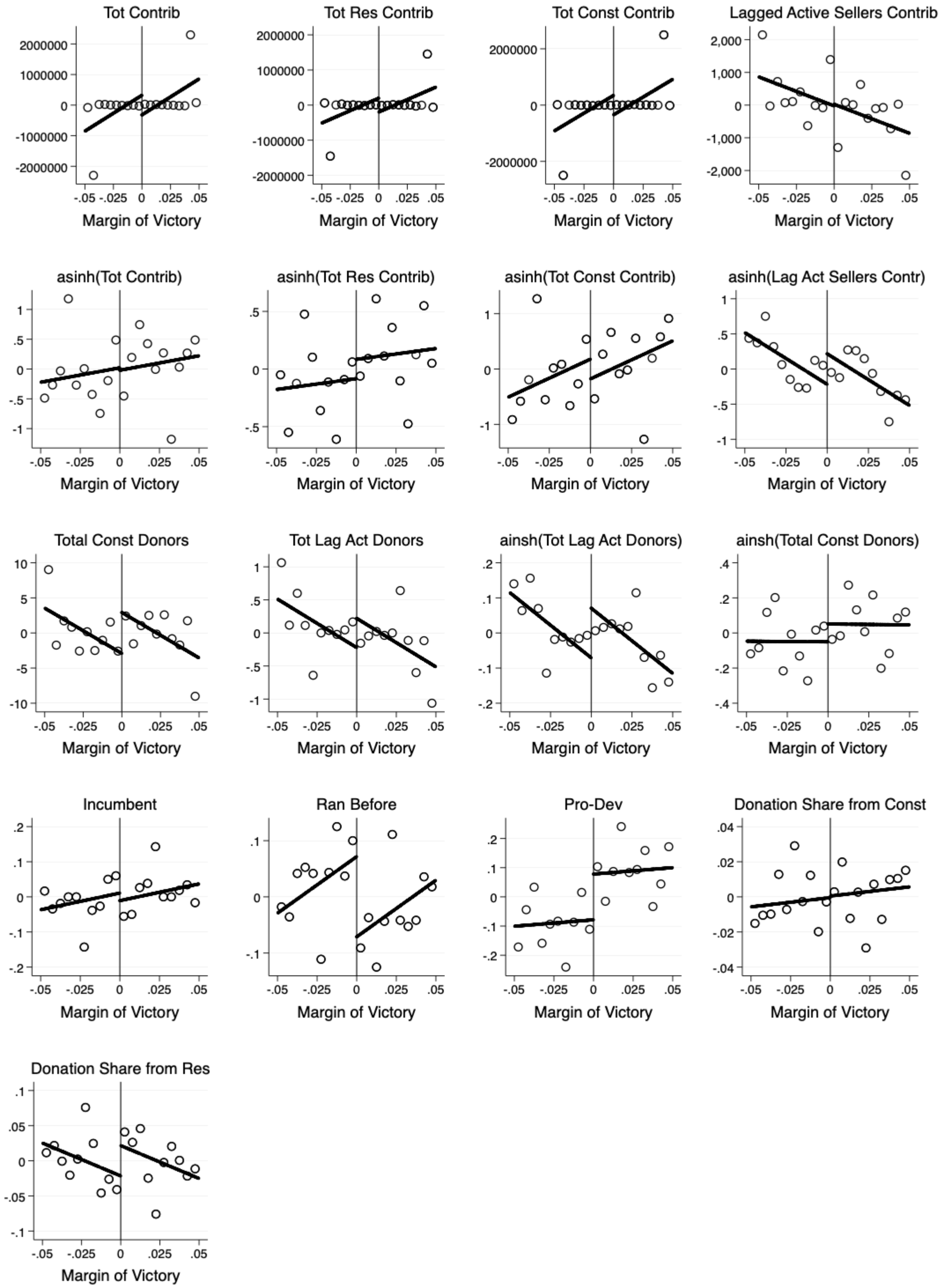

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Table 16: Covariate Balance: Candidate Characteristics

	Donor Covariate Balance			
	Coefficient	P-Value	Control Mean	Elections
Tot Contrib	-641,000	.314	210,000	291
Tot Res Contrib	-395,000	.34	82,970	263
Tot Const Contrib	-689,000	.332	28,809	263
Lagged Active Sellers Contrib	48.11	.961	2,386	291
asinh(Tot Contrib)	-.04	.929	9.91	291
asinh(Tot Res Contrib)	.17	.709	8.51	263
asinh(Tot Const Contrib)	-.36	.535	7.06	263
asinh(Lag Act Sellers Contr)	.43	.264	2.13	291
Total Const Donors	5.83	.118	11.89	291
Tot Lag Act Donors	.44	.215	1.22	291
ainsh(Tot Lag Act Donors)	.14	.069	.43	291
ainsh(Total Const Donors)	.1	.532	1.64	291
Incumbent	-.02	.801	.24	263
Ran Before	-.14	.107	.36	237
Pro-Dev	.16	.149	.34	291
Donation Share from Const	0	.969	.13	239
Donation Share from Res	.04	.363	.45	239

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Figure 19: Covariate Balance: City Characteristics

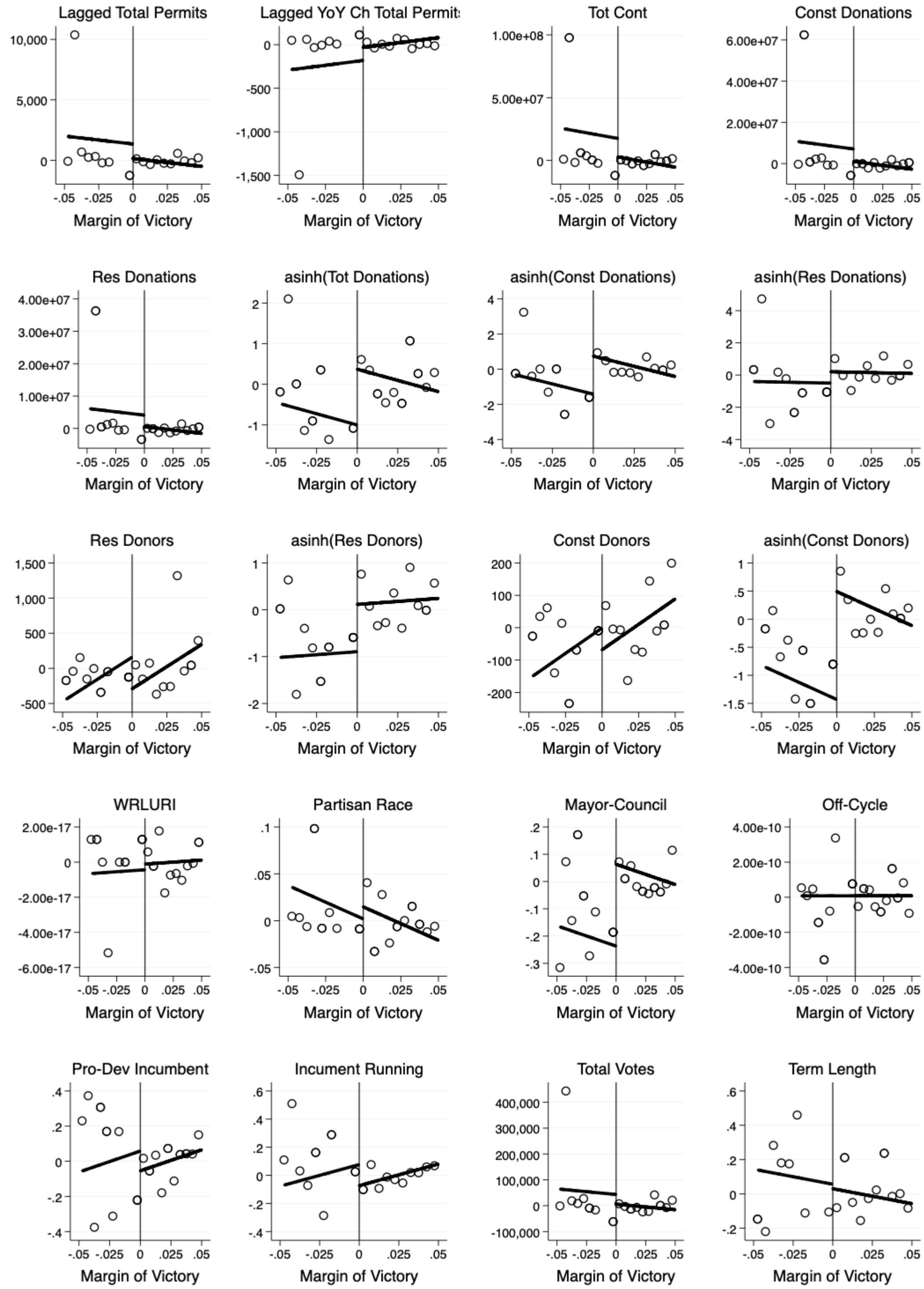

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Table 17: Covariate Balance: City Characteristics

	Donor Covariate Balance			
	Coefficient	P-Value	Control Mean	Elections
Lagged Total Permits	766	.147	434.9	242
Lagged YoY Ch Total Permits	135.9	.133	-33.21	242
Tot Cont	481,071	.917	660,000	173
Const Donations	-323,000	.899	66,096	189
Res Donations	8,357	.996	150,000	189
asinh(Tot Donations)	.54	.356	12.12	173
asinh(Const Donations)	.71	.291	9.7	189
asinh(Res Donations)	.88	.375	9.96	189
Res Donors	110.4	.773	400.1	189
asinh(Res Donors)	.69	.323	4.73	189
Const Donors	100.3	.38	112.8	189
asinh(Const Donors)	.63	.196	3.6	189
WRLURI	0	.916	.43	110
Partisan Race	.05	.279	.99	189
Mayor-Council	.07	.621	.57	189
Off-Cycle	0	1	.38	189
Pro-Dev Incumbent	.01	.965	.26	189
Incument Running	-.12	.501	.51	169
Total Votes	19,664	.419	28,300	189
Term Length	-.4	.17	3.62	156

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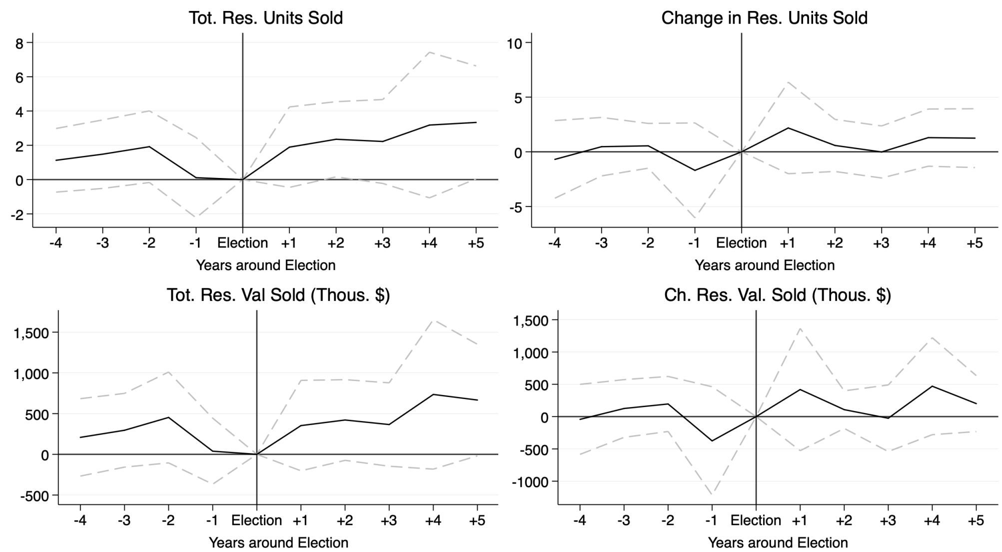
C.2 Additional Empirical Results

C.2.1 Dynamic Effects

Figure 20: Dynamic RD Design for Residential Transactions



Displayed are RD estimates on the impact of donating to a mayor using a local linear polynomial estimated on each year using panel data four years before and five years after the election. All outcomes are in changes of average transactions per year of new construction after the election. Outcome variables are residualized with municipality-election-period fixed effects.

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C.2.2 Competition

Table 18: Results on Competition in Zip Codes of Mayor's Donors

	YoY Ch. Zip Res. Units Sold	YoY Ch. Zip Res. Val. Sold	ZORI (Standardized)	ZHVI (Standardized)
	(1)	(2)	(3)	(4)
Pro-Mayor$^{i}_{c,t}$	0.481	-73114.1	-0.0905	-0.0217
	(0.482)	(188222.9)	(0.0577)	(0.0392)
R^2	0.0722	0.0703	0.0639	0.101
N: Panel	18,756	18,755	18,757	18,757
N: Firms	4,310	4,310	4,310	4,310
N: Races	194	194	194	194
Base Mean	3.1	915,127.9	0.0	0.0
MV Window	5%	5%	5%	5%
Specification	RD	RD	RD	RD

Displayed are estimates of the impact of .

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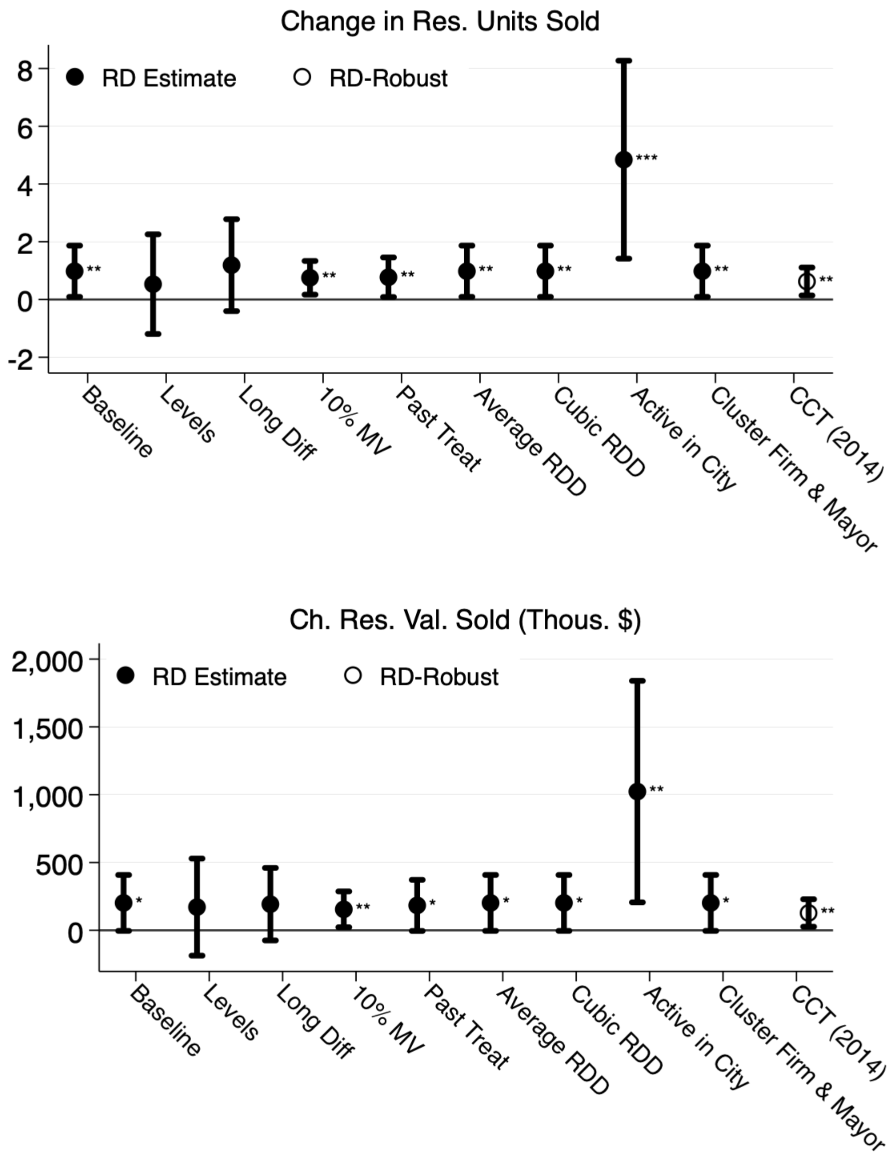
C.2.3 Alternative Specifications

Figure 21: Robustness of Firm-Level RD Design



Displayed are RD estimates on the impact of donating to a mayor using a local linear polynomial estimated on each year using panel data five years before and five years after the election. All outcomes are in changes of average transactions per year of new construction after the election. Outcome variables are residualized with municipality-election-period fixed effects.

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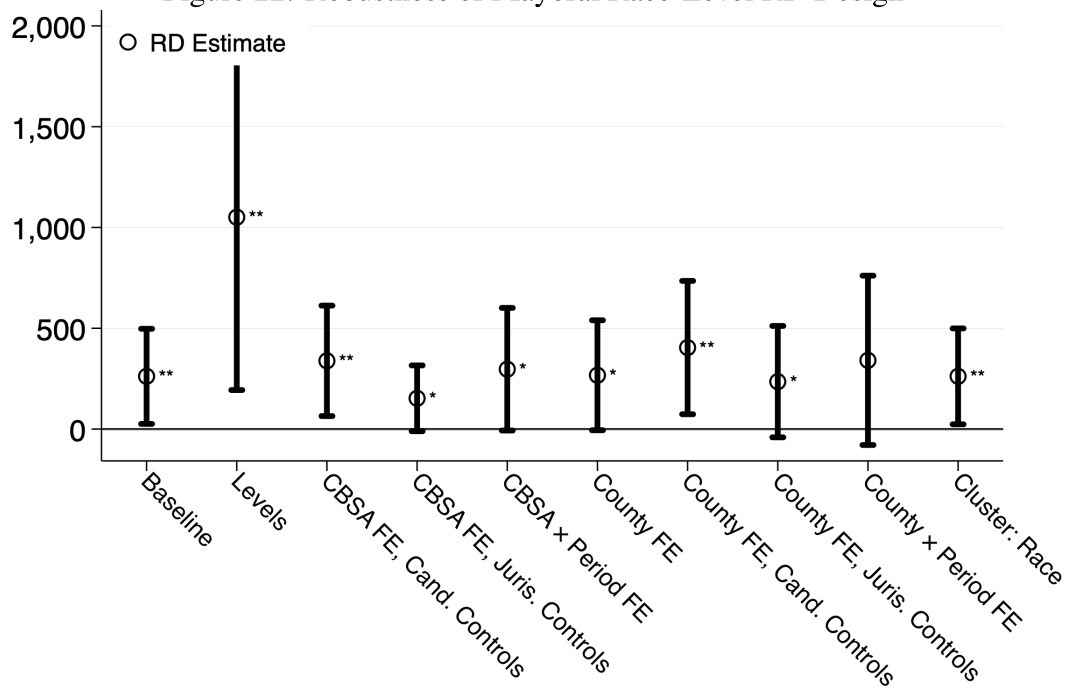
Figure 22: Robustness of Mayoral Race-Level RD Design



Displayed are RD estimates on the impact of donating to a mayor using a local linear polynomial estimated on each year using panel data five years before and five years after the election. All outcomes are in changes of average transactions per year of new construction after the election. Outcome variables are residualized with municipality-election-period fixed effects.

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C.3 Econometric Simulations

Measurement error may pose challenges to the empirical strategies in Section 5.1. Collecting, digitizing, and matching local campaign data create a selected sample of local races and firms. In addition, unobserved contributing networks, "soft" connections, and political committees are characteristic of campaign donors.[25] Linking to subsequent outcomes may be flawed. I explore the impact of different measurement error on the bias and precision of the RD estimates.

I adopt an econometric model and make parametric assumptions for simulation. Let

$$MV_{c,i} = \begin{cases} MV_c & \text{if } i \text{ donated to mayor} \\ -MV_c & \text{if } i \text{ donated to runner-up} \end{cases} \qquad \text{Pro-Mayor}_{c,i,p} = \mathbb{I}\{MV_{c,i} \geq 0\} \times \mathbb{I}\{p > 0\}$$

for donor i, candidate j, local race c, relative year p, with the election occurring $p = 0$. Let the model be:

$$y_{c,i,p} = \beta * \text{Pro-Mayor}_{c,i,p} + \varepsilon_{c,i,p}$$

I simulate scenarios by selectively altering $y_{c,i,p}$, $\text{Pro-Mayor}_{c,i,p}$ and $\varepsilon_{c,i,p}$. To operationalize I assume $N = 22,000$ donors, $\varepsilon_{c,i,p} \overset{i.i.d.}{\sim} N(0, \sigma_\varepsilon)$, $\beta = 1$, and draw $MV_{c,i}$ without replacement from the actual distribution of campaign supporters.

C.3.1 Endogeneity

First I demonstrate the use of the RD design in addressing endogeneity. Assume that outcome data are generated by:

$$\widetilde{y_{c,i,p}} = \beta * \text{Pro-Mayor}_{c,i,p} + \gamma X_{c,i,p} + \varepsilon_{c,i,p}$$

$$X_{c,i,p} = \rho MV_{c,i,p} + \eta_{c,i,p}$$

With $X_{c,i,p}$ unobservable to the hypothetical researcher, $\gamma \neq 0$, $\rho \neq 0$, $\tilde{\varepsilon}_{c,i,p} = \gamma X_{c,i,p} + \varepsilon_{c,i,p}$, I estimate OLS and RD coefficients for β in:

$$\widetilde{y_{c,i,p}} = \beta * \text{Pro-Mayor}_{c,i,p} + \tilde{\varepsilon}_{c,i,p}$$

Plots 1 and 2 in Figure 23 displays a histogram of the OLS and RD estimate for $\hat{\beta}$ in the above equation. Compared to the solid red line representing the true estimate, the OLS coefficient is

[25] U.S. federal and state law requires disclosure of campaign donors. There is confusion about the role of Citizens United vs. FEC and "dark money". The ruling in fact reinforced disclosure rules for contributions in federal elections. Anonymous donations through 501c-3 "social service organizations" constitute a loophole in the court's decision.

upwardly biased due to omitted variable bias. The RD coefficient, on the other hand, is close to the true value. Plots 4 and 5 displays empirical CDF's of p-values (against the null $\beta = 0$) across all simulation runs. Not all RD estimates are distinguishable from 0.

C.3.2 Error in Contribution Data

I evaluate measurement error arising from mismeasured contributions. These may arise from incomplete contribution data, unobserved contributing networks, proxy donors, or "soft" influence. Assume these sources of measurement error manifest before the election outcome. I additionally assume the measurement error is correlated with unobserved contributor characteristics.

Analytically let $A \equiv \{c, i\}$, the set of all who contributed to a candidate in a race. Set $\varphi_N \equiv \{c, i\} \subset A$, a weighted random subsample of all the data. If a donor donated anonymously or a supporter exerts unobservable influence on a candidate, it is akin to running estimation on φ_N rather than A. Certain contributors may select out of φ_N, which is captured by higher weights for an unobserved donor characteristic. In simulations, the weights are proportional to $X_{c,i,p}$ and 10% of data is missing in φ_N.

Plot 3 in Figure 23 shows that the RD coefficient is reasonably close to the true value despite simulated measurement error. The intuition for this is if measurement issues are uncorrelated with the random resolution of close elections, RD estimates should be internally valid. Complex, unobserved contributing networks, similarly, should exhibit balance around close elections. In this way, the RD estimate is internally valid for the observed contributors in the data. The impact manifests as slight loss in power in Plot 6.

C.3.3 Misattributing Support

However, mismeasuring contributors may be more serious if their support is attributed to the wrong candidate. For example, a donor might be recorded as supporting one candidate but in fact supported the other. This may be due to unobserved donations or noise in data processing.

Define subsample $\varphi_N = \{c, i\} \subset A$ and let:

$$\widetilde{\text{Pro-Mayor}}_{c,i,p} = \begin{cases} 1 - \text{Pro-Mayor}_{c,i,p} & \text{if } c, i \in \varphi_N \\ \text{Pro-Mayor}_{c,i,p} & \text{if } c, i \notin \varphi_N \end{cases}$$

I run simulations based on 10% of the sample with mismeasured $\widetilde{\text{Pro-Mayor}}_{c,i,p}$.

Figure 23 Plot 4 shows that misattributing support leads to lower estimates of β. Just 10% of contributors being miscategorized leads to more than halving of the estimate. Since $\widetilde{\text{Pro-Mayor}}_{c,i,p}$ attributes treatment status to observations that are in fact control and vice-versa, it tends to bias the coefficient toward the negative of the treatment effect. Due to estimates being closer to 0, the probability of rejecting $\beta = 0$ falls substantially as shown in Plot 9.

C.3.4 Error Linking to Outcomes

Whereas measurement error in contributor data may be uncorrelated to the outcome of a close race, subsequent outcome data may not. A firm may earn post-election favors, but those favors may not be documented or linked in data. Plausibly in this setting, agents exert so political favors are unobservable.

I simulate this scenario where political outcomes are poorly linked to contributors. Define $K = \{c, i : \text{Pro-Mayor}_{c,i,p} = 1\}$, set of donors to the mayor. Define a random subsample $\varphi_N = \{c, i : \text{Pro-Mayor}_{c,i,p} = 1$ K with $\#\varphi_N = N$. Let:

$$\widetilde{y_{c,i,p}} = \begin{cases} y_{c,i,p} & \text{if Pro-Mayor}_{c,i,p} = 1 \text{ and } c, i \notin \varphi_N \\ y_{c,i,p} - \text{Pro-Mayor}_{c,i,p} & \text{if Pro-Mayor}_{c,i,p} = 1 \text{ and } c, i \in \varphi_N \\ y_{c,i,p} & \text{if Pro-Mayor}_{c,i,p} = 0 \end{cases}$$

In effect a fraction of contributors to the winner have on record outcomes missing treatment. It mimics failing to link some contributors of winners to political rewards.

Plot 8 shows the RD estimate falling in magnitude by around 10% due to mismeasuring subsequent outcomes. Intuitively, the bias arises, because even in quasi-random, close races contributors to the winner are disproportionately mismeasured compared to the runner-up. For data generated after the mayoral race, mismeasurement leads to bias even in the RD estimate.

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Figure 23: Simulation Results on Impact of Measurement Error

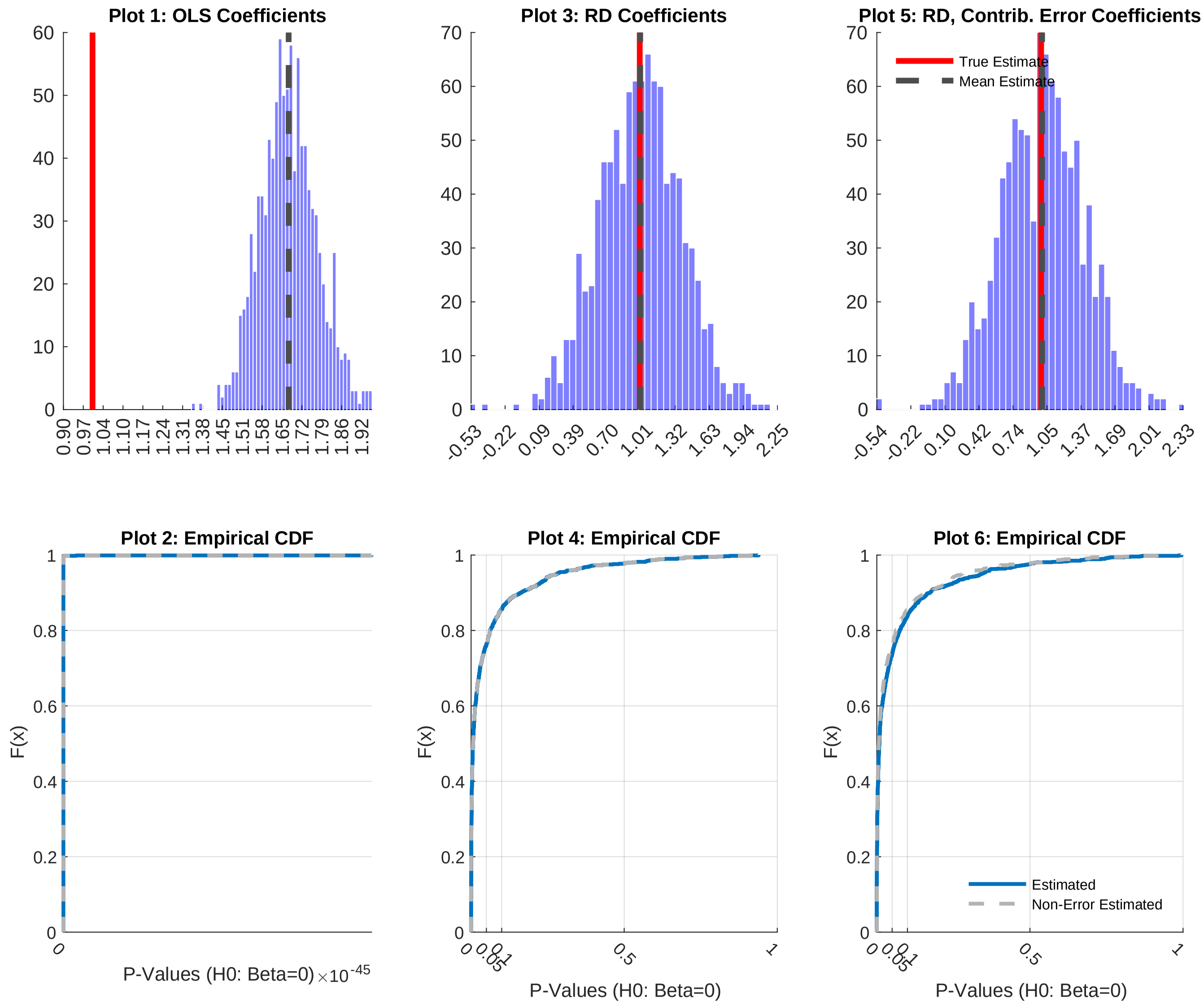

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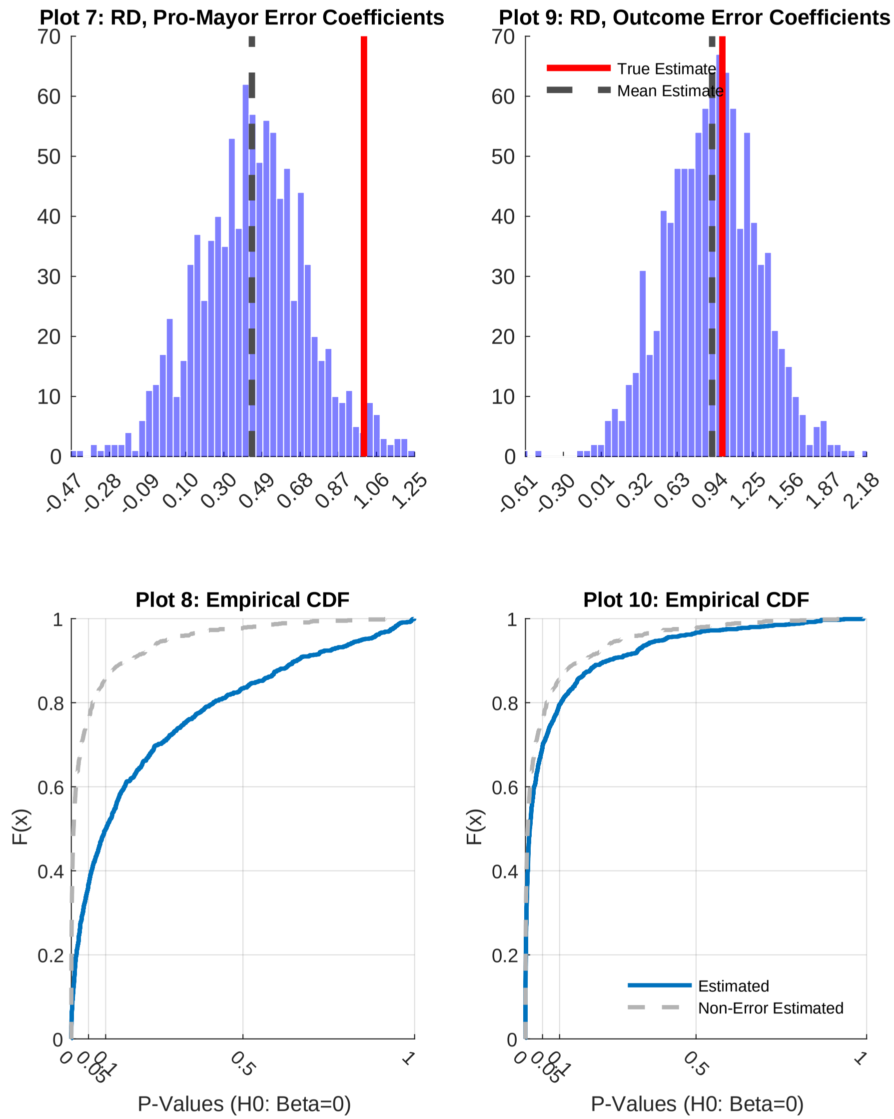
Figure 24: Simulation Results on Impact of Measurement Error



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