Why Pay The Chief?

Land Rents and Political Selection in Indonesia

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Abstract

Much of modern development efforts are channeled through traditional local governance. Yet, despite their importance as politician-bureaucrats, local leaders are rarely paid a living wage. This paper studies the effect of awarding chiefs cultivation rights over village rice land, a stable revenue generating asset, during their term of office. I use a fuzzy spatial regression discontinuity design to exploit a historical natural experiment in Java where in the nineteenth century a homogeneous region was split, and in one part chiefs were awarded cultivation rights but not in the other. To measure political outcomes, I collect original data from the field tracing the modern electoral history of 931 chiefs in 193 villages. Higher land rents cause positive chief performance and economic development. Chiefs raise more funds and construct more public goods such that areas under their control are richer and more developed even today. I find evidence consistent with historically positive political selection as a key mechanism. Higher rents attracted better quality chiefs in the past. These chiefs were so effective at educational provision that the entire village today remains more educated. As a result, despite higher land rents attracting a higher quality pool of candidates today, neither candidates nor chiefs today are more selected compared to the average villager. Instead, positive development outcomes today are shaped by the selection of chiefs whose interests are aligned away from supra-village elite interests. Overall, my findings provide evidence that paying local leaders from a stable source of local revenue can be good for economic development.

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1 Introduction

> "*(Kami) tidak ada bengkok tapi kerja sampe bengkok.* We (in this village) don't have *bengkok* (crooked) land but we've worked (all our lives) until our backs are bent."
>
> - Pak Acep (Rice farmer, Sumberjaya village)

Traditional local leaders are important for rural development. They perform state-like functions and are responsible for development in rural areas where modern state bureaucracy does not exist. Yet, positions of traditional local leadership are rarely paid and local leaders are typically appointed to de facto or de jure hereditary positions. The absence of these features of modern governance poses a central challenge to development economists: despite the association between local leaders and underdevelopment (Acemoglu et al., 2014; Anderson et al., 2015; Banerjee and Iyer, 2005), there are few settings in which we can study how increasing rents might improve local governance. Variation in rents alone is also insufficient. For higher rents to have any bite, we need robust selection mechanisms to be in place. More broadly, we have no clear evidence on the long-run effects of higher political pay on the performance of executive leaders at any level (Besley, 2005; Dal Bó and Finan, 2018; Besley, 2004). This challenge is further compounded by the lack of systematic data on compensation and characteristics of individuals who stand for office.

My paper answers the following question: In the context of locally elected leaders, how do persistent differences in political land rents affect performance and long-run economic development? Using a fuzzy spatial regression discontinuity design, I find that higher rents cause better chief performance and entire villages are richer and more developed even today. Ex ante, however, the effect of higher rents on development is ambiguous. On one hand, much of the literature has documented the widespread capture of public goods or civil society by traditional local leaders (Acemoglu et al., 2014; Anderson et al., 2015; Banerjee and Iyer, 2005). In these settings of weak state capacity, higher rents might simply lead to greater capture and worse development. On the other hand, increases in rents cause positive selection of Italian mayors who reduce the size of municipal government (Gagliarducci and Nannicini, 2013). Similarly, higher rents lead to positive selection of Brazilian municipal legislators who construct more public goods (Ferraz and Finan, 2009b). Due to the short

time frame, however, these papers do not examine downstream impacts on long-run economic development. My contribution is to clearly identify how higher rents for local leaders drive economic development.

I do so by studying a historical natural experiment in which cultivation rights over village rice land, or *tanah bengkok*, were awarded to village chiefs in Indonesia. Chiefs, in turn, are obligated to sharecrop or lease out the land to villagers at fixed prices and sales from the rice harvest serve as their rents from office. My analysis focuses on plausibly exogenous variation in higher rents that arose during the Dutch Cultivation System where some, but not all, chiefs were awarded *bengkok* rights in return for enforcing the cultivation of export crops.[1] Furthermore, Indonesia is well-suited to studying the effects of higher rents. It is one of the few countries with genuine elections at the village level. Chief elections were introduced by Dutch colonial powers in the early nineteenth century and, under Dutch rule, chiefs were elected to positions for life. In 1979, however, national laws were amended and chiefs today are elected to fixed terms of 6-8 years each.

Research on local governance is often stymied by limited data.[2] To explore political outcomes, I build an original dataset of modern village electoral history (1979-2014) from oral and written histories of 931 chiefs in 193 villages collected through thousands of hours of in-depth qualitative interviews. The final dataset includes detailed biographical information on all 2,297 candidates who ever ran for village office including education and previous occupation. I combine my survey data with administrative data to capture measures of chief performance and village development.

Specifically, I study the effects of differences in *bengkok* rights across a historical border – between two Dutch administrative units of Priangan and Cirebon – in West Java that arose due to Dutch perceptions of differences in traditional systems of remuneration. Crucially, this border did not exist prior to Dutch intervention. A frontier region, the entire Priangan-Cirebon border was relatively homogenous with little village administration and no history of *bengkok*. It was only with the need to streamline administration that the region was split into two parts, and lacking knowledge on the interior of Java, the Dutch simply drew borders based on salient geographical features.

[1] It is well-documented that the largest and worst incidences of famine in colonial Java occurred during this time period as farmers were forced to give up land and labor for the cultivation of lucrative cash crops for Dutch export. See, amongst others, Van Niel (1972) and Fasseur (1992) for an overview of the impact of the Cultivation system on Java. Notably, Dell and Olken (2017) documents positive modern-day development outcomes arising from persistence in Dutch infrastructure constructed during the Cultivation System.

[2] An exception is Acemoglu et al. (2014) that collected detailed oral histories on the families of all paramount chiefs in Sierra Leone.

These arbitrary borders, however, formed the basis for the differential reward and persistence of *bengkok* rights throughout Cirebon but not in Priangan. *Bengkok* was imposed up to the borders of Cirebon due to the pre-existence of *bengkok* practices in *central* Cirebon. *Bengkok* was not extended across the border to Priangan because it did not exist anywhere there and was deemed foreign to natives. These differences in bengkok and land rents still exist today and leaves us with both a treatment and control group.

The Dutch drew much of the border following salient geographical features of mountains and rivers. To address potential confounding factors from differences in geography, I focus exclusively on the southern portion of the historical boundary that transects mountain ranges, and I show that villages along this border are balanced on pre-determined geographical characteristics and rice fertility. Historical evidence suggests that variation in *bengkok* rights was the only difference in historical colonial policy across my study border. To address concerns regarding other possible cross-border differences in colonial policy, I digitize 1853 and 1945 Dutch Colonial maps and, in the Online Appendix, I show that my results are robust to controlling for any differences in historical colonial infrastructure investment.

Two features of my setting allow me to isolate higher land rents as the most salient effect of *bengkok*. First, individual property rights of farmers in Indonesia are relatively secure. Together with ownership rights of *bengkok* land belonging to the village and not the chief, this rules out greater security of property rights over *bengkok* land as a possible mechanism.[3] Second, *bengkok* plots are relatively small. Across villages, the average size of *bengkok* land under chief control is 1.6 ha compared to 158 ha of cultivable rice land under individual ownership of farmers. The small size of *bengkok* plots rules out changes in land inequality as a downstream effect of larger *bengkok* land rights.

My findings point to a strong positive effect of *bengkok* land rents on contemporary economic development. *Bengkok* villages today continue to exhibit stronger nighttime light intensity and *all* villagers, on average, continue to enjoy lower child mortality and higher years of education. Positive development outcomes are a result of better chief performance. Villages where chiefs are paid

[3]The existence of secure individual property rights of farmers in the Indonesian setting contrasts markedly from Goldstein and Udry (2008) who show that, within a context of insecure property rights, traditional political authority in Ghanaian villages gives traditional chiefs more secure land rights over agricultural land plots. With more secure land rights, chiefs are more willing to fallow their land for longer periods of time. This results in greater agricultural productivity of chief land compared to land owned by ordinary farmers.

higher *bengkok* rents receive more funds from both higher levels of government and from villagers. This suggests that chiefs are better at both lobbying and raising funds from local villagers. Along with the ability to raise more revenue, chiefs in *bengkok* villages provide more public goods: An increase in 1 hectare of *bengkok* leads to a 0.22 standard deviation increase in village infrastructure public goods such as access to roads, safe water and safe garbage disposal.

Why do chiefs today continue to perform better? I find evidence consistent with historically positive political selection of chiefs. As mentioned above, pre-1979, chiefs were elected for life. Hence, any positive outcomes of chief effort we observe during this period of time would almost surely have to be a result of political selection and not re-election incentives. To test for this, I examine differences in pre-1979 village school construction and educational outcomes of villagers. Indeed, I find that *bengkok* villages report greater historical village school construction. Moreover, greater historical school construction translates into actual educational outcomes. Using 100% count census data, I document that *bengkok* villagers have consistently higher years of education going as far back as the 1920s: cohorts born in 1920 have 1.5 more years of education relative to a mean of 3.6 years. Given the complete absence of top-down school provision until as late as the 1970s (Aritonang, 1994; Duflo, 2001; Djajadiningrat, 1940), these results suggest that persistently higher land rents attracted higher quality chiefs in the past who were better able to lead historical school construction efforts.

Persistently higher average villager education continues to drive up the education of the entire candidate pool today. Original survey data shows that the entire candidate pool in *bengkok* villages today is marginally more highly educated and more likely to be drawn from civil service occupations. Specifically, an increase in 1 hectare of *bengkok* leads to the entire candidate pool having 0.3 years more education relative to a mean of 11 years. Candidates are also 3.6pp more likely to have previous occupations as civil servants relative to a mean of 21%. Once I account for the average education of all villagers, however, *bengkok* candidates are not more educated nor selected from civil service occupations in comparison to non-*bengkok* candidates. In other words, persistently higher *bengkok* land rents attracted better quality chiefs *historically*. These chiefs were so effective at providing village schools that *bengkok* villagers became persistently more educated over time and those who stand for chief elections today are no more educated than the average villager.

I close by investigating why, in the absence of modern-day selection on observable education

and occupation, *bengkok* land rents continue to cause positive development. One possibility is that the *within-village nature* of *bengkok* land could have selected chiefs who are more oriented towards local villager interests and away from the interests of external elites. Indeed, I find that *bengkok* villages are less likely to vote for Golkar, a party synonymous with Suharto's authoritarian rule from 1965 - 1998. Given rich literature documenting the role of chiefs in turning out the vote for Golkar, these findings are consistent with *bengkok* rents strengthening the chief position and making chiefs *less dependent* on both supra-village government and village elite interests. In turn, this freed chiefs to act in the best interests of villagers.

The positive association between *bengkok* rents and economic development contrasts with the well-established hypothesis that areas governed through traditional local governance (indirect colonial rule) perform more poorly, on average, compared to regions directly governed through colonial administrators (direct colonial rule) (Mamdani, 1997). Why did indirect colonial rule through *bengkok* chiefs not lead to worse outcomes? The reason is that across Java the Dutch ruled entirely through local leaders. Hence, the counterfactual to *bengkok* chiefs was not direct governance by colonial administrators. Instead, in places without *bengkok*, qualitative literature suggests that villagers often elected the village fool to office (Antlöv, 1994). In contrast, my findings provide evidence that higher *bengkok* rents were beneficial for long-run development through historically positive effects on selection.

Consistent with Olson (1993) theory of "stationary bandits", the *stable, within-village* nature of *bengkok* rents could also have aligned the incentives of chiefs to their villages and motivated them to invest in productive village assets. This seems counterintuitive: a large literature shows that landowners and political elites are typically unwilling to provide public goods such as schools (Bates, 2014; Acemoglu et al., 2007), given potential increases in wages and reductions in land rents. The key difference is institutional: *bengkok* chiefs are constrained in the prices at which they can sharecrop or lease out *bengkok* land. Qualitative fieldwork reveals that prices are often tied down by traditional agreements and hence, given fixed costs, *bengkok* chiefs, unlike traditional landlords, would have had less of an incentive to withhold investments in public goods.

This study contributes to the political economy of development literature in a number of ways. First, it contributes to the literature on (pre-)colonial political institutions and long-run economic development. Appointed by hereditary rule or empowered to collect taxes without accountability

mechanisms, local leaders in many parts of the developing world today continue to capture local public goods and civil society, leading to worse development outcomes (Acemoglu et al., 2014; Anderson et al., 2015; Banerjee and Iyer, 2005). In contrast, I show that local leaders empowered through land rents *can* have positive effects on long-run development. Despite initial motives for increasing extraction, persistently higher land rents for village chiefs outlived the Dutch. These rents, together with Dutch-instituted elections, created a robust mechanism for the positive selection of local leaders and alignment of incentives that continue to have positive effects on development today.

Second, this study contributes to a largely theoretical literature on the effects of political pay on the selection and performance of politicians and bureaucrats (Besley, 2005; Dal Bó and Finan, 2018; Besley, 2004). A smaller empirical literature focuses on the effects of changes in compensation of municipal legislators across one or two election terms (Ferraz and Finan, 2009b; Gagliarducci and Nannicini, 2013). Another growing strand of literature studies the effects of career incentives on bureaucrat performance in India (Bertrand et al., 2018). In contrast, the persistent survival of *bengkok* allows me to study the effects of higher rents on rural political economy and development outcomes across three decades of modern Indonesian history. Furthermore, my results suggest that bureaucratic compensation of *village chiefs*, executives situated at the lowest rung of the state administrative ladder, can be as, if not more, important for determining long-run development outcomes.

Relatedly, I provide insight towards an old debate on how (the lack of) incentives affects whether (dis-)honest individuals choose to run for public office. A recent experimental literature shows that the old adage that "you can't get rich in politics unless you're a crook" continues to ring true: In low income countries with high levels of corruption, dishonest university students are more likely to want to enter publice service (Banerjee et al., 2015; Hanna and Wang, 2017). In high income countries with low levels of corruption, however, honest university students are more likely to want to enter (Barfort et al., 2015). I do not measure honesty but my real-world findings bridges the gap between the two, and shows that higher rents within a low income country can potentially shift local political economy into a high income country equilibrium. Higher rents consistently attract more competent politician-bureaucrats who, given better development outcomes, are arguably less dishonest.

Third, this study contributes to a growing economic literature that studies the role of village chiefs in local development (Baldwin, 2013, 2016; Basurto et al., 2017; Michalopoulos and Papaioannou, 2013; Henn, 2019). In a closely related study, Casey et al. (2018) tests the efficacy of three randomized control trials designed to increase own-village development capacity by encouraging younger, more educated villagers to participate in village development. The authors find that the probability of winning development projects is increasing in the participation of more educated villagers. More educated villagers, however, are typically sidelined by older, less educated traditional chiefs. My findings suggests that, instead of working around traditional chiefs, increases in chief remuneration could be equally effective in improving village development capacity through attracting more highly educated and skilled individuals to run for village office.

Finally, I contribute to a nascent literature on the economic history of Southeast Asia (Dell and Olken, 2017; Dell and Querubin, 2017; Dell et al., 2018; Paik and Vechbanyongratana, 2019). Here, I innovate by designing and collecting data through an original survey. This gives me the unprecedented flexibility to study the inner-workings of village institutions from a bottom-up perspective. Furthermore, lessons from traditional governance in Indonesia have broad external validity for developing countries everywhere: many aspects of traditional governance in Africa are a direct result of colonial experience in Asia (Mamdani, 1997); and many aspects of traditional governance in India are similar to Indonesia given British rule over Java. What distinguishes the Indonesian colonial experience is the granting of rents to chiefs together with the institution of democratic elections; colonial powers in Afria and India did not grant stable rents and typically appointed local leaders to hereditary positions. Hence, my findings suggest that the introduction of both stable within-village rents *and* regular elections could lead to long-lasting, positive economic development.

In the next section, I describe the role of village chiefs in Indonesia, with an emphasis on their role as key intermediaries between the villager and the state. Section 3 provides a brief account of Dutch expansion of *tanah bengkok* and presents the empirical strategy. In Section 4, I introduce my survey data and auxilliary data sources. Section 5 presents results on selection of candidates. Section 6 presents results on downstream chief performance and development outcomes. Section 7 discusses alternative explanations and Section 8 concludes.

2 Background: Village Chiefs and *Tanah Bengkok* in Indonesia

Village elections are a two-century old institution in Java. Introduced by Raffles, Governor General during the British interregnum in the early nineteenth century, the institutionalization of local chief elections distinguishes colonial Java from other colonial settings. Why did the British do this on colonial Java? Historical evidence suggests that village elections were introduced to strengthen the legitimacy of local chiefs as tax collectors (Bastin, 1954; Bosma, 2013; Holleman, 1981). The designation of local chiefs as tax collectors over regional Javanese lords was also a strategic choice: colonizers were reluctant to grant more power to regional Javanese lords lest they threaten colonial rule.[4]

Introduction of elections and taxation duties was never accompanied by a commensurate increase in remuneration. Chiefs were never formally incorporated into the bureaucratic state but were instead paid in terms of *bengkok* land or a wide variety of levies in money, produce or labor (Husken, 1994) depending on pre-existing institutions and practices. Much of these rewards for local governance arose during the Dutch Cultivation System when chiefs were made responsible for the organization of local land and labor for the forced cultivation of export crops. Given heavy financial costs of paying the salaries of thousands of chiefs, the conversion of rice fields into *tanah bengkok* were sanctioned by the Dutch (Breman, 1983) and the geographical incidence of *tanah bengkok* and differences in land rents continue to follow historical borders. In Section 3, I outline my empirical strategy and how I exploit these cross-border differences.

2.1 Chief Elections: Term Length and Campaign Costs

The persistent practice of electing village chiefs was a direct result of low managerial capacity of the Dutch colonial state (Breman, 2016), and contrasts sharply with other colonial settings where chiefs derived sole legitimacy from colonial authorities (Abraham, 2003).[5] The key difference between chief elections pre and post-Indonesian independence, however, lies in term length. Under colonial rule, chiefs were elected for life. The 1979 Village Law amended this, stipulating that chiefs were to

[4]The choice of who to designate as local tax collector was made even more difficult due to the fact that the British could not find a clear equivalent to landlords as in the *Zamindari* system instituted in much of British India. See Banerjee and Iyer (2005) for an economic analysis of the legacy of the Zamindari system.

[5]Note that my analysis throughout this study refers to *desa*'s or rural villages where village heads are elected by popular vote and not *kelurahan*'s or urban villages in which village heads are appointed. In contrast, for example, Martinez-Bravo (2014) studies the effects of differences in political leanings between *desa* and *kelurahan* chiefs.

be elected to fixed terms of 6-8 years for a maximum of two terms each.[6]

Ethnographical evidence suggests that the robustness of local elections were highly varied (Antlöv, 1994). A number of sources have documented State interference in the screening of candidates before elections are permitted to take place during the New Order period (1965-1998) (Antlöv et al., 1995). In contrast, villagers today have greater freedom to vote for the candidate of their choice without district interference (LLI3 Study, 2012: 68 – 82). Regardless, village elections are frequently described as festivals of democracy (Husken, 1994): the entire election process takes less than thirty hours during which selection of candidates are announced, speeches held, campaigning starts and ballots are cast and counted in the village hall.

Preparations, however, often begin months before election day, and it is well-known that running for the chief position is one of the most expensive ventures in village society. From my fieldwork, respondents report a mean campaign cost of 22 million Indonesian Rupiah (IDR) ($1,466) and, in particularly fierce contests, campaign costs can reach as high as 400 million IDR ($26,667). Actual, itemized expenditures are highly varied but a large amount is spent on preparing meals, coffee, snacks and cigarettes for an endless stream of visitors. In certain cases, it entails "pocket money" for voters and the sponsoring of local events and festivals both before and after election day. In my study region, respondents report having to sponsor post-election fishing festivals: one candidate reported a purchase of 100kg of *ikan gurame*, a popular local fish, to celebrate his electoral success with voters.

Running for chief is also a highly calculated bet. Many candidates borrow large amounts to finance campaign expenditures, and there is a real risk of bankrupty from losing elections. Election losses can lead to financial disaster and the fire-sale of both land and property (Husken, 1994). Similarly, we have encountered numerous occasions where our questions on campaign costs led to hushed whispers about neighbors that lost everything upon losing an election.

2.2 Chief responsibilities and remuneration today

Village chiefs bear a heavy responsibility as both agents of the state and elected representatives of a social community, maintaining responsibilities and allegiances with his fellow villagers (Antlöv, 1994). As agents of the state, chiefs are expected to supervise development projects, maintain reg-

[6]This changed in 2017. Today, chiefs are technically allowed to run for a third time given that they step-down a year before the third election is scheduled to take place.

ular contacts with higher authorities and handle issues of security and politics at the village level. As elected representatives, chiefs are expected to collect informal taxes and settle disputes and grievances amongst villagers.

Yet, despite these responsibilities, chiefs are not paid a living wage and the majority of chief remuneration is derived from traditional *bengkok* land rights. Based on my survey data, *bengkok* chiefs earn an average of 34.4 million Indonesian Rupiah (IDR) ($2,293) per year, about 3 times more than non-*bengkok* chiefs who earn 12.2 million IDR ($813) per year. The bulk of this comes from *bengkok* land with a negligible fraction from intra-village (rice) taxes levied on the population. Regardless, both *bengkok* and non-*bengkok* chief remuneration is relatively low: the remuneration gap between the two is roughly equal to that of the annual, average wage of a day laborer at 18 million IDR ($1,200) (BPS 2019).

Despite low remuneration, village chiefs play an important role in affecting the level and quality of village development. Chiefs are the only tier of government in constant, direct contact with villagers. Hence, despite their lowly positions at the bottom of a long chain of command,[7] a good chief can bring development to his village through two channels: Top-down lobbying and bottom-up management of development projects.[8]

First, the competence of village chiefs and their connections with upper levels of government play an important role in securing additional public goods (Evers, 2000). This was especially true during the last decades of Suharto-era rule in the 1990s when discretionary project funding replaced structured development grants: the village chief became a central figure in attracting project funding from the central and provincial government (von Benda-Beckmann and von Benda-Beckmann, 2013). The main channel through which this occurred was the informal and formal lobbying of upper-level government agencies.[9] More recently, the importance of lobbying has increased. Following decentralization in 1999, districts have not become more proactive in the disbursement and monitoring of funds to villages. Rather, "access to district resources (continues to) *depend* on village capacity, rather than supporting it" (LLI3 Study, 2012). In short, lobbying and connections of chiefs

[7]Indonesia has four main tiers of government: provinces, districts, subdistricts, and villages.

[8]Part of the discussion in this section is based on Evers (2000) and Martinez-Bravo (2017). See Martinez-Bravo (2017) for a detailed discussion of the mechanisms behind public good provision at the village level.

[9]Evers (2000) writes:"One village head explained it as follows. "It's a matter of dropping in frequently on heads of the important government agencies. If you're lucky, you may show up just when decisions are being made about new projects. In this manner I've managed to obtain a number of projects for my village without ever paying a bribe or having to promise a kickback."

to supra-village officials remains as, if not more, important than ever in accessing top-down funds.

Second, the ability of chiefs to raise local revenue is an important determinant of final project quality (Martinez-Bravo, 2017). Both in the absence of and in conjunction with supra-village government support, additional informal taxes or community cash contributions (*Swadaya*, *Gotong Royong*) are a well-documented source of funds and labor for village projects (Antlöv et al., 1995; Evers, 2000; Olken and Singhal, 2011; Raffles, 1830). Higher own-village investment can, in turn, lead to both higher levels and quality of public goods (Evers, 2000).

3 Empirical Strategy

This section presents the historical experiment and empirical strategy illustrating how Dutch expansion of *bengkok* allows me to identify the effects of higher rents. Throughout, I discuss and address main identification concerns.

3.1 Pre-Colonial Roots and Determinants of Adopting *Bengkok*

The practice of *tanah bengkok* is rooted in the agrarian Indo-Javanese kingdom of Mataram – the last native kingdom to rule Java before the expansion of Dutch colonial rule in the early 19th century. Literally translated as "crooked land", *tanah bengkok* refers to cultivation rights over village rice land that was granted to local notables for political loyalty and services. Pre-colonial rule, these rights were typically expanded with the extension of Mataram rule over Java (Maurer, 1994; Moertono, 2009), and the correlation between *bengkok* rights and Mataram rule is still visible in contemporary village census data. Figure 1 plots the size of village-level *bengkok* land in 2000 and the largest *bengkok* land continues to be concentrated in Central and East Java – the historical centre of the Mataram kingdom. This poses a challenge for identification of the causal effect of *bengkok* land rents today: stronger pre-colonial kingdom rule may have an impact on traditional local leadership in these areas that I cannot control for.

A second potential source of bias is pre-existing rice fertility and geographical elevation. *Bengkok* takes the form of village rice land, hence villages with more fertile rice land typically award chiefs with larger swathes of *bengkok* land (Maurer, 1994). Given that rice is a staple food crop in Indonesia, higher rice fertility could lead to better outcomes for reasons that have nothing to do with *bengkok*

land. *Bengkok* practices are also inversely related with elevation: higher altitudes are associated with lower rice fertility and hence, smaller *bengkok* land.

3.2 Exogenous Assignment from Dutch Expansion in West Java

I circumvent these concerns by focusing on a region in West Java of present-day Indonesia that was homogenous until the beginning of the ninteenth century when it was split into two Dutch administrative units assigned with different systems of chief remuneration. This region was placed under Dutch sovereignty in 1700 and, under a strict policy of non-interference, had a shared political, religious and administrative history in terms of a unified legal and taxation system (Hoadley, 1994). Importantly throughout this time, the Dutch had not yet extended their control down to the villages and there was little village administration and no history of *bengkok* throughout this region (Antlöv et al., 1995; Breman, 2016).

It was only in the early ninteenth century that colonial attempts to enforce and streamline village administration began. In 1808, with little knowledge about the interior of Java, the Dutch divided the region into two parts – Priangan in the East and Cirebon in the West – following salient geographical features of mountains and rivers.

Shortly after, the end of the Belgian War in 1831 led to an urgent need for a new source of revenue (Van Niel, 1972). This led to the imposition of the Dutch Cultivation System (1832-1870) across the entire Java where local villagers were forced to grow export crops under the supervision of local village chiefs. A lack of colonial manpower, however, meant that Dutch authorities had to work within pre-existing local institutions and constraints (Van Niel, 1972). A key institution that the Dutch were aware of were traditional *bengkok* rights for chiefs in central Cirebon but not elsewhere in Cirebon nor Priangan (Figure 3). Hence, in order to facilitate extraction, the Dutch imposed *tanah bengkok* practices everywhere across Cirebon but not in Priangan. Dutch missives and regulations suggest that the differential introduction of *bengkok* land was enforced due to the self-proclaimed importance of respecting existing local customs of *bengkok* that existed in Cirebon but not in Priangan (Raffles, 1830; Fernando, 1982). Notably, this was despite the border between the two regions (henceforth refered to as the Priangan-Cirebon border) being extremely mountainous and unsuitable for the cultivation of wetland rice and, by extension, the practice of *tanah bengkok*.

To see that the historical expansion of tanah bengkok did indeed conform to the Priangan-

Cirebon border, Figure 4 illustrates the border in black and green and the extent of tanah bengkok land at the sub-district level using 1867 Dutch archival data.[10] The expansion of *bengkok* appears to align almost exactly with the extent of the border and, despite imprecision of colonial statistics at that time, there is a marked discontinuity in *bengkok* across the border.

A related concern is that there could have been historical differences in Dutch colonial policy across the Priangan-Cirebon borders. Indeed, historical evidence suggests that crop cultivation systems were different across most of the Priangan-Cirebon border: the Dutch grew coffee in Priangan and sugar throughout Cirebon. To circumvent this, I focus on the southern segment of the Priangan-Cirebon border where historical records suggest that coffee, and not sugar, was grown along the Cirebon borders. Indeed, Figure A.1 clearly shows that no sugar was grown in the south of Cirebon. Why then was *bengkok* introduced in south Cirebon despite the cultivation of coffee? Archival work suggests that this was due to Dutch obsession in preserving contiguous borders. Despite being designated for coffee cultivation, southern Cirebon fell on the north side of the Citanduy river and hence was placed under the administration of Cirebon. This arbitrary division by river led to *bengkok* expansion in south Cirebon just because it happened to lie on the other side of the river.

Given that most of the Priangan-Cirebon border closely followed rivers and mountain ranges, I further limit my sample to two segments of the southern Priangan-Cirebon border where villages are balanced on elevation. Figure 2 plots the two segments of my study border and the contemporary size of *bengkok* across the Priangan-Cirebon borders. Moving across the borders, there is a marked discontinuity in *bengkok* size. There have, however, been increases in *bengkok* in Priangan compared to 1867 (Figure 4). This can been seen in the northwestern corner of Figure 2 where villages in Priangan have substantial amounts of *bengkok* land today. Fieldwork suggests, however, that these increases in *bengkok* came about after Dutch colonial rule. Typically, this adoption of *bengkok* land occurred when a rich villager passed on and pledged his rice land towards payment of village government officials. It could also take place if village elders or officials came together to

[10]The 1867 Eindresume is a historical land cadastre of 808 villages in Indonesian Java conducted by the Dutch colonial government in 1867 and contains the earliest records of *bengkok* land. The purpose of the survey was to determine the direction of colonial policy due to liberal Dutch opposition against the continued exploitation of natives through the Cultivation system (Eindresume Vol I, 1867 pp 3-6). All land under private estates were excluded. This refers to land sold by the Colonial Government to the European and Chinese. Most of this land was centered on the North Coast of West Java (present-day Cirebon) and Surabaya in East Java (Kano, 1904). Surveyors were advised to select at least 2 villages in each district (roughly equivalent to present-day subdistricts) with a preference for those that were as distinct from each other as possible.

purchase rice land for the same purpose. In other cases, villages received funds from supra-village government officials to purchase *bengkok* land. In sum, these increases in *bengkok* were relatively less uniform then under Dutch rule. Given positive amounts of *bengkok* land across both sides of the border, this motivates a spatial fuzzy regression discontinuity design.

3.3 Spatial Fuzzy Regression Discontinuity Design

Following Basten and Betz (2013), I estimate a spatial fuzzy regression discontinuity (RD) across the Priangan-Cirebon border. The fuzzy RD design exploits the fact that the incidence of *bengkok* does not jump from zero to one at the border. Instead, the causal effect of *bengkok* is identified by instrumenting the *size* of *bengkok* with the indicator for whether a village belonged to the historical Cirebon region and hence, was assigned *bengkok* in 1830.

In a fuzzy RD estimation framework, I estimate the following specification using ordinary least squares (OLS) and instrumental variables (IV):

$$c_{ivbt} = \alpha + \gamma\,\text{bengkok}_v + f(\text{geographic location}_v) + \phi_b + \text{Soeharto}_t + X_v\,\beta + \epsilon_{ivbt}, \tag{1}$$

where c_{ivtbt} is the outcome variable of interest for candidate i in village v at time t located along segment b of the Priangan-Cirebon administrative boundary. In the OLS specification, bengkok_v is the size of *bengkok* land in village v and in the IV specification, this is instrumented by Cirebon_v an indicator equal to 1 if village v is located in Cirebon Residency and equal to 0 otherwise. $f(\text{geographic location}_{vd})$ is an RD polynomial which controls for smooth functions of geographic location. ϕ_b is a set of boundary segment fixed effects that denote each of the north and south segments of the study boundary and Soeharto_t is an indicator that equals one if the village election took place during the Soeharto dictatorship. X_v is a vector of time-invariant covariates for village v. In my baseline specification, I control for predetermined geographical characteristics of elevation and slope shown to be important determinants of *bengkok* and results are robust to excluding these controls.

The main coefficient of interest is γ: the effect of higher land rents from an increase in 1 hectare of *bengkok* land. Under the assumption that Dutch Cirebon rule only affects outcomes via its effect on *bengkok*, the IV estimate of γ identifies the causal effect of *bengkok* land on downstream outcomes. Notably, under a Local Average Treatment Effect (LATE) framework the IV estimates isolates the effects of marginal *bengkok* land endowed under the Dutch. Given low population density at that

time, it is plausible that this land would have been more productive than the marginal *bengkok* land endowed in later periods. This is important for understanding differences between OLS and IV results presented later.

For outcomes on chief performance and development, I estimate village and individual-level outcomes analogous to equation (1) with two differences. For village-level outcomes, I include (survey-)year indicators and individual level controls for individual-level outcomes. Since village-level unobservables are likely to be spatially correlated, I report standard errors corrected for arbitrary spatial correlation and allow for spatial dependence of an unknown form (Conley, 1999). I use a cut-off window of 30kms and, in the Online Appendix, I further show that these results are largely robust to alternative cut-off windows and the clustering of standard errors at the village-level.

In terms of bandwidth selection, I limit my analysis to observations within 30 km, 20 km and 10km of the Priangan-Cirebon border. This leaves me with 193 sample villages within a 30km bandwidth. I calculated the optimal Imbens-Kalyanaram bandwidth for my main outcomes with distance to the border as the running variable. The optimal bandwidth was generally between 5 and 10 km depending on the outcome.

For villages in Cirebon to be an appropriate counterfactual for those in Priangan, all relevant factors besides treatment have to vary smoothly at the Cirebon-Priangan Residency boundary before the introduction of Dutch *tanah bengkok* in Cirebon, i.e. before 1830. An important covariate is pre-treatment economic prosperity. This is important given that, if the Dutch simply introduced *bengkok* in areas that had higher pre-existing prosperity, differences in post-treatment outcomes could simply be a reflection of this and not differences in *bengkok*. To test this, I use 1819 Dutch population records collected from Dutch colonial archives in Indonesia. Unfortunately, these population records are aggregated and reported only for the largest village located within each sub-district, a larger administrative unit. Hence, to construct measures consistent with present-day administrative boundaries, I match 1819 village names to contemporary village locations. I then divide population by the size of sub-districts and, in this way calculate measures of population density for 24 contemporary sub-districts. The reported mean in Table 1 shows that in 1819 the entire Priangan-Cirebon border region was sparsely populated with an average population density of 0.24 persons per ha.[11] The estimates imply that, if anything, the Cirebon region where *bengkok*

[11] Average population density today in the Priangan-Cirebon region is around 10 persons per ha.

was imposed was less sparsely populated before Dutch intervention.

In Table 2, Panel A, I test for jumps in important geographic characteristics of elevation, slope and ruggedness. The first three columns shows that elevation is statistically identical across the Cirebon-Priangan residency boundary except within the 10km bandwidth where Cirebon villages are of slightly higher elevation. This is consistent with historical evidence discussed above: the introduction of *bengkok* was done in a haphazard manner that ignored actual geographical suitability for *bengkok*. Regardless, I control for elevation in all my regressions and results are robust to the exclusion of elevation as a control. Next, I look at differences in slope and terrain ruggedness. All differences remain small and statistically insignificant except for ruggedness for villages within 30km where Priangan villages are marginally more rugged.

In Panel B, I further test for differences in crop suitability in terms of percentage soil with poor drainage and proxies for rice and coffee fertility using FAO-GAEZ potential yield data. Rice is a staple food crop and, as discussed, rice fertility is a strong determinant of *bengkok* incidence and size. I test for differences in coffee fertility as a proxy for Dutch extraction given that coffee was the main cash crop grown in my study region. Again, across variables and specifications, there are no large differences except on potential yield for wet rice that is, on average, 3 kilograms lower in *Cirebon* villages. Relative to a mean of 2154 kg, however, this is not a meaningful difference.

In sum, I find balance on pre-treatment economic prosperity, important predetermined geographical characteristics, and crop suitability, suggesting that villages on either side of my study border are comparable.

4 Data

To examine the effects of higher land rents on political selection and economic development, I collect original survey data and combine this with various rounds of the Indonesian Village and Population Census data. Here, I provide details on core regressors and outcomes. I introduce other outcomes of interest as they arise in Section 5.

4.1 Original Survey Data

Between January - May 2019, I design and conduct an original survey of village chiefs to record the oral and written history of village establishment, chief characteristics, and chief and village income for all post-1979 elections in 193 villages within 30km of the southern Priangan-Cirebon border. As discussed above, 1979 marked the implementation of the 1979 Village Law which introduced regular chief elections. The final dataset comprises detailed biographical information on all chief candidates who ever ran for village office including education, occupation, land ownership, chief ancestry, vote shares, campaigning costs, term length, and completion.

In particular, data on education and occupational characteristics comprises 931 chiefs and the entire candidate pool of 2,297 candidates from 1979 - 2014. I also collect qualitative data on how *tanah bengkok* functions in each village: the size of *bengkok* awarded to chiefs, mode of cultivation, the reason behind the choice of system, the number of leasors or sharecroppers and actual harvest income. Finally, I collect quantitative data on (in-)formal tax collection, development projects and qualitative information on how chiefs obtain funds for projects. My dataset substantially improves upon existing data with detailed information on characteristics of each election-term period and information on the entire candidate pool. Existing data on chief elections is limited to education and age of chiefs starting from the 1986 Indonesian village census and number of years a chief has been in office in the 1992, 2000 and 2003 census rounds.

Prior to implementation, I conduct in-depth qualitative fieldwork and pre-testing of questionnaires, entirely in the Indonesian language, jointly with AKATIGA foundation, an Indonesian NGO with extensive experience in rural poverty studies. This was done to determine how best to elicit responses to sensitive questions. I work with qualified locals as enumerators (fluent in local dialect and skilled in social issues) who reside in each survey village, and in interviews, all enumerators tried to simulate a "conversation about village oral history". We target 5 respondents per village and, to the best of our ability, interview all past and present village chiefs, currently alive, with quantitative, historical recall questionnaires embeded in qualitative interviews. If a chief was no longer alive or unable to communicate, we interviewed village elders or officials who were alive during that chief's rule and familiar with his rule. In this manner, 33.5% of sample respondents are past or present village chiefs.

There are two main survey issues – recall bias and whether an individual's response to ques-

tions varies systematically with local socio-political conditions. While it is impossible to rule out both effects, I do my best to control for them during survey implementation. First, we collect village administrative and archival records from village offices and village elders. We then cross-check survey responses with these records and the village census for all variables common across datasets. Second, survey responses were consistent across all 5 respondents. Third, almost all respondents seemed very willing to talk about corruption and electoral costs. Any hesitation seemed idiosyncratic and unrelated to local socio-political conditions. This is possibly because of the historical framing of our study and our conduct of conversational interviews within private residences.

4.2 Measuring Village Development and Chief Performance

To examine the *bengkok* system's impact on contemporary development outcomes and chief performance, I use various rounds of the Indonesian Village Census and the 100% count 2010 Indonesian Population Census and georeference outcomes to the village-level. Crucially, the 100% count population census provides information on education and health outcomes in all my sample villages. This is important because the geographical concentration of my sample limits usage of other survey modules with more detailed measures of education and health.

My main measure of chief performance is public goods provision. To measure this, I merge eleven different waves of the triennial Indonesian Village Census (*Potensi Desa*) collected between the years 1983 and 2014.[12] Conducted by the Central Bureau of Statistics, Indonesia, the village census covers the entire country and comprises a large number of measures of public goods provided in the village, such as infrastructure, health and educational facilities.[13]. Across waves, the village census has a different focus (agriculture, economy, or population) and several variables are not reported consistently across years. Hence, I focus on public good outcomes that are reported consistently across different waves of the survey.

[12] In particular, these waves correspond to the years 1983, 1986, 1990, 1993, 1996, 2000, 2003, 2005, 2008, 2011 and 2014.

[13] As discussed in Martinez-Bravo (2016), survey enumerators collect answers from members of the village administration and are expected to check these answers against village administrative records and through physical, on the ground, surveys. Since measures of public goods such as the number of schools and health facilities are easily verifiable, this survey provides an accurate representation of public goods in all villages.

5 Results

This section presents my main empirical results in three steps. First, I present first-stage results, linking historical Dutch intervention to *bengkok* prevalence today. Second, I present my main results on political selection. Third, I identify campaign costs as one possible driver behind selection. I defer exploration of downstream effects of land rents on chief performance and economic development to Section 6.

5.1 First Stage

Table 3 and Figure 5 presents first stage results of the average size of *bengkok* land under chief control. I report estimates as follows: Across columns in Table 3, I demonstrate robustness of results to bandwidth choice by presenting results for observations within three bandwidths of 30km, 20km and 10km. Following Gelman and Imbens (2017), I use a linear polynomial in latitude and longitude of each village as my baseline specification in Panel A and report robustness to the use of a cubic polynomial in distance to the border and cubic polynomial in latitude and longitude in Panel B and C. Given the small N nature of my study, however, a cubic polynomial in latitude and longitude results in substantially noiser results but reassuringly, coefficient magnitudes remain largely the same.

Across columns in Table 3, Panel A, Cirebon villages have 1.36 to 1.48 more hectares of *bengkok* land. The use of a cubic polynomial in distance and latitude, longitude leads to slightly larger point estimates in Panels B and C. As expected, a cubic polynomial in latitude and longitude leads to noisier estimates of the jump in *bengkok* at the border but reassuringly, magnitudes remain stable across all three polynomial specifications.

The jump in discontinuity of *bengkok* across the border can be seen graphically in Figure 5 which plots the actual data alongside predicted values. Given the use of a two-dimensional RD polynomial in latitude and longitude, these are three-dimensional analogues to standard two-dimensional RD plots. Each subfigure plots each villages longitude on the x-axis, latitude on the y-axis, and the actual data or outcome using an evenly-spaced monochromatic color scale. In the typical RD, the predicted value plot is a two-dimensional curve, whereas here it is a three-dimensional surface, with the third dimension indicated by the color gradient. Darker shades indicate higher values of the outcome variable. Here in Figure 5 the left subfigure plots the actual size of *bengkok* land and the

right subfigure plots the predicted values of *bengkok* land. Figure 5 shows clearly that the predicted size of *bengkok* changes discontinuously at the border. Taken together, these results testify to the strong persistence of differences in *bengkok* practices since their introduction almost 200 years ago in 1830 and suggests that IV estimates using a linear polynomial in latitude and longitude do not suffer from a weak instruments problem.

5.2 Main Outcomes

In this section, I estimate the effects of *bengkok* land rents on contemporary political selection, as proxied by education and previous occupation (Dal Bó et al., 2017; Ferraz and Finan, 2009a). I then explore effects on barriers to political entry. For all outcomes, I continue to present results for observations within three bandwidths of 30km, 20km and 10km across columns but present results only for my baseline specification of a linear RD polynomial in latitude and longitude of each village. I present key robustness checks along the way, including to alternative RD polynomials, but defer alternative explanations and further robustness checks to the following section.

5.3 Political Selection

This section examines the impact of higher land rents from *bengkok* on the education and previous occupation of both candidates and chiefs at the village-election term level for all elections held between 1979 and 2014. I show that higher land rents cause positive selection but these effects disappear once I account for average villager education. Analysis of historical cohort-level villager education and village schools in Section 6 reveals that every cohort of villagers in *bengkok* villages is more educated and more historical village schools were constructed in *bengkok* villages. Given the prominent role of chiefs in leading the historical construction of village schools, these results suggest that *bengkok* had a strong historical effect on selection of chiefs. Historically selected chiefs were more effective in school construction, causing higher average villager education. As a result, *bengkok* candidates today, despite having higher education compared to non-*bengkok* counterparts, are not more highly educated or elite compared to the average villager.

Candidate and Chief Quality: Education Table 4 estimates the effect of *bengkok* land rents on the education of village chief *candidates*. I present OLS results in panel A and IV results in panel B.

Across columns (1) - (3), a 1 hectare increase in *bengkok* land leads to an increase in the average years of education of the candidate pool by 0.15 to 0.35 years relative to a mean of 11 years. Given the average duration of high school education in Indonesia is 12 years, this suggests that *bengkok* candidates are marginally more likely to be high school graduates. These results are consistent with a model of candidate selection where candidates have better outside options and hence have to be compensated adequately to convince them to run for office (Dal Bó and Finan, 2018).

Within column (1), IV estimates are larger than OLS. An F-test of equality of coefficients, however, rejects that the coefficients are statistically different from each other. Nevertheless, OLS estimates could be smaller than IV if marginal bengkok land plots awarded post-Dutch rule, as dicussed in section 3.3., are less productive. This implies that holding size constant, the marginal post-Dutch *bengkok* land might provide less rents and have a smaller effect on selection.

In Table 5, I report effects of *bengkok* land rents on education of village chiefs. I.e. Only election winners. IV estimates fall short of statistical significance across columns except for column (1). These ambiguous effects of higher land rents on the quality of elected politicians are consistent with Dal Bó and Finan (2018) and suggest that elected chiefs might be selected based on other traits. This motivates estimating the effect of land rents on another important proxy for quality: the previous occupation of chiefs. Before I study effects on occupational selection, I explore if candidates are more educated compared to the average villager.

Are candidates more educated compared to villagers? Table 6 estimates analagous candidate-level equations by subtracting average villager education from the education of candidates. I measure villager education at the village-level from the 100% count 2010 Indonesian population census and define average villager education as the education of all villagers aged 25 to 70 years old at the time of census enumeration. Before we look at estimation results, the mean of the dependent variable here is informative. Chief candidates have, on average, 4 more years of education compared to the average villager. Given that the average villager has 6 years of primary education (Table 13, Panel C), this implies that candidates are highly selected with 10 years of education (junior high school). Remarkably, in a very different context, Thompson et al. (2019) finds that candidates who ran for Congress in the 1940s have 4.38 more years of education compared to members of the public.

Across columns (1) to (3), however, Table 6 implies that, despite overall positive selection of

candidates compared to the *average villager*, higher land rents have no effect on differences in education between candidates and the average villager today. Taken together with earlier positive results on modern selection, the lack of differences in education suggests that persistently higher land rents from *bengkok* might have caused *historically* positive selection of chiefs. *Bengkok* candidates today are not more educated than the average *bengkok* villager because historically selected chiefs were more effective at constructing schools and providing education for villagers in general. As a result, we no longer observe positive selection today. In Section 6, I explore and provide evidence for this by tracing differences in education of villagers across historical cohorts and differences in historical village school construction.

Candidate Quality: Occupation Having investigated effects of higher rents on educational selection of candidates, Table 7 examines effects on occupational selection. Specifically, I look at three main categories of previous occupation constructed from the survey question, "What was the previous occupation of each chief (candidate)?". In this manner, I classify candidates who prior to running for elections held a high wage occupation, was a civil servant, or held a low wage occupation.[14] Results in Table 7 are presented as follows: in columns (1) - (3) the dependent variable is an indicator for whether the candidate held a high skilled occupation, in columns (4) - (6) the dependent variable is an indicator for whether a candidate was an ex-civil servant and finally, in columns (7)-(9) the dependent variable is an indicator for whether a candidate held a low skilled occupation pre-election.

Before we move to results in Table 7, it is useful to understand how formal compensation from the village chief position compares with compensation from the closest outside options. The average annual remuneration of a *bengkok* chief in my sample with 2.8ha of *bengkok* land rights is 34.4 million Indonesian Rupiah (IDR) ($2,293), roughly three times more than a non-*bengkok* chief who earns 12.2 million IDR ($813). In comparison, the average annual salary of an Indonesian civil servant is 23.4 million IDR ($1,560)[15] and the annual wages of a day laborer is 1 million IDR ($700) (BPS 2019). Overall, annual compensation of an average *bengkok* chief in my sample is substantially higher than that of a civil servant, but compensation of an average non-*bengkok* chief is nearly

[14]Note that these three occupational categories are not mutually exclusive owing to the difficulty of classifying occupations. For example, a large portion of my sample consists of traders (*pedagang*) who might plausibly be classified as medium or low wage. I do not classify these occupations and they remain outside of my analysis.

[15]Author's calculation from the 2010 Indonesian Work Force Labor Survey.

equivalent to that of a day wage laborer.

Higher land rents attract a larger share of ex-civil servants who choose to run for office. Across columns in Table 7, an increase in 1 hectare of *bengkok* land leads to a 1.9pp to 3.6pp increase in the share of chief candidates from a civil service background. Interestingly, there are no differences in the share of chief candidates from high or low wage occupations. Taken together, these results suggest that candidates are being selected exactly from the middle-end of the skill-wage distribution. This is exactly what we would expect given prevailing wage differentials outlined above.

Key Robustness Checks In Appendix Table A.1 and A.2, I show that results on candidate education and occupation in Table 4 and 7 are robust to a range of alternative RD polynomial specifications and the inclusion of a range of controls. For controls, I run equation (1) including predetermined village-level agricultural controls (rice potential yield and coffee potential yield), geographic controls (ruggedness, drainage), and measures of ease of access to upper levels of external government (distance to sub-district and district capital).

Appendix Table A.1 reports robustness of main results to alternative RD specifications. For comparison, the top row of each table reports estimates from the baseline specification. First, I vary the degree of the polynomial in the running variable (latitude and longitude) in equation (1). My main results are largely robust to alternative polynomials (quadratic, and cubic). As discussed, the use of a cubic polynomial results in substantially noisier estimates, but reassuringly coefficient magnitudes remain largely similar. Second, I vary the running variable and, instead of a polynomial in latitude and longitude, use a cubic polynomial in distance to the colonial border. The RD specification remains positive and significant.

Appendix Table A.2 reports results from equation (1) with sequential addition of agricultural, geographic and distance to external government controls in each panel. Again, for comparison the top row reports results from my baseline specification in Table 4 and 7. Reassuringly, my key findings are largely robust to the inclusion of these controls.

Together, these results suggest that *bengkok* land rents had a historical effect on selection that persists until today. The lack of differences in modern selection once I account for average villager education suggests that *bengkok* land rents attracted stronger chiefs in the past and Section 6 provides empirical evidence in support of this mechanism. In the next section, I explore if land rents

affected another important political outcome: barriers to political entry.

5.4 Effect of land rents on political entry

The results thus far suggest that land rents from *bengkok* shifted villages into positive political equilibria, attracting higher quality candidates over time as proxied by education and occupation. This section sheds deeper light on how these political equilibria arose and reveals that effects could be partially driven by increases in campaign costs in response to persistently higher land rents.

I first examine if *bengkok* remuneration affected the level of campaigning costs. Within each village, we ask respondents the average cost of running for the chief position and minimize reporting bias by triangulating responses across respondents. To take into account meaningful content of zeros and attenuate the effects of outliers, I apply an inverse hyperbolic sine (IHS) transformation for all variables for which zeroes are meaningful.[16] Compared to typical log transformations, this transformation allows for more consistent estimates of marginal effects (Bellemare and Wichman, 2019).

Across columns, Table 8 implies a large, positive and statistically significant effect of *bengkok* rents on the costs of running for office. Following Bellemare and Wichman (2019), a coefficient of 0.392 in column (1) implies that a 1pp increase in *bengkok* land at the mean leads to a 0.77pp increase in campaign costs. How do higher campaign costs affect the entry of candidates? I find that higher campaign costs decrease the number of candidates who run for office. Across columns, Table 9 implies that a 1 hectare increase in *bengkok* land leads to a 0.08 to 0.157 decrease in the number of candidates running for office. Given that on average 2.46 candidates run for office, this reflects a 3 to 6pp decrease in number of candidates.

Taken together, higher rents leads to higher campaign costs and fewer candidates running for chief. The inverse relation between campaign costs and number of candidates here are analagous to the effect of higher campaign spending limits. Empirical studies find that higher campaign spending limits are typically associated with fewer candidates and lower political competition (Avis et al., 2017; Milligan and Rekkas, 2008). Here, my results suggest that a similar mechanism is at work: higher campaign costs are an endogenous response to higher rents or prize of office that increases the (monetary) barriers to running for the village chief position. As a result, the only candidates

[16] For a random variable x, taking the inverse hyperbolic sine transformation yields $\tilde{x} = arcsinh(x) = ln\left(x + \sqrt{x^2 + 1}\right)$

that can run for office are those that are sufficiently well-off and, in the face of these barriers, the candidates that choose to do so are relatively more educated and drawn from ex-civil servant occupations. Fewer but more highly educated candidates choosing to run for office is also consistent with higher *quality* of political competition .

Notably, however, the negative effect of *bengkok* land rents on number of candidates is small (3 to 6pp). This suggests that, despite higher campaign costs, higher net benefits from land rents exert a countervailing effect and continues to induce more candidates to run for office.

6 Land Rents, Chief Performance, and Economic Development

Thus far, results suggest that higher land rents from *bengkok* leads to (historical) positive selection of chief candidates who, as suggested by higher campaign costs, might be wealthier on average. Do these chiefs necessarily perform better in office? To investigate this, I turn to two measures of chief performance discussed in Section 2.2: village revenue and public goods provision. I find that higher land rents from *bengkok* leads to the collection of both higher external and internal village revenue and the construction of more infrastructure facilities. Finally, I end this section by estimating effects on historical and contemporary development outcomes. Remarkably, I find that positive effects from public goods accrue to the entire village. *Bengkok* villages continue to be better developed today across measures of economic activity, health, and education.

6.1 Village Transfers

To construct public goods, chiefs can lobby for external revenue from government sources or raise internal revenue through informal taxation of villagers. In Table 10, I investigate the extent to which chiefs are able to leverage both channels using all four rounds of village census data in 1996, 2003, 2008, and 2011 that report the amount of revenue received by villages in the previous fiscal year. To account for possibly meaningful content of zeroes, I apply an inverse hyperbolic sine transformation to the amount of external and internal village revenue received by villages.

In Table 10, coefficients across columns (1) - (3) imply that an increase in 1 hectare of *bengkok* is associated with 0.15 to 0.19 higher external village revenue. Crucially, however, the ability to obtain higher external revenue does not come at the expense of internal revenue. Columns (4) to (6) show

that there is a similar positive effect of *bengkok* land rents on internal revenue. Taken together, these results suggest that chiefs are more effective at raising funds from both top-down and bottom-up sources.

Positive effects on bottom-up funding are informative: fieldwork suggests that chiefs who have the trust and support of villagers are typically more successful at raising informal revenue for the construction of public goods. In turn, public goods constructed from a greater proportion of internal village revenue might be of higher quality if villagers are more invested in the maintenance of these facilities (Evers, 2000).

6.2 Public goods provision

Table 11 examines the effects of higher land rents on public goods provision from 1983 to 2011.[17] Following Martinez-Bravo (2017), I construct standardized z-score measures of three types of public goods provision per capita – infrastructure, health and education. To isolate the effects of chief effort, I examine public goods that are more susceptible to village governance (Lewis, 2016; Martinez-Bravo, 2017). Hence, I construct a z-score for infrastructure by taking standardized, per capita averages of three indicators for whether the main village road is passable by a 4-wheel vehicle, whether the village has access to safe garbage disposal, and whether the village has safe drinking water as measured by access to tap water or a water pump. I construct a z-score for health public goods by taking standardized, per capita averages of the sum of health posts, supplementary health posts and trained doctors in each village. I construct a z-score for education public goods by taking standardized, per capita averages of the number of kindergartens, primary schools and junior secondary schools. I omit anything above the junior secondary level as the construction and management of these schools are almost always under the control of external government offices.

Higher land rents from *bengkok* lead to positive effects on infrastructure public goods but no differences in health public goods. There is also a negative effect on education public goods. Columns (1) to (3) examine effects on infrastructure public goods and implies that a 1 hectare increase in *bengkok* land rents leads to 0.14 to 0.22 s.d. higher infrastructure public goods. As a benchmark, Martinez-Bravo (2017) finds that each additional year of *district* exposure to Soeharto-era mayors is associated with a decrease of 0.047 s.d. in education public goods per capita. Next, columns (4)

[17] Given that public goods measures are not consistently reported across village census years, I use measures from 1983, 1986, 1993, 2003, and 2011 which reports consistent measures of infrastructure, health, and education.

to (6) examine effects on health public goods and find small and insignificant differences in health public goods. In the remaining columns of (7) to (9), higher *bengkok* land rents leads to 0.08 to 0.14 standard deviations less educational public goods.

Why do *bengkok* villages today have fewer educational public goods despite earlier discussion on positive historical selection of chiefs and local village schools? This is because contemporary educational public goods measures do not distinguish between schools constructed by top-down government intervention and those constructed through local chief efforts. In Indonesia, large-scale central government school construction efforts, or INPRES, between 1973 and 1978 sought to equalize primary schooling access, with the number of government schools constructed inversely related to existing pupil enrolment (Duflo, 2001). This suggests that lower educational public goods provision in *bengkok* villages today are almost surely a result of higher education and more local village schools constructed before top-down government intervention.[18]

To investigate this, I use the 1983 village census to reconstruct the number of central government INPRES schools and non-INPRES village schools. For comparison with results in Table 11, I construct a standardized z-score average of INPRES and non-INPRES schools. Indeed, in Table 12, columns (1) - (3) reveal that less INPRES schools were constructed in *bengkok* villages and columns (4) - (6) implies that more non-INPRES village schools were constructed. I.e. Results on fewer contemporary educational public goods in Table 11 are driven by the construction of fewer top-down INPRES schools. Fewer top-down INPRES schools were constructed in *bengkok* villages because there were a larger number of existing own village schools. I explore effects on historical villager education in Section 6.4.

Large positive results on village schools are important for two reasons. First, in the absence of school construction by Dutch colonial authorities and the pre-INPRES Indonesian state, the presence of village schools are strongly suggestive of greater village school construction efforts led by village chiefs. Typically involving the pooling of contributions from land-owners or market taxes (Aritonang, 1994; Djajadiningrat, 1940), greater school construction efforts are indicative of the greater ability of village chiefs to build consensus or greater trust between chiefs and villagers.

[18]Similarly, Dell and Olken (2017) finds evidence of higher historical villager education in villages forced to cultivate sugar under the Dutch Cultivation System. There, however, the channel is through greater construction of village schools on larger plots of village-owned land induced by redistribution of village land for forced sugar cultivation. This possibly took place to a lesser extent in my study region given that coffee, and not sugar was the main export crop grown in the Priangan-Cirebon area. Coffee was typically grown outside of villages in the highlands. In contrast, sugar is typically grown inside villages directly alongside rice fields.

Second, in the absence of top-down intervention, village school construction is also a pure outcome of bottom-up village capacity and rules out differential top-down provision as an alternative explanation.

Despite greater infrastructure and historical educational public goods provision, it is unclear if increases in public goods provided by chiefs necessarily translates into improvements in overall development outcomes. Much of the development literature has highlighted the pervasiveness with which benefits from public goods remain concentrated among political elites. Hence, in the next section, I investigate the effects of higher rents on contemporary development outcomes.

6.3 Contemporary development

Do higher public goods provision translate into better development outcomes? I look at measures of contemporary development in terms of nighttime light intensity, the percentage of deceased children, and years of education. The effects of nighttime light intensity are estimated at the village-level, and the latter two at the individual-level controlling for cohort fixed effects and gender.

Nighttime light intensity is from the National Oceanic and Atmospheric Administration (see Henderson et al. (2012), for details) and is increasingly used to proxy for income in studies exploiting highly localized identifying variation (e.g., Michalopoulos and Papaioannou (2013)). I use all available years of nighttime light intensity from 1992 to 2011 as my main measure of overall economic development at the village level. The percentage of deceased children and years of education is constructed from the 2010 Indonesian population census. Percentage of deceased children is a proxy for child mortality where, for each women who ever gavebirth to a child, I use the difference between the number of children ever born and the number of children still alive to construct the percentage of deceased children. To obtain a better proxy for recent village health conditions, I restrict the sample to all women of recent child-bearing age at the time of enumeration. I.e. All women aged between 20 to 35 years or born between 1975-1990. I complement this by constructing years of education of all individuals aged 20 to 35.

I present estimates on village-level economic development in Table 13. In Panel A, I begin with estimates of nighttime light intensity. The estimates in Panel A implies that *bengkok* villages have higher economic activity as proxied by nighttime light intensity. This is consistent with positive effects on infrastructure in columns (1) - (3) of Table 11 and a sizeable literature that shows how

greater road construction is associated with greater market access and greater economic prosperity (Gollin and Rogerson, 2014).

Panel B shows that *bengkok* villages have 0.6 percentage points fewer deceased children relative to a mean of 2.4 percentage points in spite of no effects on health infrastructure in columns (4) to (6) of Table 11. This can be reconciled by the fact that childbirth and important medical care continues to take place outside villages. Within-village health posts are rarely staffed by adequately trained personnel and women have to be transported to hospitals in towns or cities with adequate medical equipment. In transportation of women to towns or cities, roads are likely to play a greater role and lower proportion of deceased children possibly reflects better within-village infrastructure as shown in columns (1) - (3) of Table 11.

Finally, panel C reports estimates for contemporary years of education of all *villagers* born between 1975-1990. Across columns, villagers have 0.17 to 0.23 more years of education relative to a mean of 6.5. These small but positive effects on education stand in contrast to negative effects on educational public goods in columns (7) - (9) of Table 11, but are consistent with better ability of chiefs to raise internal funds from villagers (Table 10). As discussed in Section 2.2., 6.1. and 6.2, schools constructed from a greater proportion of internal revenue might provide villagers with a higher quality of education as compared to schools constructed entirely from top-down, external funding. These marginally positive effects would also be consistent with intergenerational spillovers from higher education of earlier cohorts (Figure 6, discussed later in Section 6.4.).

6.4 Historical education of *villagers* and selection of chiefs

Given the earlier discussion on historical selection of chiefs and historically larger number of village schools, I now investigate effects on historical education of villagers. Using the 100% count 2000 Indonesian population census, I construct pseudo-panels of historical education levels at the individual villager level. Figure 6 plots *bengkok* coefficient estimates at 5-year cohort levels and reveals a strong positive effect of higher *bengkok* rents that decreases over time. The decrease in coefficient estimates over time are consistent with greater top-down government provision of schools in more recent years. Interestingly, the largest effect size is found in the earliest cohorts: Villagers born in 1920 and educated during Dutch rule had 1.2 more years of education relative to a mean of 3.6, an increase of 30%.

Taken together, large positive effects on historical village schools (Table 12) and historical villager education are indicative of the *timing* of effects of higher *bengkok* land rents. These results suggests that the positive effects of land rents on political selection could have been salient as far back as the early 20th century and cumulatively, led to the absence of modern selection of chief candidates over villagers.

7 Discussion: The effect of *bengkok* land rents on orientation towards elite interests

Results so far suggest that the receipt of external funds is one channel through which land rents from chief control over *bengkok* land has positive effects on village development. In this section I investigate if greater receipt of external funds affects the orientation of chiefs towards supra-village government interests. As a proxy for orientation towards supra-village interests, I examine the probability that villages vote for Golkar, the party of Soeharto, the longest-standing ruler of Indonesia, in the 1999 legislative elections. The 1999 elections is notable for being the first democratically held elections after the end of Soeharto's rule in 1998. Hence, given well-documented evidence that chiefs were made to turn out the vote for Golkar during the Soeharto era, and persistence of party machinery that helped Golkar carry the vote in 1999, voting against Golkar is a plausible indicator of chief independence of elite interests both during and after Soeharto's rule.

In the absence of individual-level vote counts, I construct an indicator that equals 1 if Golkar obtained first place in the 2000 village census. Across columns (1) - (3), Table 14 implies that an increase in 1 hectare of *bengkok* leads to a 10.5 to 18.4p.p. decline in the probability that Golkar obtained first place in a village. Together with evidence that land rents from *bengkok* led to consistently positive development outcomes, I hypothesize that the stable, within-village nature of *bengkok* rents attracted chiefs who are less oriented towards supra-village government and village elite interests. These chiefs were more likely to act in the best interests of the village. This is consistent with Olson (1993) theory of "stationary bandits": a stake in local village land attracted chiefs who are more invested in village interests.

8 Conclusion

In conclusion, I provide novel micro-level empirical evidence for the efficacy of paying chiefs higher land rents based on rights to a stable, within-village income generating asset. In contrast to the large literature that emphasizes the extractive nature of traditional local governance, I document a rare case where the strengthening of local chief authority did not lead to worse outcomes. This is striking given that the award of *bengkok* land took place during one of the most extractive colonial enterprises in history.

Using original survey data, I document that higher rents to office in the context of robust local elections led to historically positive selection of local leaders. These leaders constructed more village schools in the distant past and this has persistently positive effects on long-run development with both villagers and candidates today being more educated. The stationary nature of *bengkok* land is likely to be important. Similar to Olson (1993)'s theory on stationary bandits, the provision of higher rents through control over a within-village income-generating asset appears to have strengthened the chief position and attracted chiefs who are less beholden to supra-village elite interests (lower probability of voting for Golkar). In turn, these chiefs were more likely to invest in village development.

Last, my findings have direct implications for development policy. In Indonesia, under the 2014 Village Law Fund (*Undang-Undang Dana Desa 2014*), villages today receive direct transfers of US$70,000 to village bank accounts for development purposes, broadly construed. My findings suggests that it would be prudent to increase the remuneration of village chiefs accordingly to attract the best talent capable of handling these funds. My research also highlights benefits that might accrue if attempts to raise the salary of village chiefs in India and Africa succeed (Times of India, 2012; Daily Monitor, 2016) and provides conditions under which such measures might be effective.

References

Itty Abraham. State, place, identity: Two stories in the making of region. *Regional modernities: The cultural politics of development in India*, pages 404–425, 2003.

Daron Acemoglu, María Angélica Bautista, Pablo Querubin, and James A Robinson. Economic and political inequality in development: The case of cundinamarca, colombia. Technical report, National Bureau of Economic Research, 2007.

Daron Acemoglu, Tristan Reed, and James A Robinson. Chiefs: Economic development and elite control of civil society in sierra leone. *Journal of Political Economy*, 122(2):319–368, 2014.

Siwan Anderson, Patrick Francois, and Ashok Kotwal. Clientelism in indian villages. *American Economic Review*, 105(6):1780–1816, 2015.

Hans Antlöv. Village leaders and the new order. *Leadership on Java: Gentle Hints, Authoritarian Rule. Richmond, Surrey, UK: Curzon Press. Nordic Institute of Asian Studies, Studies in Asian Topics*, (16):73–96, 1994.

Hans Antlöv et al. *Exemplary centre, administrative periphery: rural leadership and the new order in Java.* Curzon Press Ltd, 1995.

Jan S Aritonang. *Mission Schools in Batakland (Indonesia): 1861-1940*, volume 10. Brill, 1994.

Eric Avis, Claudio Ferraz, Frederico Finan, and Carlos Varjão. Money and politics: The effects of campaign spending limits on political competition and incumbency advantage. Technical report, National Bureau of Economic Research, 2017.

Kate Baldwin. Why vote with the chief? political connections and public goods provision in zambia. *American Journal of Political Science*, 57(4):794–809, 2013.

Kate Baldwin. *The paradox of traditional chiefs in democratic Africa*. Cambridge University Press, 2016.

Abhijit Banerjee and Lakshmi Iyer. History, institutions, and economic performance: The legacy of colonial land tenure systems in india. *American economic review*, 95(4):1190–1213, 2005.

Ritwik Banerjee, Tushi Baul, and Tanya Rosenblat. On self selection of the corrupt into the public sector. *Economics Letters*, 127:43–46, 2015.

Sebastian Barfort, Nikolaj A Harmon, Frederik G Hjorth, and Asmus Leth Olsen. Dishonesty and selection into public service in denmark: Who runs the world's least corrupt public sector? *Available at SSRN 2664983*, 2015.

Christoph Basten and Frank Betz. Beyond work ethic: Religion, individual, and political preferences. *American Economic Journal: Economic Policy*, 5(3):67–91, 2013.

John Bastin. Raffles and british policy in the indian archipelago, 1811-1816. *Journal of the Malayan Branch of the Royal Asiatic Society*, 27(1 (165):84–119, 1954.

Pia M Basurto, Pascaline Dupas, and Jonathan Robinson. Decentralization and efficiency of subsidy targeting: Evidence from chiefs in rural malawi. Technical report, National Bureau of Economic Research, 2017.

Robert H Bates. *Markets and states in tropical Africa: the political basis of agricultural policies*. Univ of California Press, 2014.

Marc F Bellemare and Casey J Wichman. Elasticities and the inverse hyperbolic sine transformation. *Oxford Bulletin of Economics and Statistics*, 2019.

Marianne Bertrand, Robin Burgess, Arunish Chawla, and Guo Xu. The glittering prizes: Career incentives and bureaucrat performance. 2018.

Timothy Besley. Paying politicians: theory and evidence. *Journal of the European Economic Association*, 2(2-3):193–215, 2004.

Timothy Besley. Political selection. *Journal of Economic Perspectives*, 19(3):43–60, 2005.

Ulbe Bosma. *The Sugar Plantation in India and Indonesia: Industrial Production, 1770-2010*. Cambridge University Press, 2013.

Jan Breman. Control of land and labour in colonial java. In *Control of Land and Labour in Colonial Java*. BRILL, 1983.

Jan Breman. *Mobilizing labour for the global coffee market: profits from an unfree work regime in colonial Java*. Amsterdam University Press, 2016.

Katherine Casey, Rachel Glennerster, Edward Miguel, and Maarten Voors. Skill versus voice in local development. Technical report, National Bureau of Economic Research, 2018.

Timothy G Conley. Gmm estimation with cross sectional dependence. *Journal of econometrics*, 92 (1):1–45, 1999.

Ernesto Dal Bó and Frederico Finan. Progress and perspectives in the study of political selection. *Annual Review of Economics*, 10:541–575, 2018.

Ernesto Dal Bó, Frederico Finan, Olle Folke, Torsten Persson, and Johanna Rickne. Who becomes a politician? *The Quarterly Journal of Economics*, 132(4):1877–1914, 2017.

Melissa Dell and Benjamin A Olken. The development effects of the extractive colonial economy: The dutch cultivation system in java. Technical report, National Bureau of Economic Research, 2017.

Melissa Dell and Pablo Querubin. Nation building through foreign intervention: Evidence from discontinuities in military strategies. *The Quarterly Journal of Economics*, 133(2):701–764, 2017.

Melissa Dell, Nathan Lane, and Pablo Querubin. The historical state, local collective action, and economic development in vietnam. *Econometrica*, 86(6):2083–2121, 2018.

Raden Lockman Djajadiningrat. *From Illiteracy to University*. Netherlands and Netherlands Council of the Institute of Pacific Relations, 1940.

Esther Duflo. Schooling and labor market consequences of school construction in indonesia: Evidence from an unusual policy experiment. *American economic review*, 91(4):795–813, 2001.

Pieter J Evers. Resourceful villagers, powerless communities: Rural village government in indonesia. *A World Bank–Bappenas Research Project*, 2000.

Cornelis Fasseur. The politics of colonial exploitation: Java, the dutch, and the cultivation system, trans. *RE Elson (Ithaca: Cornell University Southeast Asia Program Publications, 1992)*, 57, 1992.

Merennage Radin Fernando. *Peasant and Plantation Economy: The Social Impact of the European Plantation Economy in Cirebon Residency from the Cultivation System to the End of First Decade of the Twentienth Century*. PhD thesis, Department of History, Monash University, 1982.

Claudio Ferraz and Frederico Finan. Motivating politicians: The impacts of monetary incentives on quality and performance. Technical report, National Bureau of Economic Research, 2009a.

Claudio Ferraz and Frederico Finan. Motivating politicians: The impacts of monetary incentives on quality and performance. Technical report, National Bureau of Economic Research, 2009b.

Stefano Gagliarducci and Tommaso Nannicini. Do better paid politicians perform better? disentangling incentives from selection. *Journal of the European Economic Association*, 11(2): 369–398, 2013.

Andrew Gelman and Guido Imbens. Why high-order polynomials should not be used in regression discontinuity designs. *Journal of Business & Economic Statistics*, (just-accepted), 2017.

Markus Goldstein and Christopher Udry. The profits of power: Land rights and agricultural investment in ghana. *Journal of political Economy*, 116(6):981–1022, 2008.

Douglas Gollin and Richard Rogerson. Productivity, transport costs and subsistence agriculture. *Journal of Development Economics*, 107:38–48, 2014.

Rema Hanna and Shing-Yi Wang. Dishonesty and selection into public service: Evidence from india. *American Economic Journal: Economic Policy*, 9(3):262–90, 2017.

J Vernon Henderson, Adam Storeygard, and David N Weil. Measuring economic growth from outer space. *American Economic Review*, 102(2):994–1028, 2012.

Soeren J Henn. The state, chiefs, and development: Evidence from africa. 2019.

Mason C Hoadley. *Selective judicial competence: the Cirebon-Priangan legal administration, 1680-1792*. SEAP Publications, 1994.

JF Holleman. *Van Vollenhoven on Indonesian adat law*. Springer, 1981.

Frans Husken. Village elections in central java. *Leadership on Java: Gentle Hints, Authoritarian Rule*, 16:119, 1994.

Blane D Lewis. Is central government intervention bad for local outcomes? mixed messages from indonesia. *The Journal of Development Studies*, 52(2):300–313, 2016.

Mahmood Mamdani. Citizen and subject: contemporary africa and the legacy of late colonialism. *Perspectives on Political Science*, 26:120–120, 1997.

Monica Martinez-Bravo. The role of local officials in new democracies: Evidence from indonesia. *The American Economic Review*, 104(4):1244–1287, 2014.

Monica Martinez-Bravo. The local political economy effects of school construction in indonesia. *American Economic Journal: Applied Economics*, 9(2):256–89, 2017.

Jean-Luc Maurer. *Pamong Desa or Raja Desa?: wealth, status and power of village officials*. 1994.

Stelios Michalopoulos and Elias Papaioannou. Pre-colonial ethnic institutions and contemporary african development. *Econometrica*, 81(1):113–152, 2013.

Kevin Milligan and Marie Rekkas. Campaign spending limits, incumbent spending, and election outcomes. *Canadian Journal of Economics/Revue canadienne d'économique*, 41(4):1351–1374, 2008.

Soemarsaid Moertono. *State and statecraft in Old Java: A study of the later Mataram period, 16th to 19th century*. Equinox Publishing, 2009.

Benjamin A Olken and Monica Singhal. Informal taxation. *American Economic Journal: Applied Economics*, 3(4):1–28, 2011.

Mancur Olson. Dictatorship, democracy, and development. *American political science review*, 87 (3):567–576, 1993.

Christopher Paik and Jessica Vechbanyongratana. Path to centralization and development: Evidence from siam. *World Politics*, 71(2):289–331, 2019.

Thomas Stamford Raffles. *The history of Java*, volume 2. J. Murray, 1830.

Daniel M Thompson, James J Feigenbaum, Andrew B Hall, and Jesse Yoder. Who becomes a member of congress? evidence from de-anonymized census data. Technical report, National Bureau of Economic Research, 2019.

Robert Van Niel. Measurement of change under the cultivation system in java, 1837-1851. *Indonesia*, (14):89–109, 1972.

Franz von Benda-Beckmann and Keebet von Benda-Beckmann. *Political and legal transformations of an Indonesian polity: the Nagari from colonisation to decentralisation*. Cambridge University Press, 2013.

Figure 1: Bengkok Land in each village, 2000 (ha)

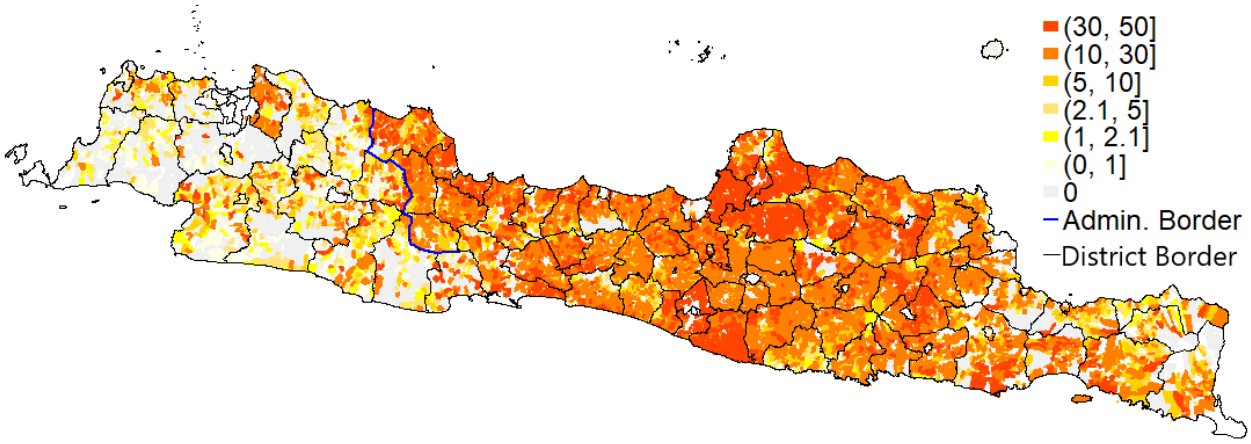


Figure 1: This map plots the size of *tanah bengkok* land, at the village-level, across the entire island of Java, Indonesia. The Priangan-Cirebon border is highlighted in dark blue. In particular, I study villages along the southern Priangan-Cirebon border where villages have similar historical crop cultivation patterns. I zoom in on this portion of the map in Figure 2 below

Figure 2: Bengkok Land in each village, 2000 (ha)

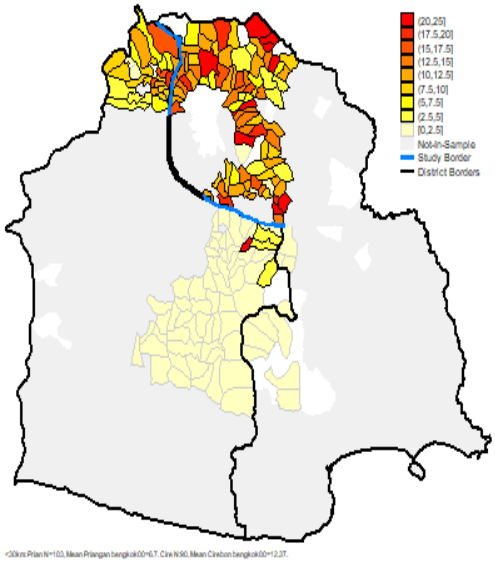


Figure 2: This map plots the size of *tanah bengkok* land, at the village-level, across my study borders. Given the mountainous geography of this region, I restrict my study sample to villages across two segments of this border where there are no discontinuities in elevation. Hence, in grey, are villages not included in my study. In white, are mountains where no village settlement exists. Urbanized towns and cities are omitted given that settlements in these areas are organized under a different system and chiefs are not awarded *bengkok* land.

Figure 3: Bengkok Land in Priangan-Cirebon, Pre-1830

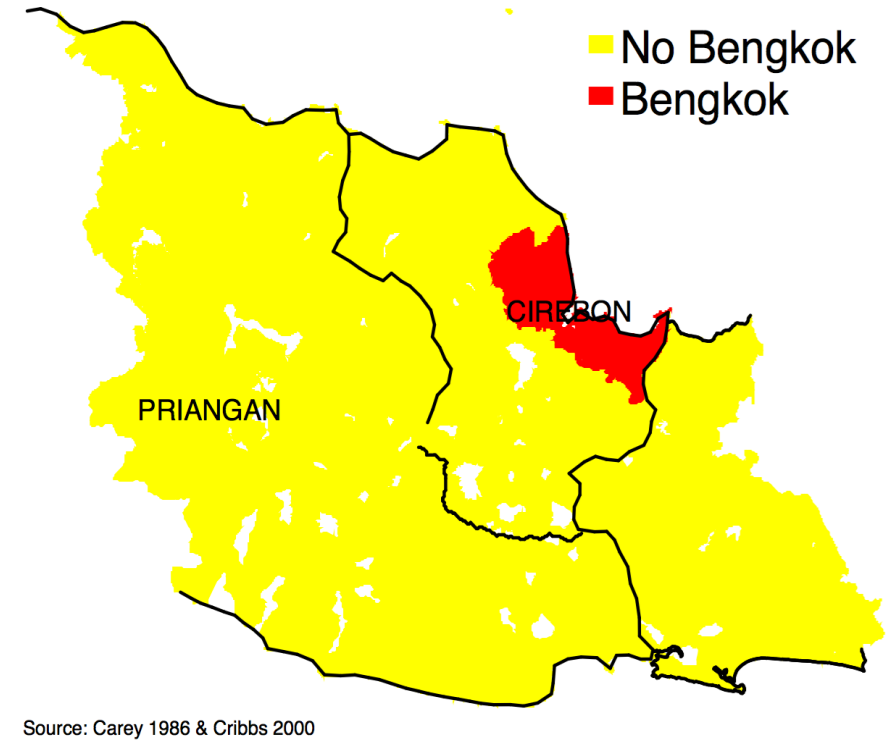


Figure 3: This map plots the geographical spread of *bengkok* before Dutch expansion in 1830. The institution was only known in central Cirebon pre-1830.

Figure 4: Average Bengkok Land in each Village, Sub-District Level 1867 (ha)

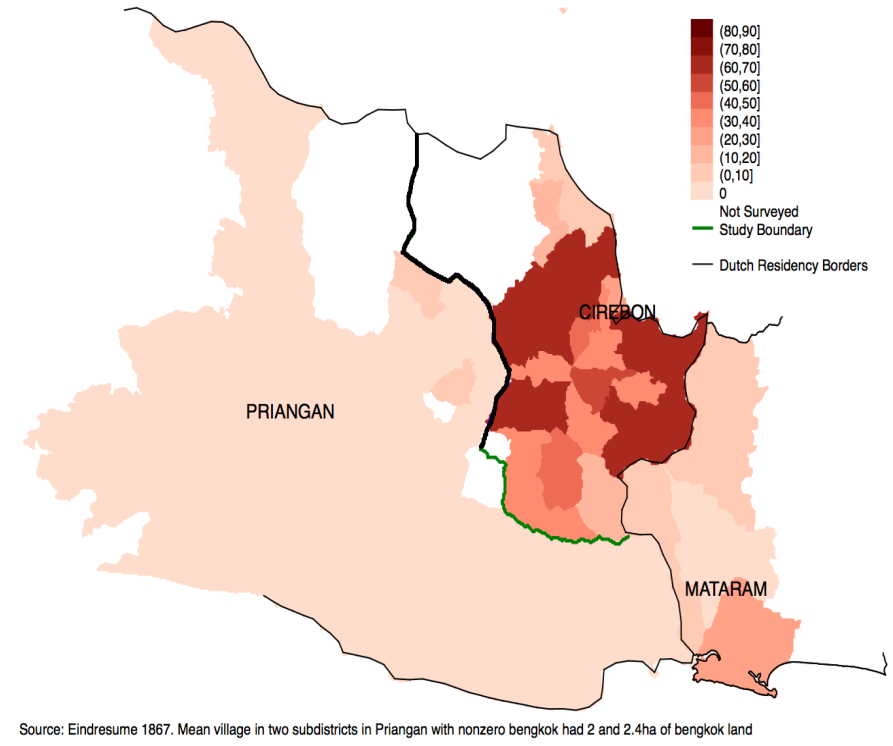
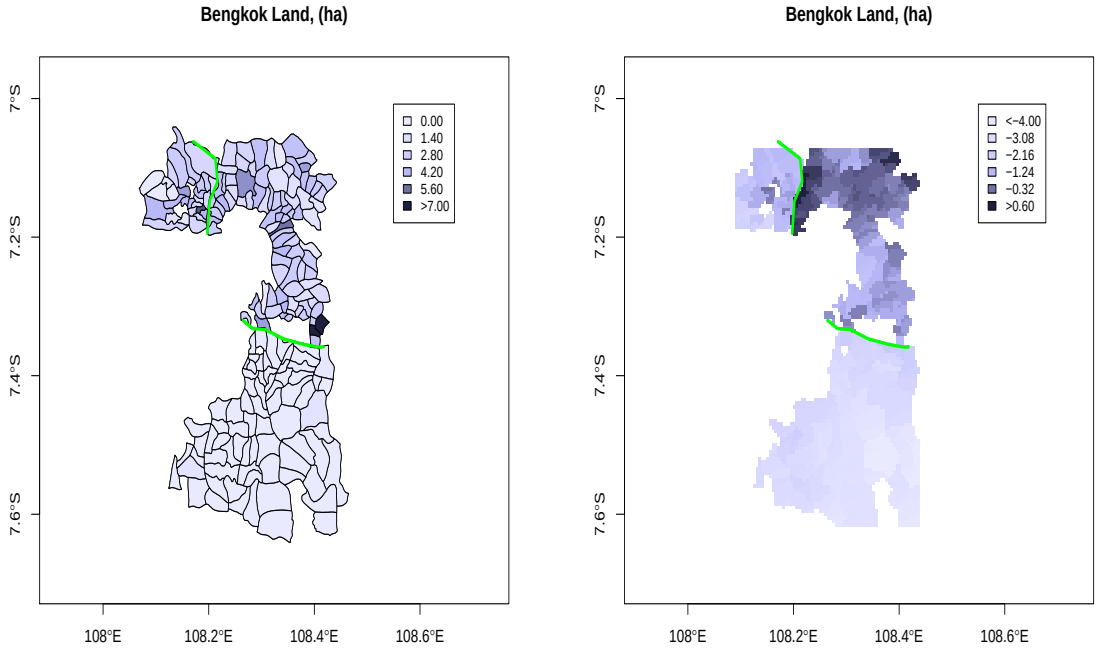


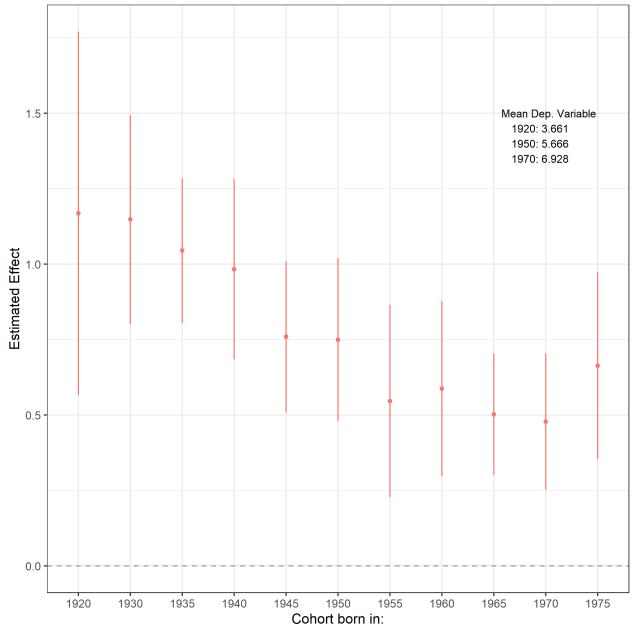
Figure 4: This map plots the size of *tanah bengkok* land, at the subdistrict-level, across my study borders from 1867 Dutch archival data.

Figure 5: First-Stage RD Graph



Longitude is on the x-axis, latitude is on the y-axis, and the data value is shown using an evenly-spaced monochromatic color scale. Figures on the left show actual data values plotted at the village-level. Figures on the right show predicted values, for a finely spaced grid of longitude-latitude coordinates, from a regression of the size of *bengkok* land on an indicator for being on the Cirebon side of the border using equation (1).

Figure 6: Cohort-Level Differences in Years of Education of Villagers Across the *Bengkok* Boundary



Source: Census 2000 data. Regressions estimated at the individual-level and pooled at 5 year cohort-levels. First cohort pooled at 10-year level (1920-1930) for power. Bars plot 95% confidence intervals.

Table 1: Balance on Pre-Treatment Population Density, 1819

	1819 Population Density		
sample within:	30 km	20 km	10 km
	(1)	(2)	(3)
cirebon border	−0.139	−0.178*	−0.177**
	(0.132)	(0.084)	(0.067)
Observations	24	20	17
Mean Dep. Var	0.24	0.25	0.26

Note: Unit of observation is at the sub-district level measured in terms of persons per hectare. Source: 1819 Dutch archival records. Regressions include border fixed effects. In successive columns, I limit the sample to include only villages located less than 30km, 20km, and 10km from the historical Cirebon-Priangan Residency boundary. Conley standard errors for difference in means between Cirebon and Priangan villages are in brackets (assuming a cut-off window of 30km).

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

Table 2: Pre-Determined Geographic Characteristics

	Panel A: Geographic Characteristics								
	Elevation			Slope			Ruggedness		
sample within:	30 km	20 km	10 km	30 km	20 km	10 km	30 km	20 km	10 km
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
cirebon border	−25.252	10.451	41.253***	1.511	0.567	−0.864	0.046*	0.004	−0.012
	(43.610)	(26.721)	(15.658)	(3.647)	(3.279)	(2.282)	(0.028)	(0.030)	(0.018)
Observations	193	164	103	193	164	103	193	164	103
Mean Dep. Var	459.38	480.41	443.03	24.76	24.94	27.15	0.18	0.16	0.14
	Panel B: Drainage & Potential Crop Yield								
	Drainage			*Wet Rice Potential Yield*			*Coffee Potential Yield*		
sample within:	30 km	20 km	10 km	30 km	20 km	10 km	30 km	20 km	10 km
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
cirebon border	0.042	0.019	−0.004	3.845	0.798	−3.131***	−0.441	0.261	−2.448
	(0.036)	(0.035)	(0.003)	(3.270)	(2.787)	(1.190)	(1.384)	(1.292)	(1.568)
Observations	164	137	81	193	164	103	193	164	103
Mean Dep. Var	0.73	0.84	0.94	2152.87	2155.18	2154.88	623.71	623.43	619.53

Note: Unit of observation is village-level. I include border fixed effects. Geospatial measures of elevation, slope and drainage are calculated using data at 30 arc second (1km) resolution (SRTM (2000)). Meaures of potential agricultural yield are calculated using FAO-GAEZ data. All measures calculated at 2000 village border polygons. The unit of measure for elevation is meters; slope is degrees; drainage is percentage of land covered by soils with poor or excessive drainage; wet rice and coffee potential yield in tons per hectare. In successive columns, I limit the sample to include only villages located less than 30km, 20km, and 10km from the historical Cirebon-Priangan Residency boundary. Conley standard errors for difference in means between Cirebon and Priangan villages are in brackets (assuming a cut-off window of 30km).

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

Table 3: First Stage: Jumps in Size of *Bengkok* Across Historical Border, Border RD

Sample Within:	30 km	20 km	10 km
	(1)	(2)	(3)
	Panel A: Linear Polynomial in Latitude and Longitude		
cirebon	1.362***	1.437***	1.487**
	(0.478)	(0.526)	(0.596)
	Panel B: Cubic Polynomial in Distance		
cirebon	1.644***	1.669***	1.669***
	(0.388)	(0.400)	(0.461)
	Panel C: Cubic Polynomial in Latitude and Longitude		
cirebon	1.589*	1.602*	1.465
	(0.923)	(0.961)	(1.289)
Observations	191	162	101
Mean Dep. Var	1.64	1.87	2.01

Note: Unit of observation is at the village level. Outcome in column (1) - (3) is the average size of *bengkok* land awarded to the elected chief as reported in our survey data. Controls: Village-level mean elevation, slope and border segment fixed effects. Conley standard errors allowing for spatial autocorrelation within cutoff of 30km is used.

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

Table 4: Candidate Characteristics: Education, Fuzzy RD

Sample Within:	Years of Education, Candidates (1979-2014)		
	30 km	20 km	10 km
	(1)	(2)	(3)
	Panel A: Ordinary Least Squares		
bengkok	0.262***	0.241***	0.217***
	(0.036)	(0.034)	(0.054)
	Panel B: Instrumental Variables		
bengkok	0.356***	0.241***	0.155*
	(0.068)	(0.063)	(0.089)
Observations	2136	1769	1103
Mean Dep. Var	10.89	10.95	11.06
First Stage F Statistic	22.70	20.30	11.05

Note: Unit of observation is at the village chief candidate level. Outcome in column (1) - (3) is the number of years of education received by a village chief candidate that ran for office between 1979 - 2014, from survey data. Controls: Village-level mean elevation, slope, indicator if election took place before 1999 and border segment fixed effects. Conley standard errors allowing for spatial autocorrelation within cutoff of 30km is used.

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

Table 5: Chief Characteristics: Education, Fuzzy RD

Sample Within:	Years of Education, Chiefs (1979-2014)		
	30 km	20 km	10 km
	(1)	(2)	(3)
	Instrumental Variables		
bengkok	0.318***	0.143	0.057
	(0.111)	(0.154)	(0.191)
Observations	873	735	456
Mean Dep. Var	11.07	11.14	11.21
First Stage F Statistic	22.2	22.9	13.9

Note: Unit of observation is at the village chief level. Outcome in column (1) - (3) is the years of education received by each village chief that ran for office between 1979 - 2014 from survey data. Controls: Village-level mean elevation, slope, indicator if election took place before 1999 and border fixed effects. Conley standard errors allowing for spatial autocorrelation within cutoff of 30km is used.

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

Table 6: Candidate Characteristics: Differencing out Average Village Education, Fuzzy RD

Sample Within:	Differences in Years of Education		
	30 km (1)	20 km (2)	10 km (3)
	Instrumental Variables		
bengkok	0.073	−0.015	−0.061
	(0.094)	(0.090)	(0.104)
Observations	2136	1769	1103
Mean Dep. Var	3.98	4.01	3.98
First Stage F Statistic	22.7	20.3	11.1

Note: Unit of observation is at the village chief candidate level. Outcome in column (1) - (3) is the years of education received for each village chief candidate that ran for office between 1979 - 2014 from survey data substracted by average years of education in the candidate's village for individuals aged 25-70 from Census 2010 data. Controls: Village-level mean elevation, slope, indicator if election took place before 1999 and border fixed effects. Conley standard errors allowing for spatial autocorrelation within cutoff of 30km is used.

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

Table 7: Candidate Characteristics (1979-2014): Occupation, Fuzzy RD

Sample Within:	High Wages			(Ex-)Civil Servants			Low Wages		
	30 km (1)	20 km (2)	10 km (3)	30 km (4)	20 km (5)	10 km (6)	30 km (7)	20 km (8)	10 km (9)
	Instrumental Variables								
bengkok	0.001	0.010	0.011	0.036***	0.017**	0.019**	0.013	0.007	0.013
	(0.008)	(0.008)	(0.008)	(0.012)	(0.007)	(0.008)	(0.013)	(0.014)	(0.009)
Observations	2204	1821	1137	2204	1821	1137	2204	1821	1137
Mean Dep. Var	0.11	0.11	0.12	0.21	0.22	0.21	0.23	0.23	0.23
First Stage F Statistic	22.5	21.2	11.9	22.5	21.2	11.9	22.5	21.2	11.9

Note: Unit of observation is at the village chief candidate level. All outcomes are coded from previous occupations of all chief candidates that ever ran for office between 1979 - 2014 from survey data. Outcome in column (1) - (3) is an indicator for whether the candidate held a high wage occupation which includes occupations like businessman, rice paddy huller and equivalent. Column (4) - (6) is an indicator for whether the candidate was previously a career bureaucrat (*PNS*) Column (7) - (9) is an indicator for whether the candidate held a low wage occupation such as day-wage (farm) laborers. Controls: Village-level mean elevation, slope, indicator for whether election took place before or after 1999 democratization and border segment fixed effects. Conley standard errors allowing for spatial autocorrelation within cutoff of 30km is used.

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

Table 8: Barriers to Political Entry (1979-2014): Campaign Costs, Fuzzy RD

	Campaign Costs, IHS		
Sample Within:	30 km	20 km	10 km
	(1)	(2)	(3)
	Instrumental Variables		
bengkok	0.392***	0.546***	0.443***
	(0.123)	(0.101)	(0.082)
Observations	553	484	298
Mean Dep. Var	2.84	2.84	2.80
First Stage F Statistic	19.4	21.7	11.9

Note: Unit of observation is at village level. Outcomes are from survey data. Outcome of campaign cost in columns (1) - (3) are transformed by an inverse hyperbolic sine transformation. Outcome in column (1) - (3) is the amount of funds that a village chief candidate expended when running for village office. We triangulate campaign costs across all available respondents in each village. Based on respondent interviews, campaign costs consist largely of food preparation costs, favors for voters and sponsorship of pre and post election events. Smaller N is due to non-responses. Controls: Village-level mean elevation, slope, indicator for whether election took place before or after 1999 democratization and border segment fixed effects. Conley standard errors allowing for spatial autocorrelation within cutoff of 30km is used.

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

Table 9: Barriers to Political Entry: Number of Candidates, Fuzzy RD

Sample Within:	30 km	20 km	10 km
	(1)	(2)	(3)
	Instrumental Variables		
bengkok	−0.157***	−0.185***	−0.080**
	(0.033)	(0.042)	(0.036)
Observations	929	786	490
Mean Dep. Var	2.46	2.42	2.45
First Stage F Statistic	13.2	13.6	10.0

Note: Unit of observation is at the village election term level. Outcome in column (1) - (3) is the number of candidates that ran for office between 1979 - 2014 from survey data. Controls: Village-level mean elevation, slope, indicator if election took place before 1999 and border segment fixed effects. Conley standard errors allowing for spatial autocorrelation within cutoff of 30km is used.

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

Table 10: Village Revenue: Fuzzy RD

	Village Revenue, IHS					
	Supra-Village			Intra-Village		
Sample Within:	30 km	20 km	10 km	30 km	20 km	10 km
	(1)	(2)	(3)	(4)	(5)	(6)
	Instrumental Variables					
bengkok	0.191***	0.142***	0.155***	0.341***	0.277***	0.219***
	(0.037)	(0.040)	(0.045)	(0.086)	(0.060)	(0.053)
Observations	764	648	404	764	648	404
Mean Dep. Var	11.34	11.35	11.39	11.84	11.85	11.89
First Stage F Statistic	12.7	13.6	9.1	12.7	13.6	9.1

Note: Unit of observation is at the village level. All variables are inverse hyperbolic sine-transformed. Outcome in column (1) - (3) is the amount of funds that a village reports having received from Central, Provincial and District governments. Outcome in column (4) - (6) is the amount of funds that a village reports having received from internal village sources such as village own taxes. Source: Village census 1996, 2003, 2008 and 2011. Controls: Village-level mean elevation, slope, survey-year and border segment fixed effects. Conley standard errors allowing for spatial autocorrelation within cutoff of 30km is used.

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

Table 11: Contemporary Public Goods Provision: Fuzzy RD

	Infrastructure Z-Score Per Capita			Health Z-Score Per Capita			Education Z-Score Per Capita		
Sample Within:	30 km	20 km	10 km	30 km	20 km	10 km	30 km	20 km	10 km
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Instrumental Variables								
bengkok	0.229***	0.188***	0.141**	0.032	0.027	−0.021	−0.083***	−0.143***	−0.113**
	(0.064)	(0.056)	(0.056)	(0.050)	(0.073)	(0.081)	(0.030)	(0.034)	(0.052)
Observations	945	802	499	946	803	499	946	803	499
Mean Dep. Var	0.00	0.00	0.00	-0.00	0.00	-0.00	0.00	0.00	-0.00
First Stage F Statistic	12.9	13.9	9.0	12.9	13.9	9.0	12.9	13.9	9.0

Note: Source: Village Census (PODES) data. Pooled regressions at tri-annual podes level for all available village census years between 1983 to 2014. All Z-scores calculated using per-capita measures. Infrastructure z-score includes 3 indicator variables which equal 1 if the village has a road passable by 4wd vehicle, if the village has safe garbage disposal, or if the village has safe water. Health: number of health posts *posyandu*, supplementary health posts and number of doctors. Schools: Kindergartens, (non-)religious primary and junior high schools Controls: Village-level mean elevation & slope, survey-year and border segment fixed effects

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

Table 12: Historical Public Goods Provision, Fuzzy RD

	Z-Score Schools, 1983					
	INPRES			Non-INPRES		
Sample Within:	30 km	20 km	10 km	30 km	20 km	10 km
	(1)	(2)	(3)	(4)	(5)	(6)
	Instrumental Variables					
bengkok	−0.167	−0.135	0.052	0.406***	0.226***	0.153**
	(0.105)	(0.089)	(0.077)	(0.145)	(0.064)	(0.075)
Observations	188	160	100	188	160	100
Mean Dep. Var	0.00	-0.00	0.00	0.00	-0.00	-0.00
First Stage F Statistic	11.7	12.2	7.4	11.7	12.2	7.4

Note: Source: 1983 Village Census (PODES) data. Unit of observation is at the village level. Outcome in columns (1) - (3) is the standardized per capita z-score of number of INPRES schools in the village. Outcome in columns (4) - (6) is the standardized per capita z-score of number of non-INPRES village schools. Smaller N is due to difficulty in merging historical village census data with modern-day villages. Controls: Village-level mean elevation, slope and border segment fixed effects. Conley standard errors allowing for spatial autocorrelation within cutoff of 30km is used.

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

Table 13: Development Outcomes: Fuzzy RD

Sample Within:	30 km (1)	20 km (2)	10 km (3)
	Panel A: Nighttime Light Intensity		
bengkok	0.114*	0.165***	0.208***
	(0.060)	(0.046)	(0.054)
Observations	3820	3240	2020
Mean Dep. Var	2.18	2.32	2.49
First Stage F Statistic	13.0	14.0	9.5
	Panel B: % Children Died		
bengkok	−0.63***	−0.65***	−0.52***
	(0.002)	(0.002)	(0.002)
Observations	21709	17947	11027
Mean Dep. Var	2.4	2.3	2.3
First Stage F Statistic	14.9	13.2	9.4
	Panel C: Years of Education, Villagers		
bengkok	0.208**	0.177***	0.233***
	(0.090)	(0.050)	(0.065)
Observations	204189	173744	113862
Mean Dep. Var	6.50	6.55	6.67
First Stage F Statistic	12.8	11.6	7.8

Note: Panel A: Unit of observation is at village-year level. Outcome in columns (1) - (3) is nighttime light intensity, inverse hyperbolic sine transformed. Controls: Village-level mean elevation, slope, year and border fixed effects. Panel B: Unit of observation is at individual level. Outcome is constructed from the number of dead children as a proportion of total children ever born reported by each women who was recorded as having ever given birth in the 2010 Indonesian Population Census. To better approximate current-day health conditions, I restrict the sample to all women born between 1975-1990. These are women who would have been 20-35 years of age at the time of enumeration of the 2010 census and of prime child bearing age. Controls: Village-level mean elevation, slope, 5-year cohort and border fixed effects. Panel C: Unit of observation is at individual level. Outcome is the number of years of education as reported in the 2010 Indonesian Population Census. For comparability with health outcomes in Table 3, I restrict the sample to all individuals born between 1975-1990. Conley standard errors allowing for spatial autocorrelation within cutoff of 30km is used

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

Table 14: Orientation towards Elite Interests: Voting for Golkar in 1999, Fuzzy RD

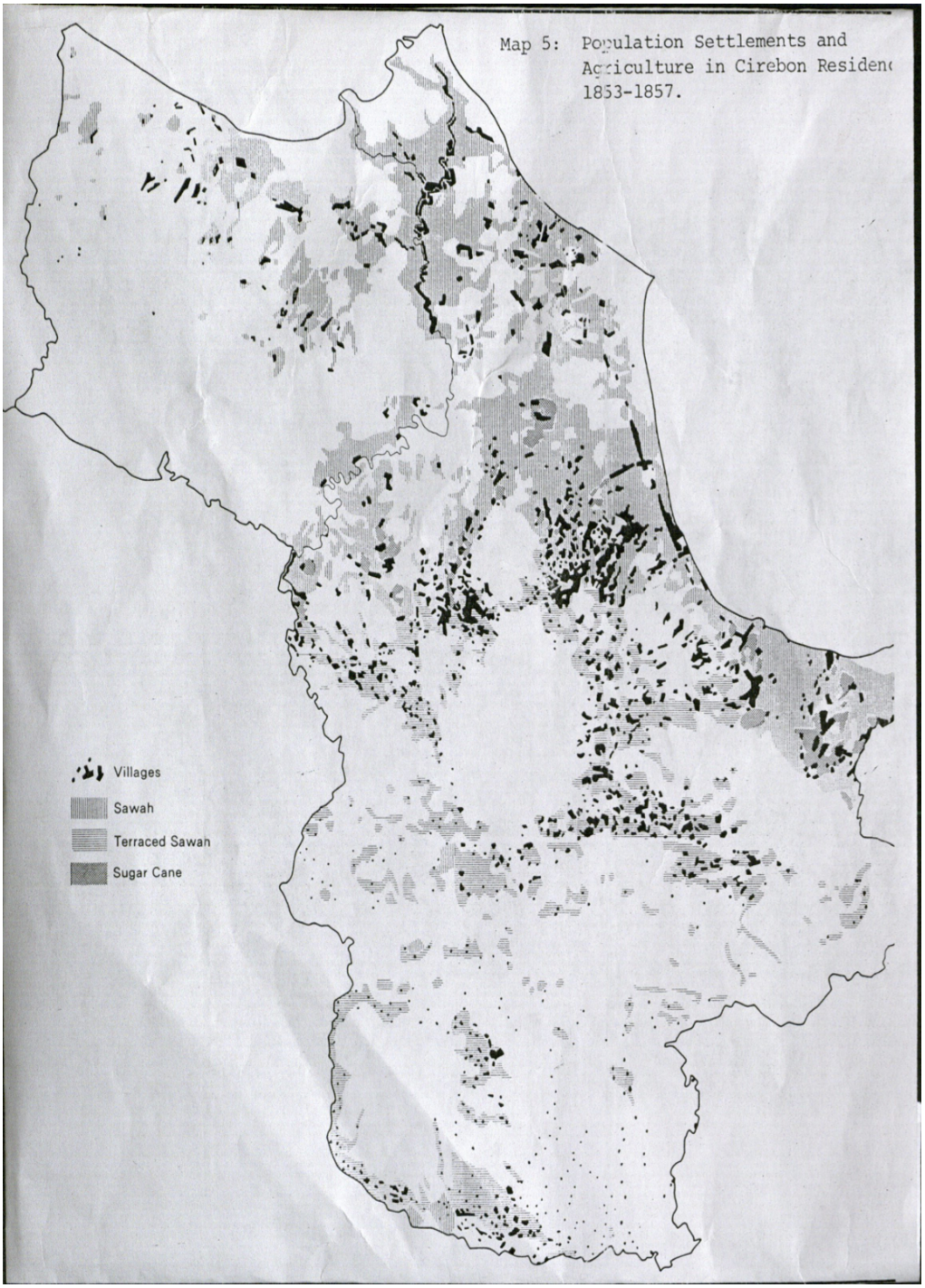
Sample Within:	30 km	20 km	10 km
	(1)	(2)	(3)
	Instrumental Variables		
bengkok	−0.184***	−0.146**	−0.105**
	(0.052)	(0.057)	(0.053)
Observations	191	162	101
Mean Dep. Var	0.32	0.29	0.30
First Stage F Statistic	12.2	13.0	8.4

Note: Unit of observation is at the village level. Outcome in column (1) - (3) is an indicator that equals 1 if Golkar received the most number of votes in 1999, the first elections after the end of Soeharto's rule in 1998. Source: 2000 village census data. Controls: Village-level mean elevation, slope and border segment fixed effects. Conley standard errors allowing for spatial autocorrelation within cutoff of 30km is used.

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

Appendix: Additional Figures and Tables

Figure A.1: Map of Agricultural Cultivation in Cirebon Residency, 1853



This map shows, shaded in dark grey, that there was no sugar cultivation along my study border in the south of Cirebon. The only pockets of sugar cane cultivation lay along the middle portion of the Priangan-Cirebon border and in Central Cirebon, away from my study border. Source: Fernando (1982).

Figure A.2: 1853 Dutch Maps

These maps were created by Dutch cartographers simultaneously with a village-level land use survey at a scale of 1:2 500 (1cm to 25m). Reproduction was allowed only after those in charge of statistical survey declared that land use was displayed correctly.

Table A.1: Candidate Characteristics: Robustness to Alternative RD Specifications

	Years of Education (1979-2014)			$= 1$ if Civil Servant (1979-2014)		
Sample Within:	30 km	20 km	10 km	30 km	20 km	10 km
	(1)	(2)	(3)	(4)	(5)	(6)
Baseline (Table 4 and 7)	0.356***	0.241***	0.155*	0.036***	0.017**	0.019**
	(0.068)	(0.063)	(0.089)	(0.012)	(0.007)	(0.008)
Quad. in Lat. Lon.	0.323***	0.291***	0.071	0.033***	0.029**	0.033
	(0.049)	(0.069)	(0.193)	(0.009)	(0.013)	(0.029)
Cubic in Lat. Lon.	0.289***	0.219**	0.049	0.034*	0.024	0.050
	(0.071)	(0.097)	(0.187)	(0.018)	(0.020)	(0.032)
Cubic in Distance	0.387***	0.405***	0.387***	0.039***	0.042***	0.033***
	(0.049)	(0.047)	(0.038)	(0.008)	(0.007)	(0.008)
Observations	2106	1750	1103	2170	1802	1137
Mean Dep. Var	10.89	10.95	11.06	0.21	0.22	0.21

Note: This table reports estimates from variants of equation (1) using outcomes of candidate education and previous occupation as in Table 4 and 7. Unit of observation is at the village chief candidate level and includes baseline controls of elevation, slope, indicator if election took place before end of Suharto rule in 1999 and border segment fixed effects. Conley standard errors allowing for spatial autocorrelation within cutoff of 30km is used.

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

Table A.2: Candidate Characteristics: Robustness to Additional Controls

	Years of Education (1979-2014)			= 1 if Civil Servant (1979-2014)		
Sample Within:	30 km	20 km	10 km	30 km	20 km	10 km
	(1)	(2)	(3)	(4)	(5)	(6)
Baseline (Table 4 and 7)	0.356***	0.241***	0.155*	0.036***	0.017**	0.019**
	(0.068)	(0.063)	(0.089)	(0.012)	(0.007)	(0.008)
Controls: Agriculture	0.305***	0.217***	0.197***	0.040***	0.020***	0.018*
	(0.068)	(0.053)	(0.074)	(0.012)	(0.007)	(0.010)
Controls: Geography	0.293***	0.175**	0.101	0.032	0.012	0.015
	(0.076)	(0.086)	(0.102)	(0.020)	(0.013)	(0.013)
Controls: Government	0.376***	0.249***	0.106	0.040***	0.021**	0.027
	(0.072)	(0.070)	(0.090)	(0.012)	(0.009)	(0.018)
Observations	2106	1750	1103	2170	1802	1137
Mean Dep. Var	10.89	10.95	11.06	0.21	0.22	0.21

Note: This table reports estimates from variants of equation (1) using outcomes of candidate education and previous occupation as in Table 4 and 7. Unit of observation is at the village chief candidate level and includes baseline controls of elevation, slope, indicator if election took place before end of Suharto rule in 1999 and border segment fixed effects. Agricultural controls include rice potential yield and coffee potential yield. Geographical controls include, in addition to elevation and slope in the baseline, ruggedness and drainage. Government controls are proxies for ease of government access and includes distance to sub-district and district capital. Conley standard errors allowing for spatial autocorrelation within cutoff of 30km is used.

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