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Buying a Blind Eye: Campaign Donations, Forbearance, and Deforestation in Colombia*

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Abstract

While existing work has demonstrated that campaign donations can buy access to benefits such as favorable legislation and preferential contracting, we highlight another use of campaign contributions: buying forbearance. Specifically, we argue that in return for campaign contributions, Colombian mayors who rely on donor-funding (compared to those who do not) choose not to enforce sanctions against illegal deforestation activities. Using a regression discontinuity design we show that deforestation is significantly higher in municipalities that elect donor-funded as opposed to self-funded politicians. Further analysis shows that only part of this effect can be explained by differences is contracting practices by donor-funded mayors. Instead, evidence from analysis of fire clearance, and of heterogeneity in the effects according to the presence of alternative formal and informal enforcement institutions, supports the interpretation that campaign contributions buy forbearance from enforcement of environmental regulations.

KEYWORDS: Campaign donations, Deforestation, Forbearance

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1 Introduction

Between 2015 and 2018, tens of thousands of hectares of forest were destroyed in the Colombian municipalities of Calamar and Miraflores, with the rate of devastation tripling over the period.[1] Clearance of the forest was connected in part to the development of a 138km road, constructed between the two municipalities without the required environmental permits or licenses. The responsibility to enforce these environmental regulations lay with the mayors of the municipalities, Pedro Pablo Novoa and Jhonivar Cumbe. But rather than enforce the laws, the mayors chose to turn a blind eye, allowing the illegal road construction and related deforestation to proceed. While some ordinary citizens may have appreciated the improved transportation links, the primary beneficiaries of this failure to enforce environmental regulations were local elites and cattle ranchers, looking to capitalise on the forest clearance for financial gain. Indeed, over this same period these two municipalities experienced high levels of vegetation fires, a common practice used by farmers to illegally appropriate lands for cattle ranching and illicit crop cultivation, and one which mayors also have a responsibility to monitor and prevent.[2] We argue that, given the benefits to be had from regulatory non-enforcement, campaign donations are used to buy forbearance of this type, as mayors choose not to sanction illegal deforestation in return for campaign contributions.

A substantial body of research has investigated the effects of campaign donations, with evidence accruing in support of the idea that donors can buy benefits such as favourable legislation and preferential access to contracting or public sector jobs (Stratmann, 2005; Boas et al., 2014; Ruiz, 2017; Colonnelli et al., 2020). But the case described above highlights another use of campaign contributions: buying forbearance. Existing work on forbearance, or the selective non-enforcement of laws, has focused primarily on its use as a form of redistribution to win the votes of the poor (Holland, 2016). Within that work, however, there is an acknowledgement that forbearance can also take more regressive forms, benefiting wealthy individuals at the upper end of the income distribution. When non-enforcement is targeted towards specific wealthy individuals in a contingent manner it can represent a type of corruption, which can be purchased from politicians with goods such as bribes or campaign funds. Yet while forbearance as corruption may seem all too familiar, clear evidence of it remains limited, in part because it is difficult to observe.[3]

[1] See https://www.semana.com/nacion/articulo/trochas-ilegales-acaban-con-la-amazonia-colombiana/649428. Last accessed June 2021.

[2] See for example https://es.mongabay.com/2019/07/incendios-norte-amazonia-deforestacion-colombia/.

[3] Sun (2015) finds that the Chinese government selectively enforces land laws, allowing violations by wealthy

We seek to address this gap by providing evidence that mayors in Colombia allow violations of environmental regulations in return for campaign donations. Using a regression discontinuity design (RDD) on close elections run between politicians who receive contributions from private donors and politicians that fund their own mayoral campaigns, we estimate that deforestation between 2012 and 2015 almost doubles in municipalities that elected a donor-funded mayor compared to those that elected a self-funded mayor. The quasi-experimental nature of the research design means we can be confident that this effect is well-identified, overcoming concerns that differences in deforestation result, for example, from variation in enforcement capacity or differences in other pre-term municipal characteristics. As such, although we do not observe variation in enforcement by local mayors directly, the research design allows us to infer that differences in deforestation result from donor-funded mayors pursuing a politically-motivated model of enforcement.

Given existing evidence on campaign donations and contracting, a possible alternative channel is that the estimated effect of electing a donor-funded mayor on deforestation stems from an increase in the number or size of infrastructure contracts rather than a reduction in regulatory enforcement. Analyzing the effects of victory by a donor-funded politician on contracting outcomes provides some support for this idea, because the average value of infrastructure contracts is larger under donor-funded mayors. However, temporal trends show that increases in infrastructure contracting can only explain part of the estimated increase in deforestation. Instead, further analysis supports the interpretation that campaign contributions buy forbearance from enforcement of environmental regulations. First, unlike large-scale infrastructure projects, deforestation for cattle ranching and cultivation often makes use of aggressive and frequently illegal practices of clearance by burning. Using data from NASA's Fire Information for Resource Management System (FIRMS), we find a 32.9% increase in average fire intensity in donor-funded municipalities.

Second, and most compelling, we find that the effect of donor-funded mayors on deforestation is mitigated by the presence of alternative sources of environmental law enforcement. Specifically, exploring heterogeneous effects using pre-term municipal characteristics measuring the extent of protected National Parks (which are subject to higher central government monitoring than most forest areas), and the presence of and distance to offices of Colombia's regional environmental management institutions (Autonomous Regional Corporations, or CARs), we find that both dampen the effect of donor-funded mayors. Similarly, the effect is also attenuated by the number of offices

individuals developers connected to high-level political elites.

of the Comptroller General (*Procuraduría*) and the Attorney General (*Fiscalía*), which we take as additional proxies for the extent of state presence within the municipality. These results therefore suggest that tighter institutional oversight beyond that provided by mayors reduces the deforestation linked to the victory of a donor-funded politician. This fits with our claim that the estimated effect stems from mayors selling forbearance, turning a blind eye to illegal deforestation.

Third, we find that the activities of illegal armed actors affect the deforestation dynamics linked to the election of a donor-funded politician. While guerrilla groups such as the Revolutionary Armed Forces of Colombia (FARC) have often obstructed and attacked the business of local elites, paramilitary groups arose out of private security forces created by large landowners and cattle ranchers, and frequently act to protect and promote the interests of these local elites. Further exploring heterogeneous effects using pre-term measures of attacks by armed groups, we find that conflict between armed actors reduces the deforestation linked to the election of donor-funded mayors. However, we also find that while guerrilla attacks substantially lower the deforestation related to the victory of donor-funded politicians, attacks by paramilitary groups have no such impact.

These results are consistent with an interpretation in which the behaviour of local elites changes when the mayor is a donor-funded politician. As Holland (2016) notes, under a "political" enforcement model, government forbearance encourages more legal violations. As further explained in Section 3, Colombia's local elites have a long history of land appropriation and illegal expansion of the agricultural frontier. Our argument suggests that campaign donations create a connection between the elites and the ruling mayor, providing elites with a degree of protection when engaging in deforestation activities. As donor-funded mayors turn a blind eye to violations of environmental regulations, so elites are encouraged to commit further offences. This fits with the findings that electing a donor-funded mayor leads to greater deforestation, and to an increase in fire intensity. It is also consistent with the findings that the effect of electing a donor-funded mayor on deforestation is attenuated by the oversight of other enforcement institutions, and by violence from armed groups that have historically undermined the power of the local elites.

These results make at least three important contributions. First, they build upon and advance the literature on the influence of money in politics. Not only do campaign donations buy favourable legislation and access to preferential contracts, but they also buy the selective non-enforcement of

laws. Second, in this way the results also contribute to the literature on forbearance. As well as being used by politicians as a form of redistribution to win the votes of poor, forbearance can and is also sold to donors as a form of corruption. Although this type of forbearance as corruption may be familiar, we believe this paper is one of the first to contribute clear evidence of its operation in practice. And third, the findings make an important contribution to our understanding of the political dynamics of deforestation. In doing so, they have the potential to inform the design of better policies to deal with the urgent challenge of climate change.

The remainder of the paper is organised as follows: Section 2 discusses the literature on deforestation, campaign donations, and forbearance. Section 3 provides details of the Colombian context, focusing specifically on issues related to deforestation and environmental regulation, and on the role that campaign donations play in local elections. Section 4 describes the data, Section 5 discusses our empirical strategy, Section 6 presents the main results and the further analysis exploring possible mechanisms, and Section 7 concludes.

2 Deforestation, donations, and forbearance

Deforestation. Increasing awareness of the existential threat posed by climate change has created an urgency in efforts to understand its drivers. One key factor is deforestation, which is closely linked with global warming.[4] Forests capture up to 45% of terrestrial carbon and seize large amounts of carbon dioxide.[5] However, despite the importance of these ecosystems, they are being destroyed at alarming rates.[6] Limiting deforestation is therefore a vital step in the fight against climate change, and accurately understanding the causes of deforestation is crucial to these efforts. Existing research has highlighted activities such as cattle ranching, farming, logging, and urbanisation as leading causes of deforestation (Curtis et al., 2018; Houghton, 2012; Hosonuma et al., 2012). Understanding factors that influence the intensity with which these activities are undertaken is therefore critically important, as it allows for better decision-making and more suitable policy design to effectively manage and limit deforestation (see, for example, Prem et al., 2020).

[4] See https://www.nationalgeographic.com/environment/article/deforestation. Last accessed April 2021.

[5] Since 1990, forests have absorbed about 33% of the total human-caused carbon dioxide emissions, and are a fundamental component of the hydrologic cycle, which helps to cool the planet (Bonan, 2008, Pan et al., 2011).

[6] If deforestation-related emissions were considered as a country, they would be the third-largest emitter, only behind China and the United States. See https://www.wri.org/insights/numbers-value-tropical-forests-climate-change-equation. Last accessed April 2021.

One such factor is electoral competition, which has been argued to influence deforestation in contrasting ways. On one hand, it has been suggested that the mere existence of democracy limits deforestation. Li and Reuveny (2006) provide evidence that democratic regimes reduce deforestation, along with other forms of environmental degradation. This positive impact of democracy is seen to be the net effect of a variety of mechanisms, including increased access to information about environmental problems, the greater role of public opinion in policy making, and the aggregation and representation of interest groups. In contrast, Morjaria (2012) demonstrates that deforestation increased following the introduction of multi-party elections in Kenya in 1992, as districts loyal to the central government were allowed increased access to government forest land. Likewise, Sanford (2018) provides cross-national evidence that competitive elections are associated with increased deforestation. Specifically, he finds that countries which undergo a democratic transition lose an additional 1 percentage point of their forest cover each year, and that years with close elections have over 1 percentage point per year higher forest cover loss compared to non-election years. The argument underpinning this finding is that deforestation provides short-term, private benefits to voters that politicians exploit to win (re-)election.

Another factor influencing activities that contribute to deforestation is corruption. Focusing on the management of logging rules in Indonesia, Burgess et al. (2012) model the incentives that local bureaucrats and politicians face to allow more or less logging in their jurisdictions as a form of Cournot competition. Consistent with a process of rent maximisation by local officials, they provide evidence that logging increases with the sub-division of districts (which reduces the market power of officials), and decreases with the emergence of alternative sources of rents (measured by oil and gas revenues). Unlike work that emphasises the manipulation of deforestation to provide benefits to voters, the focus here is therefore on connections between local officials and firms.

Similarly, in research focusing on Brazil, Pailler (2016) also highlights the role of corruption in encouraging deforestation. Connecting the influence of corruption back to electoral competition, her argument suggests that corrupt politicians exploit forest resources to fund their re-election campaigns. This claim is supported with evidence from Brazilian municipalities demonstrating an increase in deforestation in election years when incumbent mayors are running for re-election, with the link between deforestation and re-election entirely accounted for by municipalities with highly corrupt incumbents. As with our own argument, therefore, Pailler (2016) acknowledges the potential link between deforestation and campaign finance. However, she argues that this is not

due to a reduction in enforcement, but instead to other activities such as granting licenses for firms or elites to engage in deforestation-related activities.[7]

Campaign donations. This type of argument connects deforestation firmly to the literature on the influence of campaign contributions. It is by now well-established that campaign donations can buy preferential treatment in the form of favourable legislation or privileged access to contracts or licenses. Although various studies have provided mixed evidence concerning the impact of campaign contributions on policy decisions, a meta-analysis by Stratmann (2005) lends strong support to the claim that contributions do affect legislative voting behaviour. This finding is consistent with theoretical models which hypothesise that politicians will grant policy favours in exchange for campaign donations.[8]

Moreover, recent evidence has demonstrated clear effects of campaign donations on preferential access to government contracts. Using data from Brazil, Boas et al. (2014) employ an RDD to identify the effect of an electoral victory on government contracts for a candidate's corporate donors, and find that firms specialising in public-works projects receive a substantial boost in contracts when they donate to a federal-deputy candidate from the ruling party. Employing a similar design to analyse data from Colombia, Ruiz (2017) provides evidence that the election of a donor-funded politician more than doubles the probability of donors receiving contracts. Using detailed contracting data to dig deeper into this relationship, Ruiz demonstrates that rather than being contracts for large infrastructure projects, preferential contracts to donors are assigned numerous times under a minimum-value modality where there is more discretion and less transparency over who gets a contract. Finally, linking campaign donations and deforestation more closely, Bulte et al. (2007) found that wealthy Latin-American farmers bribe local politicians with contributions to obtain rural subsidies that tend to be associated with low land productivity and excessive deforestation.

Forbearance as corruption. Tying these different strands of literature together, we argue that campaign donations can influence deforestation through a different channel: by purchasing forbearance from the enforcement of environmental regulations. Recent work on forbearance, or the selective non-enforcement of laws, has demonstrated its use by politicians as a form of redistribu-

[7] Pailler (2016) finds that environmental sanctions in election years actually increase in municipalities in which mayors run for re-election, but notes that in the Brazilian context this type of environmental enforcement is likely not subject to political manipulation because it is implemented by national-level actors. This is very different to the Colombian context that we study, as detailed in Section 3.

[8] For examples see: Snyder (1990); Baye et al. (1993); Ainsworth and Sened (1993); Austen-Smith and Wright (1994).

tion to win the votes of the poor (Holland, 2017). Alongside this more progressive form, however, forbearance can also be regressive in nature, with non-enforcement targeted to benefit wealthy individuals and elites. This type of regressive forbearance may be extended generally to broad classes of elite interests, as with the legal immunity afforded broadly to wealthy groups in Latin America (Méndez et al., 1999), or the reduced enforcement of industry-wide coal mining regulations in the United States (Gordon and Hafer, 2013). When made conditional on the provision of political support, however, this type of regressive forbearance represents a form of corruption. As Sun (2015) demonstrates, for example, land use laws in China have been selectively enforced to allow violations by wealthy individual developers who have connections to high-level political elites. Yet while this type of forbearance as corruption seems familiar, to date there is only limited evidence of its operation in practice, in part because it is hard to observe.

As we discuss in Section 3, local elites in Colombia have strong economic interests in activities such as cattle ranching and cultivation that represent a significant threat to forests. The pursuance of these interests is limited by environmental regulations designed to restrict deforestation, the enforcement of which is in part the responsibility of municipal authorities. It is therefore within the power of mayors, as the heads of municipal authorities, to reduce the extent of regulatory enforcement, to the benefit of local elites. We argue that they do so in return for campaign donations that fund their election to office. In Section 3 we describe the Colombian context in more detail, clarifying the drivers of deforestation, the institutional framework for enforcing compliance with environmental regulations, the incentives of local elites to flaunt these regulations, the role of money in municipal elections, and our subsequent expectations about the relationship between donations and deforestation.

3 Context

Deforestation in Colombia. Natural forest covers roughly two-thirds of Colombia's total surface area, an amount that includes about 10% of the Amazon rainforest. Part of this forest, equivalent to 17% of the country, is designated as protected area under the care of the National Parks administration, and as a result is subject to more stringent regulation and monitoring overseen directly

by the national government.[9] Yet as elsewhere in the world, deforestation is an increasing problem in the country. From 2001 to 2020, Colombia lost more than 4.6 million hectares of tree cover, equivalent to a 5.7% decrease in the total forest area since 2000 (Global Forest Watch, 2019).

As in much of Latin America, the most notorious driver of deforestation in the country is cattle ranching (FAO, 2006). Colombia has a long history of cattle production, being the fourth largest cattle breeder in the region and the seventh worldwide, and over 200 thousand hectares of forest are lost each year to pasturing.[10] Moreover, the impact of cattle ranching on deforestation has been accompanied by the deleterious affects of other activities such as mining, illegal logging and crop production, infrastructure development, and the growth of agro-businesses.

Deforestation in Colombia has also been affected in recent years by the country's shifting political environment. Following the December 2014 ceasefire between the Colombian government and the country's biggest illegal armed group, the FARC, deforestation rose in areas previously under FARC control (Prem et al., 2020). That this effect was greater in areas with lower state presence and more land-intensive economic activities highlights the important role that regulatory enforcement and activities such as cattle ranching play in deforestation.

Economic interests of local elites. Land-intensive activities of this type are key to the economic interests of Colombian local elites. Since colonial times, Colombian landlords have steadily increased their land ownership and consolidated their power through it (Fernandez, 2012; LeGrand, 1988), resulting in substantial inequality in land distribution. This inequality has been exacerbated by violent periods such as 'La Violencia' at the end of the 1940s, which resulted in massive forced displacement and land expropriation (Guzmán et al., 2010; Fernandez, 2012). Moreover, institutional efforts to change this unequal distribution of land have been instrumentalised by elites to appropriate large land extensions (Ibañez and Muñoz-Mora, 2010).

The unequal concentration of land is a key factor underpinning the lasting presence of illegal armed actors in Colombia. The foundation of guerrilla groups such as the FARC was justified in part by a desire to protect impoverished rural people, and as such these groups presented themselves as enemies of the local elites. In response, the rise of guerrilla groups paved the way for the introduction of Law 48 in 1968, allowing the creation of large private security forces used by

[9] See https://news.mongabay.com/2021/03/colombias-national-parks-at-a-crossroads-as-new-director-installed/. Last accessed June 2021.

[10] For details on the cattle industry in Colombia, see PROEXPORT (2010) and UNODC (2016).

wealthy landowners and cattle ranchers. These private security forces represented the precursors to far-right paramilitary groups, which frequently act to protect and promote the interests of local elites.[11] Central to these interests are activities that involve the intensive exploitation of land, such as cattle ranching and cultivation, which in turn are key drivers of deforestation.

Environmental regulatory institutions. The passage of Law 99 in 1993 created Colombia's National Environmental System (*Sistema Nacional Ambiental*, SINA), which governs the implementation of a set of general environmental principles.[12] Under SINA, the Ministry of Environment is charged with leading and coordinating environmental management, but the key institutional actors responsible for implementing environmental policy in Colombia are the CARs. As independent corporate entities endowed with fiscal and administrative autonomy, CARs have broad responsibility for managing natural resources and promoting sustainable development within their territories. This remit therefore includes, among a wide range of duties, the granting of any required environmental concessions, permits or licences, overseeing activities involving both renewable and non-renewable natural resources, collecting fees and tariffs for the use of renewable resources, and imposing sanctions when environmental protection norms are violated.

The CARs have a three-tiered governing structure, consisting of a corporate assembly, a board of directors, and a director general. As the main administrative authorities of CARs, the boards of directors are composed of representatives from the central government, the state governments, the private sector, local environmental NGOs, delegates from ethnic communities, and up to four mayors elected by the corporate assembly. CAR revenue for environmental management comes from taxes on electricity generators as well as from a proportion of the municipal property tax. At the initiative of the mayor, municipal councils must transfer between 15% and 26% of the municipal property tax to the CAR each year.

Despite the CAR's jurisdiction over the nation's natural resources, their ability to maintain oversight and enforce regulations is often insufficient (Montes Cortés, 2018). Hence, other institutional actors also play a significant role in environmental protection. The national government, through the Ministry of Environment, the Department of Planning, and the army, have often played

[11] Insight Crime further connects elites and armed groups, and how they were instrumentalised to gain power and land. See https://es.insightcrime.org/investigaciones/elites-crimen-organizado-colombia-introduccion/. Last accessed April 2021.

[12] Detailed information on the structure and responsibilities of environmental regulatory institutions in Colombia is provided by Blackman et al. (2006).

an essential role in protecting Colombia's natural habitat. Moreover, local governments at both the department and municipality levels are required under Law 99 to support CARs and to implement national environmental policy within their territories. In this way, municipalities play a crucial role in monitoring and enforcing environmental regulations.

Under the Constitution, mayors represent the foremost policing authorities within their municipalities, and are responsible for supervising the National Police assigned to the area under their jurisdiction. This includes the specialized Environmental and Natural Resource Police unit created to assist territorial authorities with the enforcement of environmental laws.[13] Furthermore, under Law 99, municipal governments have various mechanisms to enforce environmental laws, including the imposition of sanctions, the suspension of environmental licenses, permits, or concessions, and the power to close or demolish businesses and seize products or equipment. As a result, not only do mayors have significant responsibilities with regards to the enforcement of environmental regulations, but they also have substantial powers at their disposal in order to meet these responsibilities.

Colombian Local Elections. Mayors in Colombia have been directly elected since 1986, as part of a long history of economic and political decentralisation policies. Prior to that time, mayors were appointed by departmental governors, who were themselves appointed by the president. Mayors are elected via a first-past-the-post system for a single four-year term.[14] In Colombia, mayoral election campaigns are not cheap. For the 2015 municipal elections, the total amount spent on mayoral campaigns was more than 238 billion pesos (about 82 million US dollar at the time), equivalent to 71% of the nation's entire science and technology budget (MOE, 2018.).

Despite this high cost, public resources available for local election campaigns are scarce, and campaigns are primarily financed by personal or family resources and private donations (Ruiz, 2017). Furthermore, campaigns are frequently highly competitive, and there is evidence of a strong correlation between campaign spending and the probability of victory (Gulzar et al., 2020). Consequently, candidates have strong incentives to secure private contributions.

Colombia has a comprehensive legal framework governing political finance, which imposes limits on total election expenses as well as on private campaign donations. The maximum private con-

[13] Mayors also have a duty to procure sufficient resources for fire services within their municipalities, in part to stop forest fires from expanding and mitigate illegal deforestation. See https://www.procuraduria.gov.co/portal/Procuradora-apropiacion-recursos-servicio-bomberos.news. Last accessed June 2021.

[14] While mayors may not serve consecutive terms, they may be reelected to non-consecutive terms.

tribution from individuals and legal entities is limited to 10% of the sum of private funding raised by the candidate. Meanwhile, the total amount is bounded according to the limit set for each election by the National Electoral Commission, with discontinuous jumps based on the number of registered voters. Not only is money an important driver of success in mayoral elections, but there is strong evidence demonstrating the value of mayoral campaign contributions to donors. As noted in Section 2, Ruiz (2017) demonstrates that the election of a donor-funded politician more than doubles the probability of donors receiving municipal contracts.

Mayors in Colombia play an essential role in contracting within their municipalities. Mayors have discretion over around 20% of all spending within their territories, with resources from property tax revenues funding the provision of a range of services including education, healthcare, water, and sanitation. Some of the activities undertaken under the purview of these contracts, especially where they involve infrastructure provision such as the construction and extension of roads, are likely to result in deforestation and other forms of environmental degradation.[15] We explore this empirically in Section 6. But given the strong economic interest that local elites have in land-intensive activities such as forest clearance and cattle ranching, and the crucial role that mayors play in the enforcement of environmental regulations that place limits on such activities, our central argument is that campaign donations also purchase forbearance. In return for campaign contributions, mayors turn a blind eye to the illegal exploitation of land, thereby facilitating deforestation.

4 Data

We combine data from various sources and build a municipality-candidate level dataset to study the effect of a donor-funded politician victory on deforestation. We focus on the 2011 mayoral election results and the government term from 2012 to 2015. In this section, we further explain our data sources and overall data structure and transformations.

Election results and campaign donations. Our electoral and campaign contributions data comes from Ruiz (2017). This dataset contains detailed data on both election results and campaign contributions received by candidates. The electoral information in the dataset originally

[15] Examples of such contracts in the data that employ include works to the road connecting the municipality of Regidor with the township of San Cayetano, the improvement of rural roads in San Jose del Guaviare, and optimization of the multiveredal aqueduct of Jardin.

comes from Pachón and Sánchez (2014), who gathered the results for mayoral elections for all Colombian municipalities reported by the Registraduría Nacional del Estado Civil, the Colombian electoral authority. Meanwhile, the campaign contributions data was collected by Ruiz from the numbers reported by the National Electoral Commission on the sources of income and campaign expenditures.

As shown by Ruiz (2017), this data is highly reliable, with low incentives to misreport or lie. Political parties were obliged to electronically submit the information on the sources and amounts of expenditure related to political campaigns and then, within one month after the elections, to provide physical evidence corroborating the previously reported data. Moreover, during the 2011 elections, the Electoral Commission had the power to penalize candidates with fines. This generated high compliance, with 89% of the information reported (Ruiz, 2017). The commission was later stripped of this sanctioning power, limiting the information delivery compliance for the subsequent 2015 electoral period.[16] Due to the absence of effective enforcement for 2015, therefore, we focus on the 2011 elections.[17]

Out of the 1,080 municipalities that elected mayors in 2011, our sample is restricted to the 996 municipalities where the top two candidates reported their campaign financing. This data structure allows us to implement an RDD around the margin of victory of the candidates. To gain leverage over the comparison between donor-funded and self-funded mayors, we focus on the 408 races decided between a candidate who was a recipient of private donations and a competitor who received no such contributions. These races are arguably representative; they are spread across the country's territory, and the municipalities in the sample do not present statistically different characteristics compared to those that are excluded.[18]

Deforestation. Our measurement of deforestation comes from the Global Forest Change dataset collected by Hansen et al. (2013). This data results from the analysis of LANDSAT's images to identify the change in forest cover from 2000 to 2020, taking advantage of remote-sensing techniques. These data, comprising pixels of 30 meters by 30 meters (approximately), have been widely used in related literature to measure deforestation (Prem et al., 2020; Zhu et al., 2016; Nepstad et al.,

[16] After analysing the 2015 funding data, we found evidence of manipulation. We speculate that this is due to significant under-reporting from non-winning candidates.

[17] The campaign finance reporting system was introduced in 2009, meaning that we are unable to analyse elections prior to 2011 due to the absence of data on campaign donations.

[18] Ruiz (2017) shows the contested municipalities are not regionally clustered and instead follow a random geographical distribution.

2014).

Tree cover is defined as vegetation taller than 5 meters and is coded as a percentage per output grid cell. We adopt a definition that considers any pixel with a tree cover superior to 50% of its surface as forest. Hence, deforestation is a pixel change from the status of forest to non-forest. This data is aggregated to the municipal level. Using the baseline coverage levels and the yearly tree-cover loss and gain for each municipality, we recover the yearly coverage in each municipality, allowing us to calculate our deforestation measure.[19] Our primary deforestation variable is defined as the negative of the change in forest area in the municipality during the mayor's term relative to the municipality tree cover in the year before the new mayor's mandate, as follows:

$$\text{(Relative) Deforestation in term} = \frac{-\Delta Coverage_{\text{government term}}}{Coverage_{\text{election year}}}. \tag{1}$$

We calculate the deforestation measure for the 2011 election (2012-2015 government term) and the previous election, the 2007 election (2008-2011 government term). Furthermore, we also calculate an alternative version of the deforestation measure relative to the year 2000.[20] Figure 1 shows that deforestation was a broad phenomenon across the country during the period that we study. Moreover, deforestation was rapidly consuming the country's tree cover. As shown in Table 1, the 1,080 municipalities that elected a mayor in 2011 lost on average almost 1.2% of their tree-cover during the period of the subsequent mayoral term (2012-2015).

Additional data. We employ several data sources for further analysis. Since illegal deforestation is often undertaken using aggressive fire clearance, we use data from NASA's Fire Information for Resource Management System (FIRMS) to track fires during the study period.[21] Additionally, we use detailed data on contracting to investigate whether the estimated effect of donor-funded candidate victory on deforestation results from an increase in contracting. Contracts data comes from the SECOP system, which collects information in all government contracts and is available online to increase transparency. In addition, to evaluate whether the estimated effects of donor-funded mayors are mediated by the presence of illegal armed groups we make use of the violent

[19] The yearly coverage is obtained as $coverage_t = coverage_{2000} + \sum_{i=2001}^{t}(gain_i - loss_i)$.

[20] The main results are robust to this change in the relative year and are available upon request.

[21] We acknowledge the use of data and/or imagery from NASA's Fire Information for Resource Management System (FIRMS) (https://earthdata.nasa.gov/firms), part of NASA's Earth Observing System Data and Information System (EOSDIS).

events data collected by Restrepo et al. (2004) and updated by Universidad del Rosario until 2014.[22]

Alongside the aforementioned data, we use a set of municipal-level covariates. Our primary source for this is the data collected by Universidad de Los Andes and their Center For Economic Development Studies.[23] This dataset contains a broad array of socio-economic variables, including fiscal performance, demographic, and geographical measures.

5 Empirical Strategy

If campaign donations do buy forbearance from environmental regulations designed to limit deforestation, we should expect to see a higher level of deforestation in municipalities in which donor-funded mayors are elected. However, the victory of a donor-funded candidate is plausibly correlated with a broad range of municipal characteristics, including enforcement capacity. Moreover deforestation itself may be determined by several additional municipality characteristics. For example, larger municipalities are likely to have more resources and a higher economic activity leading to higher deforestation. Due to these identification problems, a straightforward comparison of deforestation across municipalities that elect donor-funded mayors and those that elect self-funded mayors may be confounded by the effect of different local characteristics.

To overcome these problems we employ a quasi-experimental Regression Discontinuity Design (RDD). Using margin of victory as the running variable, we take advantage of the discontinuous change between victory of a donor-funded as opposed to a non-donor-funded mayor at the threshold between the donor-funded politician's victory or loss. This then defines the treatment rule:

$$L_i = \begin{cases} L_i = 1 & \text{if } x_i > 0 \\ L_i = 0 & \text{if } x_i < 0 \end{cases} \tag{2}$$

where x_i reflects margin of victory for the donor-funded politician, and L_i represents treatment status, as a dummy variable taking the value of one (1) if a donor-funded politician was elected (i.e. won the race).

[22] See Prem et al. (2021) for more details about this data.
[23] Please refer to Acevedo and Bornacelly (2014).

Following this, our main analysis estimates a regression of the form:

$$y_i = \alpha + \beta_1 L_i + \beta_2 f(x_i) + \beta_3 L_i \times f(x_i) + \varepsilon_i \tag{3}$$

Here y_i is the outcome, measured as the change in deforestation during the elected mayor's term in office. The coefficient of interest is therefore β_1, our estimate of the effect of electing a donor-funded mayor on deforestation. $f(x_i)$ is a polynomial, either linear or quadratic, in the donor-funded politician margin of victory. Finally, ε_i corresponds to the idiosyncratic error term.

Notice that by employing this method, we are not estimating the effect of donations themselves, but rather the effect of the type of politician that receives campaign donations. To correctly estimate the coefficient of interest β_1, which captures the change in deforestation linked to the election of a donor-funded politician, requires us to make two key assumptions. First, there should be no manipulation of the electoral results around the cutoff; in other words, it should not be the case that donor-funded politicians constantly win by a small margin. Second, covariates potentially correlated with the treatment and the outcome variable must vary smoothly around the threshold, such that the estimated effect only reflects the discontinuous change in deforestation related to the candidate's source of funding.

In order to evaluate the identifying assumptions we first check for systematic manipulation of electoral results around the threshold. Using the Cattaneo et al. (2018) manipulation test based on density discontinuity we find no statistically significant evidence of systematic manipulation.[24] Results are presented in figure 2. Second, we test whether other covariates jump discontinuously at the cutoff. As shown by the results presented in Table 2, we find that there is no discontinuity of covariates at the cut-off, suggesting that municipalities are similar except in the treatment status.

Following best practice (Cattaneo et al., 2020), we estimate the RDD specified in equation 3 non-parametrically using a polynomial of order one, and weight observations according to their distance to the cutoff using triangular kernel weights.[25] Additionally, we employ an optimal data-driven bandwidth selection procedure that minimises the asymptotic mean square error (MSE). This method allows for the selection of a bandwidth that accounts for the trade-off between efficiency and bias. In other words, the technique minimising MSE achieves a bandwidth large enough to avoid

[24] Similar results are found using the McCrary (2008) test for sorting around the threshold.
[25] The appendix presents results using a quadratic polynomial.

imprecise estimates due to small sample size, but also small enough to guarantee that municipalities around the cutoff are comparable, without discontinuous variation in their characteristics at the cutoff (Lee and Lemieux, 2010). However, since MSE bandwidths produce non-robust confidence intervals, we follow Cattaneo et al. (2020) and estimate robust standard errors and confidence intervals but report conventional point estimates within the MSE optimal bandwidth.

Finally, in further exercises we perform parametric estimations, including additional interactions, with the aim of capturing possible heterogeneous effects. In these we estimate the RDD parametrically within the MSE optimal bandwidth sample, using an OLS regression weighted by a triangular kernel, and controlling for a linear polynomial.

6 Results

6.1 Main effects

Figure 3 graphically presents the main estimate of the effect of electing a donor-funded mayor on deforestation. The graphs in the left and right panels depict the estimates using linear and quadratic polynomial approximations, respectively. We find a clear discontinuous jump in deforestation around the threshold of victory determining a donor-funded mayor. Moreover, the jump is statistically significant for both the linear and quadratic approach. What this result implies is that the amount of deforestation that occurs in a municipality during a donor-funded mayor's term in office is significantly higher than that during the term of a self-funded mayor.

Table 3 summarises the impact in greater detail. As previously stated, our coefficient of interest displays the additional effect on deforestation of electing a donor-funded mayor compared to a self-funded one. The estimates in Columns 2 and 4 also include the measure of deforestation for the previous term, 2008-2011. Despite the fact that prior deforestation varies smoothly around the cutoff, as shown in the lower panels of Figure 3, we employ this measure as a robustness check and improve the precision of the estimates (Lee and Lemieux, 2010). The estimates are positive and significant across all specifications. Results are robust to selecting a linear or quadratic polynomial, as well as to the inclusion of the measure of deforestation during the previous term. Overall, the effect of electing a donor-funded politician is substantial. The increased deforestation

related to a donor-funded mayor's election represents 91.7% of the self-funded average for the linear specification. The effect size remains reasonably stable across specifications, ranging between 58.3% and 108.3% of the self-funded average.

Finally, in Figure 4 we explore the resilience of the results to variation in bandwidth size. Following best practice, we report the results for a range of bandwidths around the MSE optimal bandwidth, from half to double the size. Overall the results are encouraging, with the effect remaining robust to a considerable range of bandwidths. It is not surprising that the results do not hold for very small bandwidths, for which the estimates are unlikely to have sufficient power. However, the effect remains reassuringly robust up to bandwidths of 0.08, where the races are far less competitive and the municipalities not as comparable.

Overall, these main effects provide compelling evidence that deforestation in Colombia increases in municipalities that elect donor-funded mayors. Not only is this effect robust, but it is also large. As previously mentioned, we find that the sampled municipalities are highly comparable, without statistically significant differences in their characteristics nor deforestation trends before the election. These results lead us to believe that the differential increase in deforestation is due to victory by donor-funded politicians. This in itself is an important finding. Deforestation is a key driver of climate change, and efforts to limit it are key to long-term environmental sustainability. Consequently, evidence such as this, which highlights political determinants of deforestation, are crucial to the formulation of effective environmental protection policies. Nevertheless, it is important to go further and attempt to understand the mechanisms underlying this effect.

6.2 Mechanisms

There are two channels through which the election of a donor-funded mayor could result in greater deforestation: contracting and forbearance. These channels are not mutually exclusive. Indeed, as the example of the Calamar-Miraflores road highlights, they may operate hand-in-hand, with contracts for higher value and more ambitious infrastructure projects being accompanied by the selective non-enforcement of environmental regulations pertaining to the ensuing construction work. Nevertheless, we dig deeper into the results in order to explore the extent to which each is driving the estimated effects. First, if increased deforestation results from preferential contracting, we should observe a temporal sequence whereby any impact of electing a donor-funded mayor on contracting

precedes its effect on deforestation. Breaking down the effects over time provides some support for this mechanism, but also shows that contracting can only partially explain the main effects that we estimate. Second, although we cannot observe forbearance by mayors directly, we explore three pieces of evidence to investigate whether the remainder of the effect is driven by selective non-enforcement: (1) fire intensity, (2) the conditional impact of alternative formal enforcement institutions, (3) the conditional impact of illegal armed groups that serve as informal enforcement actors. All of the results support our central claim that campaign contributions are used, at least in part, to purchase forbearance from environmental regulations.

6.2.1 Contracting

Breaking down the main result, Table 4 presents estimates of the effect of electing a donor-funded politician on deforestation by each year of the four-year mayoral term. We find that the positive effect is significant in all but the third year, and intensifies during the final year of the mayor's term in office.[26] Although the estimated coefficient is substantially greater in magnitude for the final year, when considered in comparison to the average for self-funded mayors the difference is somewhat less stark. For the first year of government, deforestation in municipalities with a newly elected donor-funded mayor is about 92.4% higher vis-a-vis municipalities that elected self-funded mayors, while for the last year it is 107.7% higher.[27]

Interestingly, although the increase in deforestation in the last year of government is consistent with findings from existing literature on deforestation and elections, that work has predominantly focused on reelection settings. Therefore, while reelection incentives are often invoked in explanations of electoral cycles in deforestation, no such incentives can explain the temporal trends that we observe in the context of Colombian mayoral elections, where reelection is not possible. Instead, the increase in the estimated effect in year four could follow from contracting, if donor-funded mayors increase access to government contracts during their terms in order to reward their campaign donors.

[26] Interestingly, when implementing a non-parametric differences-in-differences for all 408 municipalities where the top two candidates are a donor-funded and a non-donor-funded politician, we also find a large and significant increase in deforestation for the last year of the term, despite not finding effects for the previous years. We do however see an upward trend in deforestation across the years. The results are summarised in Figure A3.

[27] Similar results hold if we use a quadratic polynomial, although the relative effect size is more consistent across years one to three and then greater in year four (see appendix Table A1).

It is useful to note here that this evidence suggests already that the estimated effect of electing a donor-funded mayor on deforestation is not solely due to the contracting channel, because the effect appears in the first year immediately following election. The contracting channel expects that donor-funded mayors reward their donors with increased or preferential access to government contracts, such as infrastructure construction or mining concessions, the work from which in turn results in deforestation. It is therefore unlikely that deforestation in year one derives from this channel, since insufficient time would have passed for contacts to have been awarded and environmentally harmful work to have commenced. We explore this further by directly investigating the effect of electing a donor-funded mayor on contracting outcomes.

One of the largest state-related sources of deforestation is the construction of infrastructure projects, so we start by testing whether there is a differential increase in the number and average value of infrastructure contracts. Table 5 present our results. We find no evidence that donor-funded mayors take on more infrastructure projects. However, the election of a donor-funded mayor is related to an increase in the average value of infrastructure contracts, with the estimated effect corresponding to an increase of 139% over the average value of infrastructure contracts in municipalities electing self-funded mayors. We also test for differences in contracts for mining and environmental work, both of which are likely to be related to deforestation. Again the results are presented in Table 5. We find no significant differences in the number or average value of mining or environmental works between municipalities electing self-funded and donor-funded mayors.

The contracting channel implies a temporal sequence whereby an increase in contracting precedes the rise in deforestation. To explore this we analyse the impact of electing a donor-funded politician on the increase in the average value of infrastructure contracting by each year of the mayoral term. The results presented in Table 6 show that the increase in the average value of infrastructure contracts takes place in the third year of government. Although the estimated coefficient is positive in all years, it is only significant in year three, and is substantially larger in that year relative to all other years. Taking into account the larger magnitude of the estimated effect on deforestation in year four (see Table 4), this finding is consistent with the claim that donor-funded mayors contribute to deforestation in part by awarding larger or more ambitious contracts for infrastructure projects.

Given the implied temporal sequence of the contracting channel, however, even if the increase

in average value of infrastructure contracts leads to an increase in deforestation, this would only explain the estimated effect of electing a donor-funded mayor on deforestation after the third year of the mayoral term. Moreover, it is worth noting that contracts awarded to campaign donors have been found to involve significant over-costs, involving a price premium of between 1.7 to 2.2 times the local average monthly wage compared to identical contracts awarded to non-donors (Ruiz, 2017). Such over-costs suggest that the increased average value of infrastructure contracts awarded in municipalities electing donor-funded mayors may not actually result in larger or more ambitious infrastructure projects of the type that could induce greater deforestation, but instead may simply increase the cost of similar projects to those undertaken in municipalities run by self-funded mayors.

These findings therefore suggest that the contracting channel does not fully account for the overall effect, not least because we estimate significant and substantial effects of electing a donor-funded mayor on deforestation in years one and two also. We argue that these effects result instead from a forbearance channel, whereby donor-funded mayors reward their donors with selective non-enforcement of environmental regulations. Moreover, we might (quite reasonably) assume that this forbearance persists over the mayoral term, further reducing the share of the overall effect that can be attributed to the contracting channel.

6.2.2 Forbearance

We interpret the large part of the main effect that cannot be explained through the contracting channel as resulting from forbearance. One of the challenges with empirically substantiating claims about forbearance is that it is often difficult to observe directly. A key benefit of the RDD that we employ is that, given balance on pre-term municipal characteristics across the municipalities electing self-funded as opposed to donor-funded mayors, we can be confident that the observed differences in deforestation do not result from variation in enforcement capacity.[28] However, the problem remaining is that we observe the outcome, deforestation, rather than directly observing compliance with or enforcement of environmental regulations. Our approach is therefore to consider and explore the different possible mechanisms through which electing a donor-funded mayor could result in higher deforestation.

[28] A useful alternative approach to identify regulatory manipulations and distinguish forbearance from state weakness is the method of "enforcement process tracing" proposed by Bozçağa and Holland (2018).

Having established that only part of the estimated effect can plausibly result from differential contracting practices, we consider a series of further implications of the forbearance mechanism. First, that illegal deforestation is more likely to be accompanied by fires. Second, that selective non-enforcement of environmental regulations by mayors should be offset by the presence of alternative formal enforcement institutions. And third, that selective non-enforcement should be offset by the presence of informal enforcement actors. Although ideally we would observe forbearance directly, taken together, evidence of these further implications provide strong support for our interpretation that increased deforestation following the election of donor-funded mayors results in large part from forbearance granted to their donors.

Fires. In Colombia and elsewhere, the use of fires is common practice to clear forest areas for cattle ranching and cultivation.[29] This is a dangerous and environmentally harmful practice that is regulated by the law. Moreover, intensive fire clearance practices are much more likely to be employed for illegal land grabbing linked to cattle ranching and cultivation than for government-contracted infrastructure projects. Therefore, using data from NASA's Fire Information for Resource Management System (FIRMS), we check for an increase in the intensity of forest fires in municipalities governed by donor-funded mayors. A differential increase in fire intensity would be a strong indicator of unregulated land exploitation through the more aggressive usage of environmentally harmful fire clearance.

Following the same RDD approach described above, we test for a discontinuous jump in fire intensity, measured as average fire brightness, when a donor-funded mayor is elected. Table 8 presents results that are consistent with our interpretation; we find an increase in average fire intensity of 32.9% when a donor-funded mayor is elected relative to a self-funded victory. The results are robust to selecting a linear or quadratic polynomial (Table A6), and hold across a range of bandwidths (Figure A2).

Interestingly, when the estimates of fire intensity are broken down by year of mayoral term, the effect is concentrated in the final year (see Table 9). This behaviour may be consistent with an increase in illegal deforestation towards the end of the term due to the potential increased risk of punishment in the future under a new mayor. Indeed, this fits with additional evidence that munic-

[29] See for example, https://news.mongabay.com/2019/09/as-the-amazon-burns-colombias-forests-decimated-for-cattle-and-coca/ and https://theecologist.org/2020/aug/17/deforestation-colombia. Last accessed June 2021.

ipalities electing donor-funded mayors see a significant increase in the registration in the chamber of commerce of agro-cattle firms, which are known for the use of fire clearance practices, and that this effect is concentrated in the final year of the mayoral term (Tables A8 and A9).[30] Moreover, and importantly, it suggests that the increase in deforestation in the final year of the mayoral term (as shown in Table 4) is not solely due to an increase in the average value of infrastructure contracts.

Alternative formal enforcement institutions. If it is the case that donor-funded mayors turn a blind eye to their donors' illegal deforestation activities, we should also expect the effect of donor-funded mayors on deforestation to be mitigated by the presence of alternative sources of environmental law enforcement. Where other enforcement institutions are present, selective non-enforcement by mayors should determine deforestation levels to a lesser extent. To investigate this expectation we look primarily at whether the effect of electing a donor-funded mayor is conditional on either of two alternative enforcement institutions: the CARs and the National Parks administration. In addition, we also test whether the main effect is attenuated by the number of offices of the Comptroller General (*Procuraduría*) and of the Attorney General (*Fiscalía*), which we take as additional proxies for the extent of state presence within the municipality. Importantly, all of the measures capturing the presence of these alternative formal enforcement institutions vary smoothly at the cutoff, as shown in Table 2.

As detailed in Section 3, part of Colombia's natural forest is designated as protected area under the care of the National Parks administration, and as a result is subject to more stringent regulation and monitoring overseen directly by the national government. This means that in areas designated as National Parks, responsibility for enforcement of environmental regulations falls less heavily on local municipal officials. In column 1 of Table 7, we present results from an analysis in which we interact the variable capturing victory by a donor-funded politician with a measure of the amount of area in square kilometres designated as National Parks in the municipality. Consistent with our interpretation, the estimated coefficient on the interaction term is negative and significant, indicating that an increase in the amount of National Parks area within a municipality reduces the additional deforestation linked to electing a donor-funded mayor.

Section 3 also contained details of the significant role that CARs play in monitoring and enforc-

[30] For reports on the use of fire clearance by agro-businesses, see for example: https://www.eltiempo.com/vida/medio-ambiente/opinion-480690, and https://es.mongabay.com/2019/07/incendios-norte-amazonia-deforestacion-colombia/. Last accessed June 2021.

ing environmental regulations across Colombia. While CARs delegate much of this responsibility to territorial governments, their own offices still play an important role in enforcement. As a second test of the effects of alternative enforcement institutions, therefore, we study how the presence of and distance to CAR offices condition the effects of victory by donor-funded mayors on deforestation. Columns 2 and 3 in Table 7 show estimates where the indicator of victory by a donor-funded politician is interacted with a dummy for the presence of at least one CAR office in the municipality, and with the distance to the closest CAR office from the centroid of the municipality, respectively. Once again, the results support the forbearance channel. The presence of CAR offices significantly diminishes the effect of a donor-funded victory on deforestation. Meanwhile, the greater the distance to the CAR offices, the greater the increase in deforestation when a donor-funded politician is elected.

Finally, while National Parks administration and CARs represent alternative institutions with specific responsibilities for environmental regulatory enforcement, we also explore whether the main effects are conditional on two other measures of state presence. In particular, we consider the number of offices of the Comptroller General (*Procuraduría*) and of the Attorney General (*Fiscalía*), as additional proxies for the extent of state presence within the municipality. As shown by the results in columns 4 and 5 of Table 7, the coefficients on the interaction terms between both of these additional measures and the indicator for victory by a donor-funded politician are negative and significant. These findings therefore add further weight to the idea that the presence of alternative formal enforcement institutions mitigate the extent of forbearance.

Informal enforcement institutions. The ultimate winners of the increased deforestation in our preferred interpretation would be landowners and cattle ranchers, who exploit land with greater intensity when a donor-funded mayor is elected. The activities of these local elites have been traditionally affected by the history of internal conflict in Colombia. As such, we posit that an additional source of alternative regulatory enforcement comes from informal institutions, in particular illegal armed groups.

As discussed in Section 3, the lasting presence of illegal armed actors in Colombia is closely connected to conflict over land, with the actions of guerrilla groups such as the FARC often justified by a desire to push back against inequality exacerbated by land expropriation by local elites. Moreover, and partly in response, far-right paramilitary groups have frequently acted to protect

and promote the economic interests these elites. Given the history of violence in the country, therefore, we consider these armed groups as representing informal institutions for the enforcement of environmental protection. Specifically, because guerrilla groups have often obstructed and attacked the business of local elites, we expect that the presence of such groups should serve to limit illegal deforestation by local elites, thereby offsetting selective non-enforcement of environmental regulations by donor-funded mayors. The presence of paramilitary groups, on the other hand, should have no such effect.

Taking attacks by these two different types of illegal armed group as a proxy for their presence in a municipality, we study how acts of violence by each type of group affects our main result. As with the formal institutions, the measures capturing the presence of these informal enforcement institutions also vary smoothly at the cutoff (see Table 2). Table 10 therefore presents the estimated effects of the impact of a donor-funded politician on deforestation, conditional on the number of attacks in the municipality. In column 1 attacks are by paramilitary groups, and in column 2 they are by guerrilla groups. The results are consistent with the historical alignment of these armed groups with local elites. While attacks by guerrilla groups mitigate the increase in deforestation linked to a donor-funded victory, paramilitary attacks have no such impact. Taking attacks by guerrilla groups as a proxy for the presence of informal institutions providing checks on illegal deforestation by local elites, therefore, these findings provide further evidence in support of the forbearance mechanism.

7 Conclusions

The type of politicians that get elected matters; we provide evidence that in Colombia, the election of mayors who rely on campaign donations significantly increases deforestation within their municipality. In line with existing literature on the impact of money in politics, we show that this may be due in part to differential contracting practices. Specifically, the average value of infrastructure contracts increases with the election of a donor-funded mayor. But temporal dynamics demonstrate that the more standard contracting story only provides a partial explanation for the effects that we estimate. Instead, we provide evidence that campaign donations also influence deforestation through another channel: forbearance. Donor-funded mayors turn a blind eye to activities resulting in illegal deforestation in return for campaign contributions. Using a RDD gives us confidence

that the estimated effect of electing a donor-funded as opposed to a self-funded politician on deforestation is causal. This finding is important in itself, because it provides clear, well-identified evidence of the political dynamics affecting deforestation, a central driver of environmental degradation and climate change. One key benefit of the RDD here is to rule out the possibility that this variation is due to differences in institutional enforcement capacity across municipalities. Disaggregating by year of office shows that this effect is present across the mayoral term, and that differential contracting practices can only explain the effect observed in the final year, and even then only partially so. We argue that the remainder of the overall effect results from the selective non-enforcement of environmental regulations by mayors looking to reward their donors.

Although we cannot observe enforcement by mayors directly, we present a range of additional evidence consistent with this interpretation. First, because illegal deforestation frequently makes use of aggressive fire-clearance practices, we show that fire intensity is significantly higher in municipalities that elect donor-funded mayors. Second, we demonstrate that the effect of victory by a donor-funded politician on deforestation is attenuated by the presence of alternative formal enforcement institutions (which are beyond the mayor's control). Finally, we show that the effect is also mitigated by the presence of illegal armed groups that serve as informal enforcement actors. Taken together, this range of evidence supports our interpretation that campaign donors in Colombia purchase regulatory non-enforcement by mayors, allowing them to exploit land in a way that increases deforestation. Although the available evidence is compelling, future work could usefully seek to bolster these findings with qualitative evidence garnered through enforcement process tracing (Bozçağa and Holland, 2018).[31]

The findings make a number of important contributions. First, they advance the literature on the influence of money in politics, by moving beyond a focus on favorable legislation and preferential contracting to acknowledge that campaign donations may also influence regulatory enforcement. In doing so, they contribute to the burgeoning work on forbearance by providing clear evidence of its use as a form of corruption. And finally, the findings increase our understanding of the political dynamics of deforestation, and of environmental degradation more broadly. This matters, because learning how political competition and incentives influence the implementation of environmental regulations is vital if we are to effectively counter the challenge of climate change.

[31] Unfortunately, there are few successful prosecutions of mayors in Colombia since there are only two known cases of Mayor's who have been sanctioned due to deforestation.

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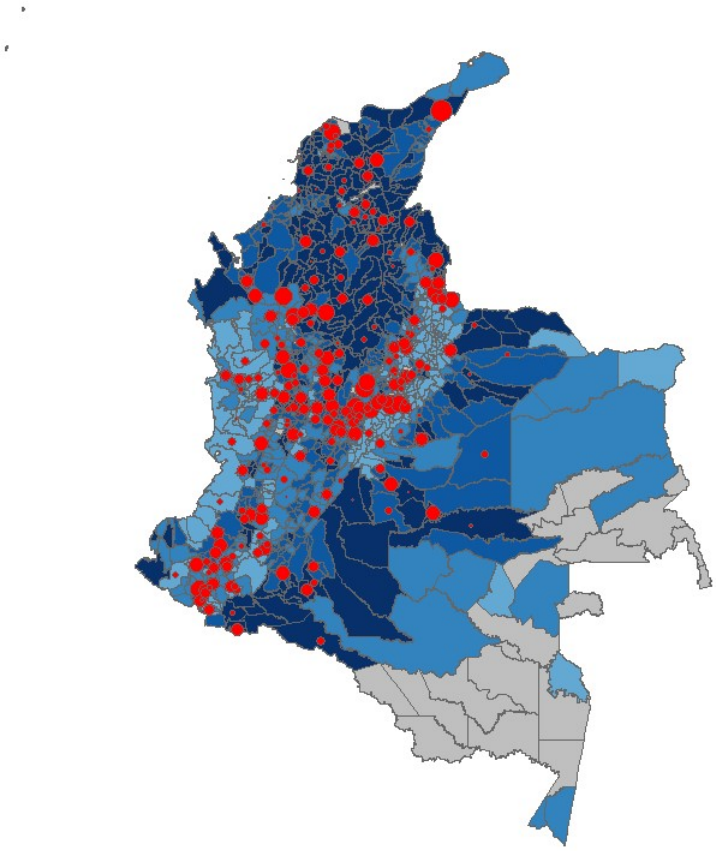
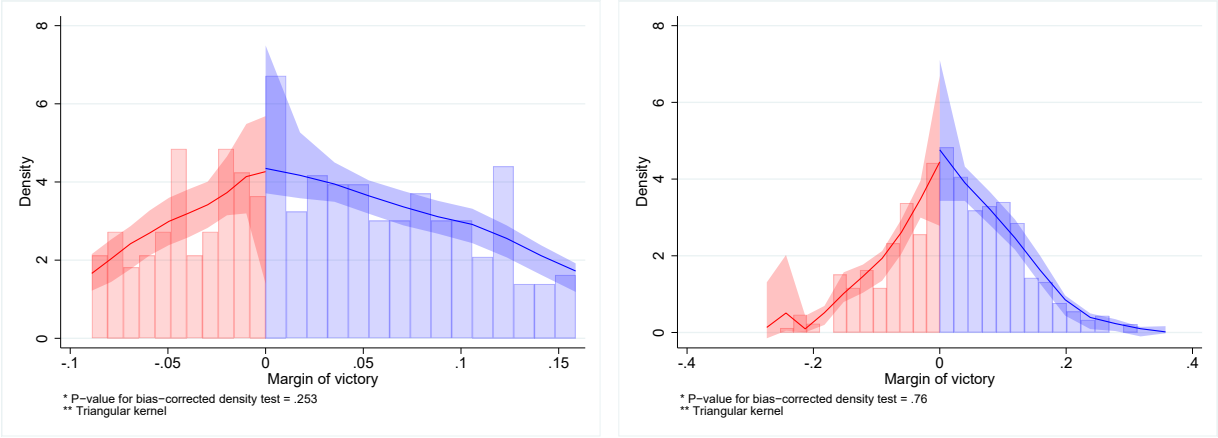
Figure 1: Deforestation during term by municipality



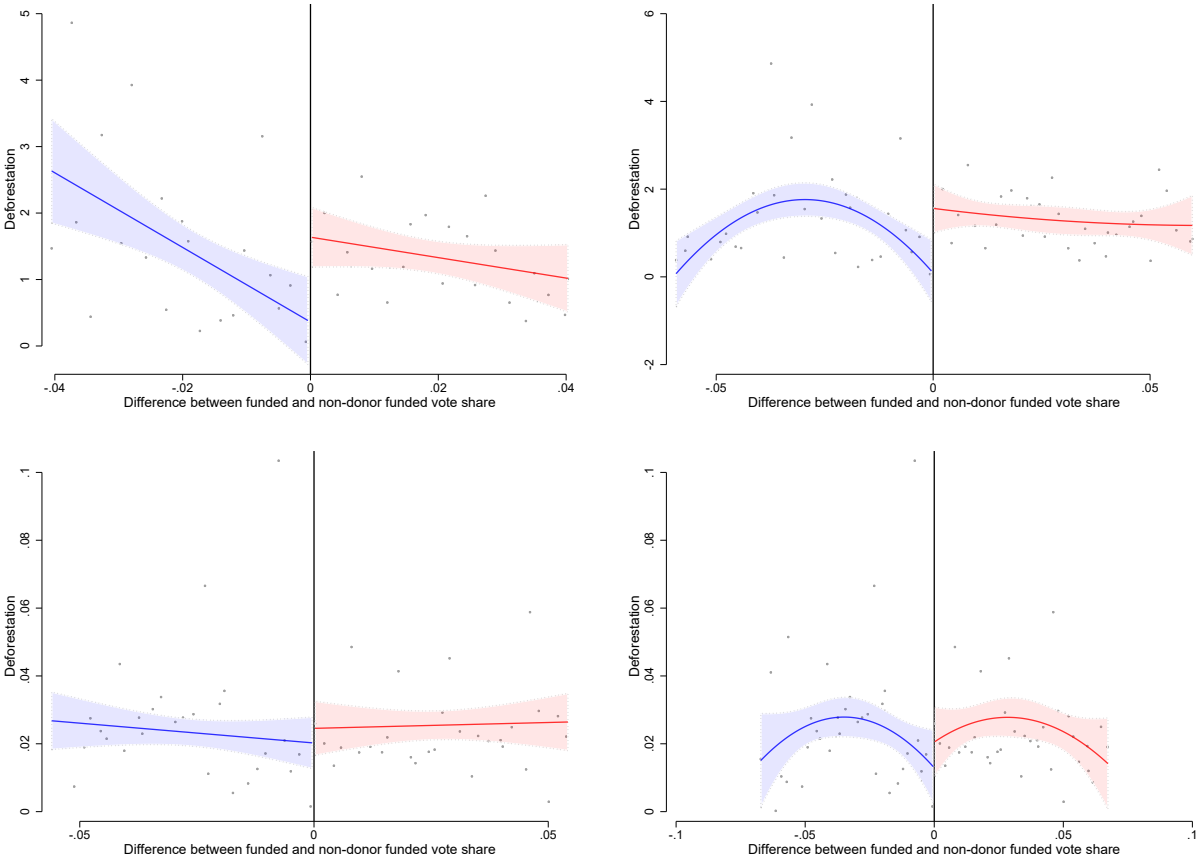
Note: This figure shows the geographical distribution of deforestation and the vote share of privately funded candidates for the 2011 election period. The shades of blue correspond to the quartiles of deforestation during the full term. The bubble size correspond to the quartiles of the margin of victory privately funded candidates.

Figure 2: Manipulation Test



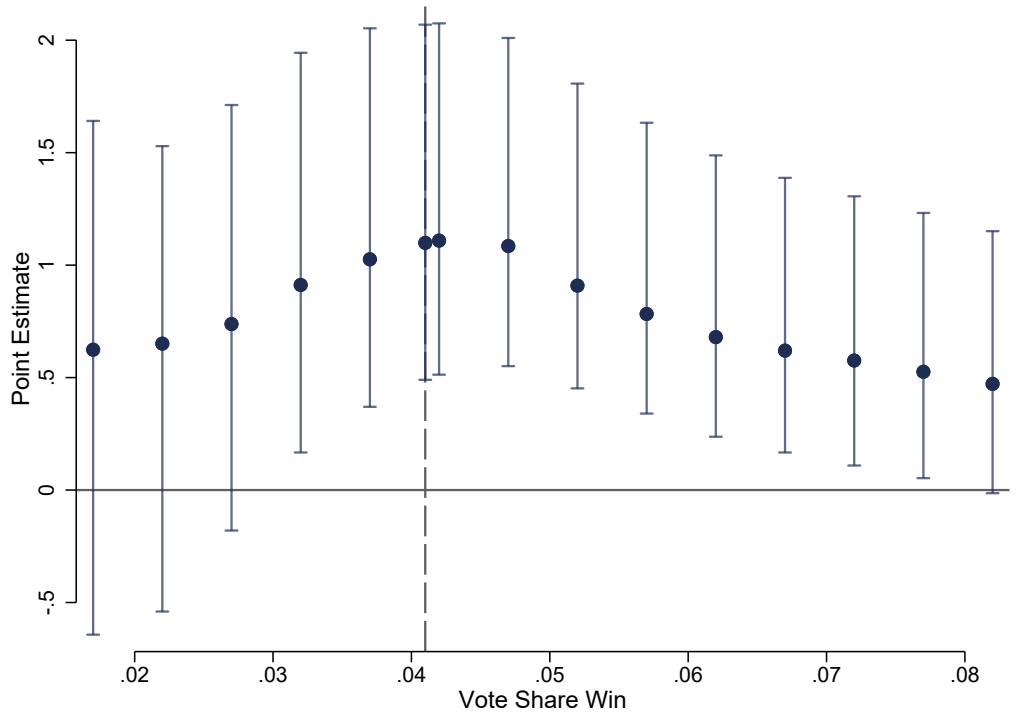
Note: This figure presents the density test suggested by Cattaneo et al. (2018). From left to right; the first figure uses a linear polynomial approximation, meanwhile, the second uses a quadratic approximation.

Figure 3: Effect of electing a donor funded politician on deforestation



Note: This figure presents a graphical approximation of the regression discontinuity design. We present deforestation during the full term in the first row, while deforestation during the previous electoral term is shown in the second row. The observations are shown within Calonico et al. (2014) optimal bandwidth. From left to right; the first figure uses a linear polynomial approximation, meanwhile, the second uses a quadratic approximation.

Figure 4: Different bandwidth sizes: Effect of electing a donor-funded politician on deforestation



Note: Estimates calculated using optimal MSE bandwidths and triangular kernel weights. Robust 90% confidence intervals estimated following Calonico et al. (2014).

Table 1: Summary statistics

	(1)	(2)	(3)	(4)	(5)	(6)
	Obs	**Mean**	**Standard Deviation**	**Minimum**	**Median**	**Maximum**
A. Elections						
Private income % total	2160	0.19	0.27	0	0	1
Margin of victory donor-funded	408	0.022	0.101	-0.354	0.019	0.383
B. Deforestation						
Deforestation ratio 2008-2011	1080	2.141	2.023	0	1.526	14.565
Deforestation ratio 2012-2015	1080	1.182	1.572	0	0.576	16.625

Note: This table presents summary statistics for the main variables of interest used in the analysis. An observation is a municipality except for the Private income % total that uses as unit of observation the candidate (top two candidates per each municipality).

Table 2: Smooth covariates

	(1) Mean	(2) Std. Dev.	(3) Donor fund. won	(4) Std. Error.	(5) Obs	(6) P-value	(7) Pval Canay
A. Individual covariates							
Women	0.116	0.320	0.119	0.202	132	0.121	0.789
Age	45.245	9.709	-3.551	5.398	126	0.573	0.061
Black	0.044	0.205	-0.023	0.195	126	0.865	0.490
Asian	0.107	0.309	0.050	0.230	126	0.570	0.423
Left-wing party	0.024	0.154	0.018	0.165	132	0.801	0.664
Right-wing party	0.239	0.427	0.181	0.147	132	0.474	0.816
Previously sanctioned	0.121	0.326	-0.024	0.137	132	0.813	0.119
Illegal Registration of ID.	0.005	0.071	0.013	0.009	132	0.268	1.000
Has political experience	0.448	0.497	0.326	0.196	132	0.157	0.323
Has electoral experience	0.361	0.480	0.156	0.181	132	0.336	0.871
B. Policy Outcomes							
Total Income Y(COP M)	47102.906	361239.511	12723.550	8666.063	132	0.704	0.467
Land Taxes (%Y)	3.889	4.695	0.346	2.083	132	0.938	0.303
Industry (%Y)	3.377	5.967	1.378	1.755	132	0.823	0.252
Funct. expen. (%Y)	13.284	5.045	-1.439	4.719	132	0.535	0.758
Investment (%Y)	86.716	5.045	1.439	4.719	132	0.535	0.757
Deficit (%Y)	11.346	9.573	1.049	6.648	132	0.613	0.963
C. Other municipality socio-economic characteristics							
Altitude (meter)	1158.170	1161.175	-227.936	571.983	132	0.885	0.164
Sq km	876.992	2982.007	-91.459	578.174	132	0.323	0.713
Distance Department capital	78.701	56.010	13.930	25.906	132	0.855	0.112
Distance to Bogota	319.459	189.400	-84.390	183.531	132	0.286	0.609
Literacy rate	83.903	8.484	-0.536	5.141	132	0.818	0.138
Rurality index (0-1)	0.564	0.239	-0.107	0.133	132	0.322	0.225
Unsatisfied basic needs	44.622	20.279	9.368	9.454	132	0.197	0.187
CAR office	0.140	0.347	-0.030	0.205	132	0.545	1.000
Distance to CAR office	0.030	0.033	-0.004	0.015	132	0.363	0.935
Comptroller general offices	0.604	6.388	0.044	0.091	132	0.636	1.000
Attorney general offices	4.042	38.057	0.810	0.683	132	0.629	0.570
Paramilitary attacks	1.279	9.780	0.151	1.882	132	0.724	0.173
Guerilla attacks	0.608	2.091	0.424	1.215	132	0.995	0.205
D. Other potential explanations							
Deforest ratio previous term 2011	0.022	0.022	0.007	0.006	132	0.334	0.365
Disposable Income (mw)	29004.315	393732.953	1078.397	5317.036	126	0.719	0.305
Municipal category	5.708	0.995	0.095	0.241	132	0.264	1.000
Mayor wages	6.692	2.543	-0.190	0.481	132	0.264	1.000
Council size	10.957	2.907	1.775	1.292	132	0.217	0.081
Total population	41707.711	257110.752	8672.028	9205.110	132	0.926	0.214
Income from royalties	0.070	0.150	0.022	0.159	130	0.487	0.747
Education establishments	284.522	170.665	-70.098	73.363	132	0.840	0.256

Note: The first two columns present the basic statistics (mean and standard deviation) of each covariate. Column (3) reports the RDD's point estimate of the effect of a donor-funded candidate victory on each covariate (as dependant variable), the Calonico et al. (2014)'s optimal bandwidth for the main model is used throughout. Bias corrected robust standard errors (column 4). The number of effective observations is detailed in column 5. Column 6 reports the estimated p-value, while column 7 reports the Canay and Kamat (2015) permutation test for the null hypothesis of continuity of the distribution around the cutoff.

Table 3: Donor funded politician and deforestation during term in office

	(1)	(2)	(3)	(4)
Donor Funded	1.099***	0.627**	1.290**	0.972**
Robust p-value	0.008	0.019	0.026	0.021
CI 95%	[0.339, 2.220]	[0.127, 1.442]	[0.158, 2.471]	[0.158, 1.940]
Previous deforestation		✓		✓
Observations	408	408	408	408
Bandwidth obs.	132	174	191	198
Mean	1.183	1.183	1.183	1.183
Effect size (%)	92.90	53.00	109.05	82.16
Bandwidth	0.041	0.053	0.060	0.064
(Local) polynomial order	1	1	2	2

Note: Columns 1 and 2 present the local linear estimates of average treatment effects at cut-off estimated with triangular kernel weights and optimal MSE bandwidth. Columns 3 and 4 presents the quadratic estimates of average treatment effects at cut-off estimated with triangular kernel weights and optimal MSE bandwidth. 95% robust confidence intervals and robust p-values are computed following Calonico et al. (2014). Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. The Effect Size (%) is computed as the point estimate over the mean x 100. Columns (2) and (4) include as covariate the measure of deforestation in the previous term (2008-2011). *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Donor funded politician and deforestation by year of government

	(1)	(2)	(3)	(4)
	Year of government			
	1	2	3	4
Donor Funded	0.195***	0.220**	0.117	0.490***
Robust p-value	0.003	0.029	0.224	0.006
CI 95%	[0.077, 0.376]	[0.027, 0.504]	[-0.095, 0.404]	[0.164, 0.959]
Observations	408	408	408	408
Bandwidth obs.	132	139	187	130
Mean	0.211	0.306	0.211	0.455
Effect size (%)	92.42	71.90	55.45	107.69
Bandwidth	0.041	0.043	0.059	0.040
(Local) polynomial order	1	1	1	1

Note: Local linear estimates of average treatment effects at cut-off estimated with triangular kernel weights and optimal MSE bandwidth. 95% robust confidence intervals and robust p-values are computed following Calonico et al. (2014). Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. Each column shows the deforestation rate, defined as lost coverage$_t$/$coverage_{\text{election year}}$, for a given year of government. The Effect size (%) is computed as the point estimate over the mean x 100. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Donor funded politician and contracts

	(1)	(2)	(3)	(4)	(5)	(6)
	Infrastructure		*Environmental*		*Mining*	
	Number	*Avg. value*	*Number*	*Avg. value*	*Number*	*Avg. value*
Donor Funded	-30.151	1.091**	-4.904	0.486	0.209	0.486
Robust p-value	0.357	0.017	0.742	0.150	0.637	0.150
CI 95%	[-127.980, 46.163]	[0.219, 2.258]	[-55.157, 39.293]	[-0.197, 1.294]	[-0.774, 1.265]	[-0.197, 1.294]
Observations	401	400	401	366	401	366
Bandwidth obs.	226	165	211	174	216	174
Mean	140.896	4.818	18.197	3.795	0.976	3.795
Effect size (%)	-21.40	22.64	-26.95	12.81	21.41	12.81
Bandwidth	0.077	0.049	0.073	0.062	0.074	12.81
(Local) polynomial order	1	1	1	1	1	1

Note: Local linear estimates of average treatment effects at cut-off estimated with triangular kernel weights and optimal MSE bandwidth. 95% robust confidence intervals and robust p-values are computed following Calonico et al. (2014). Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. The average value of contracts was transformed using inverse hyperbolic sine. The contracts are catalogued in each category by analysing their reported object. The Effect size (%) is computed as the point estimate over the mean x 100. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Donor funded politician and infrastructure contracts per year of government

	Year of government			
	1	2	3	4
Donor Funded	0.520	0.484	1.391***	0.760
Robust p-value	0.245	0.252	0.008	0.116
CI 95%	[-0.410, 1.610]	[-0.404, 1.538]	[0.385, 2.597]	[-0.217, 1.968]
Observations	381	386	386	389
Bandwidth obs.	179	195	193	179
Mean	4.204	5.092	5.284	5.508
Effect size (%)	12.37	9.51	26.32	13.80
Bandwidth	0.060	0.070	0.068	0.058
(Local) polynomial order	1	1	1	1

Note: Local linear estimates of average treatment effects at cut-off estimated with triangular kernel weights and optimal MSE bandwidth. 95% robust confidence intervals and robust p-values are computed following Calonico et al. (2014). Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. The average value of contracts was transformed using inverse hyperbolic sine. The contracts are catalogued in each category by analysing their reported object. The Effect size (%) is computed as the point estimate over the mean x 100. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Heterogeneous Effects: State Presence

		(1)	(2)	(3)	(4)	(5)
		Measure Z				
		National Parks Area	CAR office	Distance to CAR	Comptroller offices	Attorney offices
A	Donor funded	1.117**	1.195**	-0.149	1.024**	1.325***
		(0.439)	(0.466)	(0.518)	(0.427)	(0.496)
	Z	0.210**	0.487	0.0003	1.195***	0.215**
		(0.105)	(0.592)	(0.0079)	(0.175)	(0.0992)
B	Z × Donor funded	-0.279*	-1.610*	0.0371**	-2.434***	-0.450**
		(0.144)	(0.966)	(0.0153)	(0.245)	(0.162)
Observations		408	408	408	408	408
Bandwidth obs.		132	132	132	132	132
R-squared		0.051	0.062	0.209	0.053	0.067
Bandwidth		0.041	0.041	0.041	0.041	0.041
(Local) polynomial order		1	1	1	1	
A + B		0.838	-0.416	-0.111	-1.410	0.875
Effect size (%)		93.09	-35.04	-15.12	-72.136	102.267
Ho: $A + B = 0$						
F-statistic		4.39	0.24	0.05	34.5	4.7
P-value		0.04	0.62	0.83	0.05	0.30

Note: OLS regression weighted by a triangular kernel within the MSE optimal bandwidth sample and controlling for a linear polynomial. Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. The dependent variable is deforestation during the full term. National Parks area is defined as the total area with national parks in the municipality, CAR office is a dummy that takes the value one if there was at least on CAR office in the municipality, Distance to CAR is the distance to the closest CAR, Comptroller offices is the number of offices of the Comptroller General (*Procuraduría*), and Attorney offices is the number of offices of the Attorney General (*Fiscalía*). The Effect size (%) is computed as $100x(A+B)/(constant+\beta_Z)$. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Donor funded politician and fire intensity

	(1)	(2)
Donor Funded	80.976*	75.464**
Robust p-value	0.059	0.041
CI 95%	[-3.381, 181.446]	[3.189, 156.092]
Previous fire intensity		✓
Observations	408	408
Bandwidth obs.	195	198
Mean	246.141	246.141
Effect size (%)	32.90	30.66
Bandwidth	0.061	0.063
(Local) polynomial order	1	1

Note: Local linear estimates of average treatment effects at cut-off estimated with triangular kernel weights and optimal MSE bandwidth. 95% robust confidence intervals and robust p-values are computed following Calonico et al. (2014). Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. Column (2) includes as covariate the measure of fire intensity from the previous term (2009-2011), being 2009 the first year with data availability. Fire intensity is measured as the average brightness of fires in a municipality. The Effect size (%) is computed as the point estimate over the mean x 100. *** p<0.01, ** p<0.05, * p<0.1.

Table 9: Donor funded politician and fire intensity by year of government

	(1)	(2)	(3)	(4)
	Year of government			
	1	2	3	4
Donor Funded	31.434	55.882	1.715	110.844**
Robust p-value	0.461	0.225	0.978	0.018
CI 95%	[-65.426, 144.208]	[-42.699, 181.289]	[-110.545, 107.437]	[20.741, 224.285]
Observations	408	408	408	408
Bandwidth obs.	232	200	215	237
Mean	189.663	183.108	185.204	198.902
Effect size (%)	16.57	30.52	0.93	55.73
Bandwidth	0.078	0.066	0.073	0.082
(Local) polynomial order	1	1	1	1

Note: Local linear estimates of average treatment effects at cut-off estimated with triangular kernel weights and optimal MSE bandwidth. 95% robust confidence intervals and robust p-values are computed following Calonico et al. (2014). Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. Fire intensity is measured as the average brightness of fires in a municipality. The Effect size (%) is computed as the point estimate over the mean x 100. *** p<0.01, ** p<0.05, * p<0.1.

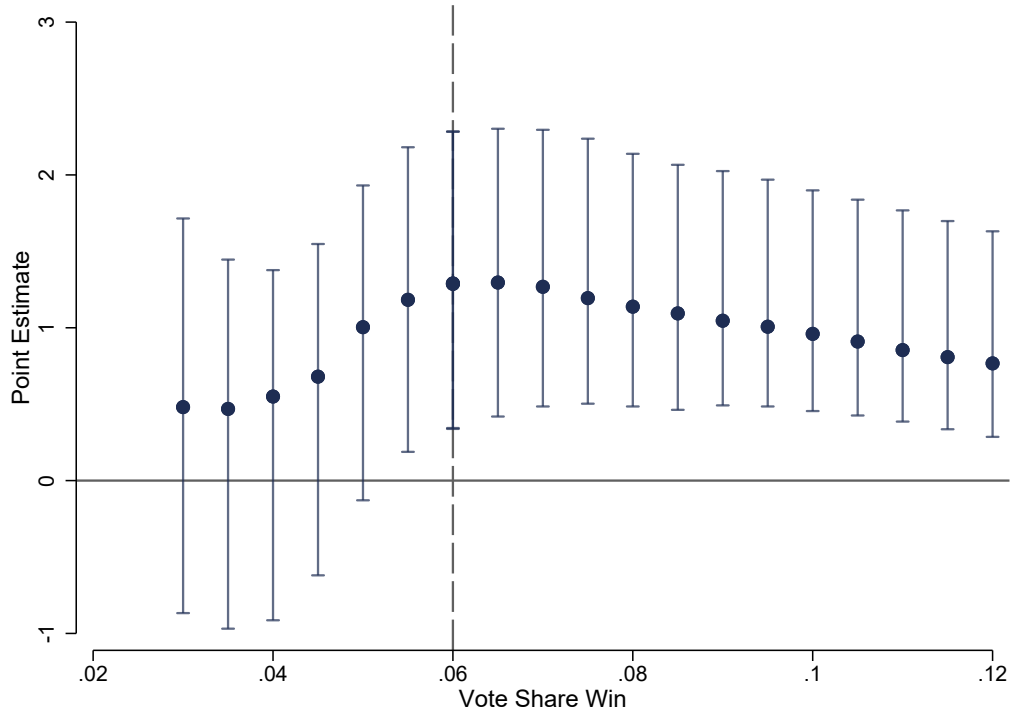
Table 10: Heterogeneous Effects: Armed Conflict

		(1)	(2)
		Attacks measure Z	
		Paramilitary	Guerrilla
A	Donor funded	0.704*	1.133***
		(0.422)	(0.427)
	Z	0.116	0.574***
		(0.139)	(0.187)
B	Z × Donor funded	0.123	-0.623**
		(0.153)	(0.241)
Observations		408	408
Bandwidth obs.		132	132
R-squared		0.116	0.131
Bandwidth		0.041	0.041
(Local) polynomial order		1	1
A + B		0.827	0.510
Effect size (%)		90.17	42.86
Ho: $A + B = 0$			
F-statistic		4.60	1.37
P-value		0.03	0.24

Note: OLS regression weighted by a triangular kernel within the MSE optimal bandwidth sample and controlling for a quadratic polynomial. Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. The dependent variable is deforestation during the full term. Paramilitary (Guerrilla) attacks is the number of paramilitary (guerrilla) attacks during the previous term (2008-2011). The Effect size (%) is computed as $100x(A+B)/(constant+\beta_Z)$. *** p<0.01, ** p<0.05, * p<0.1.

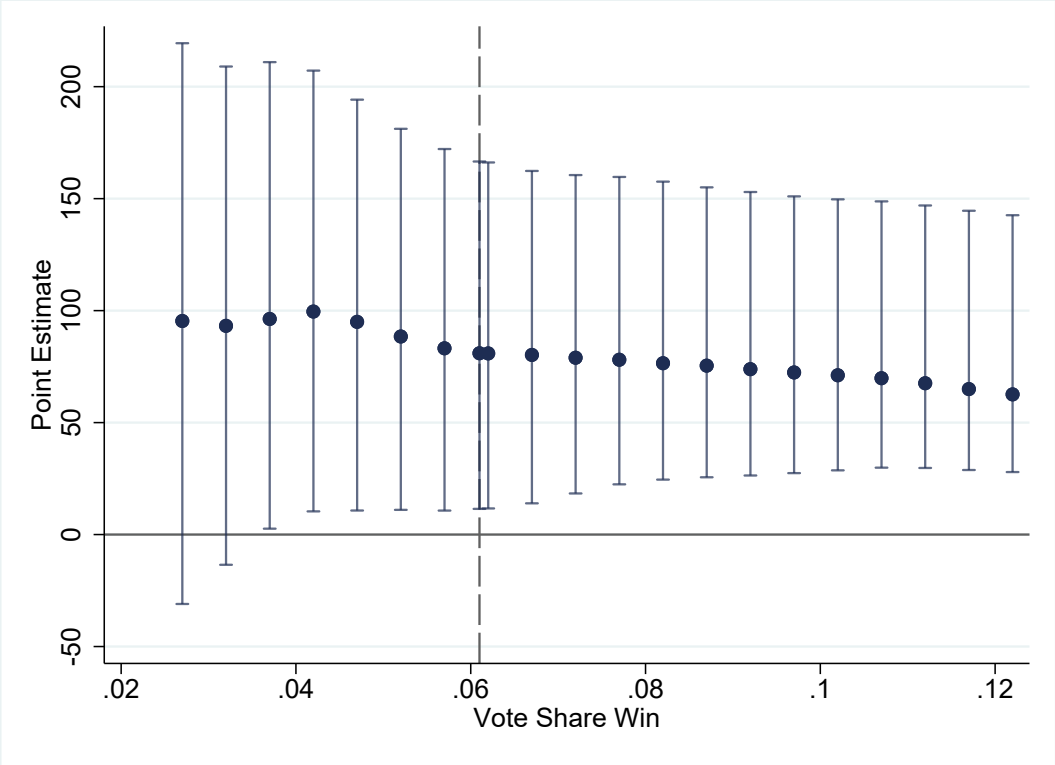
A ONLINE APPENDIX: Supplementary Figures and Tables

Figure A1: Different bandwidth sizes. Donor funded politician and deforestation



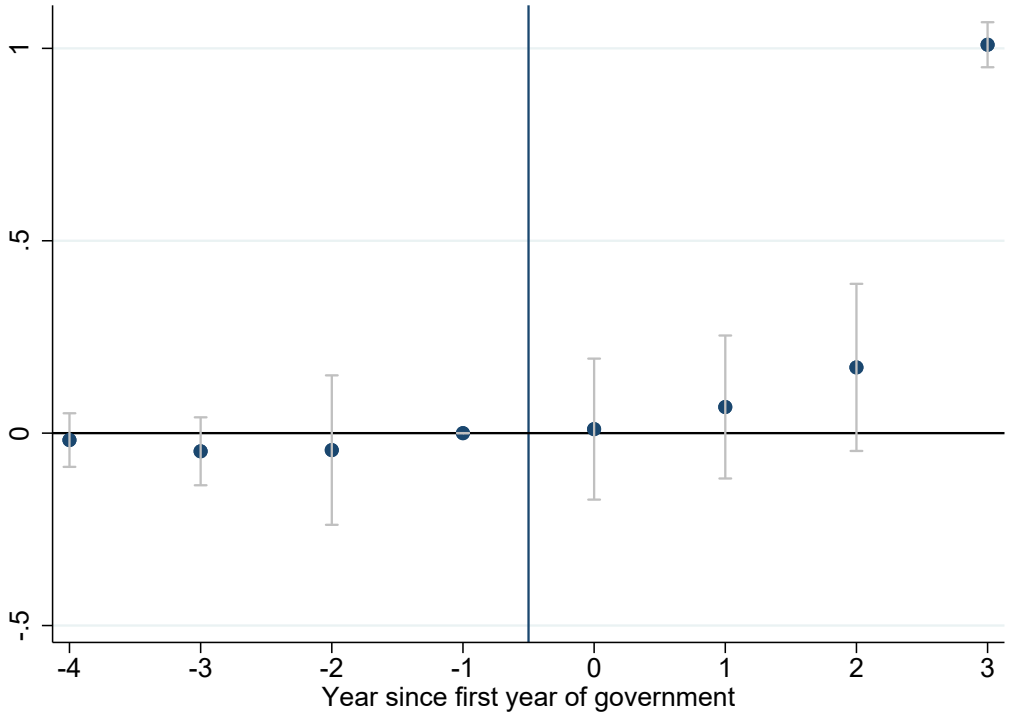
Note: Estimates calculated using optimal MSE bandwidths and triangular kernel weights. Robust 90% confidence intervals estimated following Calonico et al. (2014).

Figure A2: Different bandwidth sizes. Donor funded politician and fire intensity



Note: Estimates calculated using optimal MSE bandwidths and triangular kernel weights. Robust 90% confidence intervals estimated following Calonico et al. (2014).

Figure A3: Donor-funded politician on deforestation: Non-parametric DiD



Note: We perform a non-parametric difference-in-differences interacting the treatment by the year dummy. 90% confidence intervals. The year zero represents the first year of government and the year -1, is the election year. We use the full sample 408 of races between donor-funded and non-donor-funded top candidate.

Table A1: Donor funded politician and deforestation ratio - Quadratic Polynomial

	(1)	(2)	(3)	(4)
	Year of government			
	1	2	3	4
Donor Funded	0.002***	0.002*	0.002	0.005**
Robust p-value	0.009	0.074	0.166	0.048
CI 95%	[0.001, 0.004]	[-0.000, 0.005]	[-0.001, 0.006]	[0.000, 0.009]
Observations	408	408	408	408
Bandwidth obs.	188	200	209	187
Mean	0.012	0.012	0.012	0.012
Effect size (%)	16.67	16.67	16.67	41.67
Bandwidth	0.059	0.066	0.070	0.059
(Local) polynomial order	2	2	2	2

Note: Local quadratic estimates of average treatment effects at cut-off estimated with triangular kernel weights and optimal MSE bandwidth. 95% robust confidence intervals and robust p-values are computed following 112014Calonico et al.Calonico, Cattaneo, and Titiunik (). Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. Each column shows the deforestation rate, defined as lost coverage$_t$/$coverage_{\text{election year}}$, for a given year of government. The Effect size (%) is computed as the point estimate over the mean x 100. *** p<0.01, ** p<0.05, * p<0.1.

Table A2: Heterogeneous Effects: Right-wing affiliation

	(1)	(2)
A Donor funded	1.139**	0.668
	(0.483)	(0.412)
Right-wing	0.0560	-0.870
	(0.547)	(0.789)
B Right-wing × Donor funded	-0.696	-0.643
	(0.989)	(0.822)
Observations	408	408
Bandwidth obs.	132	191
R-squared	0.057	0.077
Bandwidth	0.0410	0.0600
(Local) polynomial order	1	2
A + B	0.443	0.025
Effect size	54.471	2.535
Ho: $A + B = 0$		
F-statistic	0.26	0
P-value	0.61	0.97

Note: Column 1 controls for the local linear polynomial, while column 2 controls for the local quadratic polynomial. Observations restricted to those in the optimal linear and quadratic bandwidths. Weighted using a triangular kernel. Effect size is calculates as $(A+B)/(constant+\beta_Z)$. National Parks Area in squared hectares. Distance in KM. *** p<0.01, ** p<0.05, * p<0.1

Table A3: Heterogeneous Effects: State Presence - Quadratic Polynomial

	(1)	(2)	(3)	(4)	(5)
	Measure Z				
	National Parks Area	CAR office	Distance to CAR	Comptroller offices	Attorney offices
A Donor funded	0.679*	0.750*	-0.234	0.624*	0.830**
	(0.366)	(0.386)	(0.429)	(0.361)	(0.405)
Z	0.348	1.532*	-0.00279	1.062***	-0.0685
	(0.240)	(0.798)	(0.0101)	(0.310)	(0.143)
B Z × Donor funded	-0.329*	-2.072***	0.0267**	-1.695***	-0.285**
	(0.176)	(0.660)	(0.0133)	(0.574)	(0.118)
Observations	408	408	408	408	408
Bandwidth obs.	191	191	191	191	191
R-squared	0.069	0.083	0.201	0.068	0.087
Bandwidth	0.060	0.060	0.060	0.060	0.060
(Local) polynomial order	2	2	2	2	2
A + B	0.350	-1.322	-0.207	-1.071	0.545
Effect size (%)	17.56	-41.28	-12.05	-38.988	30.569
Ho: $A + B = 0$					
F-statistic	.99	6.09	0.24	3.83	4.7
P-value	0.32	0.01	0.62	0.05	0.11

Note: OLS regression weighted by a triangular kernel within the MSE optimal bandwidth sample and controlling for a quadratic polynomial. Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. The dependent variable is deforestation during the full term. National Parks area is defined as the total area with national parks in the municipality, CAR office is a dummy that takes the value one if there was at least on CAR office in the municipality, Distance to CAR is the distance to the closest CAR, Comptroller offices is the number of offices of the Comptroller General (*Procuraduría*), and Attorney offices is the number of offices of the Attorney General (*Fiscalía*). The Effect size (%) is computed as $100x(A + B)/(constant + \beta_Z)$. *** p<0.01, ** p<0.05, * p<0.1.

Table A4: Donor funded politician and contracts - Quadratic Polynomial

	(1)	(2)	(3)	(4)	(5)	(6)
	Infrastructure		*Environmental*		*Mining*	
	Number	*Avg. value*	*Number*	*Avg. value*	*Number*	*Avg. value*
Donor Funded	-30.151	1.091**	-4.904	0.486	0.209	0.486
Robust p-value	0.357	0.017	0.742	0.150	0.637	0.150
CI 95%	[-127.980, 46.163]	[0.219, 2.258]	[-55.157, 39.293]	[-0.197, 1.294]	[-0.774, 1.265]	[-0.197, 1.294]
Observations	401	400	401	366	401	366
Bandwidth obs.	226	165	211	174	216	174
Mean	140.896	4.818	18.197	3.795	0.976	3.795
Effect size (%)	-21.40	22.64	-26.95	12.81	21.41	12.81
Bandwidth	0.077	0.049	0.073	0.062	0.074	12.81
(Local) polynomial order	1	1	1	1	1	1

Note: Local quadratic estimates of average treatment effects at cut-off estimated with triangular kernel weights and optimal MSE bandwidth. 95% robust confidence intervals and robust p-values are computed following 112014Calonico et al.Calonico, Cattaneo, and Titiunik (). Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. The average value of contracts was transformed using inverse hyperbolic sine. The contracts are catalogued in each category by analysing their reported object. The Effect size (%) is computed as the point estimate over the mean x 100. *** p<0.01, ** p<0.05, * p<0.1.

Table A5: Donor funded politician and infrastructure contracts by year of government - Quadratic polynomial

	Year of government			
	1	2	3	4
Donor Funded	0.561	0.195	1.431**	0.886
Robust p-value	0.418	0.918	0.028	0.114
CI 95%	[-0.752, 1.812]	[-1.209, 1.344]	[0.161, 2.785]	[-0.230, 2.136]
Observations	381	386	386	389
Bandwidth obs.	210	217	268	265
Mean	4.204	5.092	5.284	5.508
Effect size (%)	13.34	3.83	27.08	16.09
Bandwidth	0.075	0.076	0.108	0.105
(Local) polynomial order	2	2	2	2

Note: Local quadratic estimates of average treatment effects at cut-off estimated with triangular kernel weights and optimal MSE bandwidth. 95% robust confidence intervals and robust p-values are computed following 112014Calonico et al.Calonico, Cattaneo, and Titiunik (). Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. The average value of contracts was transformed using inverse hyperbolic sine. The contracts are catalogued in each category by analysing their reported object. The Effect size (%) is computed as the point estimate over the mean x 100. *** p<0.01, ** p<0.05, * p<0.1.

Table A6: Donor funded politician and fire intensity - Quadratic polynomial

	(1)	(2)
Donor Funded	92.839**	77.625
Robust p-value	0.044	0.145
CI 95%	[2.659, 187.461]	[-26.568, 180.535]
Previous intensity		✓
Observations	408	408
Bandwidth obs.	312	217
Mean	246.141	246.141
Effect size (%)	37.72	31.54
Bandwidth	0.124	0.073
(Local) polynomial order	2	2

Note: Local quadratic estimates of average treatment effects at cut-off estimated with triangular kernel weights and optimal MSE bandwidth. 95% robust confidence intervals and robust p-values are computed following 112014Calonico et al.Calonico, Cattaneo, and Titiunik (). Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. Column (2) includes as covariate the measure of fire intensity from the previous term (2009-2011), being 2009 the first year with data availability. Fire intensity is measured as the average brightness of fires in a municipality. The Effect size (%) is computed as the point estimate over the mean x 100. *** p<0.01, ** p<0.05, * p<0.1.

Table A7: Donor funded politician and fire intensity by year of government - Quadratic polynomial

	Year of government			
	1	2	3	4
Donor Funded	51.029	118.096*	4.267	122.898*
Robust p-value	0.451	0.100	0.952	0.068
CI 95%	[-90.214, 203.103]	[-25.585, 292.761]	[-145.384, 154.528]	[-9.357, 256.419]
Observations	408	408	408	408
Bandwidth obs.	238	204	233	267
Mean	189.663	183.108	185.204	198.902
Effect size (%)	26.91	64.50	2.30	61.79
Bandwidth	0.082	0.068	0.079	0.097
(Local) polynomial order	2	2	2	2

Note: Local quadratic estimates of average treatment effects at cut-off estimated with triangular kernel weights and optimal MSE bandwidth. 95% robust confidence intervals and robust p-values are computed following 112014Calonico et al.Calonico, Cattaneo, and Titiunik (). Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. Fire intensity is measured as the average brightness of fires in a municipality. The Effect size (%) is computed as the point estimate over the mean x 100. *** p<0.01, ** p<0.05, * p<0.1.

Table A8: Donor funded politician and agro-cattle firms entry by year

	Year of government			
	1	2	3	4
Donor Funded	1.093	1.831	1.340	2.569**
Robust p-value	0.314	0.243	0.496	0.019
CI 95%	[-1.151, 3.585]	[-1.308, 5.169]	[-1.893, 3.910]	[0.495, 5.653]
Observations	408	408	408	408
Bandwidth obs.	190	198	232	161
Mean	0.211	0.306	0.211	0.455
Effect size (%)	518.01	598.37	635.07	564.62
Bandwidth	0.060	0.063	0.077	0.048
(Local) polynomial order	1	1	1	1

Note: Local linear estimates of average treatment effects at cut-off estimated with triangular kernel weights and optimal MSE bandwidth. 95% robust confidence intervals and robust p-values are computed following Calonico et al. (2014). Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. The dependent variable is the number of firms registered in agro-cattle business during that year. The Effect Size (%) is computed as the point estimate over the mean x 100. *** p<0.01, ** p<0.05, * p<0.1.

Table A9: Donor funded politician and agro-cattle firms entry by year - Quadratic

	Year of government			
	1	2	3	4
Donor Funded	1.116	1.749	1.168	2.671**
Robust p-value	0.415	0.346	0.505	0.030
CI 95%	[-1.515, 3.671]	[-1.788, 5.097]	[-2.152, 4.370]	[0.278, 5.574]
Observations	408	408	408	408
Bandwidth obs.	245	271	267	246
Mean	0.211	0.306	0.211	0.455
Effect size (%)	528.91	571.57	553.55	587.03
Bandwidth	0.084	0.099	0.097	0.085
(Local) polynomial order	2	2	2	2

Note: Local quadratic estimates of average treatment effects at cut-off estimated with triangular kernel weights and optimal MSE bandwidth. 95% robust confidence intervals and robust p-values are computed following Calonico et al. (2014). Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. The dependent variable is the number of firms registered in agro-cattle business during that year. The Effect Size (%) is computed as the point estimate over the mean x 100. *** p<0.01, ** p<0.05, * p<0.1.

Table A10: Heterogeneous Effects: Armed Conflict - Quadratic Polynomial

		(1)	(2)	(3)
		Measure Z		
		Attacks		Clashes
		Paramilitary	Guerrilla	Conflict
A	Donor funded	0.337	0.733**	0.829**
		(0.364)	(0.367)	(0.367)
	Z	-0.0783	0.435*	-0.0195
		(0.144)	(0.227)	(0.287)
B	Z × Donor funded	0.168	-0.554**	-0.164
		(0.156)	(0.241)	(0.153)
Observations		408	408	408
Bandwidth obs.		191	191	191
R-squared		0.108	0.166	0.102
Bandwidth		0.0600	0.0600	0.0600
(Local) polynomial order		2	2	2
A + B		0.505	0.179	0.665
Effect size		30.50	8.68	40.54
Ho: $A + B = 0$				
F-statistic		2.43	0.21	3.13
P-value		0.12	0.64	0.80

Note: OLS regression weighted by a triangular kernel within the MSE optimal bandwidth sample and controlling for a quadratic polynomial. Bandwidth obs. denotes number of observations in the optimal MSE bandwidth. The dependent variable is deforestation during the full term. Paramilitary (Guerrilla) attacks is the number of paramilitary (guerrilla) attacks during the previous term (2008-2011). The Effect size (%) is computed as $100x(A+B)/(constant+\beta_Z)$. *** p<0.01, ** p<0.05, * p<0.1.