

Electoral Transhumance: Voter Registration Shifting and Corruption Engagement Before Election Day

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November 6, 2023

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Abstract

The literature on corruption distinguishes between two forms of vote buying: corrupt candidates can either bribe voters to change their vote (voter-buying) or bribe non-voters to vote (turnout-buying). This reasoning relies on the assumption that the electoral roll is fixed, overlooking a third method explored in this paper: *electoral transhumance*. In its most common form, corrupt candidates pay citizens from neighboring areas to change their registration location, so that they can vote in the locations where the candidates plan to run. I study electoral transhumance in Colombia by looking at failed registration attempts – i.e., registrations of people who illegally attempted to vote in a municipality that was not their residence – and studying whether these respond systematically to politicians’ incentives to increase votes. Overall, I find that ‘failed’ transhumance – i.e. cases where voters were caught switching their localities – represents 5.03% of the electoral roll. I then study a reform that made public, more than one year prior to election day, information about drastic changes in the future allocation of resources to the municipalities that increased the presumed returns from office. I exploit a discontinuity in the (future) allocation of transfers from central to local governments to show that electoral transhumance is more common in districts with expected larger budgets, which may give local politicians greater incentives to seek office. I estimate that ‘successful’ cases of transhumance represent 2.23% of the electoral roll, which is a significant fraction considering that 15% of the municipal elections were won by a margin less than that value. Consistent with a model in which open economies can “trade” voters, I find that a positive shock in a municipality’s revenue makes electoral transhumance more likely in three types of municipalities: (i) those with small populations, (ii) those with poorly functioning institutions, and (iii) those with neighboring municipalities that have a large electorate. Finally, I show that candidates are forward-looking: they engage in this behavior as early as one year prior to election day.

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1 Introduction

Clientelistic practices such as vote buying, which are widely perceived as major obstacles to economic development, are often analyzed in a static context and within a short time around election day (Vicente & Wantchekon, 2009). When the incentives to capture office increase, candidates might find it profitable not only to buy votes on election day (when monitoring is supposed to be higher) but to overcome the costs of engaging in a long-term clientelistic relationship with particular citizens. The literature tends to be more silent about this second channel, mainly because it is hard to monitor these interaction, particularly a long time prior to the election. Yet it is an open question whether candidates (and citizens) engage in investments over a long time horizon in order to buy votes when it becomes more profitable to capture office. Exploring this issue is important, as clientelism is found to limit the provision of public goods and adversely affect efficiency and equity (Olken & Pande, 2012).

In this paper, I rely on an unusual yet precise measure of sophisticated vote buying to proxy for candidates' ability to get information, coordinate, and exert effort in their political campaigns, using municipality-level variation within Colombia. As in many other countries, in Colombia voters must change their residency and present an official request to the National Electoral Commission (NEC) before being allowed to vote in a municipality other than where they reside. In recent years, the NEC has had to develop a way to verify the information and deny many of these requests, since it has become clear that local politicians are willing to pursue this process in order to mobilize citizens from one municipality to another to increase their support on election day. I collect information on the number of cancelled (or nullified) registration records to measure the incidence of this illegal practice, which is known as *electoral transhumance*.

I test whether this practice is more common in places that received more transfers from the central government, since local politicians might have greater incentives to capture office when the gains from appropriation are higher.

I find that the incidence of electoral transhumance is high. Around 55% of all records were nullified in the period 2012–2015. There were also 1,056,342 nullified registrations, representing 5.03% of the electoral roll. Transhumance is so popular because there are no negative repercussions for citizens: if the request is nullified, an individual can still vote in their municipality of origin (and can attempt to register in another municipality by providing more documentation).

Yet transhumance tends to be complex for political candidates, especially compared to traditional vote buying, where exchanges are made on election day. Candidates risk a large amount of money by financing intra-municipal transportation for citizens not just on election day, but when registration takes place (in addition, they usually compensate citizens with a small cash payment when the registration is carried out). In some cases, candidates coordinate such registration attempts many months before the election to avoid raising suspicions from the electoral authority

My identification strategy benefits from a reform that took place at the end of 2011 in which the central government changed the way it distributed royalties generated from the exploitation of non-renewable resources to municipalities. The reform greatly reduced the payments to producing municipalities; the surplus was transferred to municipalities that until that point had not received royalties. I focus exclusively on the post-reform period and exploit a discontinuity in the allocation the fact that after 2012, this surplus was assigned discontinuously to municipalities based on a poverty index.

Overall, I provide compelling evidence of a causal effect of transfers to local administrations on candidates' ability to modify actions, and particularly to engage in long-term clientelistic relationships. By comparing municipalities around the cutoff, I find that those favored by the allocation received, on average, 75% more royalties between 2012 and 2015. This increase is equivalent to 6% of their total budget and around 40% of their discretionary-destination revenue. I then show that in the municipalities that benefited from the reform around the cutoff, the local authority invalidated three more registration attempts for every 100 inhabitants who were allowed to vote. Using a back-of-the-envelope calculation, I estimate that this effect is approximately equivalent to a 2.2% increase in the proportion of votes cast in a municipality. This result is relatively large, considering that around 15% of the municipal elections in 2011 had a margin of victory of less than 2.2%.

Taken together, these results suggest that: (i) candidates become informed about the current and future revenues of the office they aim to rule, (ii) candidates use this information to help decide on the amount of effort (clientelism) to exert, and (iii) this information can make candidates more willing to engage in higher long-term investments/risks.

I present a very simple framework to study how certain municipality characteristics might hamper or foster the effect of an income shock on electoral transhumance. The model predicts that not only own characteristics but also characteristics of neighbors municipalities are relevant. The model predicts that the value of the bribe is a key channel through which most of these effects take place. For example, a positive shock in revenue makes transhumance

more attractive when neighboring economies are larger. The rationale for this result is that a shock in revenue tends to increase the bribe, but this only translates into a higher incidence of transhumance if neighboring economies have a large pool of individuals available to move.

In the empirical part, the heterogeneous effects are consistent with the predictions of the model. The effect of an income shock in transhumance is larger in places with low populations or a small number of voters. The effect is also larger in places with low institutional capacity and in places whose neighbors are small.

The paper contributes to several strands of research. First, it adds to the literature that explores the consequences of decentralization in developing countries (Gadenne, 2017; Martinez, 2019; Corbi, Papaioannou, & Surico, 2019). I find evidence that transfers from the central government to local administrations, in the form of royalties, lead to a considerable increase in corruption. A large part of the literature implicitly assumes that this is the case when it has found very moderate or no corresponding effects on living standards (Caselli & Michaels, 2013).¹

Two key studies go beyond those mentioned above to provide evidence on *how* transfers to local administrations transform the political equilibrium. First, Ferraz and Monteiro (2014) exploits exogenous variation in oil-based revenues in Brazil to show subnational entities that receive more transfers experience a large incumbency advantage in the two elections after an oil windfall boom.

Second, (Brollo, Nannicini, Perotti, & Tabellini, 2013), using the same intergovernmental discontinuities as Litschig and Morrison (2013) in Brazil, show that in places with more revenue, the average education of mayoral candidates decreases, which suggests that resources may attract corrupt politicians who seek to capture rents. (Brollo et al., 2013) also find that larger transfers increase observed corruption, specifically in how the mayor spends the funds.

Like these two papers, I provide compelling evidence that politicians do respond to larger budgets. However, I document a more complex type of corruption in the sense that it requires citizens' consent. Furthermore, rather than analyzing the outcomes of the subsequent election, I study whether candidates' behavior changes before the election, and whether they are able to overcome the potential risks of engaging in long-term clientelistic relationships, by exploring *when* candidates engage in transhumance. I find that candidates do so more frequently during election years. But surprisingly, the effect is not unique to that year: it

¹This paper is also related to the work of (Dube & Vargas, 2013), since it shows that non-desirable social outcomes can increase when the incentives to capture the office are greater. In the context a commodity price shock in Colombia, they show that a rise in contestable income (measured as oil resources) may increase violence by increasing the gains from appropriation.

is generally positive and statistically significant until two years before the election. This finding suggests that candidates are able to coordinate long-term investments/risks in order to smooth corruption over time and avoid registering all citizens at the last moment, thus reducing the chances of detection by the electoral commission.

The results in this paper also relate to the literature that studies how interventions around election day affect the transparency of elections. One common finding is that policies such as monitoring or informing voters of the risks of electoral fraud tend to reduce vote buying (Vicente & Wantchekon, 2009). The results reported here suggest that this is true as long as political candidates are not able to anticipate such an intervention. Otherwise, a candidate who foresees an increase in monitoring on election day can reoptimize and substitute traditional vote buying for longer-term clientelistic practices to some degree. Therefore, only examining the effects on election day risks overestimating the effect of such an intervention.

The paper proceeds as follows. Section 2 discusses the institutional context regarding royalties and electoral transhumance in Colombia and offers some anecdotal evidence. Section 3 presents the model. Section 4 discusses the data and empirical strategy. Section 5 presents the main results. Section 6 concludes with suggestions for future research.

2 Context

2.1 Royalties and Subnational Transfers

Over the last two decades, the Colombian government has received around 4.3% of its GDP in the form of royalties generated from the exploitation of nonrenewable resources, about 35% of which has been allocated to municipalities.²

Until 2011, only 355 out of the 1,123 municipalities were entitled to receive royalties (henceforth *producing municipalities*). These are municipalities where non-renewable natural resources were extracted or with sea and river ports where such resources or derived products were transported from. In July 2011, the Senate passed a Law that mandated that, starting 2012, these resources were going to be distributed among all municipalities in the country.³

The proposal and future implementation of the reform was motivated by two important

²Oil and coal account for almost the entire value of the royalties – 72% and 15%, respectively.

³The 1991 National Constitution was modified by The Legislative Act 05. Figure A-1 shows the geographical distribution of royalties before and after the reform. A summary of how the royalties were distributed among the central government and subnational is in Figure A-2. See Bonet and Urrego (2014) for more information.

factors. First, the commodities boom that took place prior to the 2008-2009 Great Recession and led to a period of substantial increases in commodities' exports. Second, the illegal appropriation of these resources along with the assignment to unproductive expenditures led to almost no improvement in the development of the recipients despite the large increase in the budget (Echeverry, Masmela, & García, 2011).⁴

In addition to the change in the distribution, the 2011 Reform also mandated that 5% of all resources from royalties after 2012 should be used to monitor the implementation and subsequent development of the projects financed with these transfers, creating an entity attached to the National Comptroller in charge of this mission.

Despite the fact that no convincing study has analyzed if this is broadly the case, there are some examples in municipalities suggesting that the spread of resources over the whole territory was accompanied by an increase in corruption in many places (Maya, 2018). In the last five years there have been at least 16 heads of subnational entities convicted for embezzlement of royalty resources and at least other 215 prosecuted for the same crime.⁵ The reason is that mayors play an important role in deciding how the royalties are spent and thus capturing these charges might result in a very profitable business for a clientelistic politician.

One important factor that makes royalties so attractive to corrupt politicians is the way how they are invested. Unlike other transfers from the central government that usually have an established destination, mayors and council members are usually in charge of proposing the projects to decide how royalties are going to be spent. There are two requirements. First, the project is required to have a "social impact", however, no specific destination is required and in practice it can go from improving the municipal road, building a new soccer field for a small community or buying a new ambulance for the hospital. Second, in addition to the mayor, the project needs to have the approval from both the governor (of the department where the municipality is located) and a delegate of the central government (usually a member of the National Planning Department). The three members conform a OCAD (Collegiate body of Administration and Decision) to decide from the pool of projects,

⁴Martinez (2019), one of the few studies trying to causally assess whether royalties improve living standards, finds very limited or no evidence during the period from 2000 to 2011. He also shows evidence that higher natural resource royalties lead to an increase in the probability that the mayor and top members of staff are prosecuted, found guilty and removed from office. There is also some evidence that this increase in revenue led to more fiscal dependence of subnational governments for a small number of municipalities and to the wasteful assignment of resources in sanctuary investments (Brosio & Jiménez, 2012).

⁵<https://www.semana.com/nacion/articulo/alejandro-lyons-destituido-e-inhabilitado-por-15-anos/593546>

which ones will be executed. Each member has a vote and a project is carried out as long as the municipality has enough resources and two (or three) out of the three members decide so.⁶ Another important aspect is that once the project has been approved, the legal offices of mayors have a large autonomy to define the rules (technical or specific experience) that they put in the specifications which might intentionally restrict competition.⁷ In fact, 7 out of 10 contracting processes have a single bidder.

2.2 Electoral Transhumance and the Political Landscape

Electoral transhumance consists of registering a citizen's ID card (required when casting a ballot) in a different municipality than that of his electoral residence in order to improperly participate in local elections. In response to multiple reports by the Office of the Attorney General that political candidates widely use electoral transhumance to increase their pool of voters on election day, the NEC implemented a way to verify applicants' residency (CNE, 2019).⁸ To do so, it compares the information that citizens present with (i) large national datasets that register the place of residence of a large proportion of the country's population,⁹

I collect information on the number of cancelled (or nullified) registrations to measure the incidence of electoral transhumance in each municipality. This data is provided by the NEC, which reports a total of 1,056,342 nullified registrations during the period 2011–2015. This is a large incidence when compared with the electoral roll in 2015 ($\approx 5\%$; 21,014,492) or the total number of successful registration attempts made (864,279).

Transhumance is so popular because citizens are offered cash incentives and do not face major monetary penalties if they are caught. If a registration is nullified, the individual can make a second attempt to register by providing more evidence of his current residence. If a registration is classified as invalid and the individual does not reapply, he is still allowed to vote in his municipality of residence.

Electoral transhumance, however, tends to be costlier for politicians than regular vote

⁶By Law any citizen has the right to propose a project. In practice, mayors and council members propose around 88% of the projects. Even in the case where a politician is not the proposer, the project need to be approved by the OCAD.

⁷<https://lasillavacia.com/silla-sur/caqueta-se-gasta-sus-regalias-con-licitaciones-de-un-solo-proponente-63774>

⁸Electoral transhumance is not unique to Colombia. Newspapers report incidents in other Latin American (such in Mexico where this practice is known as “electoral tourism”) and African countries. See <http://aceproject.org/electoral-advice/archive/questions/replies/288263279>.

⁹Two examples are The Beneficiary Selection System for Social Programs (also known as SISBEN) that collects information for around 26 million individuals; the main conditional cash transfer program in the country *Familias en Acción*. See CNE (2019) for more information.

buying. Anecdotal evidence suggests that it usually consists of a key actor, called the backpacker (*el mochilero*), who connects citizens and political candidates. There are usually three steps. First, the backpacker identifies potential *transhumants* and helps citizens collect the information they need in order to request a change in their place of residence. Second, the backpacker and the political candidate organize a bus or truck¹⁰ to take citizens to and from the NEC for registration; participants receive a down payment at this point. Third, on election day the transhumants are taken to and from the polling station in the other municipality and receive a follow-up payment when they certify that they have voted. In some regions a citizen can receive a total of up to 200,000 COP (approximately \$50 and equivalent to one third of the monthly minimum wage) in addition to free transportation and snacks.¹¹ In some cases the process can be simpler. For instance, residents who have lived in Venezuela for years (mainly in cities close to the border) visit their relatives in Colombia and are contacted by politicians (or their intermediaries) to participate. Once they register their IDs, they only return to vote on election day in the riverside municipalities of Manatí and Arroyohondo with all expenses paid.¹²

Electoral transhumance is much more complex than simple vote buying. Candidates invest several million pesos in down payments, transportation, and snacks in a long-term transaction that may not pay off if office is not captured. In addition, the process of changing the citizens' residence has to be done quietly and usually in advance to avoid suspicion from the NEC.

Transhumance is believed to be stronger in small municipalities since every vote carries relatively more weight. Hernán Penagos, president of the NEC, explains, “The most affected are small municipalities, where elections have 1,000, 2,000 or 3,000 votes. In these places, a 200-vote deal is a sure win.”¹³ According to Penagos, “In Soacha [a municipality near Bogotá] an average of 1,200 people per month have registered since last year; but in July 20,000 people registered in a single month; that is not reasonable... We have found places where we find 100 people with the same residence address, or with non-existent addresses.”¹⁴

¹⁰Figure A-3 shows a picture that illustrates evidence against Wilmer González, a governor elected in 2015 who was sent to prison in 2017 for illegally offering transportation and money in exchange for votes.

¹¹Based on (León, 2018) and an interview by Yennys Martínez (Social Control Inspector for Public Management). See <https://lasillavacia.com/historia/seis-caras-de-las-trampas-electorales-50547>.

¹²See <https://lasillavacia.com/trasteo-votos-le-madrugo-las-regionales-octubre-71425>

¹³See <https://www.eltiempo.com/elecciones-colombia-2019/otras-ciudades/alerta-roja-por-situacion-electoral-en-el-pais-cne-414908>

¹⁴Ibid.

2.3 Electoral Transhumance and Royalties

I use data on transhumance between 2012 and 2015 because it coincides with the period when the reform to the royalties was implemented and when local elections were held. In October 2011 and October 2015, mayors of municipalities, representatives of municipal councils, department governors, and members of departmental assemblies were elected. Those elected in 2011 held office from January 1, 2012 to December 31, 2015.¹⁵

There is some anecdotal evidence suggesting that the practice of transhumance could be more widespread in places that received more royalties. According to NEC Vice President Felipe García, “Transhumance does not respect regions and departments... it attacks mainly the municipalities with resources, with oil royalties, drug trafficking routes, money laundering or with a large collection of property taxes, because what is intended is to get the municipality with the votes and steal it.”¹⁶

Other newspaper articles have gone even further, explaining how political candidates are informed and update their behavior when they receive information about the revenues the local government will have (one of the main hypotheses tested in this paper):¹⁷

“It is incredible but true: the entire process of usurpation of royalties begins from political campaigns in municipalities and departments, usually part of an informant who may be an official of the Ministry of Finance, who passes the information to the politicians on duty about the amount to be allocated. Once this information is obtained, the candidates running for governors, mayors, councils, assemblies and Congress structure a campaign budget and since the money is not yet in the treasury, they go to a moneylender who lends it with a discount of up to 30%; in the event that the candidate does not win, he must secure the amount of the obligation with an efficient co-debtor. When the governor or mayor takes office, the process of royalties begins, with the argument that with them the works promised in the political campaign will be carried out, for this they go to the senator or representative, who helps them in the disbursement as much as possible.”

¹⁵Figure A-6 shows the timing of the reform and elections. By the time of the October 2011 election, candidates knew that a new allocation of royalties was going to take place. However, it was not until late August that the exact formulas and distribution of resources were defined. In practice, it was unlikely that candidates could anticipate transhumance in the 2011 election because the NEC does not allow registration attempts 45 days before election day.

¹⁶See <https://www.elheraldo.co/politica/se-ha-anulado-inscripcion-de-374625-cedulas-en-la-costa-219842>

¹⁷See <https://www.elespectador.com/opinion/asi-se-roban-las-regalias-columna-689890>

3 Theoretical Framework

I present a very simple model to analyze how certain municipality characteristics might hamper or foster the effect of an income shock on electoral transhumance. To facilitate the analysis, I start by presenting the simple case of a “closed” economy in which vote buying (but not transhumance) is possible. I then extend the framework to allow for transhumance.

3.1 A Closed Economy

Consider a simple economy of size N where two candidates, A and B , are running for office.¹⁸ The only way candidates can alter the course of the election is to engage in vote buying. We could think of this as the residual instrument once the candidates have extenuated all other possible actions (advertising, visits to the communities, debate participation, etc.). Although some complementarities could emerge from allowing the interaction of several instruments, I focus exclusively on vote buying and electoral transhumance, in line with my empirical analysis. I assume that only candidate A is corrupt and engages in vote buying.¹⁹

Citizens can be classified into two groups: *committed* and *disinterested*. There is a fraction γ of the latter group in the population. I assume that candidates have an idea of how *committed* voters behave. In particular, let s_C^k be the fraction of committed individuals that supports candidate $k \in \{A, B\}$. Then:

$$s_C^A - s_C^B = \delta$$

where $\delta \sim U[\underline{\delta}, \bar{\delta}]$ and $-1 \leq \underline{\delta} < \bar{\delta} \leq 1$. In this sense, δ is a measure of the relative advantage of candidate A with respect to B among committed voters. Moreover, $\Delta\delta = \bar{\delta} - \underline{\delta}$ is a measure of how precise is such prior.

Candidate A can bribe a disinterested citizen, but at a cost of c , which includes the cost of identifying a disinterested citizen and visiting them to make the offer or paying an emissary to do so. If the citizen agrees to sell her vote, the candidate pays her an amount p once the transaction is completed. With probability $1 - \theta$, the authorities will uncover the

¹⁸The fact that there are two candidates is without loss of generality.

¹⁹I assume that only one candidate is corrupt to simplify the analysis. The model can be generalized to a setting in which all candidates engage in corruption to some degree but face different disutilities of participating in vote buying. Alternatively, candidates might experience different costs from engaging in vote buying. The latter is consistent with some anecdotal evidence that some parties have the knowledge and the political machinery to perpetuate this practice over time.

illegal transaction and prohibit the individual from voting. Individual i has a disutility of selling her vote of d_i , where $d_i \sim U[0, 1]$. Thus, the utility of a disinterested individual is:

$$U_i = \begin{cases} \theta(p - d_i) + (1 - \theta)(-d_i) = \theta p - d_i & \text{if } i \text{ sells her vote} \\ 0 & \text{if } i \text{ does not sell her vote} \end{cases} \quad (1)$$

Let s^{VB} be the share of disinterested citizens that engage in vote buying. Then, candidate A chooses p to maximize her profit:

$$\pi = P(\text{A wins})f(R) - [\theta p + (1 - \theta)c]\gamma N s^{VB}$$

where $f(\cdot)$ represents the candidate's benefits from being elected, which are a function of the total income of municipality R . I conjecture (and test in the empirical section) that $f'(\cdot) > 0$. This is the case if, for example, a dishonest politician is able to appropriate a fraction of the resources transferred from the central government. The probability that candidate A wins is:

$$P(\text{A wins}) = P((1 - \gamma)(s_C^A - s_C^B) + \gamma\theta s^{VB} > 0)$$

Solving the first-order condition for this problem, we get:²⁰

$$p^* = \frac{f(R)}{2\Delta\delta(1 - \gamma)N} - \frac{(1 - \theta)c}{2\theta} \quad (2)$$

and $s^{VB} = \theta p^*$.

3.2 Trading voters

3.2.1 Generalization

Assume now two economies with population N_1 and N_2 . Candidates in the former (latter) economy are A_1 and B_1 (A_2 and B_2). As above, assume that A_1 and A_2 are corrupt candidates. Now, disinterested individuals not only decide *whether* to sell their vote, but also

²⁰Throughout the model, I assume that $\underline{\delta}$ and $\bar{\delta}$ are such that there is an interior solution to the model (so that the probability of winning for A is between zero and one). In this case, these parameters need to satisfy $\gamma\theta^2 p^* + (1 - \gamma)\bar{\delta} > 0$ and $\gamma\theta^2 p^* + (1 - \gamma)\underline{\delta} < 0$.

where to sell it. The utility of a disinterested individual i who resides in economy j is:

$$U_{ij} = \begin{cases} \theta_j p_j - d_i & \text{if } i \text{ sells vote in } j \\ \theta_{-j} p_{-j} - (1 + \lambda) d_i & \text{if } i \text{ sells vote in } -j \\ 0 & \text{if } i \text{ doesn't sell vote} \end{cases} \quad (3)$$

where $-j$ represents the other economy different from j , and λ represents the relative cost of electoral transhumance with respect to vote buying. λ should be interpreted as a non-monetary cost for the citizen. It could be a measure of the additional disutility of registering in a different municipality or the relative increase in the psychological cost of travelling longer distances.

The politician generally pays the monetary costs associated with transportation and paperwork. I capture this by assuming that the per capita cost of electoral transhumance is ψc (where c is the cost of vote buying) and $\phi > 1$ is a measure of the marginal increase in the cost due to transhumance. Let s_j^{VB} and s_j^T be the fraction of disinterested individuals in economy j that engages in vote buying and transhumance, respectively, in economy j . Candidate A_j chooses p_j to maximize:²¹

$$\pi_j = P(A_j \text{ wins})f(R_j) - [\theta_j p_j + c_j] \gamma_j N_j s_j^{VB} - [\theta_j p_1 + c_j \phi] \gamma_{-j} N_{-j} s_{-j}^T$$

The profits are very similar to the autarkic case with the exception of the third term in the right-hand side, which accounts for the fact that candidate A_j can bribe not just disinterested residents of the municipality where he runs (j) but also disinterested individuals of the other economy ($-j$).

The probability of A_j winning is:

$$P(A_j \text{ wins}) = P(N_j(1 - \gamma_j)\delta_j + N_j\gamma_j\theta_j s_j^{VB} + N_{-j}\gamma_{-j}\theta_{-j} s_{-j}^T > 0)$$

In the rest of the paper, I let γ , λ and c be the same in both economies and focus on the comparative statistics with respect to the other parameters.

²¹Note that I allow the reward for the exchange to vary by economy but assume that, conditional on voting in the same economy, an individual receives the same reward for selling his vote regardless of his residence. One could also extend the model to allow different prices for transhumance and vote buying, but I make this simplification since according to newspaper evidence, the range of prices for both practices is usually similar.

3.2.2 The Equilibrium

This model predicts that bilateral transhumance cannot coexist in equilibrium. Consider the case when $\theta_1 p_1 > \theta_2 p_2$ (Figure A-5).²² In such a case, an individual living in Economy 1 finds it more profitable to sell his vote in the economy where he resides regardless of the disutility of voting. Thus, no resident of Economy 1 votes in Economy 2 ($s_1^T = 0$).

Without a loss of generality, I assume that in autarky, $\theta_1 p_1^* \leq \theta_2 p_2^*$. Under this condition, three cases are possible. First, transportation costs may be so large that there is no transhumance. A fraction $s_j^{VB} \in [0, 1]$ of disinterested voters in economy j incur in vote buying and the complementary fraction do not vote. The solution to this equilibrium is trivial, and prices in each economy satisfy equation 2. The second possible case is that transportation costs are small and the gap between the prices under autarky is so large that transhumance displaces vote buying.²³ Third, vote buying and transhumance coexist in Economy 2; since this is the most realistic equilibrium, I focus on this case below.

Proposition 1 *Suppose that $\bar{\delta}$ and $\underline{\delta}$ are such that there is an interior solution to the problem (see footnote 20). In addition, let $1 < \theta_2 p_2^* < \theta_1 p_1^* < (1 + \lambda)\theta_2 p_2^*$ where p_1^* and p_2^* correspond to the equilibrium prices. Then:*

1. *In equilibrium $s_j^{VB} > 0$ for all $j \in \{1, 2\}$; $1 - s_j^{VB} - s_j^T > 0$ for all $j \in \{1, 2\}$; $s_1^T = 0$ and $s_2^T > 0$.*
2. *Let T_2 be the total number of citizens traveling from Economy 2 to Economy 1. Then, the following comparative statics hold:*

$$\frac{\partial^2 T_2 / N_1}{\partial R_1 \partial N_1} < 0, \frac{\partial^2 T_2 / N_1}{\partial R_1 \partial \theta_1} > 0, \frac{\partial^2 T_2 / N_1}{\partial R_1 \partial \Delta \delta_1} < 0;$$

$$\frac{\partial^2 T_2 / N_1}{\partial R_1 \partial N_2} > 0, \frac{\partial^2 T_2 / N_1}{\partial R_1 \partial \theta_2} = 0, \frac{\partial^2 T_2 / N_1}{\partial R_1 \partial \Delta \delta_2} = 0;$$

The proposition shows that under the stated conditions, individuals who sell their vote and those who do not vote coexist in both economies, and voters also migrate from Economy 2 to 1.

A key insight of the model is that it predicts that not only own characteristics but also characteristics of neighbors municipalities can be important for determining how a revenue

²²Equation 2 shows that this is likely to happen if, for example, N_1 is large enough compared to N_2 .

²³Note that there are subcases of this equilibrium depending on whether or not transhumance captures all disinterested voters in Economy 2.

shock can affect electoral transhumance. It also shows that price is a key channel through which most of these effects take place. For example, a positive shock in revenue makes transhumance more attractive when neighboring economies are larger. The rationale for this result is that a shock in revenue tends to increase the bribe, but this only translates into a higher incidence of transhumance if neighboring economies have a large pool of individuals available to move.

Armed with these results, in the empirical section I test whether own characteristics and neighboring characteristics are important for explaining whether an exogenous increase in revenue makes electoral transhumance more salient.

4 Data Sources and Identification Strategy

This section starts by discussing the source and definition of the main variables in the analysis. It then presents the empirical strategy. Table 1 reports the descriptive statistics of the main variables.

4.1 Data

I collect NEC data on the number of nullified registrations to measure the incidence of electoral transhumance. There were a total of 1,056,342 nullified registrations from 2012 to 2015 – a high incidence in 21 million of registered voters. The mean and median number of cases by municipality was 1,033 and 518, respectively. The main dependent variable used in the analysis, *transhumance*, is the fraction of cancelled records between 2012 and 2015 as reported by the NEC due to proof that an individual attempted to register in a municipality where he or she does not reside.

The ratio between total cancelled records between 2012 and 2015 as a proportion of the electoral roll in 2011). Figure 1 shows that transhumance is more likely to occur in municipalities with a smaller number of electors – consistent with the fact that votes in small municipalities are more valuable since the probability of being a pivotal voter is higher.

To construct the main main independent variable I use using information on royalties for the period between 2012 and 2015 at the subnational level from the National Planning Department, the entity in charge of distributing and monitoring the royalties.

4.2 Empirical Strategy

In the period 2012–2015, municipal royalties accounted for 10.3% of municipalities’ fiscal budgets, on average,²⁴ or 38% of their total discretionary-destination revenue. These funds were twice as large as the property tax, the primary source of revenue collected at the municipality level.

In order to smooth the expected fall in fiscal revenue among the producing municipalities (which received all royalties until 2011) due to the policy change in 2011, the allocation rule implemented after the reform earmarked a fraction of the royalties assigned to municipalities to be directly distributed among this group. This fraction decreased over time from 64% in 2012 to 30% in 2015. Each producing municipality receives a share of this fund that is roughly proportional to its contribution in the production of non-renewable resources.

The complementary fraction was distributed among two funds that I denote A and B . A municipality is classified as a recipient of fund A if it has unfulfilled basic needs (UBN, an index that measures the proportion of poor people in a municipality from the 2005 Census, henceforth UBN) greater than 35% and a recipient of fund B if its UBN is less than or equal to 35% and belongs to categories 4–6.²⁵ Therefore, no royalties were received by the 60 municipalities with a UBN less than or equal to 35% and in categories 4–6.²⁶ See Table A-1.

The complementary fraction is distributed in a ratio of 3 to 1 between funds A and B , and each fund is distributed among the municipalities as follows.²⁷ A municipality in fund A receives a fraction of royalties equal to its population share. A municipality in fund B receives a fraction of royalties equal to a weighted share of its population and UBN.²⁸ Though cumbersome, the rationale of the distribution process is as follows. First, the 3 : 1

²⁴There is a large amount of variation. Figure A-4 shows that in 2013, royalties represented up to 21.8% of the fiscal budget.

²⁵All municipalities are classified into one of seven categories from 0 (a special category) to 6 based on their population and discretionary-destination income. Municipalities in categories 4–6 have the lowest populations (less than 30,000 inhabitants) and the lowest discretionary-destination income (less than 30,000 monthly minimum wages).

²⁶These are the very rich municipalities including the three largest cities – Bogotá, Medellín, and Cali.

²⁷Consider the following example for clarification. Let R be the total amount of royalties to be transferred to municipalities in 2015. Producing municipalities receive $0.3R$, while the remainder, $0.7R$, is distributed between municipalities in funds A and B . Specifically, given the 3 : 1 ratio between A and B , the amount of royalties that funds A and B receive is $\frac{21}{40}R$ and $\frac{7}{40}R$, respectively.

²⁸To be more specific, let R_f be the total amount of resources assigned to fund $f \in \{A, B\}$. Then, municipality m in fund A receives royalties equal to $\frac{Population_m}{\sum_{i \in A} Population_i} \cdot R_A$. Municipality m in fund B receives royalties equal to $\frac{(Population_m)^{0.6}(UBN_m)^{0.4}}{\sum_{i \in B} (Population_i)^{0.6}(UBN_i)^{0.4}} \cdot R_B$.

ratio between funds A and B reflects the fact that the total populations are much larger among municipalities of fund A compared to municipalities of fund B . Panels A and B in Table 1 show that the average amount of royalties per capita received by a municipality in fund A was only 30% higher than in a municipality in fund B . Second, distribution among recipients of fund B is not done merely based on population to account for the fact that there is much more disparity among recipients in this group, where large populated areas (which are also less poor) would have kept most of the resources.

Two groups could have experienced a potential discontinuity at the 35% cutoff. First, municipalities in categories 4 to 6 could have moved between funds A and B . There are two opposite effects in play for such municipalities: (i) municipalities in fund A receive, on average, fewer royalties per capita (compared to those in fund B , see Panels A and B), but (ii) among recipients in fund A (and conditional on the level of population), those with a UBN close to 35% receive more royalties than any other municipality in the same group with a lower UBN (and thus, receive much more than the average). Panels C and D of Table 1 show that (ii) dominates (i); thus, among municipalities close to the cutoff, the allocation favors those with a $UBN \leq 35\%$. The second group is municipalities in categories 0 to 3. In this case, it is clear that those with $UBN > 35\%$ are favored by the law since no money is transferred to those with $UBN \leq 35\%$. However, since only 65 municipalities (5% of the sample) are in categories 0–3, I only focus on the first group. The sample for the main analysis contains 1,036 municipalities in categories 4–6. I then define the running variable for a municipality m as $Z_m = 0.35 - UBN_m$ and estimate:²⁹

$$X_m = \alpha + \beta \times I[Z_m \geq 0] + f(Z_m) + \varepsilon_m \quad (4)$$

across municipalities. X_m is the natural logarithm (of the average between 2012 and 2015) of the royalties (2012 COP) received by each municipality from the central government. $I[Z_m \geq 0]$ is a dummy variable that equals 1 if $Z_m \geq 0$ (thus, if UBN_m is less than 35%). $f(Z_m)$ is a linear (or quadratic) polynomial in Z_m at both sides of the discontinuity. The coefficient of interest is β . This regression is estimated across municipalities close to the 35%

²⁹I also re-estimate (but do not report) all the regressions in the paper including all municipalities (categories 0th to 6th) and define the running variable as:

$$Z_m = \begin{cases} UBN_m - 0.35 & \text{if category} \in \{0th, 1st, 2nd, 3rd\} \\ 0.35 - UBN_m & \text{if category} \in \{4th, 5th, 6th\} \end{cases}$$

The quantitative and qualitative results are very similar.

cutoff and in categories 4 to 6. A municipality is defined as close to the cutoff if the running variable is within the Calonico, Cattaneo, and Titiunik (2014) optimal bandwidth.

To study the effect of transfers on electoral transhumance, I estimate:

$$Y_m = \delta + \gamma \times \hat{X}_m + f(Z_m) + \varepsilon_m, \quad (5)$$

where \hat{X}_m are the fitted values of equation 4 and Y_m is the dependent variable. The key dependent variable, *transhumance*, is the ratio between cancelled registration attempts (between 2012 and 2015) and electoral roll (measured in 2011). I also present the main results when using alternative definitions of the variable. The coefficient of interest is γ . I mostly focus on reduced-form estimates when estimating equation 4 but using instead Y_m as the dependent variable.

5 Results

I start by discussing how to study the validity of the regression discontinuity design (RDD) assumptions in this setting. I then present evidence of the first stage, showing that the 2011 reform created a large discontinuity in the amount of royalties received by municipalities around the 35% cutoff of the *UBN*. I then present the main results – the effect of subnational transfers on electoral transhumance. In particular, I test whether a higher allocation of royalties for the period 2012–2015 produced a higher incidence of nullified cases in the same period (measured as total cancelled records between 2012 and 2015 as proportion of electoral roll in 2011).

5.1 RDD Assumptions

Before presenting the main results, I briefly argue that the *UBN* index was unlikely to be manipulated because the components defined to construct this index were defined 6 years before the reform took place based on 2005 Census data. Figure 2 shows the distribution of *UBN* and reports the McCrary (2008) statistic, according to which I am unable to reject the null hypothesis of no jump in the distribution. The discontinuity estimate (log difference in height) is -0.0033 (SE = 0.1743), which indicates that manipulation of the index was unlikely.

An additional concern is that the *UBN* – specifically the cutoff – is used to target other programs. To the best of my knowledge, the *UBN* index is not used to target subnational

entities in any other policy. However, I investigate whether total revenue and other key variables changed discontinuously around the 35% cutoff. The results, reported in Figure 3, suggest that the level of other types of revenue – total revenue (excluding royalties), discretionary-destination revenue, and property tax revenue – are very similar at both sides of the cutoff. Panel D shows that the amount of royalties directly transferred to producing municipalities does not change discontinuously at the cutoff, which confirms that if there is a jump in total royalties, it is due to the assignation of funds A and B .

5.2 Discontinuity and First Stage

Figure 4 shows that there was in fact a significant discontinuity in the amount of royalties that favored municipalities with $UBN \leq 35$ around the threshold. Panel A of Table 3 confirms this result. Columns 1 and 2 (3 and 4) report estimates of equation 4 allowing for a linear (quadratic) polynomial on UBN estimated separately on both sides of the cutoff. Controls included in even columns are the natural logarithm of population, municipality size category (4, 5 or 6) fixed effects, and electoral jurisdiction fixed effects. The coefficient ranges from 0.698 to 1.030.

The most conservative estimate suggests that municipalities with a UBN barely below 35% received 70% (SE = 0.197) more in royalties compared to those with a UBN barely above 35%. This effect represents a 6–7% increase in the municipality’s total budget, and is roughly equivalent to a 40% increase in the discretionary-destination revenue (over which the mayors have much more control).

5.3 The Effect of Subnational Transfers on Electoral Transhumance

The key dependent variable in my analysis, *transhumance*, is the ratio between cancelled registration attempts (between 2012 and 2015) and electoral roll (measured in 2011). I also present the main results when using alternative definitions.

Panels B and C of Table 3 report causal evidence that transfers from the central government to local administrations increase electoral transhumance.

Panel B reports the reduced-form regression (equation 4, where the dependent variable is *transhumance*). The coefficient ranges from 3.25 to 3.55. The coefficient in column 1 (3.55, SE = 0.9) indicates that the jump in royalties around the cutoff led to a 3-percentage-point increase in electoral transhumance. This effect is as large as one-third of the mean of the

dependent variable. These estimates presume that when running for office is more profitable, local politicians are willing to engage in longer-term practices of clientelism.

Panel C reports the second stage (equation 5). The estimate is relatively stable, ranging from 52.85% to 84.66%. Considering the size of the effect in column 1, the coefficient of 78.81 (SE = 31.04) implies that when royalties double, electoral transhumance increases by 78 percentage points.

I focus here on the reduced-form estimates. To further illustrate the magnitude of this impact, Panel A of Figure 5 plots the transhumance average of six equally sized bins to each side of the cutoff as well as the coefficients and 95% confidence intervals of a local linear polynomial regression. The figure shows that transhumance ranges from 6.6% to 9.7% from the left to the right of the cutoff. Panel B shows that the results are similar when a quadratic linear polynomial regression is estimated.

Appendix Table A-2 presents non-parametric estimates. Kernels used in the regressions are triangular (Columns 1 and 2), uniform (Columns 3 and 4), and Epanechnikov (Columns 5 and 6). Odd (even) columns include but do not report a linear (quadratic) polynomial estimated separately on both sides of the cutoff. The magnitude of the coefficient and the standard error are very similar to the parametric estimators. The coefficient ranges from 2.83 to 3.56, suggesting that the methodology of estimation, the kernel, and the polynomial degree are unlikely to change the quantitative or qualitative results.³⁰

As discussed above, the income shock that municipalities above the threshold received led to a 3-percentage-point increase in electoral transhumance. In other words, in these municipalities, there were three more registration attempts for every 100 eligible voters. But is this effect large enough to change the course of an election? I conduct a back-of-the-envelope calculation to answer this question. I assume an inter-municipal migration rate for the quadrennium of 1.5% between 2012 and 2015.³¹ This implies that in the absence of electoral transhumance, we should have expected around 525,000 attempts to register in a different municipality.³² We observed 864,279 attempts (see section 2), which suggests

³⁰The optimal size of the bandwidth in the regression is 8.135. Figure A-7 plots the estimator (as well as 95% confidence intervals) when a bandwidth equal to $8.135 \cdot \kappa$ is used instead, where κ goes from 50% to 150%. The coefficient is stable although less precise for values of $\kappa < 0.65$.

³¹The National Statistical Agency estimates that the average inter-municipal migration rate between 2000 and 2016 was 6.14% <https://www.dane.gov.co/index.php/estadisticas-por-tema/demografia-y-poblacion/movilidad-y-migracion>. I assume that the growth rate was constant for the whole period, so that the migration in a quadrennium is equivalent to roughly one-fourth of that figure.

³²In 2012 Colombia's population was 44 million. I assume that 80% of the population was old enough to vote ($44,000,000 \cdot 80\% \cdot 1.5\% \approx 525,000$).

that around 339,279 attempts of transhumance succeeded. I assume that the ratio between successful attempts and cancelled attempts of transhumance is constant and equal to 32% ($\approx 339,279/1,056,342$; the denominator is the total number of cancelled records, see section 2). I finally use the fact that the turnout rate in Colombia is approximately 51% to estimate the number of individuals that successfully registered as a proportion of the people that turned out to vote:

$$\text{Estimated Effect} \rightarrow \underbrace{3.55}_{\frac{\text{Cancelled records}}{\text{Electoral roll}}} \times \underbrace{32\%}_{\frac{\text{Successful records}}{\text{Cancelled records}}} \times \underbrace{1/51\%}_{\frac{\text{Electoral roll}}{\text{Turnout}}} = \underbrace{2.23\%}_{\frac{\text{Successful records}}{\text{Turnout}}}$$

This implies that, under the assumption that only one candidate per municipality engaged in transhumance, we should have expected the share of votes for this candidate to have increased by 2.23% among municipalities above the threshold. I find that 15% of the 2011 municipal elections were won by a margin equal to or less than that value.³³

Before presenting more substantial results, I discuss two additional robustness exercises. Figure A-8 explores two alternative transformations of the dependent variable. Rather than using the ratio between the number of cancelled records and the electoral roll, I plot the share of cancelled records (as a fraction of the total number of records) in Panel A, and the ratio of total records to electoral roll in Panel B. Both variables are consistent with the claim that more resources to a local administration led to an increase in attempts of electoral transhumance.

Although the assumptions of the regression discontinuity hold, and it is very unlikely that there is a direct association between being on one side of the cutoff and the dependent variable that is unrelated to royalties, I further explore this concern in placebo tests (results reported in Table 2). If municipalities close to the cutoff and with $UBN \leq 35$ are different from those close to the cutoff but with $UBN > 35$ in the sense that the former group systematically reports a higher fraction of cancelled records, then one should expect to find a difference in 2011, before the reform was implemented. I then again construct the dependent variable using information only on cases from 2011.

In Column 1, I assess whether this is the case. I find that the coefficient is positive but very close to zero and not statistically significant (the effect is merely 0.044, $SE = 0.0782$). In addition, I test whether municipalities around the cutoff were different in a large group of electoral variables from the 2011 election: number of electors, total votes, number of

³³In particular, the average margin of victory (difference in the share of votes between the winner and the runner-up) for the 2011 municipal elections was 8.6%.

candidates, number of parties, votes for the party that was ruling before the election, votes of the future mayor, and the margin of victory. In all cases, I find that the coefficients are very close to zero. The difference in the dependent variables among municipalities around the cutoff is less than 10% of a standard deviation in all cases.

5.4 Heterogenous Effects

Overall, these results provide compelling evidence of a causal effect of transfers to local administrations on candidates' ability to modify actions – particularly, to engage in long-term clientelistic relationships. Table 4 examines heterogeneous effects with pre-determined characteristics of municipalities (and characteristics of neighboring municipalities) to better understand both the mechanisms at play and the additional implications of these findings.

I use five different variables to test the predictions of the model (particularly the comparative statics from Proposition 1). To proxy for the size of the economy N , I use the number of inhabitants and the electoral roll in 2011. I use the average margin of victory in the 2011 election to proxy for $\Delta\delta^{-1}$ (municipalities are expected to have close elections if they had close elections in previous years). Finally, I use two indexes of state capacity (measured before 2012) to proxy for θ^{-1} . The first is Judicial Efficiency, measured as the ratio between *Total Resolved Judicial Cases* and *Total Unresolved Judicial Cases*³⁴ relative to *Total Judicial Cases*. The second is an index of fiscal transparency calculated by the National General Attorney based on how transparent and efficient municipalities are in reporting their expenditures.

Table 4 reports the results of these tests. Panel A reports the interactions with municipalities' own characteristics. I find that the effect is larger in places with low populations and eligible voters (Columns 1 and 2). The effect is also larger (but only marginally significant) among municipalities where there is less uncertainty about the election and in those with low state capacity (fiscal transparency is only marginally significant).

I then take the (unweighted) average of these characteristics among the neighbors of each municipality and interact the effect with these variables. The results are reported in Panel B. I find that the only relevant characteristic is the size of the economy: a revenue shock has a stronger effect on transhumance when neighboring municipalities are relatively large.

Overall, I find that the signs of the estimated interactions are in line with the effects predicted by the model (with the exception that in two cases the results are not significant

³⁴Unresolved cases are those where nobody is found guilty or terms expire and the judge is forced to close the case with no definite action.

at the 95% confidence level).

5.5 Smoothing Corruption over Time

Finally, I study whether political candidates are able to smooth corruption over time and coordinate to overcome the risks and costs of engaging in long-term clientelistic relationships when the incentives to capture office increase. To do so, I construct the ratio between the number of cancelled records for each year between 2012 and 2015 and the electoral roll. I use each of these variables as a dependent variable in the reduced-form regression and report the results in Table 5. In 2012, 3 years before the election, the coefficient is small and not significant. It doubles in 2013 from 0.66 to 1.41 percentage points before reaching its peak in 2014 and 2015 with 3.81 and 4.80 percentage points, respectively. The table shows two interesting patterns. First, as one could have anticipated, the effect is larger in the election year (2015). Second and more interestingly, candidates are able to foresee the demand for vote buying: the number of cancelled cases of registration increases even 2 years prior to election day.

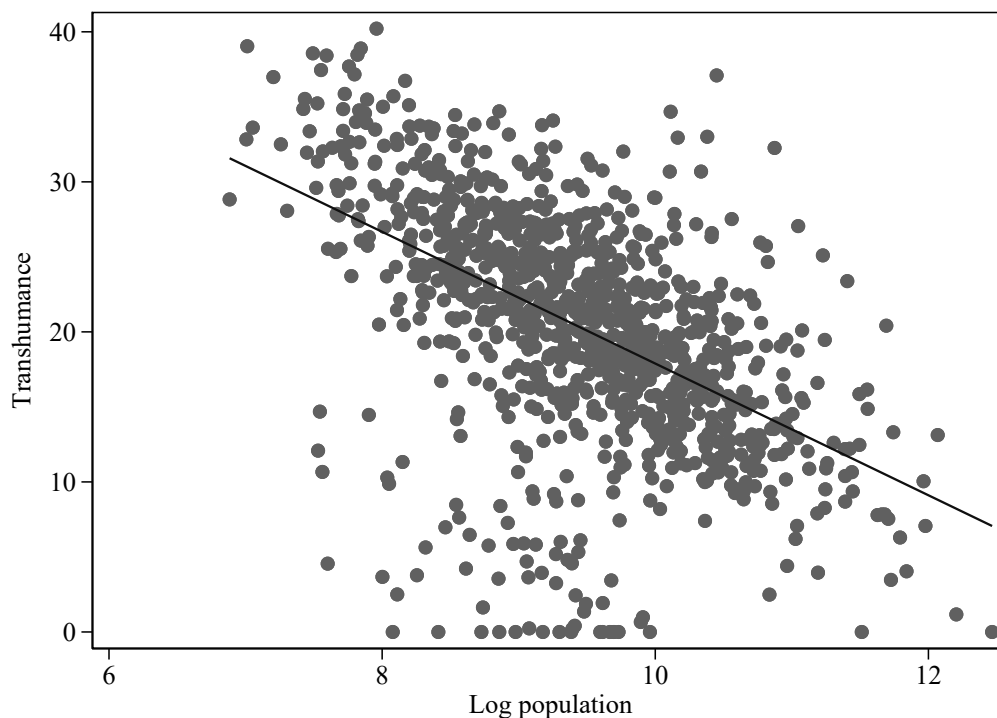
6 Concluding Thoughts and Future Work

I study whether political candidates and citizens are able to coordinate and overcome the risks and costs associated with engaging in long-term clientelist relationships when the government's budget is larger, which increases the potential benefits of capturing office. I find robust evidence that this is the case by showing that political candidates in municipalities that received more transfers from the central government (by exploiting a discontinuity in the allocation process) are more likely to engage in very complex forms of vote buying.

In addition to showing that candidates exert more effort when the municipality's budget is larger, this analysis also suggests that candidates are informed about potential sources of revenue that local governments might receive in the future, and that they consider this information when deciding how to conduct their political campaigns. In a future study I would like to explore the consequences of this setting in the subsequent election (in 2015). This would shed some light on the mechanisms at play in these results. In line with the argument above, whose effort is increasing? Is the effort made by the incumbent, who has firsthand information that the seat is profitable? Or does the average candidate realize that it is worth exerting more effort? Although mayors are not eligible for reelection in Colombia,

7 Figures and Tables

Figure 1: Electoral Transhumance and Population

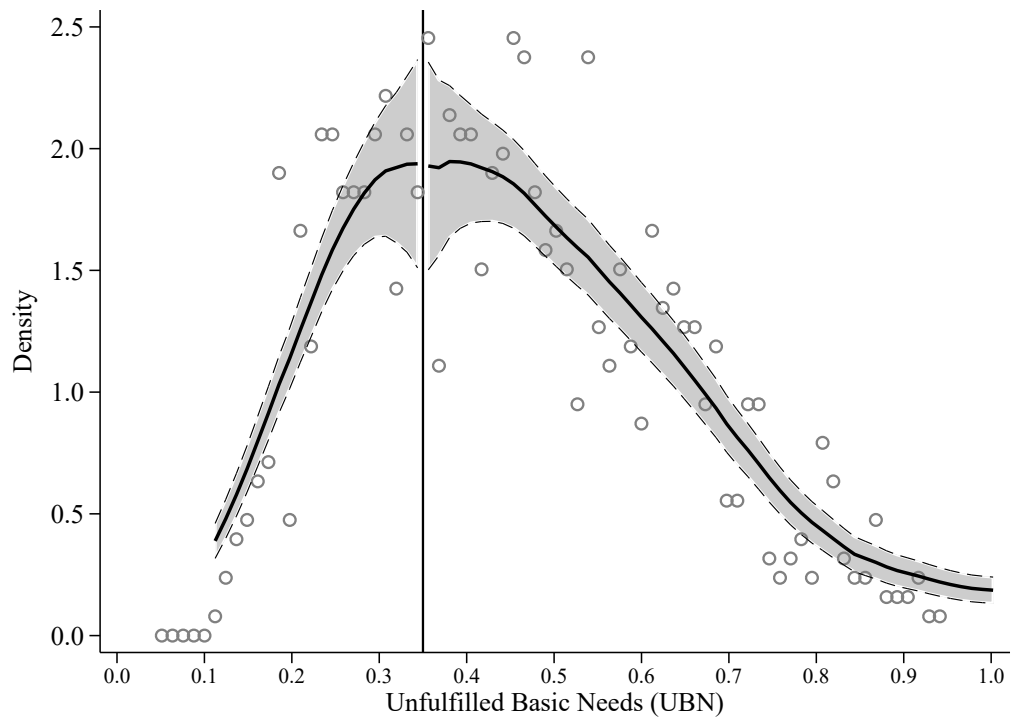


Notes: This figure plots the relationship between *transhumance* and the natural logarithm in each municipality. *Transhumance* is the fraction of cancelled records between 2012 and 2015 (due to proof that an individual attempted to register in a municipality where he or she does not reside).

the analysis can be performed at the party level. Alternatively, council members are also elected by popular vote and can be reelected.

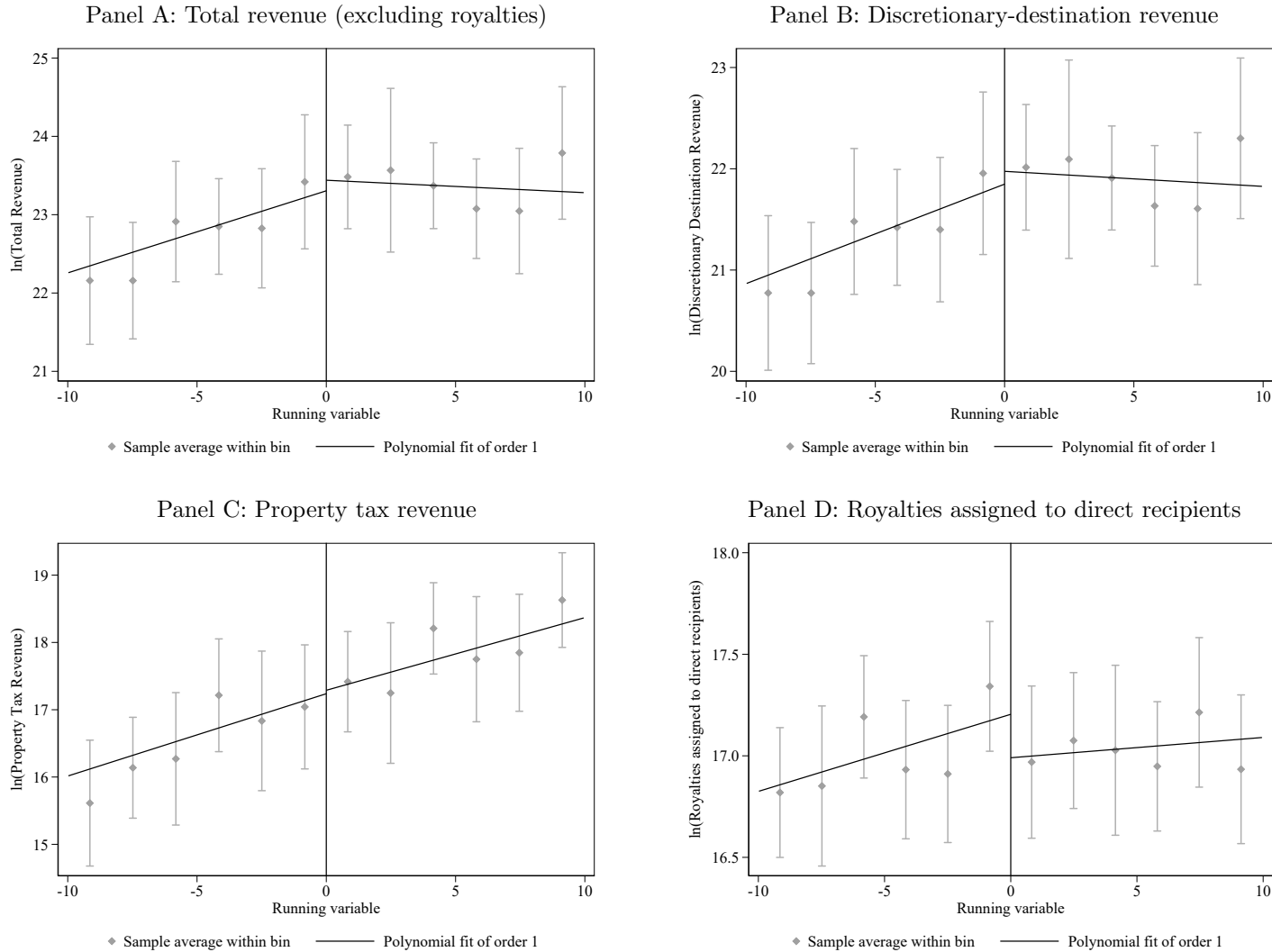
An important question in the literature on corruption concerns its efficiency costs since, at least theoretically, not every form of corruption decreases efficiency (Olken, 2007, 2009). It is worth exploring how a municipality's development changes after the introduction of this reform in Colombia, and how is the performance of mayors and council members elected in 2015 (presumably elected with the help of transhumance) in terms of public good provision and living standards.

Figure 2: Distribution of Unfulfilled Basic Needs Index



Notes: Figure plots the *UBN* index that measures the proportion of poor people in a municipality based on 2005 Census data. The allocation of transfers changed discontinuously at the 35% cutoff starting in 2012, as described in section 4. Discontinuity estimate (log difference in height) is -0.0033 (standard error 0.1743).

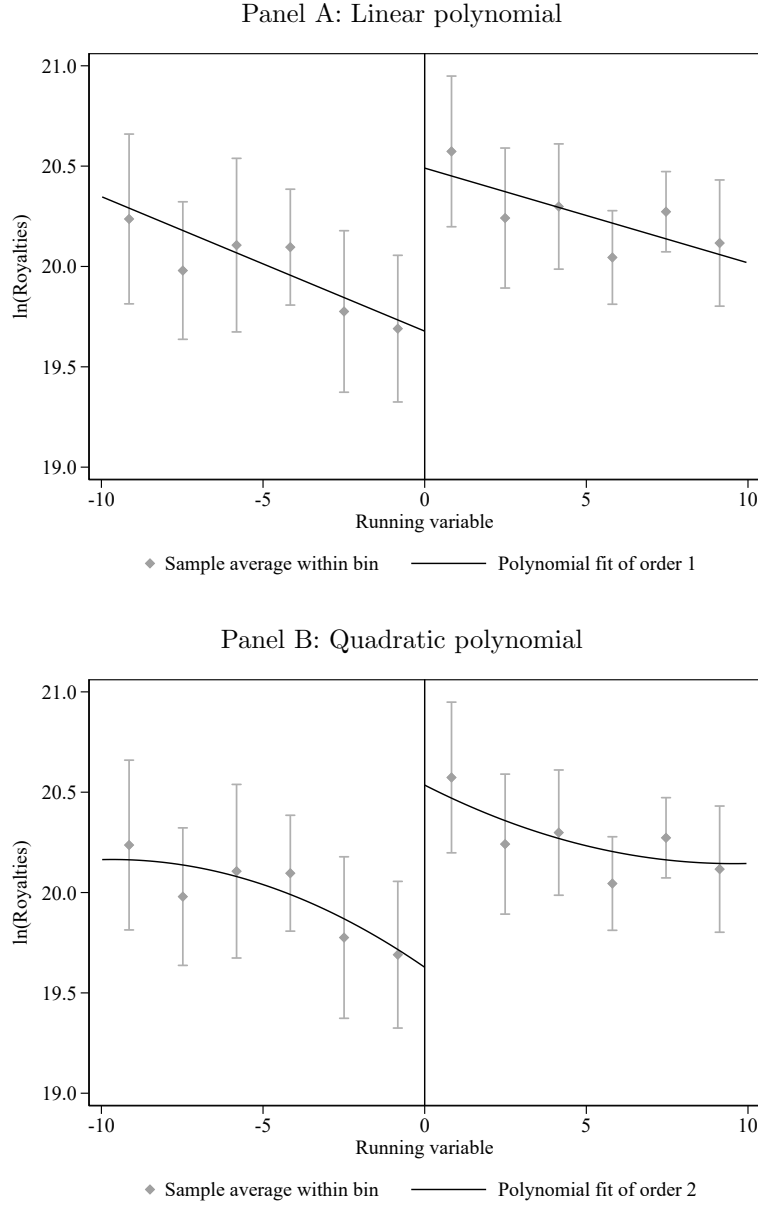
Figure 3: (No) Discontinuity of Other Sources of Income around the Cutoff



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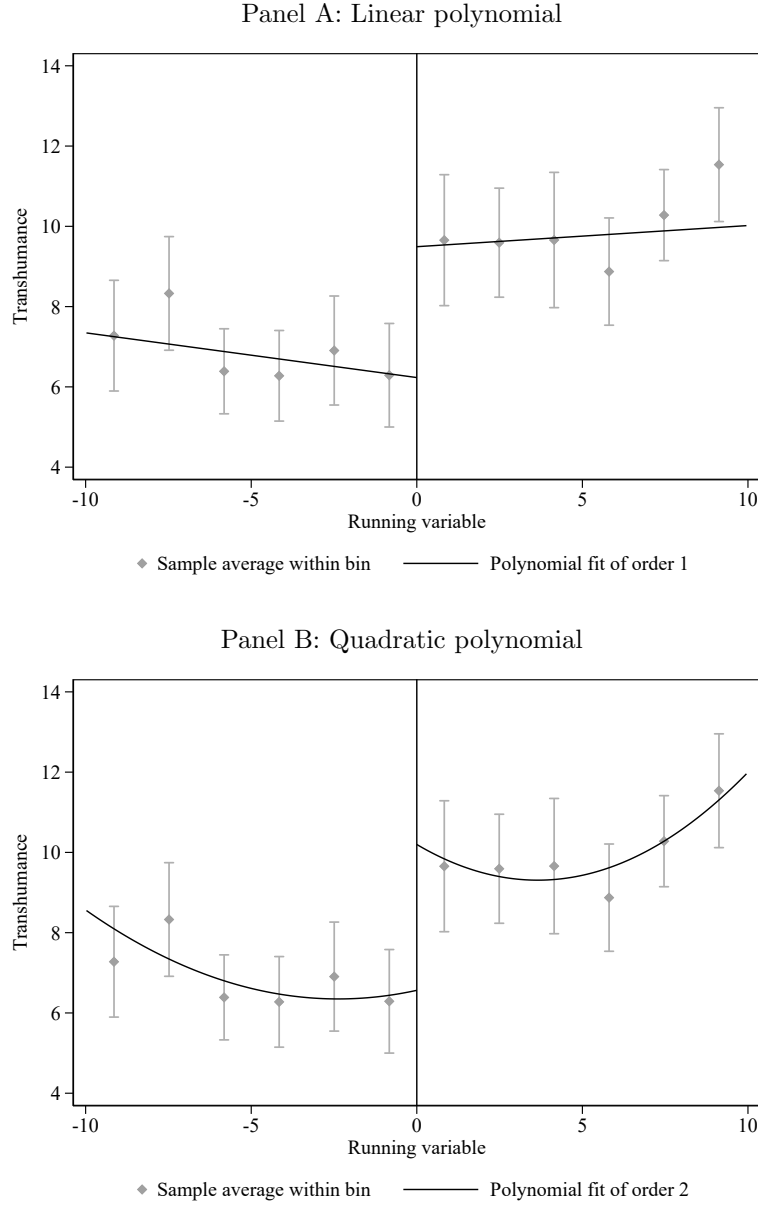
Notes: The running variable is $z = 0.35 - UBN$ (see Section 4), where UBN is the Unfulfilled Basic Needs index, which measures the proportion of poor people in a municipality based on 2005 Census data. The vertical axis is (the natural logarithm of) the average (between 2012 and 2015) of the variable in the header of each panel. The figure plots the sample averages of six equally sized bins to each side of the cutoff as well as the coefficients and 95% confidence intervals (mimicking the variance evenly spaced method using a spacings estimator) of a local linear polynomial regression. Calonico et al. (2014) optimal bandwidth.

Figure 4: Discontinuity of Royalties around the Cutoff



Notes: The running variable is $z = 0.35 - UBN$ (see Section 4), where UBN is the Unfulfilled Basic Needs index, which measures the proportion of poor people in a municipality based on 2005 Census data. $\ln(Royalties)$ is the natural logarithm (of the average between 2012 and 2015) of the royalties (in 2012 COP) received by each municipality from the central government. The figure plots the sample averages of six equally sized bins to each side of the cutoff as well as the coefficients and 95% confidence intervals (mimicking the variance evenly spaced method using a spacings estimator) of a local linear (or quadratic) polynomial regression. Calonico et al. (2014) optimal bandwidth.

Figure 5: Discontinuity of Electoral Transhumance around the Cutoff



Notes: The running variable is $z = 0.35 - UBN$ (see section 4), where UBN is the Unfulfilled Basic Needs index, which measures the proportion of poor people in a municipality based on 2005 Census data. *Transhumance* is the ratio between the number of cancelled records between 2012 and 2015 (due to proof that an individual attempted to register in a municipality where he or she does not reside) and electoral roll. The figure plots the sample averages of six equally sized bins to each side of the cutoff as well as the coefficients and 95% confidence intervals (mimicking the variance evenly spaced method using a spacings estimator) of a local linear (or quadratic) polynomial regression. Calonico et al. (2014) optimal bandwidth.

Table 1: Summary Statistics

	<i>Descriptive Statistics</i>					
	Observations	Mean	Median	SD	Min	Max
Panel A. All municipalities with $UBN > 35$						
ln(Royalties)	696	20.36	20.24	1.16	17.63	25.25
Royalties per capita (millions of COP)	696	0.08	0.05	0.23	0.03	5.01
Transhumance	696	6.36	6.13	3.84	0.00	15.95
Panel B. All municipalities with $UBN \leq 35$						
ln(Royalties)	340	20.25	20.16	0.77	18.96	24.11
Royalties per capita (millions of COP)	340	0.06	0.04	0.12	0.00	1.74
Transhumance	340	9.93	10.03	3.99	0.76	19.54
Panel C. Municipalities close to the cutoff and with $UBN > 35$						
ln(Royalties)	162	19.93	19.77	1.04	18.19	23.16
Royalties per capita (millions of COP)	162	0.06	0.05	0.07	0.04	0.62
Transhumance	162	6.73	6.65	3.53	0.00	15.03
Panel D. Municipalities close to the cutoff and with $UBN \leq 35$						
ln(Royalties)	159	20.29	20.13	0.85	19.01	24.11
Royalties per capita (millions of COP)	159	0.07	0.05	0.09	0.02	0.91
Transhumance	159	9.61	9.73	4.02	0.92	19.51

Notes: The table reports descriptive statistics of the main variables for the 1,036 municipalities in categories 4, 5, and 6. Panels C and D restrict the sample to municipalities close to the cutoff. A municipality is defined as close to the cutoff if its UBN is within the Calonico et al. (2014) optimal bandwidth. UBN is the Unfulfilled Basic Needs Index, which measures the proportion of poor people in a municipality based on 2005 Census data. The assignation of transfers changed discontinuously at the 35% cutoff starting in 2012 as described in section 4. $ln(Royalties)$ is the natural logarithm (of the average between 2012 and 2015) of the royalties (2012 COP) received by each municipality from the central government. $Transhumance$ is the ratio between the number of cancelled records between 2012 and 2015 (due to proof that an individual attempted to register in a municipality where he or she does not reside) and electoral roll.

Table 2: Transfers and Electoral Transhumance Before the Reform

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>Dependent variable</i>	<i>Transhumance</i>	<i>Electors</i>	<i>Total votes</i>	<i>Number of candidates</i>	<i>Number of parties</i>	<i>Votes incumbent</i>	<i>Votes winner</i>	<i>Margin of victory</i>
Above threshold	0.3246 (0.4354)	-0.9657 (1.2680)	-0.2229 (0.3000)	-0.1056 (0.2103)	-0.0855 (0.1621)	0.3414 (0.6126)	0.2674 (0.4823)	0.0325 (0.0435)
Beta-coefficient	[0.072]	[-0.083]	[-0.082]	[-0.051]	[-0.054]	[0.057]	[0.056]	[0.072]

Notes: Unit of observation is a municipality. *Favored with assignation* is a dummy coded 1 for municipalities with a non-negative running variable ($z = 0.35 - UBN \geq 0$) or equivalently $UBN \leq 35$ (see section 4). *Transhumance* is the ratio between the number of cancelled records between 2012 and 2015 (due to proof that an individual attempted to register in a municipality where he or she does not reside) and electoral roll. All other dependent variables are from the 2011 mayoral election. *Electors* and *Total votes* are the (natural logarithm of) the number of eligible voters and actual voters, respectively. *Number of candidates* (*Number of parties*) is the number of candidates (parties) that ran in that election. *Votes incumbent* is the share of votes obtained by the party of the 2007–2011 mayor. *Votes winner* is the share of votes obtained by the winner of the election. *Margin of victory* is the difference in the share of votes between the winner and the runner-up. All regressions include (but do not report) a linear polynomial estimated separately on both sides of the cutoff. A Beta coefficient is the implied effect on the dependent variable, in standard-deviation units, of a 0–1 increase in the main independent variable. Calonico et al. (2014) optimal bandwidth. Robust standard errors are reported in parentheses.

Table 3: The Effect of Transfers on Electoral Transhumance

	(1)	(2)	(3)	(4)
<i>Panel A. First stage. Dependent variable is $\ln(\text{Royalties})$</i>				
Above threshold	0.7513 (0.2230)	0.6978 (0.1970)	1.0300 (0.3152)	0.9625 (0.2711)
<i>Panel B. Reduced form. Dependent variable is Transhumance</i>				
Above threshold	3.5533 (0.8976)	3.5448 (0.9005)	3.2664 (1.3784)	3.2538 (1.3809)
<i>Panel C. Second stage. Dependent variable is Transhumance</i>				
$\ln(\text{Royalties})$	78.8197 (31.0356)	84.6654 (33.0275)	52.8531 (27.5869)	56.3434 (29.0611)
Observations	321	321	321	321
Controls		✓		✓
Polynomial	Linear	Linear	Quadratic	Quadratic

Notes: Unit of observation is a municipality. $\ln(\text{Royalties})$ is the natural logarithm (of the average between 2012 and 2015) of the royalties (in 2012 COP) received by each municipality from the central government. *Favored with assignation* is a dummy coded 1 for municipalities with a non-negative running variable ($z = 0.35 - \text{UBN} \geq 0$) or equivalently $\text{UBN} \leq 35$ (see section 4). *Transhumance* is the ratio between the number of cancelled records between 2012 and 2015 (due to proof that an individual attempted to register in a municipality where he or she does not reside) and electoral roll. Controls included in even columns are the natural logarithm of population, municipality size category fixed effects, and electoral jurisdiction fixed effects. All regressions include (but do not report) the linear (or quadratic) polynomial estimated separately on both sides of the cutoff. Calonico et al. (2014) optimal bandwidth. Robust standard errors are reported in parentheses.

**Table 4: The Effect of Transfers on Electoral Transhumance
Heterogeneous Effects with Own and Neighbors' Characteristics**

	(1)	(2)	(3)	(4)	(5)
<i>Dependent variable is Transhumance</i>					
	<i>Population</i>	<i>Electors</i>	<i>Margin of victory</i>	<i>Judicial efficiency</i>	<i>Fiscal transparency</i>
<i>Panel A. Heterogenous effects with Own Characteristics</i>					
Above threshold	2.7319 (0.7325)	2.6226 (0.7032)	4.4638 (0.9525)	4.4482 (0.9522)	3.5227 (0.9028)
Above threshold \times ...	-0.6551 (0.0435)	-0.6289 (0.0418)	0.2538 (0.1329)	-0.4983 (0.2666)	-0.1796 (0.1204)
Proxy for	N_1	N_1	$\Delta\delta_1^{-1}$	θ_1^{-1}	θ_1^{-1}
Sign predicted	< 0	< 0	> 0	< 0	< 0
<i>Panel B. Heterogenous effects with Neighbors Characteristics</i>					
Above threshold	4.4806 (0.9479)	4.3014 (0.9099)	4.2853 (0.9144)	4.2703 (0.9142)	4.4482 (0.9522)
Above threshold \times ...	0.2593 (0.1311)	0.2489 (0.1259)	0.0537 (0.2473)	-0.1738 (0.1158)	-0.0453 (0.0302)
Proxy for	N_2	N_2	$\Delta\delta_2^{-1}$	θ_2^{-1}	θ_2^{-1}
Sign predicted	> 0	> 0	$= 0$	$= 0$	$= 0$
Observations	321	321	321	321	321

Notes: Unit of observation is a municipality. For each column, the table reports the coefficient of *Favored with assignation* and the interaction between *Favored with assignation* and the variable in the header (the non-interacted variable is included but not reported). *Favored with assignation* is a dummy coded 1 for municipalities with a non-negative running variable ($z = 0.35 - UBN \geq 0$) or equivalently $UBN \leq 35$ (see Section 4). *Electors* is the (natural logarithm of) the number of eligible voters in 2011. *Population* is also in logs and represents numbers from the 2005 Census. *Margin of victory* is the difference in the share of votes between the winner and the runner-up in the 2011 election. *Judicial efficiency* is the difference between Total Resolved Judicial Cases and Total Unresolved Judicial Cases relative to Total Judicial Cases (unresolved cases are those where nobody is found guilty or terms expire and the judge is forced to close the case with no definite action). *Fiscal transparency* is an index computed by the National General Attorney to measure the performance of strategic anti-corruption standards in municipalities based on internal control, recruitment, administrative management systems, and accountability. *Transhumance* is the ratio between the number of cancelled records between 2012 and 2015 (due to proof that an individual attempted to register in a municipality where he or she does not reside) and electoral roll. All regressions include (but do not report) a linear polynomial estimated separately on both sides of the cutoff. Calonico et al. (2014) optimal bandwidth. Robust standard errors are reported in parentheses.

Table 5: The Effect of Transfers on Electoral Transhumance over Time

	(1)	(2)	(3)	(4)
<i>Dependent variable is Transhumance</i>				
	2012	2013	2014	2015
Above threshold	0.6602 (0.4509)	1.4102 (0.4509)	3.8183 (0.9011)	4.8033 (0.8976)

Notes: Unit of observation is a municipality. *Favored with assignation* is a dummy coded 1 for municipalities with a non-negative running variable ($z = 0.35 - UBN \geq 0$) or equivalently $UBN \leq 35$ (see section 4). *Transhumance* is the ratio between the number of cancelled records between 2012 and 2015 (due to proof that an individual attempted to register in a municipality where he or she does not reside) and electoral roll. All regressions include (but do not report) a linear polynomial estimated separately on both sides of the cutoff. Calonico et al. (2014) optimal bandwidth. Robust standard errors are reported in parentheses.

References

- Bonet, J., & Urrego, J. (2014). El sistema general de regalías:¿ mejoró, empeoró o quedó igual. *Documentos de trabajo sobre economía regional*(198).
- Brollo, F., Nannicini, T., Perotti, R., & Tabellini, G. (2013). The political resource curse. *American Economic Review*, 103(5), 1759–96.
- Brosio, G., & Jiménez, J. P. (2012). The intergovernmental allocation of revenue from natural resources: finding a balance between centripetal and centrifugal pressure. In *Decentralization and reform in latin america*. Edward Elgar Publishing.
- Calonico, S., Cattaneo, M. D., & Titiunik, R. (2014). Robust nonparametric confidence intervals for regression-discontinuity designs. *Econometrica*, 82(6), 2295–2326.
- Caselli, F., & Michaels, G. (2013). Do oil windfalls improve living standards? evidence from brazil. *American Economic Journal: Applied Economics*, 5(1), 208–38.
- CNE. (2019). Informe final de transhumancia. *Concejo Nacional Electoral, 09 de octubre de 2019*.
- Corbi, R., Papaioannou, E., & Surico, P. (2019). Regional transfer multipliers. *The Review of Economic Studies*, 86(5), 1901–1934.
- Dube, O., & Vargas, J. F. (2013). Commodity price shocks and civil conflict: Evidence from colombia. *The Review of Economic Studies*, 80(4), 1384–1421.
- Echeverry, J., Masmela, A., & García, A. (2011). Por qué es necesaria la creación de un sistema general de regalías. *Notas Fiscales*, 2, 2–46.
- Ferraz, C., & Monteiro, J. (2014). Does oil make leaders unaccountable? evidence from brazil’s oshore oil boom.
- Gadenne, L. (2017). Tax me, but spend wisely? sources of public finance and government accountability. *American Economic Journal: Applied Economics*.
- León, J. (2018). *El dulce poder*. La Silla Vacía, Aguilar.
- Litschig, S., & Morrison, K. (2013). The impact of intergovernmental transfers on education outcomes and poverty reduction. *American Economic Journal: Applied Economics*, 5(4), 206–40.
- Martinez, L. R. (2019). Sources of revenue and government performance: Evidence from colombia. *Available at SSRN 3273001*.
- Maya, E. (2018). Recursos del sistema general de regalías: Informe auditoría de cumplimiento. *Contraloría General de la República*.
- McCrary, J. (2008). Manipulation of the running variable in the regression discontinuity

- design: A density test. *Journal of econometrics*, 142(2), 698–714.
- Olken, B. (2007). Monitoring corruption: evidence from a field experiment in indonesia. *Journal of political Economy*, 115(2), 200–249.
- Olken, B. (2009). Corruption perceptions vs. corruption reality. *Journal of Public economics*, 93(7-8), 950–964.
- Olken, B., & Pande, R. (2012). Corruption in developing countries. *Annual Review of Economics*, 4(1), 479–509.
- Vicente, P., & Wantchekon, L. (2009). Clientelism and vote buying: lessons from field experiments in african elections. *Oxford Review of Economic Policy*, 25(2), 292–305.

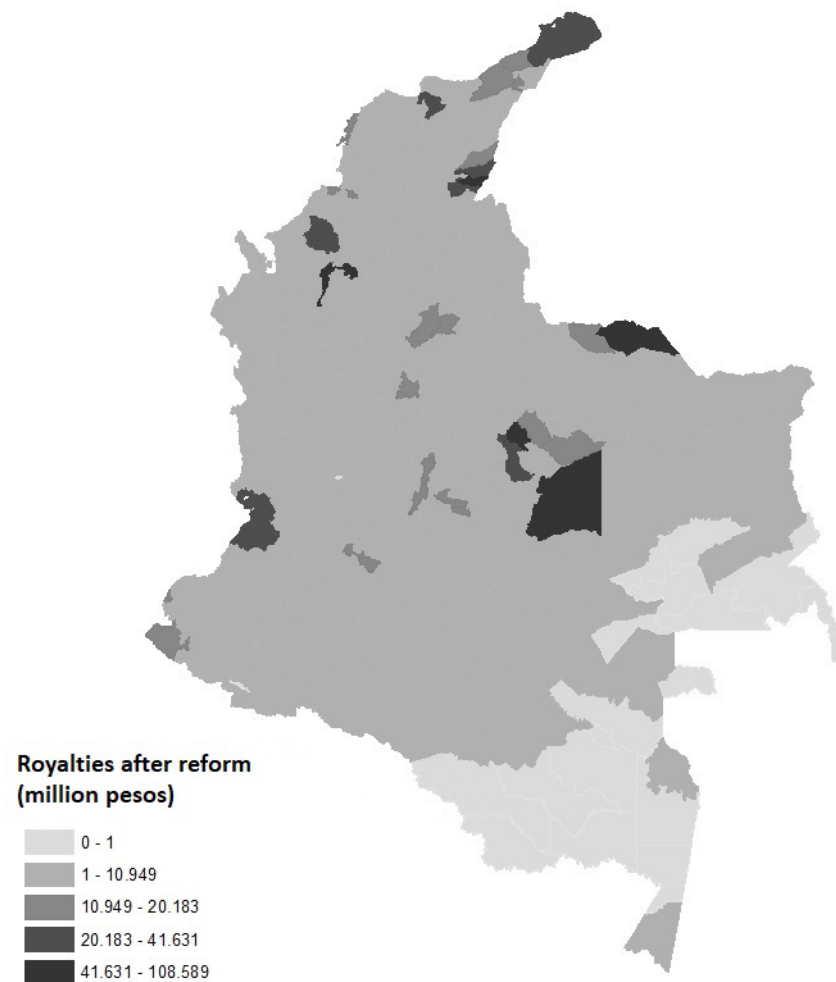
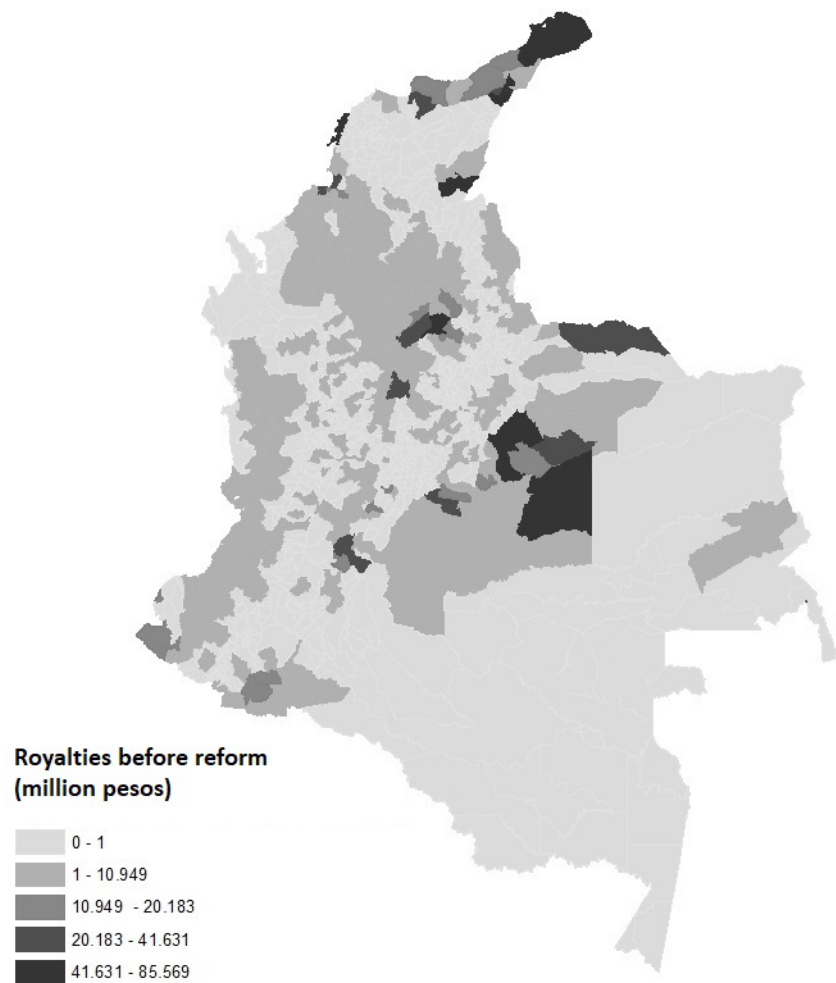
A Appendix

Figure A-1: Distribution of Royalties Before and After the Reform

A. Average 2000–2011

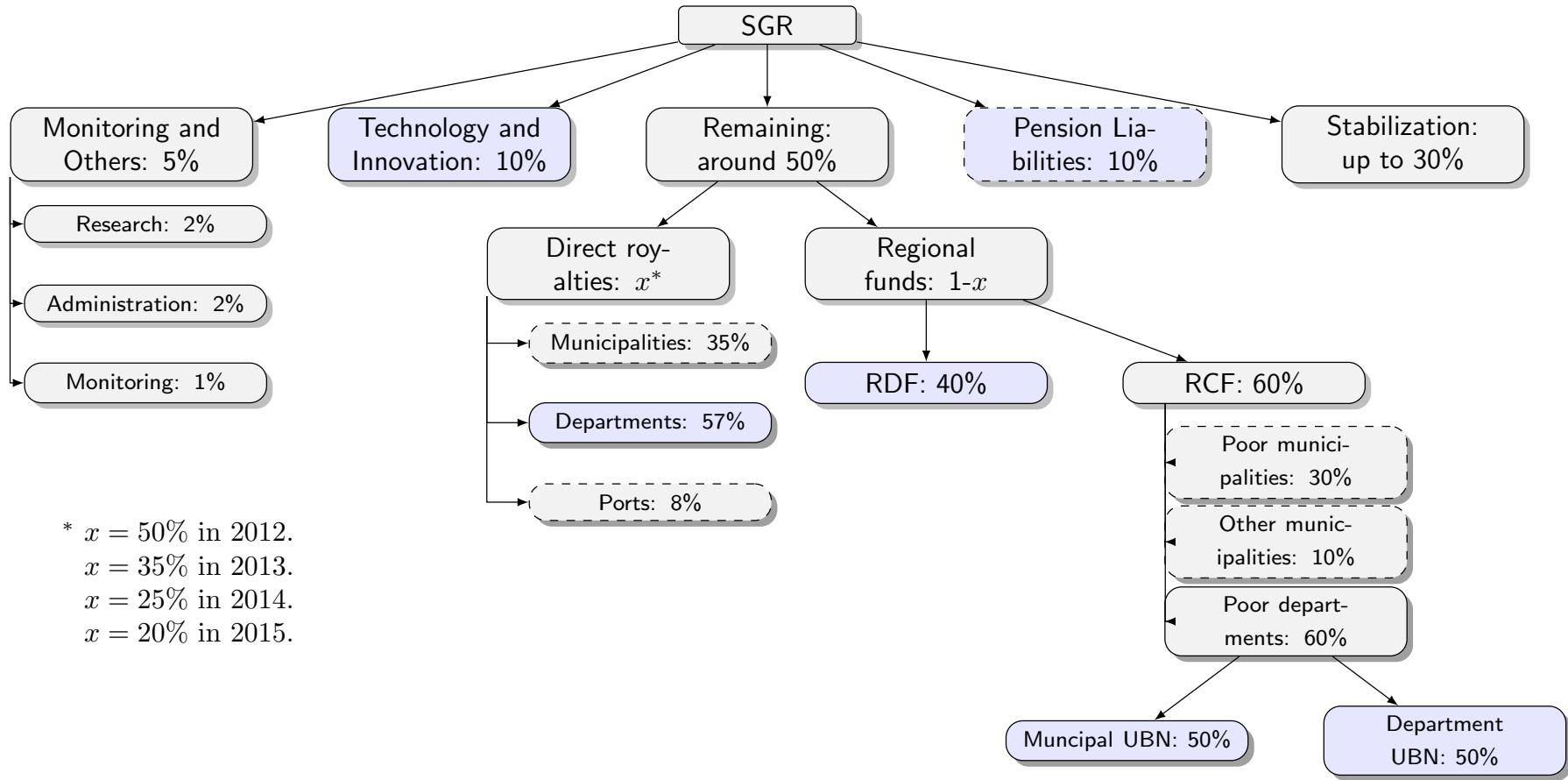
B. Average 2012–2014

34



Notes:

Figure A-2: Distribution of Royalties After the Reform



35

Notes: The figure shows the distribution, between national entities and local governments, of all taxes paid in the form of royalties. Departments, the largest administrative division, receive approximately 40% of the total amount of resources (see violet boxes), while municipalities (the second administrative division), receive around 35% (see dashed boxes). Municipalities can receive income from three funds: (i) “Direct royalties” (assigned to municipalities classified as *direct recipients*), (ii) “Poor municipalities” (*Fund A* in section 4) and (iii) “Other Municipalities” (*Fund B* in section 4).

Figure A-3: Illegal Transportation on Election Day



Notes: This picture was taken by *La Silla Vacía*, a Colombian news website that focuses primarily on Colombian politics. See <https://lasillavacia.com/historia/asi-contamos-el-trasteo-de-votos-en-la-guajira-59533>. This and several other pictures were taken on October 25, 2015 on election day to show how Wilmer González illegally offered transportation and money in exchange for votes. González was elected governor before being dismissed and sent to prison. Political ads, clearly visible on the truck, are banned on election day. For more details, see <https://www.eltiempo.com/justicia/conflicto-y-narcotrafico/envian-a-prision-al-gobernador-de-la-guajira-wilmer-gonzalez-brito-60195>.

Figure A-4: Royalties as a Proportion of Total Revenue, 2013

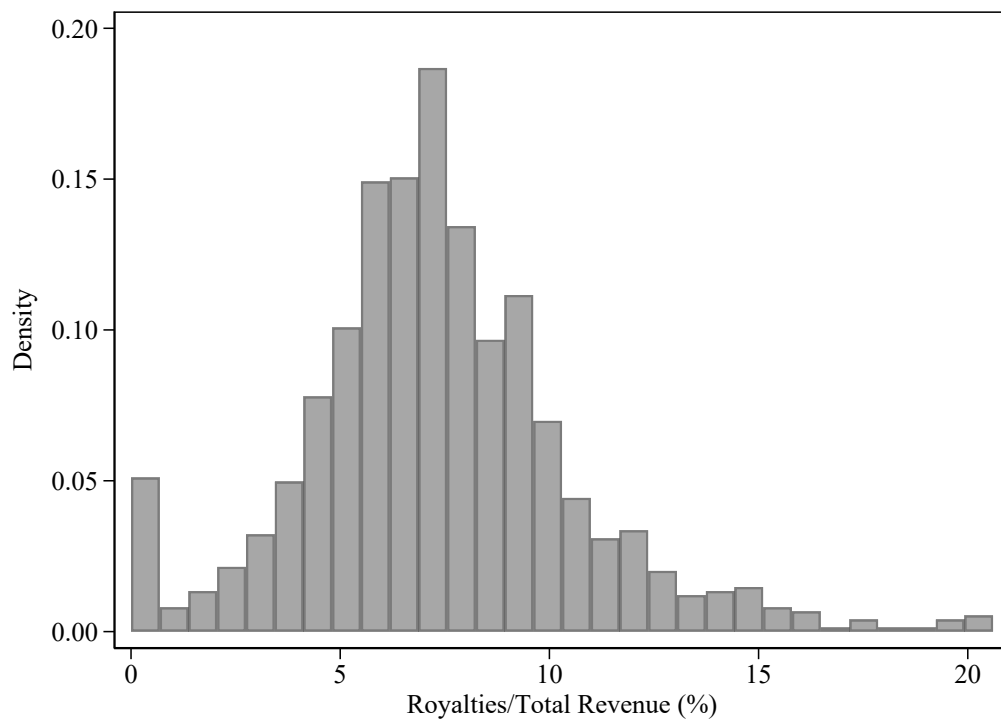


Figure A-5: Distribution of Vote Sellers, Transhumants, and Non-voters in Economies 1 and 2

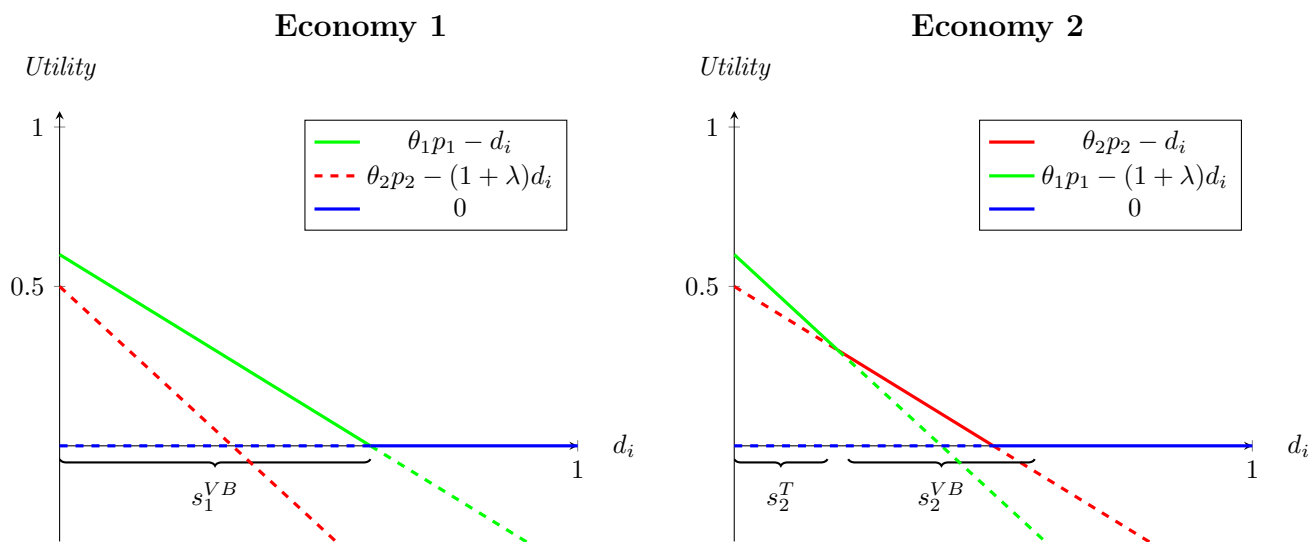


Figure A-6: Distribution of Vote Sellers, Transhumants, and Non-voters in Economies 1 and 2

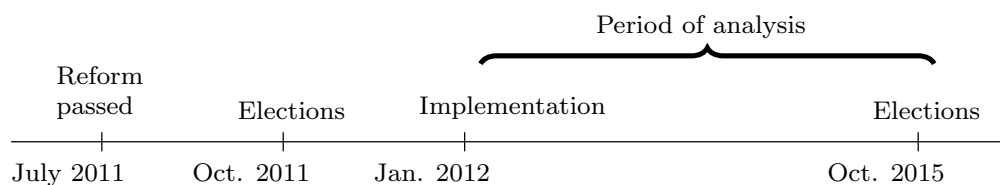
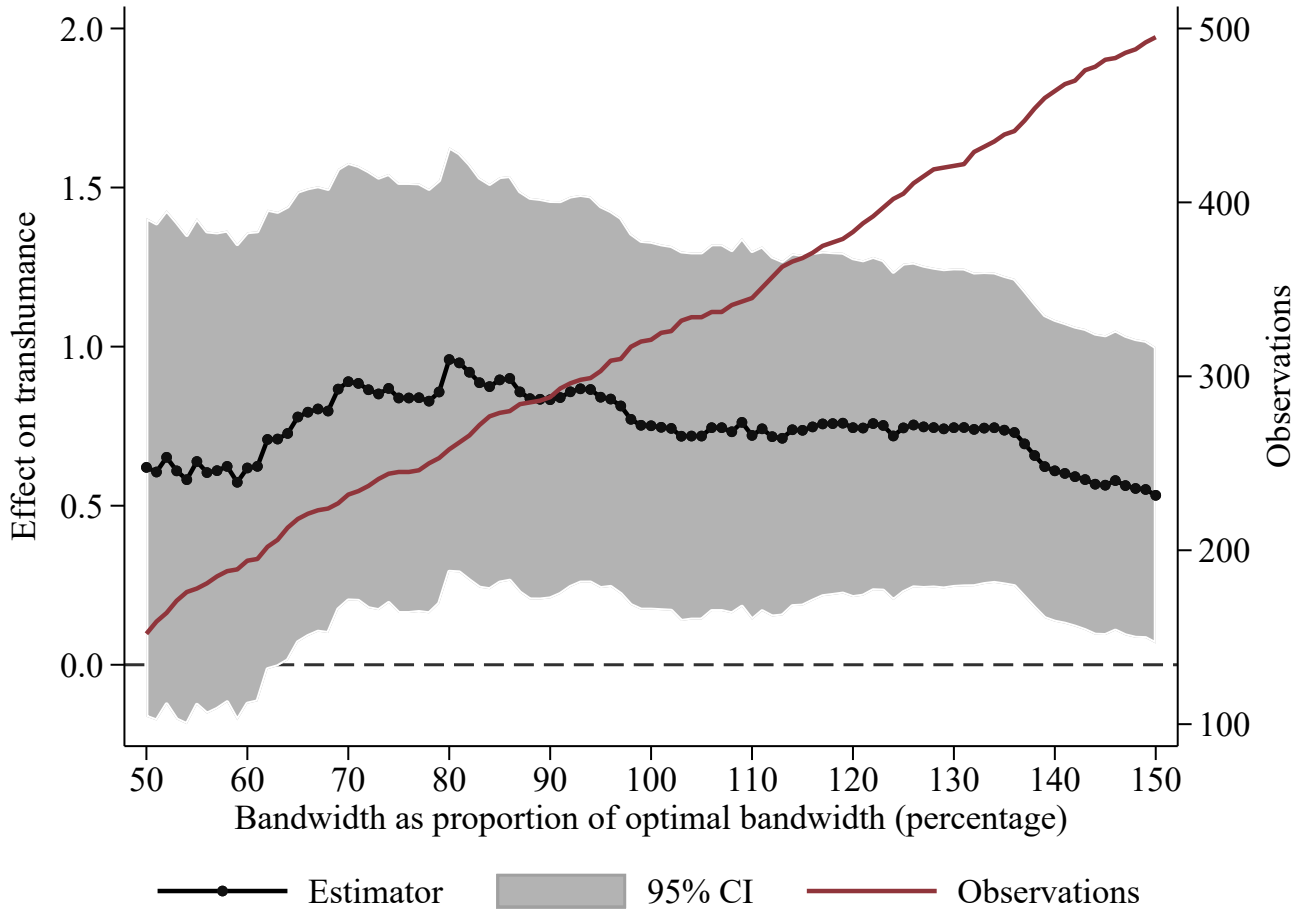
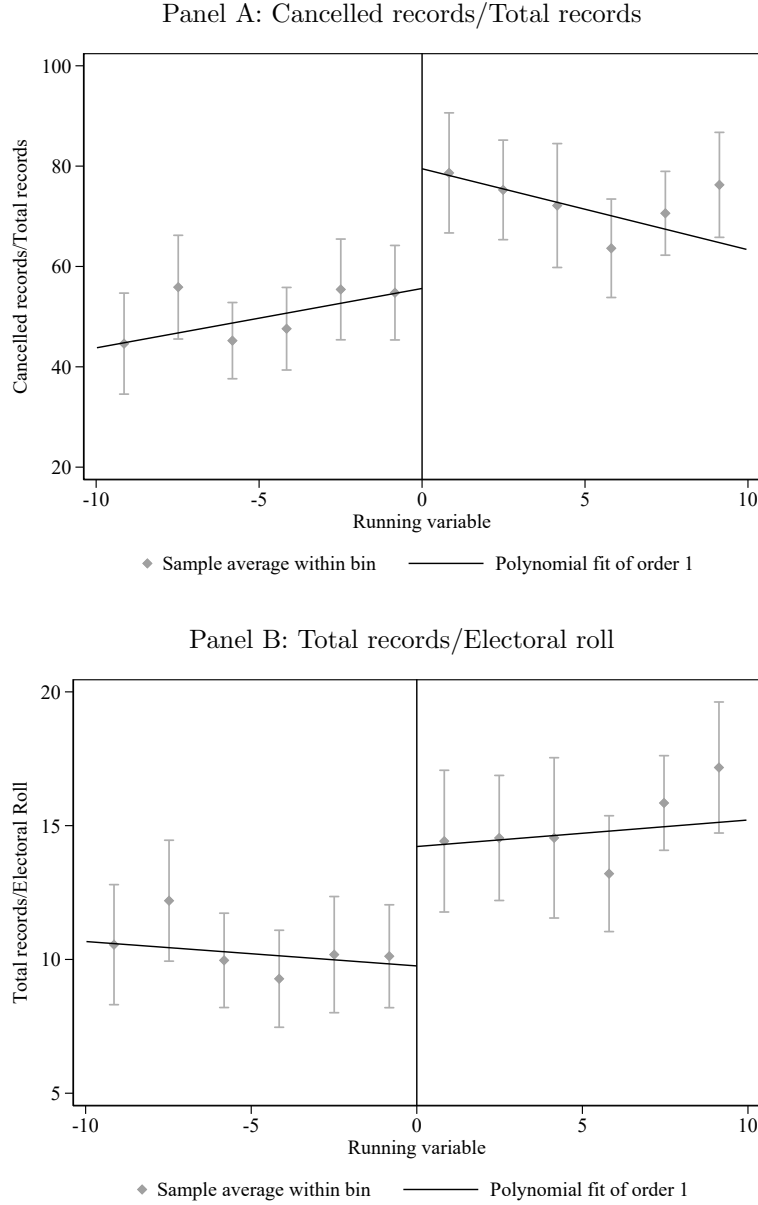


Figure A-7: The Effect of Transfers on Electoral Transhumance
Robustness to Bandwidth



Notes:

Figure A-8: Discontinuity of fraction of cancelled records



Notes: The running variable is $z = 0.35 - UBN$ (see Section 4), where UBN is the Unfulfilled Basic Needs index, which measures the proportion of poor people in a municipality based on 2005 Census data. *Cancelled records* is the total number of cancelled records between 2012 and 2015 (due to proof that an individual attempted to register in a municipality where he or she does not reside). The figure plots the sample averages of six equally sized bins to each side of the cutoff as well as the coefficients and 95% confidence intervals (mimicking the variance evenly spaced method using a spacings estimator) of a local linear (or quadratic) polynomial regression. Calonico et al. (2014) optimal bandwidth.

Table A-1: Assignment of royalties

		$UBN \leq 35$	$UBN > 35$
<i>Municipality</i>	0-3	None	Fund A
<i>size category</i>	4-6	Fund B	Fund A

**Table A-2: The Effects of Transfers on Electoral Transhumance
Non-Parametric Estimators**

	(1)	(2)	(3)	(4)	(5)	(6)
<i>Dependent variable is Transhumance</i>						
Favored with assignation	3.4955 (1.1745)	3.5610 (1.8547)	3.4452 (1.1990)	2.8311 (1.8127)	3.4583 (1.0781)	3.4167 (1.9036)
Observations	1,036	1,036	1,036	1,036	1,036	1,036
Observations in bandwidth	321	290	245	262	340	273
Bandwidth size	16.27	14.77	12.06	13.23	17.54	13.53
Polynomial	Linear	Quadratic	Linear	Quadratic	Linear	Quadratic
Kernel	Triangular		Uniform		Epanechnikov	

Notes: Unit of observation is a municipality. *Favored with assignation* is a dummy coded 1 for municipalities with a non-negative running variable ($z = 0.35 - UBN \geq 0$) or equivalently $UBN \leq 35$ (see section 4). *Transhumance* is the ratio between the number of cancelled records between 2012 and 2015 (due to proof that an individual attempted to register in a municipality where he or she does not reside) and electoral roll. All regressions include (but do not report) the linear (or quadratic) polynomial estimated separately on both sides of the cutoff. Kernels used in the regressions are triangular (Columns 1 and 2), uniform (Columns 3 and 4), and Epanechnikov (Columns 5 and 6). Calonico et al. (2014) optimal bandwidth with bias-corrected coefficients and robust standard errors.