Village Elites, Political Land Rents, and Incentives for Local Development: Evidence from Indonesia

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May 11, 2024

Abstract

Much of rural development policy is implemented by traditional local leaders. Yet, it is unclear what is the most effective way to elicit effort from these leaders. This paper examines the long-run effects of awarding higher political land rents to elected village chiefs in Java, Indonesia. I exploit a historical policy that granted chiefs cultivation rights over village rice land (*bengkok*) in the early nineteenth century on one side of a historical border, but not the other. I use a spatial regression discontinuity design and original survey data to compare villages on either side of the border. I find that *bengkok* chiefs generated more local revenue, constructed more public goods, and villages continue to experience more positive economic outcomes. Rich survey data documents that *bengkok* improved the quality and selection of chiefs. In particular, consistent with Olson (1993)'s theory of stationary bandits, I provide suggestive evidence that *bengkok* increased service motivation and incentive alignment of chiefs with villagers. Taken together, my findings suggest that paying local leaders from a stable source of bottom-up, local revenue can have persistent effects on local governance and development outcomes.

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1 Introduction

Traditional local leaders play a crucial role in rural development: they form the last mile of service delivery and are often directly responsible for local policy implementation.[1] Most studies, however, have found a consistently negative impact of traditional leaders on development outcomes – reasons for which are often traced to their overwhemingly authoritarian and despotic rule (Acemoglu et al., 2014; Mamdani, 1997). Yet, a simple reason could be that local leaders lack the *incentives* to perform – leaders are rarely adequately compensated and often hold hereditary positions. Naturally, this raises the question: given their importance for development, what is the most effective way to elicit effort from local leaders? Specifically, given the familiar multi-tasking problem in politics (Besley, 2004), is it possible to implement an effective, high-powered incentive scheme that does not rely solely on higher wage compensation?

I answer this question in the context of village chiefs in Java, Indonesia. The Indonesian context is ideal for three reasons. First, Indonesia has a rich history of robust, bottom-up village elections and a strong village-level bureaucracy (dating back to the Dutch colonial era). Second, given the lack of detailed datasets on local leaders, I collect a unique panel dataset from oral and written histories of (ex-)village chiefs and local elites. Third, and most importantly, the presence of *tanah bengkok* – an institution whereby elected chiefs are remunerated in the form of cultivation rights over within-village rice land throughout their term of office. Chiefs typically sharecrop or lease out *bengkok* land to villagers at fixed prices and these payments serve as compensation for their political service to the village.[2]

To that end, this paper answers the following question: In the presence of bottom-up elections, how do persistent differences in political land rents from *bengkok* affect chief performance and long-run economic development? I hypothesize that higher *bengkok* rents attracted better quality leaders, influencing chief performance, local public goods provision, and economic development. Furthermore, I hypothesize that, consistent with Olson (1993)'s theory of "stationary bandits", the persistence of these effects might be traced to the nature of *bengkok* rents. Specifically, the *bottom-up*,

[1] Close to a quarter of the world's population is governed by some form of active traditional political leadership (Baldwin and Holzinger, 2019) and organizations like the World Bank have spent nearly US$80bn on local development programs, the majority of which, channel funds through these leaders (Mansuri and Rao, 2013).

[2] Typically, *bengkok* land is also awarded to other lesser village officials. The size of these allotments, however, are typically much smaller. Furthermore, chiefs are the key decision-makers at the village-level. Hence, we focus on the effects of *bengkok* land awarded to chiefs.

within-village nature of *bengkok* remuneration may have attracted chiefs whose incentives were more aligned to villagers or directly incentivized chiefs to invest in village development.

For identification, I leverage plausibly exogenous variation in the persistence of *bengkok*, arising from the introduction of the Dutch Cultivation System in the early 19th Century.[3] Specifically, frequent redelineation efforts led to the split of a previously homogenous region coinciding with the introduction of differential chief remuneration systems *within* the System. Villages immediately to the north of a newly formed Dutch colonial border (the historical Cirebon–Priangan border, highlighted in green in Figure 2), by virtue of being placed with a larger administrative unit where *bengkok* was deemed to be native, compensated chiefs primarily in terms of *bengkok*. In contrast, villages to the south, where *bengkok* was not deemed to be native, were remunerated through in-kind labor services.[4] Section 2.2 and 2.3 provides detailed evidence that this bifurcation occurred because of idiosyncratic political circumstances rather than economic, cultural, or political differences across the boundary.

[FIGURE 2 ABOUT HERE]

Using a spatial fuzzy regression discontinuity design, I show that villages to the north and south of my study border are largely geographically and ethnically similar. I then use the 100% count Indonesian Population Census, various rounds of the Indonesian Village Census, and primary survey data to estimate effects of *bengkok* on contemporary chief performance and long-run economic development. I find a strong positive effect of *bengkok* land rents: chiefs raise more funds – especially through informal taxes from villagers – provide higher levels of public goods, and this translates into villagers having both higher levels of education and a higher probability of having a non-agricultural job. The results are largely robust to a variety of analyses, including alternative RD specifications and bandwidths. To address possible cross-border differences in colonial policy that

[3]On the Dutch Cultivation System in general: 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, among others, Van Niel (1972) and Fasseur (1992) for an overview of the impact of the Cultivation System on Java. Notably, however, Dell and Olken (2020) document positive modern-day development outcomes from persistent effects of Dutch infrastructure constructed during the Cultivation System. In contrast, historical evidence suggests that the Cultivation System in my study areas focused largely on extraction, rather than investments in infrastructure. This allows me to better isolate the effects of higher land rents from *bengkok*, on my outcomes of interest (Michalopoulos and Papaioannou, 2020). Specifically, effects on the bottom-up provision of public goods by chiefs, vis-a-vis top-down infrastructure provision.

[4]In addition, all chiefs were remunerated in terms of a commission on crops produced at the village-level. The monetary-equivalent amounts from these sources, however, were low in comparison to *bengkok* (Breman, 2016). I provide contemporary evidence for persistent differences in remuneration in Section 2.5.

evolved after the imposition of *bengkok*, I digitize 1853 and 1945 Dutch Colonial maps and find little evidence that this explains my observed results. I further document that higher levels of villager education can be traced back to cohorts born as early as the 1920s, during the Dutch colonial era.

I then examine four possible mechanisms: First, higher *bengkok* rents may attract better quality chiefs *(political selection)*. Second, higher rents might incentivize chiefs seeking re-election to put in greater effort *(re-election incentives)* (Ferraz and Finan, 2009; Gagliarducci and Nannicini, 2013). Third, higher rents might lead to greater *political competition* which could, in turn, lead to more pro-growth policies (Besley et al., 2010). Last, given the within-village nature of *bengkok* rents, I test if *bengkok* might have attracted or aligned chiefs towards the interests of villagers, akin to Olson (1993)'s theory of stationary bandits.

To test these mechanisms, I implement a novel primary survey data collection exercise across both sides of my study border drawn from thousands of hours of in-person, mixed-methods interviews with (ex-)village chiefs and elites. I find evidence that *bengkok* leads to positive effects on political selection. Chiefs are around 22p.p. more likely to hail from an ex-civil servant background and have marginally higher years of education. I find relatively little evidence for re-election incentives and political competition. Taken together, my results suggest that *bengkok* played a key role in attracting better chiefs who shaped stronger bottom-up interactions between chiefs and villagers. These chiefs were better at raising funds for the construction of public goods, resulting in better educational and economic outcomes for *all* villagers.

I close by investigating if the *within-village* nature of *bengkok* rents might have attracted or aligned chiefs towards villager interests.[5] First, *bengkok* chiefs are more likely to own farmland after assuming office. In line with Munshi and Rosenzweig (2015), farmer-chiefs might be more likely to provide public goods that are beneficial for both *bengkok* rice fields and the rice fields of the average villager.[6] Second, *bengkok* chiefs are, correlation-wise, more likely to say that they ran for office due

[5] Baldwin (2016b) argues that the economic and social well-being of local chiefs, who often live full-time in their communities, is closely tied to that of their communities. Hence, one possibility is that the *within-village nature* of *bengkok* land could have attracted chiefs who are more oriented towards local villager interests.

[6] The construction of schools might seem puzzling: why would chiefs construct schools that raise the marginal productivity and outside options of villagers who, in the absence of which, would be locked in to stay in the village and work on *bengkok* land for lower wages? In particular, evidence suggests that landowners and political elites are typically unwilling to provide public goods such as schools (Bates, 2014; Acemoglu et al., 2007). The answer is possibly 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. Furthermore, results on historical schools does not rule out the possibility that village chiefs could have, historically, constructed public goods other than village schools. Data limitations, however, prevent me from probing the effects of *bengkok* rents on the

to pro-social reasons such as to "give back to the community" and "to contribute towards village construction". Together with evidence that *bengkok* chiefs consistently collect higher informal taxes for village projects, these differences are consistent with the hypothesis that the persistently positive effects of *bengkok* might be traced to the nature of *bengkok* rents. Above and beyond providing higher levels of remuneration, *bengkok*, through tying chief remuneration to within-village rice-land, might have led to stronger social ties and incentives for village development.

I argue that three features allow me to interpret differences in *bengkok* as that of land rents. First, *bengkok* land is under common ownership. Chiefs are obligated to rent or sharecrop *bengkok* land out to villagers at fixed prices and do not manage this land on their own. Hence, there is less scope for chiefs to extract additional rents from villagers or multi-tasking issues. Second, the average size of chief *bengkok* land is small relative to total cultivable rice land: an average of 1.6ha out of 158ha. This suggests that land inequality is an unlikely channel behind observed differences in development. Third, *bengkok* exists within a context of relatively secure individual land rights of farmers and chiefs do not have the authority to allocate village land to villagers. This rules out more secure land rights from *bengkok* land as a possible mechanism.[7]

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, than 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, as I have shown, the counterfactual was non-*bengkok* leaders of lower quality.[8]

I make novel contributions to three literatures. An important set of studies in development and economic history examine the effects of (pre-)colonial political institutions of traditional leadership, on modern outcomes. These include the effects of precolonial centralization (Michalopoulos and

construction of other historical public goods.

[7]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.

[8]Antlöv (1994) provides several qualitative accounts consistent with this.

Papaioannou, 2014, 2018) and indirect rule (Acemoglu et al., 2014; Banerjee and Iyer, 2005; Baldwin et al., 2016). The results of these studies, however, are often in conflict. On one hand, precolonial centralization in terms of stronger accountability of local chiefs is correlated with positive economic development in Africa (Gennaioli and Rainer, 2007). Yet, on the other, most instances of indirect rule through local chiefs continue to have largely negative effects on contemporary economic development (e.g. Anderson et al. (2015); Lowes and Montero (2021)). This study bridges the gap between the two: by using fine-grained primary survey data, I pin down higher bottom-up remuneration, in the context of robust local elections, as two key institutional features that have led to persistently positive improvements in the selection and incentive alignment of local leaders. In addition, by studying intra-country variation in political land rents, I am able to circumvent potential confounding factors from differences in e.g., colonizer identity.

More broadly, my findings have direct relevance for many developing countries where vestiges of indirect colonial rule continue to cast a long shadow on political and economic development (Michalopoulos and Papaioannou, 2017). Colonial powers in much of Sub-Saharan Africa and India did not grant political land rents to local leaders and typically appointed leaders to hereditary positions. My findings suggest a clear way to improve the efficacy of traditional local institutions.

Second, this study contributes to the literature on local elites, state capacity, and development (Basurto et al., 2017b; Martinez-Bravo, 2014, 2017; Martinez-Bravo et al., 2022; Balán et al., 2022). I innovate by identifying political selection and the strengthening of bottom-up collective action as a salient channel through which historical institutions can shape long-run state capacity and development outcomes. This is made possible due to an unusual historical institution that has survived multiple abolition attempts. Importantly, it suggests that implementing policies that ensure adequate returns to office and electoral accountability of local officials can be effective tools in stimulating long-run improvements in the local accountability of leaders above and beyond voter-side measures (Mansuri et al., 2018; Pande, 2011; Banerjee et al., 2011).

Third, policy-relevance. Despite the importance of local leaders in delivering development outcomes (Baldwin, 2013, 2016a; Basurto et al., 2017a; Michalopoulos and Papaioannou, 2013; Henn, 2019), there exists little empirical evidence for the optimal design of incentive schemes for eliciting local politician effort. Theory suggests that high-powered incentive schemes, rather than fixed wages, might be more effective in eliciting effort given difficulties in creating clear and credible

performance measures for political tasks (Besley, 2004). I contribute by providing novel, policy-relevant evidence that high-powered incentive schemes that tie local leaders to their constituents, in terms of a persistent, recurrent revenue-generating asset, can be effective in aligning incentives and chief effort.[9]

Last, I contribute to the long-term persistence literature of colonial institutions on modern-day development outcomes (Dell and Olken, 2017; Dell and Querubin, 2017; Dell et al., 2018). Here, I provide the first quantitative evidence on the positive effects of a specific institution, *tanah bengkok*, that was instituted by the Dutch during one of the most extractive periods of Dutch colonial rule: The Cultivation System. My findings relate most closely to Dell and Olken (2020) who finds that, during the same period, the establishment of sugar factories with initially extractive motives, led to greater long-run development through persistence in supply chain linkages and infrastructure. Similarly, I show that land rents, initially introduced for extractive motives, outlived the Dutch regime, and continue to have positive effects on local governance and development outcomes in Indonesia.

The remainder of the paper is organized as follows. Section 2 provides an overview of the historical context of *tanah bengkok* and its expansion across two centuries. Section 3 discusses my empirical specification. Section 4 tests whether *tanah bengkok* continues to have an impact on village chief performance and downstream development outcomes. Section 5 examines mechanisms by presenting a conceptual framework, and describing fieldwork data and results. Section 6 concludes.

2 The History of *Tanah Bengkok*

This section presents the historical natural experiment illustrating how Dutch expansion of indirect rule and *bengkok* in West Java, up to and stopping at the Cirebon-Priangan border, allows me to identify the effects of higher rents. I also describe relevant changes in the village chief electoral and remuneration system from colonial times until today.

[9] My findings echo historical evidence from Western Europe on how the strengthening of local, self-governing, institutions can have long-run positive effects on development (Angelucci et al., 2022).

2.1 Precolonial Roots and Determinants of Adopting *Tanah Bengkok*

The practice of *tanah bengkok* today refers to the granting of usufruct rights to village rice-land and 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 nineteenth century. At that time, *tanah bengkok* referred to cultivation rights that was granted to local notables for political loyalty and services. Prior to 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 center of the Mataram kingdom. This poses a challenge for identification of the causal effect of *bengkok* land rents today: stronger precolonial kingdom rule may have had an impact on traditional local leadership in these areas beyond *bengkok*.

[FIGURE 1 ABOUT HERE]

A second potential source of bias is pre-existing rice fertility and geographical elevation. *Bengkok* takes the form of village rice land, and hence, villages with more fertile rice land typically award chiefs larger plots of *bengkok* land (Maurer, 1994). Given that rice is the main staple food crop, higher rice fertility could lead to better outcomes for reasons that have nothing to do with *bengkok*. Similarly, areas of low elevation are typically more suited for growing rice and such differences in elevation might have an impact on outcomes that I cannot control for.

2.2 Exogenous Assignment in Historical West Java: The Priangan Regency

Fortunately, these concerns can be addressed by focusing on the eastern periphery of the historical Priangan regency, *Preangerstelsel*, a region in West Java, Indonesia, that was relatively homogeneous until the beginning of the 19th century, when the region was split into two Dutch administrative units. Specifically, the north was joined with the regency of Cirebon, while the south stayed in Priangan. Subsequently, villages across this new administrative border were assigned different systems of chief remuneration. I describe this process in detail, in Section 2.3.

Historians note that the entire polity, of what was then known as the Priangan Regency, assumed a shared political, religious and administrative history in terms of a unified legal system

and shared taxation system (Hoadley (1994)). Neither does it appear that, at the start of colonial rule in the 1700s, the region had a strong, fixed local village-based administration. Quoting de Haan (1912), Antlöv et al. (1995) states that, "On the eve of colonial rule, Priangan was isolated and semi-autonomous, *without any centralized ruler claiming taxes and loyalty*.... Dry rice agriculture (*huma* or *gaga*) did not allow for much population growth ... The settlements were small, dispersed and rarely integrated into larger villages. Isolated clusters of dry rice cultivating households lived mainly from what they themselves produced."

Beginning from the mid-18th century, however, Dutch institutionalization of coffee production led to the consolidation and increasing importance of village chiefs and villages as both the unit of production and administration.[10] In particular, the Dutch cultivated coffee in both regions, first under a loose un-unified system, and then, later, as the Dutch streamlined and unified the system, under the *Preangerstelsel* (Breman, 2016). The *Preangerstelsel* marked the beginnings of the increased power of village elites: village officials were appointed by the Dutch to supervise and collect coffee. In return, village officials received income and enjoyed greater authority from the collection of taxes from individual households.[11]. The position of these officials as key intermediaries were further consolidated during the advent of the Cultivation System in 1832 when differences in assignment of *bengkok* as remuneration first arose.

2.3 Origins of the Study Boundary: The Cirebon-Priangan Boundary in the early 19th Century

My treatment of interest is the persistent differences in *bengkok* land rents that arose in the easternmost periphery of the Priangan Regency in the early 19th century. The relevant boundary is the southernmost one in Figure 2, highlighted with a thick green line. In areas to the north of this boundary (the historical district of Galuh), the main source of chief remuneration was *bengkok*, whereas in areas to the south (the historical districts of Limbangan and Sukapura), the main source of chief remuneration was levies of money, produce or labor (Husken, 1994). Historical evidence suggests that idiosyncratic top-down political factors – rather than economic differences – caused this bifurcation in chief remuneration. In particular, it was the result of an idiosyncratic redrawing

[10] Hoadley (1994): pp76 and pp145.

[11] Antlöv et al. (1995): p. 19-20. It is important to note, however, that villages also had a Council of Elders who were oriented towards the needs of the village (Antlöv (1994): p. 75.)

of boundaries in 1810, one amongst many arguably done for administrative efficiency, and the hasty introduction of the Dutch Cultivation System in 1832 based on these boundaries.

[FIGURE 2 ABOUT HERE]

Origin of the border The 1810 boundary (and hence, 1832 basis for north-south bifurcation of *bengkok*) originated in the re-organization of administrative districts and borders following the arrival of Governer-General Herman Willem Daendels (1808-1811). Re-organization took place in two steps. First, in 1808, for the first time in one and a half centuries, Priangan was reorganized based on coffee production.[12] All three historical districts in my study sample, Limbangan, Sukapura, and Galuh, all of which cultivated less coffee compared to other parts of Priangan, were joined with the northern Cheribon districts to form the *Cheribonsche Preangerlanden*.[13] Second, in 1810, this decision was partially reversed: Limbangan and Sukapura were removed and added to the *Jaccatrasche en Preangerbovelanden*. This decision, however, was not made based on pre-existing differences in coffee production. Rees (1869): p. 110-111 writes that this decision was made on the "logic of preserving existing (contiguous) borders." and by "by virtue of their mandatory production of coffee, not one of *product or yield*". Hence, by 1810, Limbangan and Sukapura were, administratively, part of Priangan Residency, and Galuh, part of Cheribon Residency. This proved to be consequential: wide-ranging changes during the Cultivation System subsequently took place across these administrative borders.

1832 Dutch Cultivation System: Bifurcation across the newly established Dutch Residency borders The end of the Belgian War in 1831 spurred the need for additional revenue. This resulted in the imposition and expansion of cash crop cultivation all across Java through The Dutch Cultivation System (1832-1870). Due to a lack of manpower, however, the Dutch turned towards village chiefs as key local intermediaries. There were, however, no uniform set of rules for the Cultivation System – the Dutch worked with local intermediaries in ways that differed depending on pre-existing local institutions and constraints (Van Niel, 1972). Van Niel (1972) states that 'the 'system' became in actuality an interlocking set of local accomodations".[14] In particular, in many parts of Java, given the abundance of land and lack of labor, the Dutch sanctioned the conversion of village rice fields

[12] Hardjasaputra (2004): p.57
[13] Rees (1869): p. 110-111.
[14] Van Niel (1972): p. 93

into *tanah bengkok* to shoulder the heavy financial costs of paying the salaries of tens of thousands of chiefs (Breman, 1983).

Figure 2 clearly shows, however, that this expansion took place throughout Cirebon Residency, of which Galuh was a part of, but halted abruptly at the Cirebon-Priangan border. Why? The historiography strongly suggests that this was a result of Residency-level policies based on Dutch perceptions that had little to do with pre-existing, on-the-ground differences. Most importantly, the Dutch perceived *tanah bengkok* as an institution native to Cirebon but not Priangan. The northernmost borders of Cirebon Residency included the seat of the Cirebon kingdom which had, historically, granted similar land rights to princes (Figure 3). Historians widely believe that these rights were a precursor to *bengkok* rights (Moertono, 1963, 2009).[15] Conversely, no such rights were known throughout Priangan and *tanah bengkok* was not introduced beyond the Cirebon–Priangan border.

[FIGURE 3 ABOUT HERE]

Hence, the introduction of the Cultivation System in 1832, together with the happenstance that Galuh, had been placed under the jurisdiction of Cirebon in 1810, led to the expansion of *tanah bengkok* practices into Galuh but not across the Cirebon-Priangan border into Priangan.[16]. Figure 2 illustrates the Cirebon–Priangan border in black and green and the extent of *tanah bengkok* land at the subdistrict level using 1867 Dutch archival data.[17] The expansion of *bengkok* between Pre-1830 Cirebon (Figure 3) to 1867 (Figure 2) appears to align almost exactly with the extent of the border, and despite the possible imprecision of colonial statistics at that time, there is a marked discontinuity in *bengkok* across the border.

What then, was the Cirebon-Priangan border based on? Like other interior Javanese boundaries, these borders were largely determined by mountains and rivers as the Dutch had limited

[15]These land rights, however, were almost certainly never extended to villages in Cirebon prior to the Cultivation System, as village administration and villages were never the fundamental unit of production until the mid-18th century. Hoadley (1994): pp76.

[16]Indeed, differences between Galuh and it's southern neighbors were so few that, after the initial establishment of the Cultivation system, the administration of Galuh was transferred multiple times between Cirebon and Priangan Residency, up till the end of the colonial period (Gooszen, 1985)

[17]The 1867 Eindresume is a historical land cadastre of 808 villages in Indonesian Java compiled 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 to the continued exploitation of natives through the Cultivation System (Eindresume Vol I, 1867 pp 3–6). All land under private estates was excluded. This refers to land sold by the colonial government to Europeans 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 (approximately equivalent to present-day subdistricts) with a preference for those that were as distinct from each other as possible.

information about rural Java (Ricklefs, 2008). Hence, given that most of the border closely followed rivers and mountain ranges, I further limit my sample to two segments of the southern Cirebon–Priangan border where areas on both sides are balanced on elevation. Figure 4 plots the two segments of my study border and the contemporary size of *bengkok* across the Cirebon–Priangan border. Moving across the border, there is a marked discontinuity in *bengkok* size. There have, however, been increases in *bengkok* in villages to the south of the border. This can be seen in the northwestern corner of Figure 4, where villages to the left of the border have positive amounts of *bengkok* land today. Fieldwork suggests, however, that these increases in *bengkok* came about after the end of Dutch colonial rule, during the 80s and 90s in an ad-hoc fashion.[18] Nonetheless, I take into account positive amounts of *bengkok* land across both sides of my study border by using a spatial fuzzy regression discontinuity design that I detail in Section 3.2.

[FIGURE 4 ABOUT HERE]

2.4 Village Chief Elections and *Tanah Bengkok*

In my study areas, along with the expansion of *bengkok*, the role of chiefs as key intermediaries was further solidified by the introduction of chief elections throughout Java, starting from the early 19th century (Raffles, 1830). These elections were introduced to strengthen the legitimacy of local chiefs as tax collectors (Bastin, 1954; Bosma, 2013; Holleman, 1981).[19] The introduction of elections and taxation duties, however, was never accompanied by a commensurate increase in formal remuneration. Chiefs were never formally incorporated into the bureaucratic state but were instead paid in terms of *bengkok* land and a variety of levies in money, produce or labor (Husken, 1994). And these practices, as described above, differed across my study border.

Furthermore, all throughout the colonial period, and up till 1979, chiefs were elected for life. It was only in 1979 that chiefs became term-limited. The 1979 Village Law states that chiefs were to be elected to fixed terms of 6–8 years for a maximum of two terms. I describe this, in further detail,

[18]Typically, this adoption of *bengkok* land occurred when a rich villager passed on and pledged his rice land toward payment of village government officials. It could also take place if village elders or officials came together to 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 largely ad-hoc and did not take place in a systematic manner due to the difficult of enforcement and purchasing prime plots of land in an era of high population density and land scarcity (as opposed to the land abundant early 19th century colonial period).

[19]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.

in Section 5.2.

2.5 Colonial and Post-Colonial Periods till today: Changes in Chief Remuneration

During the Cultivation System, in areas to the north of my study border, in Cirebon Residency, the Dutch gave chiefs *tanah bengkok*, "a double portion of village *sawah*" as part of their remuneration, on top of a 8% commission from land rent, coffee collected (24 duit per picul of coffee delivered) and services from villagers.[20] In areas to the south of my study border, in Priangan Residency, chief remuneration was identical except for the absence of *tanah bengkok* rights. Unfortunately, quantitative data on differences in remuneration during the colonial period is largely unavailable. The Cultivation System was abolished in 1870, but the role of village chiefs and the practice of *bengkok* and elections have persisted till today.

Chief Remuneration Today Today, most forms of informal remuneration have been abolished and *tanah bengkok* serves as the main source of chief remuneration.[21] Despite heavy responsibilities,[22] chiefs are not paid a living wage, and the majority of chief remuneration is derived from traditional *bengkok* rights. Based on my survey data, *bengkok* chiefs earn an average of 34.4 million 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, remuneration for both *bengkok* and non-*bengkok* chiefs remains relatively low: the average annual salary of an Indonesian civil servant is 23.4 million IDR ($1,560),[23] and the average annual wage of a day laborer is 18 million IDR ($1,180) (BPS 2019).

Such levels of low compensation for local leaders, however, are not unique to my setting. 98% of municipal legislators hold a second job in Brazil (Ferraz and Finan, 2011), and the president of a *panchayat*, the equivalent of village chiefs in the Indian village government, is paid less than the minimum wage, at 50-60 dollars per month (Munshi and Rosenzweig, 2015).

[20] Fernando (1982): pp165.

[21] Traditional levies of produce or labor were officially abolished on Java, in 1916. See (Hup, 2021) for more details. A fixed salary for chiefs was introduced starting from 2014 but this later period does not form part of my analysis.

[22] I describe these in Section 3.1.

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

2.6 External Validity: Parallels to Other Kingdom States

Importantly, *bengkok* is not an institution unique to Indonesia. Conceptually, it bears striking similarities to historical tax farming systems that were prevalent throughout both the Roman and Ottoman empires (Özel, 1999; Lewis, 1979; İnalcık and Quataert, 1994; Tan, 2017).[24] Throughout much of medieval Europe, sovereigns frequently granted taxation or land rights (*apanage*) to nobles or military personnel as compensation for their service in administering different parts of the kingdom (Darling, 1996). Similar practices existed in India, where members of upper castes and government officials were granted land rights in return for performing administrative duties (Sharma, 1957). What is unique to my setting is the persistence of these practices. This allows me to investigate how political land rents as remuneration continues to affect modern-day local governance and development outcomes.

3 *Bengkok* and Long-Run Development

To examine the effects of higher land rents on long-run 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. Appendix Table B.1 provides a summary of data sources for all variables.

3.1 Data: Measuring Contemporary Chief Performance and Village Development (1986-2000

I examine *bengkok*'s long-run impact by testing whether it affects contemporary chief performance and individual-level development outcomes. I do so using various rounds of the Indonesian Village Census and the 100% count 2000 Indonesian Population Census geo-referenced at the village level. For individual-level development outcomes, the 100% count Population Census provides information on individual-level education outcomes and my main measure of economic prosperity – having a non-agricultural job – in all my sample villages. This is important because the rural, geographical concentration of my research design limits usage of other data sources like the Indonesian

[24] In practice, however, there was one key difference: In return for serving the colonial Dutch enterprise, village chiefs in Indonesia were granted cultivation rights, or rights of usage. In return for serving the Roman or Ottoman empire, however, Roman tax farmers and Ottoman *timars* were granted ownership rights.

Family Life Survey or the Indonesian Socioeconomic Census.

My main measures of chief performance are village revenue and public goods provision. Village chiefs bear a heavy responsibility as both agents of the state and bottom-up, elected representatives of the village community, maintaining responsibilities and allegiances with fellow villagers (Antlöv, 1994). As agents of the state, chiefs are expected to supervise and lobby for development projects, maintain regular 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.

To measure village revenue and public goods provision, I merge six waves of the triennial Indonesian Village Census (*Potensi Desa, PODES*) collected between 1980 and 1996.[25] The Village Census covers the entire country and comprises a large number of measures of public goods in villages, such as infrastructure, health and educational facilities.[26] Across waves, the village census has a different focus (agriculture, economy, or population) and several variables are not reported consistently. Hence, I focus on public good outcomes reported consistently across different waves and where the role of provision by chiefs is clear. Where relevant, I supplement these measures using primary survey data.

With regards to village revenue, the major responsibilities of village government are to construct and maintain local infrastructure. Funds for doing so are typically raised from villagers (bottom-up), or by lobbying district line offices (top-down) (MacAndrews, 1986). Indonesia has four main administrative tiers: Central, Provincial, District, and Villages.[27] District governments, however, are the closest tier through which village chiefs directly obtain funds and projects, hence, we would expect that chiefs who are better at lobbying would obtain greater funds from district governments.

Throughout, to better interpret outcomes as a measure of chief effort, I focus on outcomes in Indonesia's pre-decentralization period, before 2000.[28] "Big-bang" political, administrative, and

[25] In particular, these waves correspond to the years 1980, 1983, 1986, 1990, 1993, 1996

[26] 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.

[27] Both historically and today, sub-district governments, the tier between districts and villages, have played a negligible role in administration and funding.

[28] I further exclude village-level infrastructure outcomes in 2000, given the fall of Suharto and the Asian Financial Crisis in 1998.

fiscal decentralization took place in 1999 after the fall of Suharto in 1998 (Skoufias et al., 2011). Pre-decentralization, the competence of village heads and their connections with upper levels of government played a relatively more important role in public goods provision (Evers, 2000). Post-decentralization, however, various laws led to the increase of mandatory fund transfers to village governments (Sjahrir et al., 2014), making it more difficult to interpret outcomes, such as district-level funds, as a sole measure of chief effort.

3.2 Estimation Framework: Spatial Fuzzy Regression Discontinuity Design

To isolate the effects of *bengkok* from a composite *border* treatment effect, I use a spatial fuzzy regression discontinuity (RD), analogous to Basten and Betz (2013), to assess differences in outcomes for villages located just to the south and to the north of the study boundary. Specifically, the fuzzy RD leverages three characteristics of (changes in) *bengkok* across the Cirebon–Priangan border. First, that the incidence of *bengkok* does not jump from zero to one at the border. Second, that the institution of *bengkok* still exists today and third, that we are able to measure, at the village level, the *size* of *bengkok* awarded to chiefs from primary survey data.[29]

Formally, let $\text{Bengkok}_{fuzzy,v}$ be the size of chief *bengkok* land in each village v. I obtain the fuzzy RD estimate of *bengkok* on the outcomes of interest by jointly estimating:

$$y_{ivtb} = \alpha^f + \gamma^f \, \text{Bengkok}_{fuzzy,v} + f(\text{location}_v) + X_v' \, \beta^f + \phi_b + \epsilon_{ivbt}, \tag{1}$$

$$\text{Bengkok}_{fuzzy,v} = \delta + \tau \, \text{Cirebon}_v + g(\text{location}_v) + X_v' \, \beta + \phi_b + \nu_{ivbt}, \tag{2}$$

where y_{ivtb} is the outcome of interest for individual i in village v at time t located along segment b of my study border. Cirebon_v is an indicator equal to 1 if village v falls to the north of the Cirebon-Priangan border, in Cirebon Residency; X_v is a vector of time-invariant covariates for village v;

[29] Specifically, we collect and construct a panel dataset on the size of *bengkok* awarded to each and every village chief that won office between 1979–2014. There exists, however, little variation across time and hence, we use the *average* size of *bengkok* awarded to chiefs, at the village-level as our key regressor of interest. The lack of variation across time is consistent with our qualitative fieldwork. When asked why there were few, if any, changes in sharecropping, leasing arrangements, and size of *bengkok* across time, nearly all respondents replied that this was because (the practice of) *bengkok* was *turun temurun*, an ancient practice that had been passed down from one generation to the next.

ϕ_b is a set of border segment fixed effects that denote each of the north and south segments of the study border. $f(\text{location}_v)$ and $g(\text{location}_v)$ are the RD polynomials which controls for smooth functions of geographic location for v. I let both polynomials have the same order in both equations (Lee and Lemieux, 2010). For all regressions, X_v includes an indicator for whether a village had ever split[30] For all regressions at the chief(-electoral term) level, I additionally control for whether a chief's term of office included 1998, the year marking the end of Suharto's rule.[31] I describe additional, regression-specific control variables in the footnotes of each regression table. I further exclude 5 outliers from my study sample: two villages with one of the largest religious schools in West Java, and three villages where village boundaries include large areas of inhospitable, volcanic land. Following Calonico et al. (2014); Cattaneo et al. (2019); Gelman and Imbens (2017), my baseline specification is a a local linear polynomial in distance to my study border estimated separately on each side of the border. I use a triangular weighting kernel and calculate the optimal bandwidth using the MSE-minimizing procedure suggested by Cattaneo et al. (2019). I also present results with a wider fixed bandwidth of 30km from the border. I check robustness to using various other forms of RD polynomials and bandwidths in Section 4.3.

I identify the causal effect of present-day *bengkok* by instrumenting the size of *bengkok*, $\text{bengkok}_{fuzzy,v}$, with an indicator, Cirebon_v, for whether a village had been assigned *bengkok* in the early nineteenth century. My coefficient of interest is γ^f: the effect of an increase of 1 hectare in the amount of *bengkok* on my outcome of interest. Under the assumption that Dutch Cirebon rule affected outcomes only via its effect on *bengkok*, the IV estimate of γ^f identifies the causal effect of *bengkok* land on downstream outcomes.

3.3 Validity of RD Design

The RD approach presented in equations (1) and (2) requires two identifying assumptions. The first assumption is that all relevant factors before *bengkok* was assigned varied smoothly at the Cirebon–Priangan Residency border. This assumption is needed to ensure that villages located just north of the border are an appropriate counterfactual for those located just south of them. In another

[30] Most splits occurred in the early 1980s where a single village was typically split into 2 or 3 villages. The probability of a split occurring, however, is largely balanced across my study boundary and appears to have been driven mostly by idiosyncratic factors.

[31] Kammen (2003) further describes how village life was severely disrupted even in the years prior, between 1997-1998 due to widespread protests by village chiefs in response to a Central Government announcement to postpone village chief elections.

words, to identify the effect of *bengkok*, villages should have had similar economic development, geography, history, and institutions prior to the assignment of *bengkok*

A key concern for identification is that villages to the north might have been strategically chosen for certain characteristics that could affect our outcomes of interest. For example, these villages might have been more suitable for growing certain crops or might have been more densely populated. However, whether a village was assigned *bengkok* is a deterministic and discontinuous function of whether a village fell to the north of the Priangan–Cirebon border. As described in Section 2.3, these borders were drawn when much of interior Java had not been explored. Hence, they were largely defined by salient geographic characteristics of rivers and mountains. Thus, *bengkok* villages were unlikely to have been selected based on local characteristics that also vary discontinuously at the Cirebon–Priangan border.

To assess the plausibility of this first assumption, Table 1 presents summary statistics and estimates using equation (2) and replacing $\text{Bengkok}_{fuzzy,v}$ with important geographic characteristics and a measure of pre-*bengkok* economic prosperity. Geographic characteristics include elevation, ruggedness, land suitability, rainfall, crop suitability, and river characteristics. I present these results with standard errors clustered at the subdistrict level.

[TABLE 1 ABOUT HERE]

Consistent with the first identification assumption, I find balance on elevation, average rainfall, river characteristics and ethnic shares.[32] There are, however, statistically significant differences in ruggedness, wet rice potential yield, and coffee potential yield, even when restricting to the optimal bandwidth specification. Note, however, that the direction of the estimates for differences in ruggedness and wet rice potential yield, suggest that, if anything, *bengkok* was introduced in regions that were *less* suitable for development to begin with. This implies that later results could be interpreted as a lower bound estimate of the *bengkok* effect. Specifically, villages where *bengkok* was introduced were *more* rugged and had *lower* potential wet rice yield.[33] Moreover, difference in potential wet rice yield are not economically significant: wet rice potential yield is 5.84 kg lower in *bengkok* villages on a mean of 2150 kg. Differences in coffee potential yield, however, could potentially be a confounding factor. Up until the mid-19th century, coffee was the main extractive

[32]Note that measures of pre-treatment ethnic shares do not exist. As a proxy, I measure ethnic shares from the 2000 Population Census.

[33]Wet rice was and continues to be the main staple crop grown on Java.

crop that the Dutch forced villagers to cultivate. There are two pieces of evidence against this. First, differences are not economically significant: coffee potential yield is 4.09 kg *lower* in *bengkok* villages on a mean of 620 kg. Second, in Section 4.3, I test and show that my results are robust to controlling for any differences in measures of actual coffee cultivation, digitized from 1853 Dutch colonial maps.

With regards to pre-treatment economic prosperity, data on per capita income are difficult to come by and many studies use, as a proxy, data on population density (Acemoglu et al., 2002). To this end, I hand-collect and digitize 1819 population records from Dutch colonial archives.[34] Table 1 shows that there were no significant differences between villages on both sides of the border in terms of pre-treatment population density and suggest that, if anything, villages where *bengkok* was assigned, were more sparsely populated before Dutch intervention.

The second identifying assumption is that there was no selective sorting across the RD threshold when the Cirebon–Priangan border was established. If the imposition of *bengkok* led to selective out-migration of individuals from *bengkok* villages to non-*bengkok* villages or vice versa, γ^f would be picking up this indirect effect of migration. The rigid social structure and closed nature of rural Javanese villages (McNicoll, 1968) suggests that large waves of cross-village migration were unlikely. For the historical period: there is no data available to quantify the potential magnitude of migration during the Dutch colonial era. Instead, as a proxy, I turn to present-day 2000 Indonesian Census data. Across all my study villages, the mean in-migration rate is 5.4p.p. and differences in rates of in-migration (in the last 5 years) are economically unimportant: in-migration into *bengkok* villages is only 1.3p.p higher than in non-*bengkok* villages.

A related concern is selective sorting at the chief-level: whether high-ability villagers from non-*bengkok* villages could have migrated to *bengkok* villages to run for chief. This was unlikely to have occurred both during and after the assignment of *bengkok*. Dutch archives suggest that, as early as 1819, it was mandatory for chief candidates to be residents of villages in which they run for office (Raffles, 1830). Today, this regulation continues to be adhered to both in regulation and in practice. The earliest post-independence village law of 1945, largely based on Dutch law, explicitly states that chiefs have to be legal residents of their village. In practice, it is also difficult for outsiders to garner

[34] Unfortunately, these population records are aggregated and reported only for the largest village located within each Indonesian subdistrict, 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 the population by the size of subdistricts and in this way calculate measures of population density for 24 contemporary subdistricts.

votes without strong ties to the village (Maurer, 1994). Primary survey data corroborates this: 90% of village chiefs we surveyed were born in the village in which they held office.

4 Results

This section presents my main empirical results in two stages. First, I present first-stage results linking historical Dutch intervention to modern-day differences in *bengkok* prevalence across the border. Second, I estimate downstream effects on chief performance in terms of fund-raising, public goods provision and individual-level development outcomes. In each sub-section, I present core robustness checks but defer alternative explanations and other robustness checks to Section 4.3.

4.1 First Stage

Table 2 and Figure 5 present first-stage results.[35] Columns in Table 2 differ in terms of bandwidth with Column (1) showing results for the optimal Calonico et al. (2014) bandwidth. In comparison, Column (2) and Figure 5 show results for the fixed, wide bandwidth of 30km which includes all villages in my sample. Figure 5 shows that the size of *bengkok* land changes discontinuously at the border. The estimated effect in the narrow bandwidth of 5.99 km is 2.4ha and, in the wide bandwidth of 30 km is 1.9ha. These results show the strong, continued persistence of *bengkok* across the study border, and that the IV estimates are unlikely to suffer from a weak instruments problem.

[TABLE 2 AND FIGURE 5 ABOUT HERE]

4.2 *Bengkok*, Village Chief Performance and Long-Run Economic Development

To examine the long-run effects of *bengkok* on chief performance and economic development, I proceed in four steps. First, I analyze data on the amount of funds raised by chiefs from villagers and top-down government sources. Second, I show that *bengkok* villages consistently perform better in terms of public goods provision. Third, I provide evidence that these effects translate into higher contemporary education and economic prosperity at the individual-level. Last, I close by studying the persistence of educational outcomes over time.

[35] Appendix Figure A.2 plots analogous spatial RD plots of both raw and predicted values of chief *bengkok* land

1. Fund-raising Good chiefs can bring development to their villages through bottom-up fund-raising and top-down lobbying for development funds.[36] In Table 3: to measure bottom-up funding, I combine the amount of funds collected from villagers (PODES 1993),[37] with primary survey data on the percentage of informal taxes, collected successfully by village chiefs, as a percentage of their annual target. The latter is measured for all chiefs that took office between 1979-1996. Appendix Table A.1 documents that 64% of villages report using these informal taxes for village development projects. Both secondary literature and 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 in greater proportion from internal village revenue might be of higher quality given that villagers might be more invested in the maintenance of these facilities (Evers, 2000). To measure top-down lobbying, I use data on the sources and levels of village funds from PODES 1996, the only pre-decentralization year which records the amount and source of funds a village obtained from each tier of upper-level government: Central, Provincial, and District. Where applicable, to account for possibly meaningful content of zeros, I apply an inverse hyperbolic sine transformation (Bellemare and Wichman, 2019).

[TABLE 3 ABOUT HERE]

Bottom-up fund-raising Columns (1) and (2) of Table 3, Panel A present estimates for the amount of contributions, while columns (3) and (4) present estimates for the percentage of informal taxes. An additional 1ha of *tanah bengkok* leads to higher villager contributions and this is achieved through a 12.9 to 28.0pp increase in the percentage of informal taxes collected. These results suggest that *bengkok* might have led to stronger bottom-up collective action norms where *bengkok* chiefs, who are more trusted by their fellow villagers, are able to collect a higher percentage of taxes. The importance of bottom-up funding is further underscored by comparing the raw means of funding from villager contributions vis-a-vis district funding. The mean amount of villager contributions is about 15 to 37 times larger.

Top-down lobbying Top-down funds were typically channeled from the central government directly to district line offices with each district having separate line offices connected to each Min-

[36] 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.

[37] This is the only year in the Village Census which records the level of village funds collected from villagers and used for development purposes.

istry (MacAndrews, 1986). Hence, the competence of village chiefs and their connections with upper levels of government played an important role in securing additional public goods through (in-)formal lobbying (Evers, 2000). These channels were especially important during the last decades of Suharto-era rule (1965-1998), when structured development grants were largely replaced by discretionary project funding (von Benda-Beckmann and von Benda-Beckmann, 2013). Relying solely on top-down funding, however, would often be ineffective: bottom-up funds are often a source of funds and labor for village-level projects both in the absence of, or in cooperation with government financial support (Raffles, 1830; Antlöv et al., 1995; Evers, 2000). Surveys by the Indonesian Statistical Office found that, at the end of the 1970s, two-thirds of development expenditure undertaken by villages was self-financed.[38]

To that end, Columns (1) and (2) of Table 3, Panel B present estimates on district government funds received in 1996, while columns (3) and (4) presents estimates for an indicator variable, *Govt and Own Village Funds*, from primary survey data, which equals one if a development project was constructed using both top-down government and bottom-up villager contributions, and zero otherwise. Columns (1) and (2) of Panel B, estimates that chiefs are better able to raise funds from district line offices and Columns (3) and (4) estimates that chiefs are 12.3 to 14.5pp more likely to have constructed village public goods from a combination of both district and own village funds. Together, these results suggest that *bengkok* chiefs are effective at raising funds from both top-down and bottom-up sources, and effectively combining both sources for the provision of public goods.

In contrast, Panel C of Table 3 presents results on the level of Central and Provincial funds that a village obtained in 1996. There are small and statistically insignificant differences in these two sources of funding. This is in line with the political economy of this period, where the Provincial Government did not have large sources of discretionary funding and, as described above, Central Government funding was typically channeled through district offices.

2. Public Goods Provision To what extent does greater fund-raising lead to more public goods provision? I focus on two types of public goods for which chiefs play a relatively more important role. First, the historical provision of bottom-up village schools (PODES 1983). The 1983 village census is the only round that separately reports the number of top-down (INPRES) and bottom-up (non-INPRES) schools. INPRES schools were constructed under large-scale central government

[38] MacAndrews (1986): pp93

efforts between 1973 and 1978 (Duflo, 2001). In contrast, before INPRES, in the immediate post-colonial period (1945-1973), schools were largely funded locally and there was limited school construction by Dutch colonial authorities and top-down authorities (Djajadiningrat, 1940; Aritonang, 1994). Hence, I interpret the number of non-INPRES schools in a village as a measure of greater village school construction efforts led by village chiefs. Furthermore, bottom-up school construction is the sole measure of chief effort during the immediate post-colonial period and hence, serves as an intermediate measure of chief effort. Second, I analyze results on the provision of village-level infrastructure in terms of asphalt roads, access to safe water, and access to safe garbage disposal (1980-1996).

Columns (1) and (2) in Table 4, Panel A show that *bengkok* villages have significantly higher levels of non-INPRES schools.[39] In contrast, Columns (3) and (4) finds small and statistically insignificant differences in the number of INPRES schools. This is reassuring given that INPRES school construction was a top-down program for which chiefs played a minimal role and hence, we should not expect to find any differences. Columns (1) and (2) in Panel B reports estimates for a normalized index (Kling et al., 2007) of three infrastructure public goods,[40] and shows a positive effect that is statistically significant at the 5% level.

Figure 6 is a coefficient plot of each of the 3 individual components in addition to the estimated index coefficient. The point estimates for all 3 components are consistently positive – in particular, effects are concentrated on provision of asphalt roads and access to safe garbage disposal. I view these results on infrastructure, however, as merely suggestive. Appendix Figure A.5 tests for robustness to alternative RD bandwidths and finds that, though the coefficient remains positive, the difference is not always significant in the middle bandwidths. This result may be indicative of general equilibrium effects. Villages in the middle bandwidths on the non-*bengkok* side are slightly closer to a small city and more public goods constructed in these villages might be indicative of higher villager demand for connectivity to the city. Together, I interpret positive results on non-INPRES schools and infrastructural public goods as evidence that greater fund-raising efforts by *bengkok* chiefs have indeed resulted in persistently higher public goods provision, both historically and today.

[39] To reduce the influence of outliers, I winsorize the top 95th percentile of village schools. Results remain qualitatively similar without this adjustment.

[40] These are access to safe water sources, presence of aspalt roads, and safe garbage disposal. I follow Martinez-Bravo (2017) in the construction of these variables.

[TABLE 4 AND FIGURE 6 ABOUT HERE]

3. Individual-Level Outcomes Does higher public goods provision translate into better individual-level outcomes? Table 4, Panel C reports effects on villager years of education and, as a proxy for economic prosperity, an indicator that takes the value of 1 if a villager has an agricultural job. I measure both outcomes in the 2000 Indonesian Population Census, and restrict my estimation sample to the latest cohort of working-age individuals (aged 21 to 40 years old). Given the lack of household-level income or consumption data,[41] a lower probability of having an agricultural job is a possible indicator of higher economic prosperity as villagers move from the lower-paying agricultural sector to the higher-paying manufacturing and services sector.

Columns (1) and (2) in Table 4, Panel C estimate that *bengkok* villagers have 0.29 to 0.45 more years of education relative to a mean of 7 years. Columns (3) and (4) estimate that *bengkok* villagers are less likely to hold an agricultural job but I view this latter result as suggestive, as it is estimated less precisely in the larger bandwidth. Furthermore, Figure A.5 shows that, though the coefficient on agricultural job remains negative, the difference is not statistically significant in larger bandwidths. This might be indicative of complementarities between chief efforts and the supply of non-agricultural jobs: despite higher infrastructure goods provision, the overwhelmingly rural nature of villages in the larger bandwidth might limit, in the absence of a sufficient supply of non-agricultural jobs, the potential for better public goods provision to translate into greater non-agricultural employment and economic prosperity.

Overall, I find evidence that chiefs from *bengkok* villages are more effective at both bottom-up fund-raising and top-down lobbying. In turn, these funds have been used for the construction of more schools and infrastructural public goods. Last, construction of these public goods have translated into better outcomes for villages as a whole – individuals residing in *bengkok* villages have more years of education and are somewhat less likely to hold an agricultural job. In particular, the last set of results are consistent with recent work finding that increases in education has led to a fall in agricultural employment globally (Porzio et al., 2022).

Figures 7 and 8 presents standard RD plots for my main outcomes of interest, with distance to border as the running variable and a local linear trend to each side of the discontinuity. For all

[41] I have insufficient observations even after pooling all rounds of the Indonesian Socio-Economic Status survey (*Susenas*) across all available years. This is possibly due to the overwhemingly rural nature of the villages in my sample, leading to them being under-sampled in *Susenas*.

relevant outcomes, except on the probability of having a non-agricultural job, we observe a clear discontinuity at the border.

[FIGURES 7 AND 8 ABOUT HERE]

4.3 Robustness of Main Results

There are three main empirical concerns for the results presented in Tables 3 and 4: Robustness to alternative RD specifications, the overlap between the study boundary and historical Dutch administrative borders, and the overlap between the study boundary and modern-day district borders.

The first concern is whether results are robust to alternative RD specifications. In Appendix Tables A.2 and A.3 I test robustness to a linear polynomial in latitude and longitude where $f(\text{location}_v)$ and $g(\text{location}_v)$ in equations (1) and (2) are modified to be a function of latitude and longitude and results are robust. In Appendix Figures A.4 and A.5, I show that the results are robust to alternative bandwidths, with the only exceptions, as described earlier, being that on *Infrastructure Index* and *Agricultural Job*.

A second potential concern is the overlap between the study boundary and the historical Dutch administrative border of Cirebon–Priangan. Though historical Dutch borders are defunct, the results may, for example, reflect differences resulting from persistent effects of any historical differences in colonial Dutch extraction or investment in infrastructure across my study border. To assess this possibility, Appendix Table A.5 examines proxies for differences in colonial extraction and infrastructure across my study border at two points in time: 1853, at the height of the colonial-period Cultivation System, and 1945, just before the end of the Dutch colonial period, and shows that differences are minimal.[42] In particular, the only statistically significant differences are in terms of the percentage of village land used to grow coffee in 1853 (Columns (3) - (4)). Since the 1870s, coffee has not been grown in my study areas (Breman, 2016). Nonetheless, in Appendix Table A.6, I show that my main results on long-run economic development are robust to controlling for these differences.

A third potential concern is the overlap between the study boundary and a modern-day district border: *Bengkok* and non-*bengkok* villages lie on opposite sides of a modern-day district border. In particular, this would be a concern if differences in outcomes reflects any differences in the unilateral, top-down disbursement of funds from different districts. Fieldwork suggests that, during my

[42] I digitize both 1853 and 1945 measures from historical maps. Appendix Figure A.3 provides an example.

study period, there were few differences in the unilateral top-down disbursement of public goods or funds from upper levels of government. Respondents frequently cited the need for chiefs to visit external village government offices to lobby for funds and public goods, without which "there would be no village development."[43] Last, given that the distribution of *bengkok* preceded the formation of modern-day district boundaries (which were largely established post-1945 Indonesian independence), any observed differences might also plausibly be interpreted as a downstream effect of *bengkok* chiefs on district government behavior. Nonetheless, it is still possible that modern-day district cross-border differences of the magnitude of my estimates are sufficiently common to raise concerns about the validity of my interpretation. To assess this, I conduct a falsification exercise where I run my main specification, using district funds in 1996 as the outcome variable, across all adjacent, modern-day district boundary pairs on Java.[44] Figure 9 plots the distribution of differences in district funds and shows that estimated effects across my study border are located slightly below the 90th percentile of estimated effects across modern-day district pairs but remain larger and more negative than estimated effects across most district pairs.

[FIGURE 9 ABOUT HERE]

4.4 Persistence of Educational Outcomes (1920-1980)

We have found that *bengkok* villages have higher levels of historical schools and individuals living in these villages continue to have higher levels of education today. Given that many of these schools were likely to have been constructed during the late colonial or early post-colonial period, it is natural to investigate if effects on years of education stretch back in time and, if so, how far back.

I dig deeper into the effects on historical villager education by using the 100% count sample of the 2000 Population Census to estimate cohort-level regressions.[45] Specifically, I jointly estimate equation (1) and (2) beginning with the cohort born between 1920 and 1930, and ending with the cohort born between 1975 and 1980, the youngest cohort to have completed formal education by 2000. Figure 10 plots cohort-level coefficient estimates. Impacts on years of education are large and positive across all cohorts, although effects on earlier cohorts are slightly noisier due to the

[43] This is reflected in my survey data, where 75% of all development projects constructed by chiefs were reported to have been secured through chiefs' lobbying efforts.

[44] I describe this exercise in detail in Appendix Section B.1

[45] These are analogous to the cohort-level regressions on years of education estimated in Dell and Olken (2020).

smaller sample size. In particular, cohorts born in 1920 – 1930 who completed their education in the complete absence of top-down school provision by the Dutch have 0.6 more years of education relative to a mean of 3.6 years. These effects decrease somewhat across time but are still present in the most recent cohorts – cohorts born in 1970 – 1975 have 0.3 more years of education relative to a mean of 6.9 years.[46]

[FIGURE 10 ABOUT HERE]

Taken together, the positive effects on historical, bottom-up village schools and villager education are important for three reasons. First, in the absence of top-down school construction by the Dutch colonial authorities and the Indonesian state prior to INPRES, the presence of village schools is 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), school construction efforts are indicative of the ability of village chiefs to win the trust of villagers and build consensus between different stakeholders. They are also consistent with positive effects on contemporary informal tax collection documented in Section 4.2. Chiefs in the distant past were already more effective at collecting informal taxes for school construction, and these effects have persisted till today. Second, in the absence of top-down intervention, greater village school construction is a pure outcome of bottom-up village capacity and rules out differential top-down provision as an alternative explanation. Last, these results are suggestive of *bengkok* land rents exerting a historically positive effect on both the selection and incentives of chiefs.

5 Testing Mechanisms with Fieldwork

My analysis thus far finds a lasting positive effect of *bengkok* on chief performance and long-run development outcomes. Given *bengkok* still exists today, this section uses rich, original survey data to understand the contemporary mechanisms through which *bengkok* exerts a positive effect. I focus on three mechanisms commonly discussed in the empirical literature: higher land rents may attract better quality chiefs *(political selection)*; incentivize chiefs seeking re-election to put in greater effort *(re-election incentives)* (Ferraz and Finan, 2009; Gagliarducci and Nannicini, 2013); or lead to greater *political competition* which might, in turn, lead to more pro-growth policies (Besley et al., 2010). To

[46]This fall in relative magnitudes might reflect more recent construction of INPRES schools in non-*bengkok* villages.

the best of my ability, I use survey data to disentangle these mechanisms. Last, given the within-village nature of *bengkok* rents, I test if *bengkok* might have attracted or aligned chiefs towards the interests of villagers akin to Olson (1993)'s theory of stationary bandits.

My results document that *bengkok* led to positive political selection: higher *bengkok* land rents attracted higher quality chiefs. Specifically, *bengkok* chiefs are more likely to have been ex-civil servants. Together with positive results on fund-raising and public goods, this suggests that *bengkok* attracted chiefs who were able to leverage their previous connections with upper tiers of government to provide higher levels of public goods. In contrast, I find minimal evidence for re-election incentives or political competition. Last, I close by providing suggestive evidence of the positive effects of *bengkok* remuneration on aligning chief incentives and attracting chiefs that are more pro-socially motivated.

5.1 Original Survey Data

Existing data from Indonesia does not allow us to test these mechanisms. Between January and May 2019, I conducted surveys of village chiefs to record the oral and written history for all post-1979 elections in 193 villages within 30 km of my study border. 1979 marked the implementation of the 1979 Village Law, which introduced regular, term-limited elections for chiefs. The final dataset comprises detailed biographical information on all chiefs who ever ran for village office, including details on their education, occupation, land ownership, vote shares, term length, and completion.[47]

Prior to implementation, I conducted qualitative fieldwork and pretesting of questionnaires, entirely in the Indonesian language, jointly with AKATIGA Foundation, a NGO with extensive experience in rural poverty studies. This was done to determine how best to elicit responses to sensitive questions. Throughout, we worked with qualified locals as enumerators who resided in each survey village, and in interviews, all enumerators tried to simulate a "conversation about village oral history." We targeted 5 respondents per village and, to the best of our ability, interviewed all past and present village chiefs, currently alive, with quantitative, retrospective questionnaires embedded in qualitative interviews. If a chief was no longer alive or able to communicate, we interviewed village elders or officials who were alive during that chief's rule and were familiar with his rule. This procedure yielded a sample in which 33.5% of the respondents are past or present village

[47]Existing data is limited to the education and age of chiefs starting from the 1986 Indonesian Village Census and the number of years that a chief had been in office in the 1992, 2000 and 2003 rounds.

chiefs.

There are two potential issues with retrospective survey data collection — recall bias and the possibility that an individual's response to questions varies systematically with local sociopolitical conditions. While it is impossible to rule out these two issues, we did our best to control for them by collecting village administrative and archival records from village offices and village elders. We then cross-validated survey responses with these records and the village census for variables common across datasets. Furthermore, survey responses were largely consistent across all 5 respondents in each village. Last, almost all respondents seemed very open to our interviews. Any hesitation was largely idiosyncratic and unrelated to local sociopolitical conditions. This is possibly because of the historical framing of our study and our choice to conduct conversational interviews within private residences.

5.2 The Political Economy of Chief Elections: Changes in Term Length and Barriers to Entry

The practice of democratically elected village chiefs was a direct result of the low managerial capacity of the Dutch colonial state (Breman, 2016) and contrasts with other colonial settings where chiefs derived sole legitimacy from colonial authorities (Abraham, 2003).[48] The key difference between chief elections that occurred during the colonial and early post-colonial period, and today lies in term length. Under colonial rule, chiefs were elected for life. The 1979 Village Law amended this, stipulating that chiefs were to be elected to fixed terms of 6–8 years for a maximum of two terms.[49]

Ethnographic evidence suggests that, in general, villagers had relative autonomy in both who to vote for and choosing to run for elections (Antlöv, 1994). Husken (1994) describes village elections as "festivals of democracy": the entire election process takes less than thirty hours, during which the selection of candidates is announced, speeches are held, campaigning starts, and ballots are cast and counted in the village hall. Running for the chief position is one of the most expensive ventures in village society. Respondents report a mean campaign cost of 22 million Indonesian

[48] Note that my analysis throughout this study refers to *desas* or rural villages where village heads are elected by popular vote and not *kelurahans* 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.

[49] This changed again 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.

rupiah (IDR) ($1,466), and in particularly fierce contests, campaign costs can reach as high as 400 million IDR ($26,667).[50]

5.3 Political Selection, Re-Election Incentives, and Political Competition

To maintain consistency with my main results on chief performance and development outcomes, I focus on chief related outcomes for all elections that took place between 1979 and 1996.

1. Political Selection: Education and Occupation Table 5 estimates the effect of *bengkok* land rents on two measures of chief quality: years of education and an indicator variable that takes the value of 1 if a leader was a civil servant before running for office. Columns (1) and (2) of Panel A estimate that a 1 hectare increase in *bengkok* land is associated with an increase of 0.4–0.6 years of education for village chiefs. These effects, however, are only marginally significant at the 10% significance level in the wide bandwidth, suggesting that higher rents from *bengkok* do not attract more educated leaders.

[TABLE 5 ABOUT HERE]

Columns (3) and (4) in Panel A examines the effects of *bengkok* on occupational selection of chiefs. Since the likelihood of running for office is likely determined by outside options, it is useful to understand how formal compensation from the village chief position compares with that from the closest outside options. The average annual remuneration of a *bengkok* chief is 34.4 million IDR ($2,293), approximately three times more than that of 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),[51] Given these differentials, we should expect that a civil servant is more likely to run for office in a *bengkok* village. We find evidence that this is indeed the case. An increase of 1 ha in *bengkok* land leads to a 11.2 to 22.1pp increase in the share of chiefs from a civil service background. Overall, these results suggest that *bengkok* remuneration is sufficiently high such that it attracts individuals who are likely already more familiar with the inner-workings of government bureaucracy and are able to leverage their knowledge and connections to provide greater public goods for their villages.

[50] In the 1980s, Husken (1994) documents campaign costs ranging from 15 - 90 million rupiah ($8,000 - $50,000).
[51] Author's calculation from the 2010 Indonesian Work Force Labor Survey.

2. Re-election Incentives The results from Panel A of Table 5 suggest that better chief performance is possibly driven by the selection of *bengkok* chiefs who are more likely to be drawn from ex-civil service occupations. To what extent, however, could better chief performance also be driven by stronger re-election incentives from higher *bengkok* rents?

Columns (1) and (2) in Panel B of Table 5 uses, as the dependent variable, an indicator that takes the value of one if a chief ran in the election immediately following the end of his first electoral term. The effects of *bengkok* on the probability of a chief re-running for elections are statistically insignificant and, if anything, are somewhat negative. More generally, the rate of re-running for elections is very low: only 22–28% of incumbent chiefs choose to run again.[52] The general lack of re-election incentives is consistent with fieldwork. Survey respondents frequently cited long term lengths and low chief remuneration as reasons for their reluctance to run for a second electoral term.

3. Political Competition Having ruled out re-election incentives, I next document if *bengkok* had effects on the level of political competition for the chief position. Higher political competition could have, in turn, disciplined *bengkok* chiefs into providing public goods more focused on growth and development. Table 6 presents results on political competition and finds no evidence of this alternative mechanism across a range of outcomes. First, there are no statistically significant differences in the number of candidates running for *bengkok* elections (Columns (1) and (2) of Panel A) and, if anything, *bengkok* elections have, instead, a higher probability of being contested by a single candidate (columns (3) and (4) of Panel A). Second, there are no differences in vote margins across winners and runner-ups (Columns (1) and (2) of Panel B).[53] Third, given the traditional nature of village institutions, the observed lack of differences in political competition could be, instead, a result of *bengkok* leading to the entrenchment of traditional ruling families and hence, the capture of elections by these families (Acemoglu et al., 2014). This is unlikely given positive development outcomes. Nonetheless, we ask respondents if villagers in their village typically believe that a chief should belong to a traditional ruling family. Estimates in columns (3) and (4) of Panel B are imprecise but suggest that *bengkok* villages are, if anything, less likely to hold this belief.

[TABLE 6 ABOUT HERE]

[52] On average, 66% of Italian mayors run for a second term, and 78% are re-elected (Gagliarducci and Nannicini, 2013). In Brazil, 75% of municipal legislators ran for a second term, and 40% were re-elected (Ferraz and Finan, 2009).

[53] Estimates on vote margins are slightly noisier given it was difficult for respondents to recall precise vote margins in more historical elections.

Figures 11 and 12 present standard RD plots. Consistent with the results in Tables 5 and 6, we observe a clear discontinuity at the border for whether a chief was a previous civil servant, in Panel (b) of Figure 11. We do not observe a discontinuity for any other outcome. As before, I show robustness of my result on political selection to alternative RD specifications. Appendix Figure A.6 shows robustness to alternative bandwidths and Appendix Table A.4 shows robustness to a linear polynomial in latitude and longitude.

[FIGURES 11 AND 12 ABOUT HERE]

Taken together, my results suggest that positive chief performance and development outcomes are likely driven by positive political selection: *bengkok* chiefs are more likely to have been civil servants. In contrast, I find little evidence that *bengkok* led to stronger re-election incentives or higher political competition.

5.4 Discussion of Results: Alignment of Incentives and Pro-Social Motivation

Having documented evidence of political selection, an important question remains: why do *bengkok* chiefs perform better, given that they were historically elected for life, and that today, there continues to be weak evidence for re-election incentives? The stable, within-village nature of *bengkok* suggests a compelling possibility: perhaps, the incentive effects of *bengkok* remuneration lead chiefs to provide public goods, such as roads documented in Section 4.2, that benefit both their own rice-fields and that of villagers. Alternatively, given that chiefs typically lease or sharecrop out *bengkok* land to villagers at fixed, below-market rates, chiefs might be selected on a different margin of *pro-social motivation*.[54] These two possibilities cannot be directly tested nor disentangled in my data. Instead, I present two pieces of suggestive evidence in support of both possibilities.

First, *bengkok* might align the incentives of chiefs with that of village rice farmers by the possibility that *bengkok* chiefs, after entering office and gaining cultivation rights over *bengkok* land, might be more likely to cultivate rice-land compared to non-*bengkok* chiefs. This might, in turn lead them to construct public goods that increases the productivity of both their own rice-fields and that of villagers. Table 7 provides supporting evidence: a *bengkok* chief is 6.0 to 7.2p.p. more likely to have cultivated farm-land after assuming office.

[54] A recent literature focused on delivery agents in non-governmental organizations, suggests that pro-socially motivated individuals might perform better in terms of last-mile service delivery (Deserranno, 2019)

[TABLE 7 ABOUT HERE]

Second, *bengkok* land, might attract more pro-socially motivated chiefs. To test this, we ask all living, current and ex-village chiefs, what was their motivation for running for office.[55] Figure 13 finds a positive correlation between pro-social motivation and the size of *bengkok* land. Together, I interpret these results as suggestive evidence that, consistent with Olson (1993)'s theory of stationary bandits, the within-village nature of *bengkok* remuneration possibly aligns the incentives of chiefs with villagers and attracts more pro-socially motivated individuals to run for office.

[FIGURE 13 ABOUT HERE]

6 Conclusion

In this paper, 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 show that the key to the positive economic development outcomes documented here was the award of higher rents from office-holding in the context of robust local elections. This led to historically positive selection of local leaders. These leaders constructed more village schools in the distant past, which has had persistently positive effects on long-run development, with villagers today being more educated. Today, these leaders continue to raise more local revenue and construct higher levels of public goods. I provide suggestive evidence that the within-village nature of *bengkok* land is likely to be important. Just like stationary bandits (Olson, 1993), the provision of higher rents through control over a within-village income-generating asset appears to have strengthened the chief position and attracted chiefs whose interests are more aligned with villagers. In turn, these chiefs were more likely to invest in village development, especially in public

[55] I do not have sufficient observations to run an RD analysis as my sample size is limited compared to other outcomes. The reason being that we were unable to interview deceased or extremely old chiefs. Hence, for this outcome, I expand my analysis to include all curent and ex-village chiefs that ever took office, both pre- and post-decentralization (2000).

goods that benefited both their own remuneration (from *tanah bengkok* rice land) and villagers writ large.

My findings have direct implications for development policy. In Indonesia, under the 2014 Village Law Fund (*Undang-Undang Dana Desa 2014*), villages received direct transfers of US$70,000 to village bank accounts for development purposes, broadly construed. My findings suggest that recent, concomitant increases in and provision of stable compensation for village chiefs are a step in the right direction. My research also highlights benefits that might arise if attempts to raise the salaries of village chiefs in India and Africa succeed (Times of India, 2012; Daily Monitor, 2016) and identifies conditions under which such measures might be more effective.

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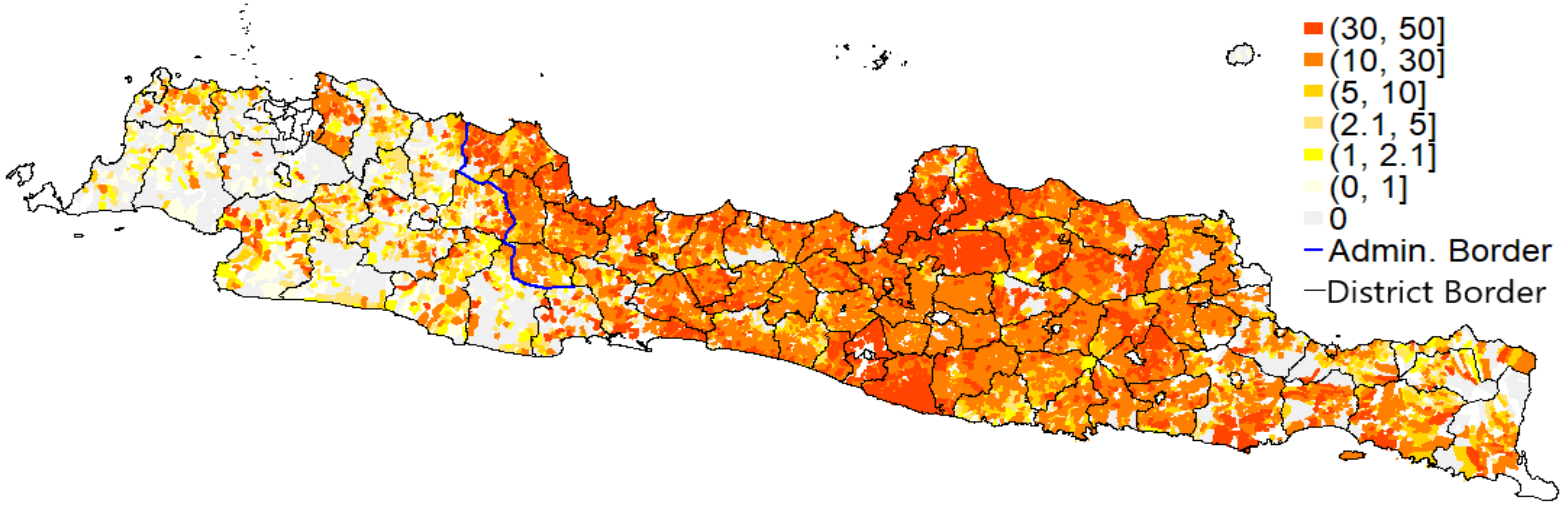
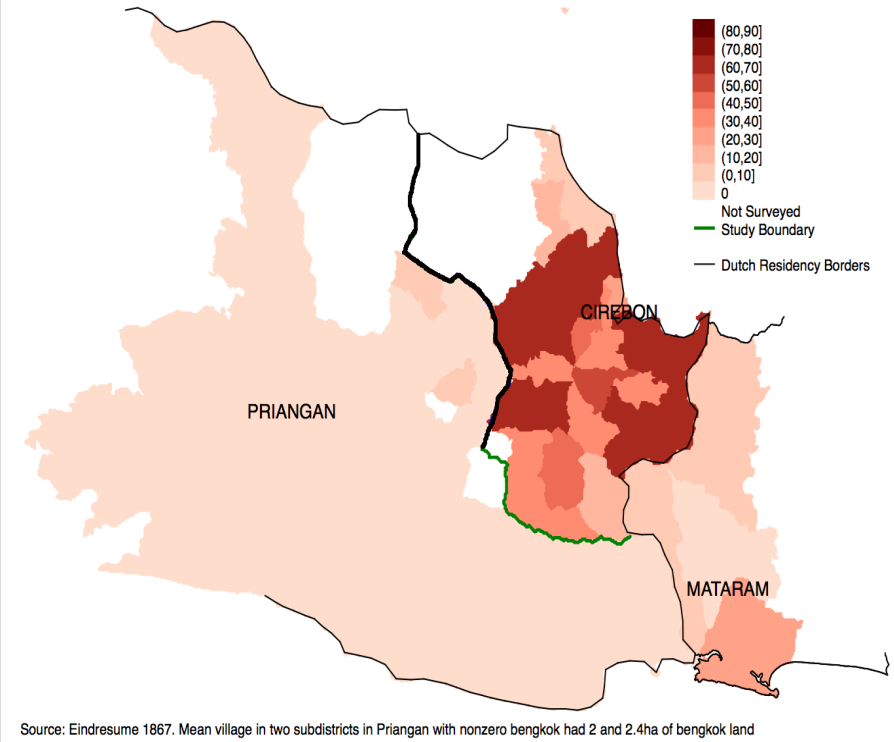
Figure 1: Bengkok Land in each village, 2000 (ha)



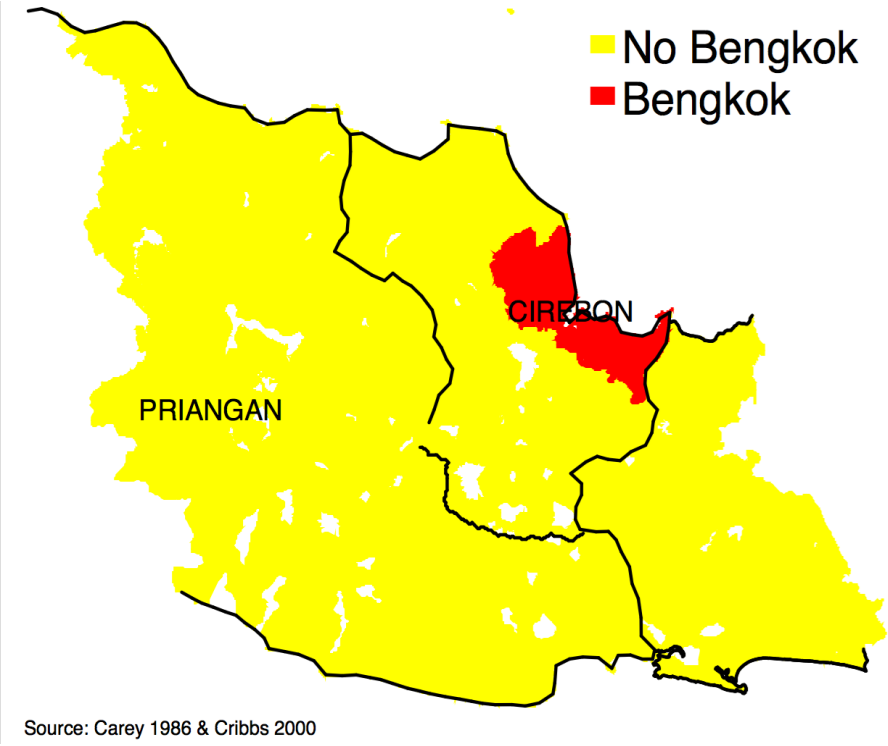
Notes: This map plots the size of *tanah bengkok* land, at the village-level, across the entire island of Java, the most populous island in Indonesia. The full Cirebon–Priangan Residency border is highlighted in dark blue. Residencies are deprecated Dutch administrative units and hence, these borders no longer demarcate separate Dutch Residencies. Parts of this deprecated border, however, continues to overlap with modern-day district borders. I address this issue in Section 4.3. In addition, for identification in a fuzzy regression discontinuity setting, I compare areas to the North (Cirebon) and South (Priangan) of the southernmost third of the Cirebon–Priangan border, a frontier region where historical evidence suggests that areas to the North and South were largely similar on pre-treatment characteristics. I provide quantitative evidence in support of this in Section 3.3. I zoom in on my study border and sample villages, progressively from more distant time periods to the present, in Figures 3, 2, and 4.

Figure 2: Average Bengkok Land in each Village, Aggregated at the Sub-District Level 1867 (ha)



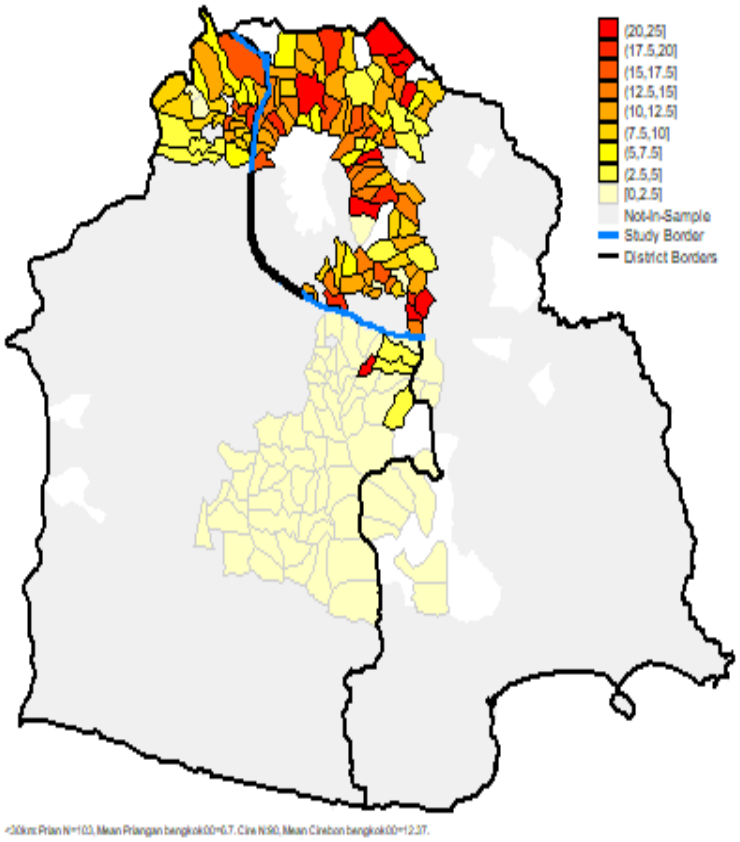
Notes: Secondary data on pre-2000 village-level *bengkok* land and breakdowns of *bengkok* land awarded to (non-)chiefs does not exist. Hence, this map plots the average, total size of *tanah bengkok* land at the village-level, across 1867 sub-districts. My study borders, along the southern-most portion of the Cirebon–Priangan boundary, are highlighted in green. I zoom in on these borders in Figure 4. *Source:* 1867 Dutch Eindresume archival data.

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



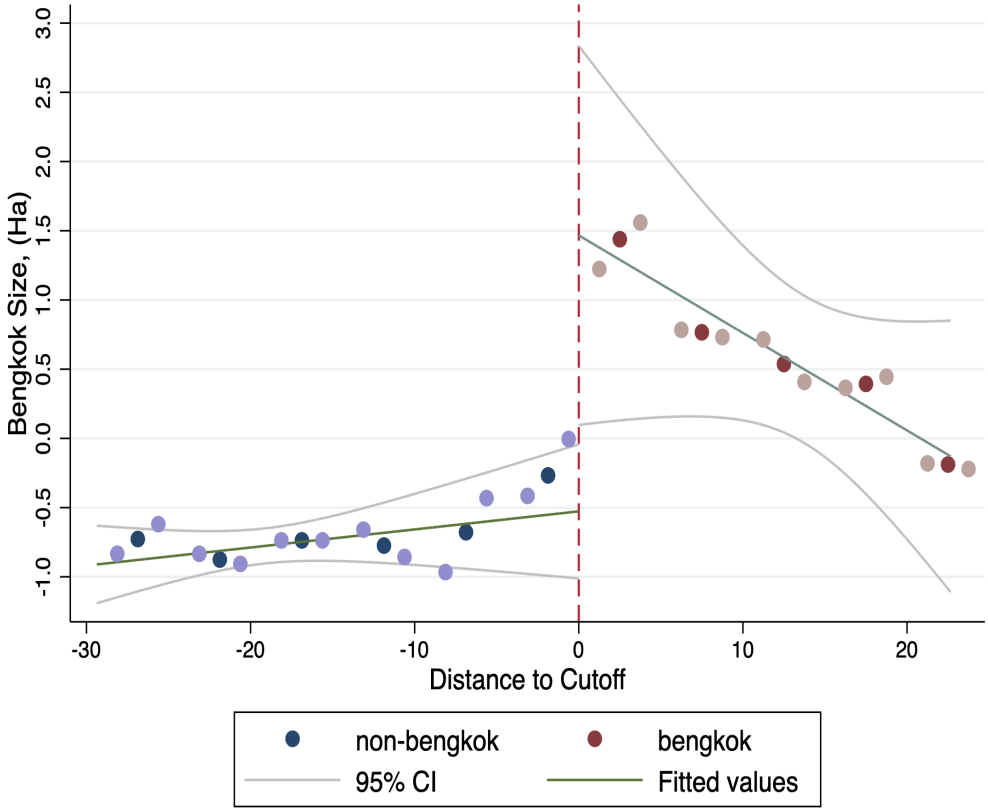
Notes: This map zooms in on the administrative units adjacent to the Cirebon–Priangan Residency border, highlighted in blue, in Figure 1. The shaded colors in the background plots the geographical incidence of *tanah bengkok* prior to Dutch expansion of *bengkok* throughout Cirebon Residency in 1830. Areas shaded in red are those where *bengkok* was known to have been practised. Areas shaded in yellow are those where *bengkok* was not known to have practised nor existed. Hence, this map provides historical, graphical, evidence that,prior to Dutch intervention in 1830, *bengkok* was known to have been practised only in and around the port city of Cirebon, the capital of Cirebon Residency (the areas shaded in red). Conversely, in the greater Cirebon Residency area, practice of *bengkok* was virtually unknown to both the Dutch administration and the local population (in areas away from the capital city of Cirebon, including those near my study border, highlighted in Figure 4). Similarly, it was virtually unknown throughout the entire Priangan Residency.

Figure 4: Total *bengkok* Land in each village, 2000 (ha)



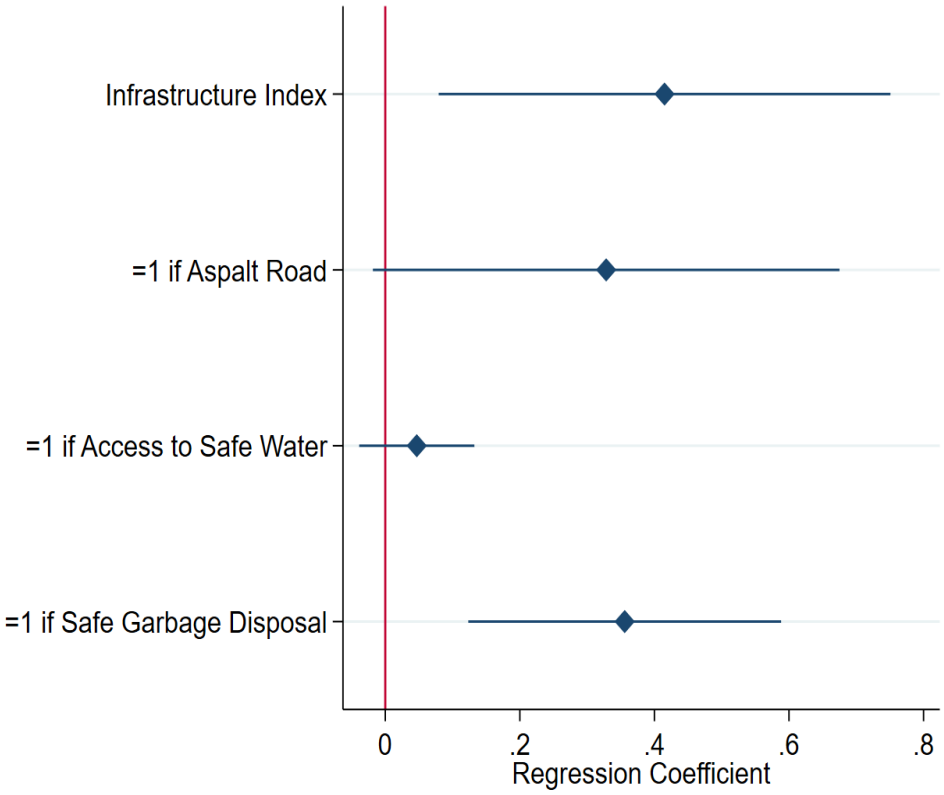
Notes: This map plots the total size of *tanah bengkok* land awarded to both chiefs and non-chiefs, at the village-level, across my study borders. Given the mountainous geography of this region, I restrict my study sample to villages across two segments of this border where there are no discontinuities 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 of village administration.

Figure 5: First-stage: Size of chief *bengkok* land, conditional on distance to the border: Bandwidth 30km



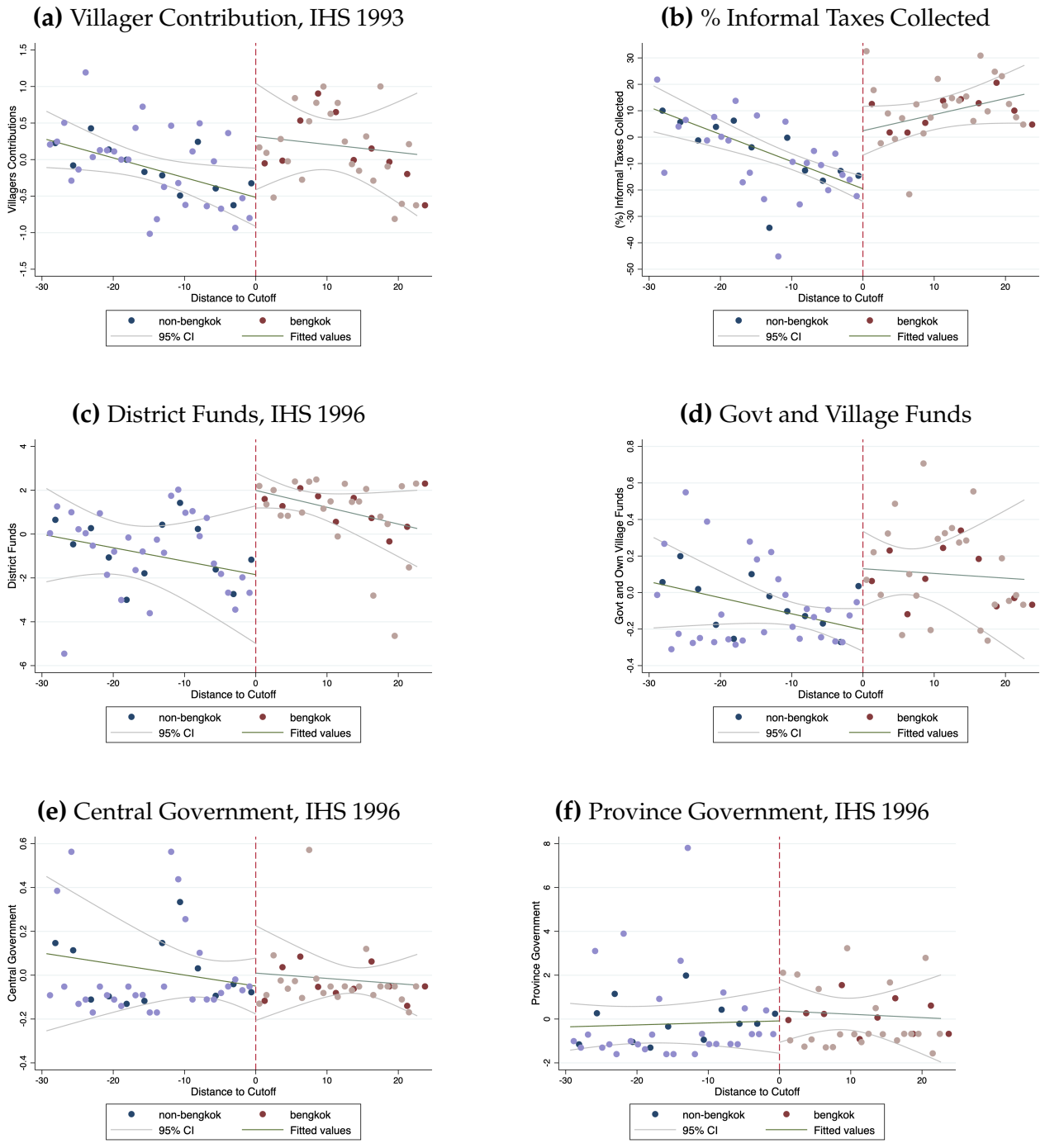
Notes: The figure presents RD plots for the size of *tanah bengkok* land (in hectares) awarded to chiefs (i.e. first-stage results). Darker (lighter)-shaded dots give the average value of the specified outcome variable for villages falling within 2.5km (1km) distance bins. Distance to cutoff refers to the distance between a village centroid and the closest point on the Cirebon–Priangan border in kilometers. The dotted vertical line represents the Cirebon—Priangan border. Negative (positive) values of distance give the distance of villages South (North) of the Cirebon–Priangan border with villages to the North having had persistently larger plots of *bengkok* land. Solid line trends are predicted values from a regression of the specified variable on a linear polynomial in distance to the border that allows for a local linear trend estimated separately on each side of the discontinuity, uses a triangular kernel and a bandwidth of 30km. Regressions control for whether a village had ever split and include a nearest-border segment fixed effect. Standard errors are clustered at the subdistrict level and the figures show 95% confidence intervals.

Figure 6: *Bengkok* Villages and Infrastructure Public Goods Provision (1986-1996)



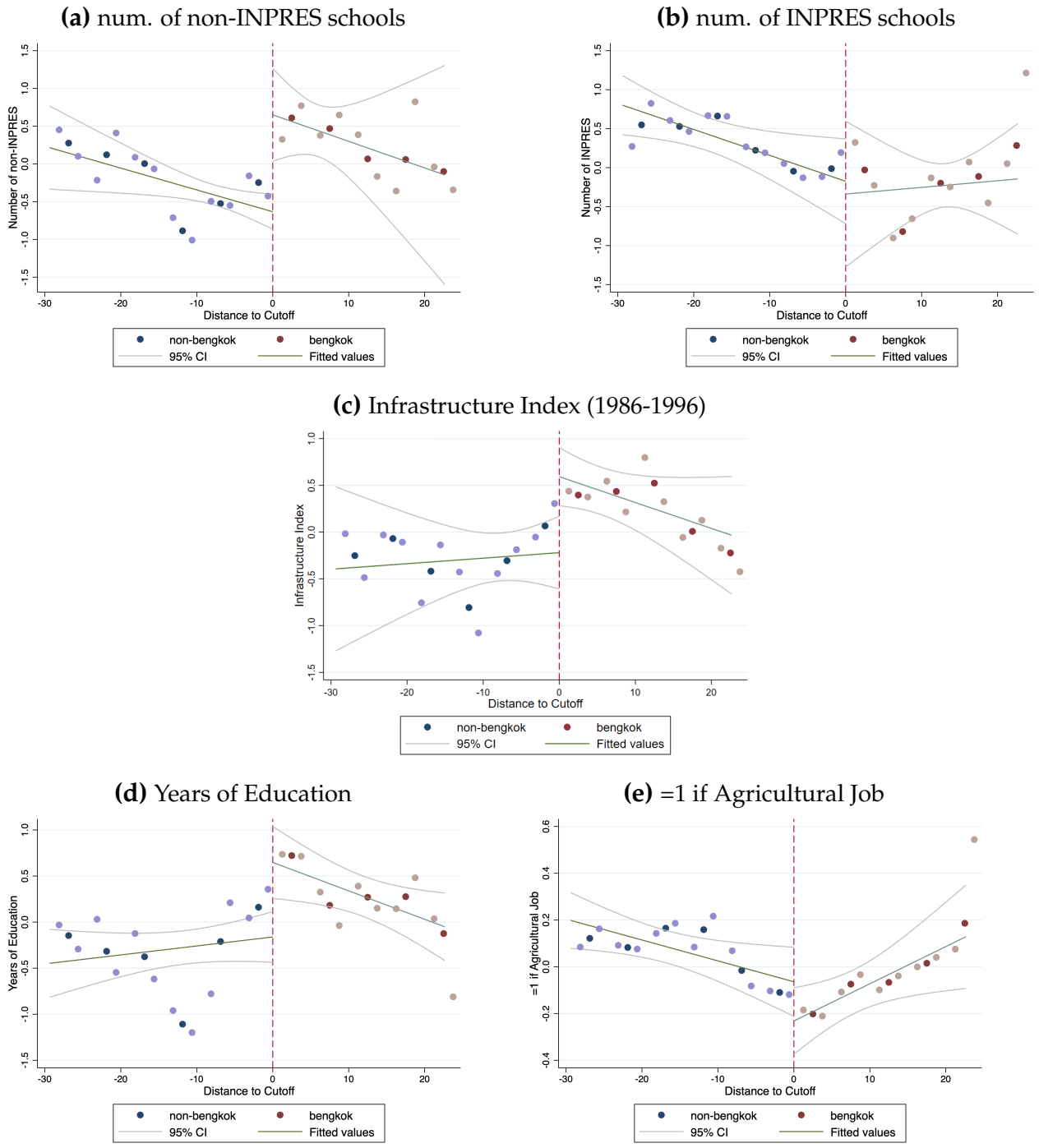
Notes: Infrastructure Index is constructed following Kling et al. (2007). Each public good outcome is standardized. Point estimates and 90% confidence interval shown in the figure are from a regression of the specified variable on a linear polynomial in distance to the border that allows for a local linear trend estimated separately on each side of the discontinuity, uses a triangular kernel, and the Calonico et al. (2014) optimal bandwidth. Each regression is jointly estimated following equations (1) and (2). Regressions control for whether a village had ever split, survey year, and include a nearest-border segment fixed effect. Standard errors are clustered at the subdistrict level.

Figure 7: RD Plots: *Bengkok* Villages and Village Funds



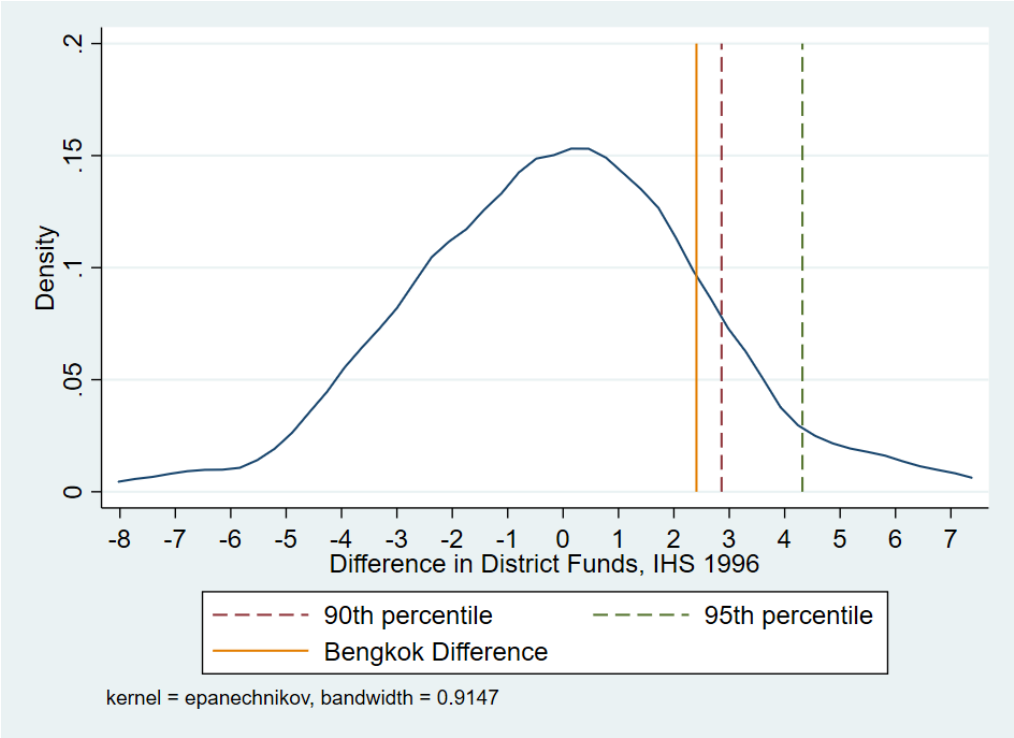
Notes: Darker (lighter)-shaded dots give the average value of the specified outcome variable for villages falling within 2.5km (1km) distance bins. Distance to cutoff refers to the distance between a village centroid and the closest point on the Cirebon–Priangan border, in kilometers. The dotted vertical line represents the Cirebon–Priangan border. Negative (positive) values of distance give the distance of villages South (North) of the Cirebon–Priangan border with villages to the North having had persistently larger plots of *bengkok* land. Solid line trends are predicted values from a regression of the specified variable on a linear polynomial in distance to the border that allows for a local linear trend estimated separately on each side of the discontinuity, uses a triangular kernel and a bandwidth of 30km. Each regression is jointly estimated following equations (1) and (2). All regressions control for whether a village had ever split, and include a nearest-border segment fixed effect. In addition, both Panel (b) and (d) controls for whether a chief's electoral term coincided with the end of Suharto rule. Panel (d) additionally controls for whether the development project was a road project, the most common type of project in our survey data. Standard errors clustered at the sub-district (*kecamatan*) level and figures show 95% confidence intervals. The order of these plots correspond to the order of outcomes in Table 3.

Figure 8: RD Plots: *Bengkok* Villages and Contemporary Development



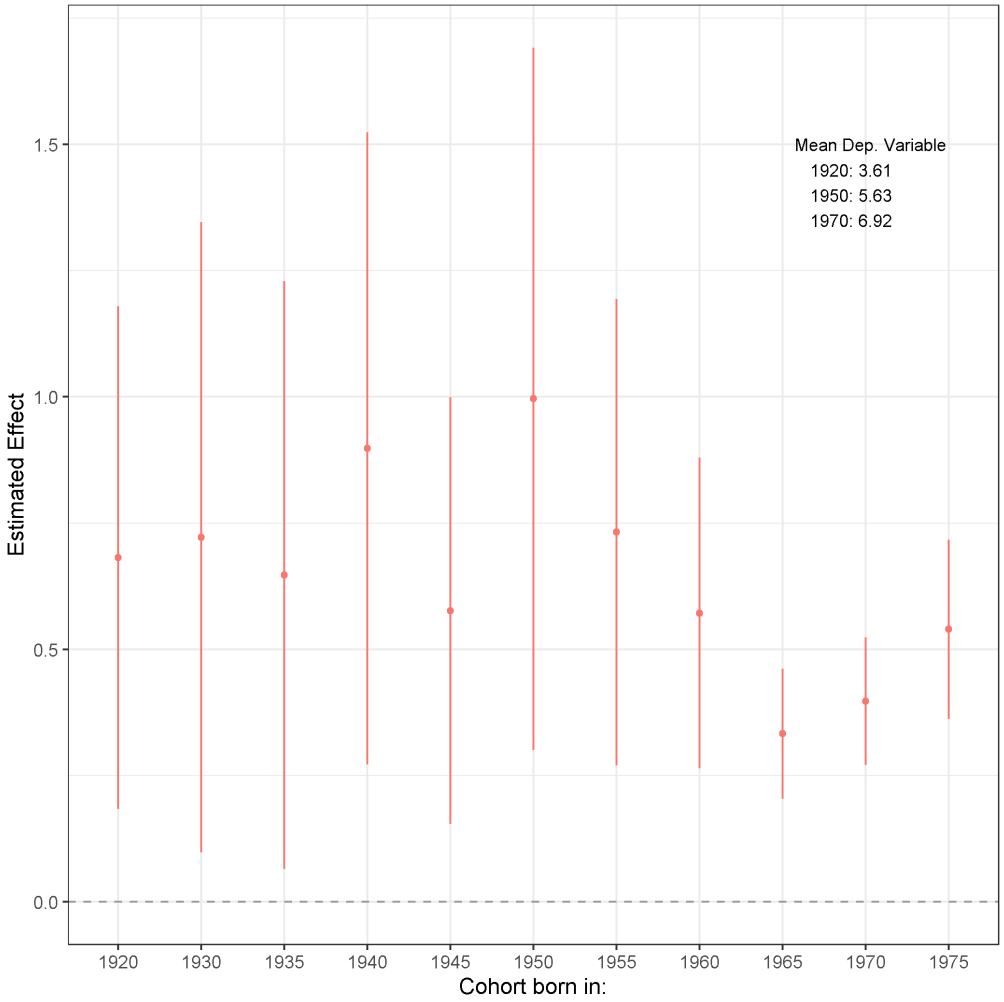
Notes: Darker (lighter)-shaded dots give the average value of the specified outcome variable for villages falling within 2.5km (1km) distance bins. Distance to cutoff refers to the distance between a village centroid and the closest point on the Cirebon–Priangan border, in kilometers. The dotted vertical line represents the Cirebon–Priangan border. Negative (positive) values of distance give the distance of villages South (North) of the Cirebon–Priangan border with villages to the North having had persistently larger plots of *bengkok* land. Solid line trends are predicted values from a regression of the specified variable on a linear polynomial in distance to the border that allows for a local linear trend estimated separately on each side of the discontinuity, uses a triangular kernel and a bandwidth of 30km. Each regression is jointly estimated following equations (1) and (2). All regressions control for whether a village had ever split and include a nearest-border segment fixed effect. In addition, the regression in Panel (c) control for survey year, and regressions in Panel (d) and (e) control for cohort-year and gender. Standard errors clustered at the sub-district (*kecamatan*) level and figures show 95% confidence intervals. The order of these plots correspond to the order of outcomes in Table 4.

Figure 9: Differences in District Funds, IHS 1996: Neighboring District-Pairs on Java



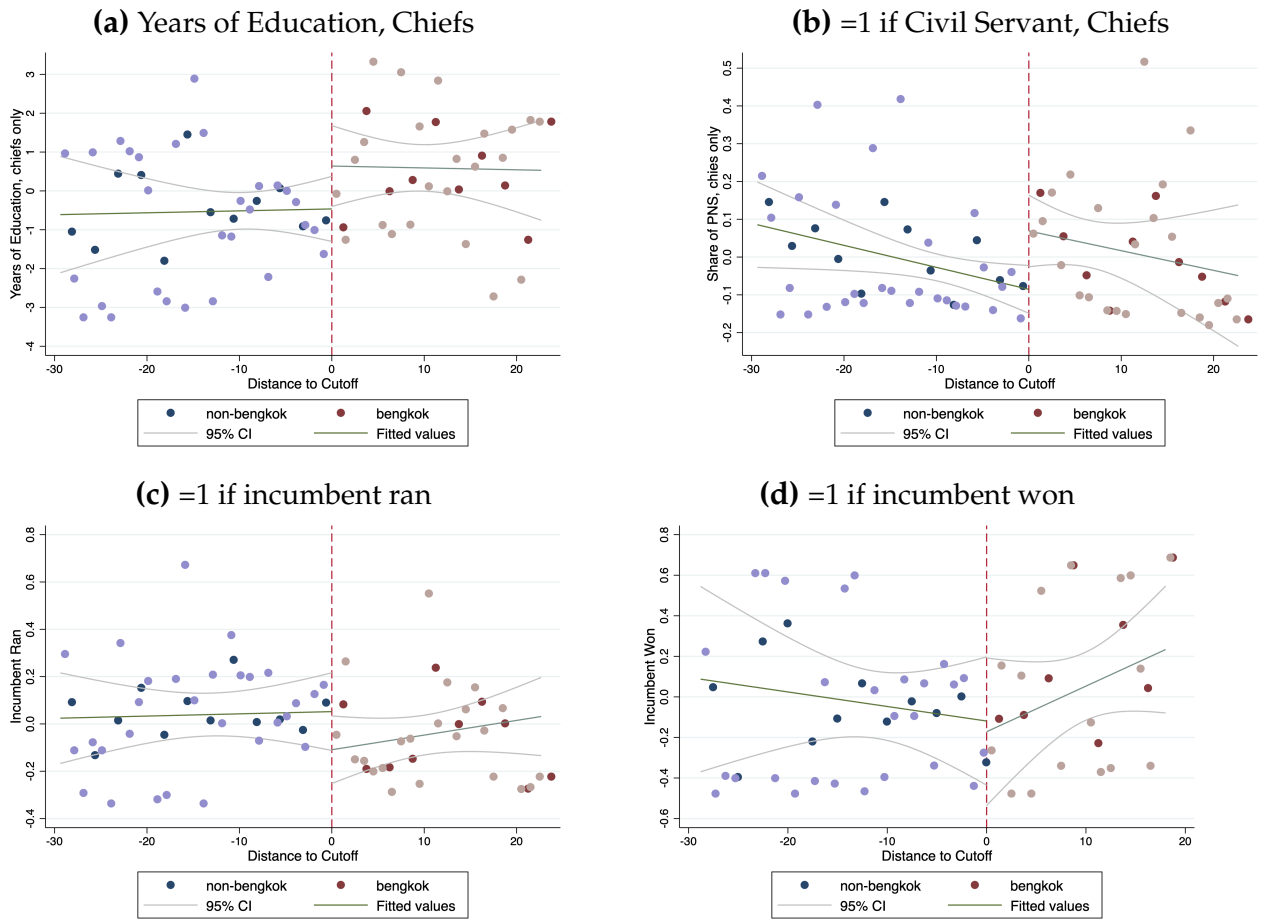
Notes: Histogram of differences in amount of funds received from their respective district governments, for villages in adjacent districts on Java. Dashed lines give the 90th and 95th percentile of the distribution. The solid line gives the estimated difference between *bengkok* and non-*bengkok* villages across my study boundary. Sample excludes all villages within urban areas (whose chiefs do not receive any *bengkok*); adjacent district-pairs where there are insufficient villages on both sides of the border for estimation (district-pair border is too short); adjacent district-pairs that are unbalanced on elevation; and adjacent district-pairs that are outliers in terms of cross-district border differences in *bengkok*.

Figure 10: Cohort-Level Differences in Years of Education of Villagers Across the *Bengkok* Boundary



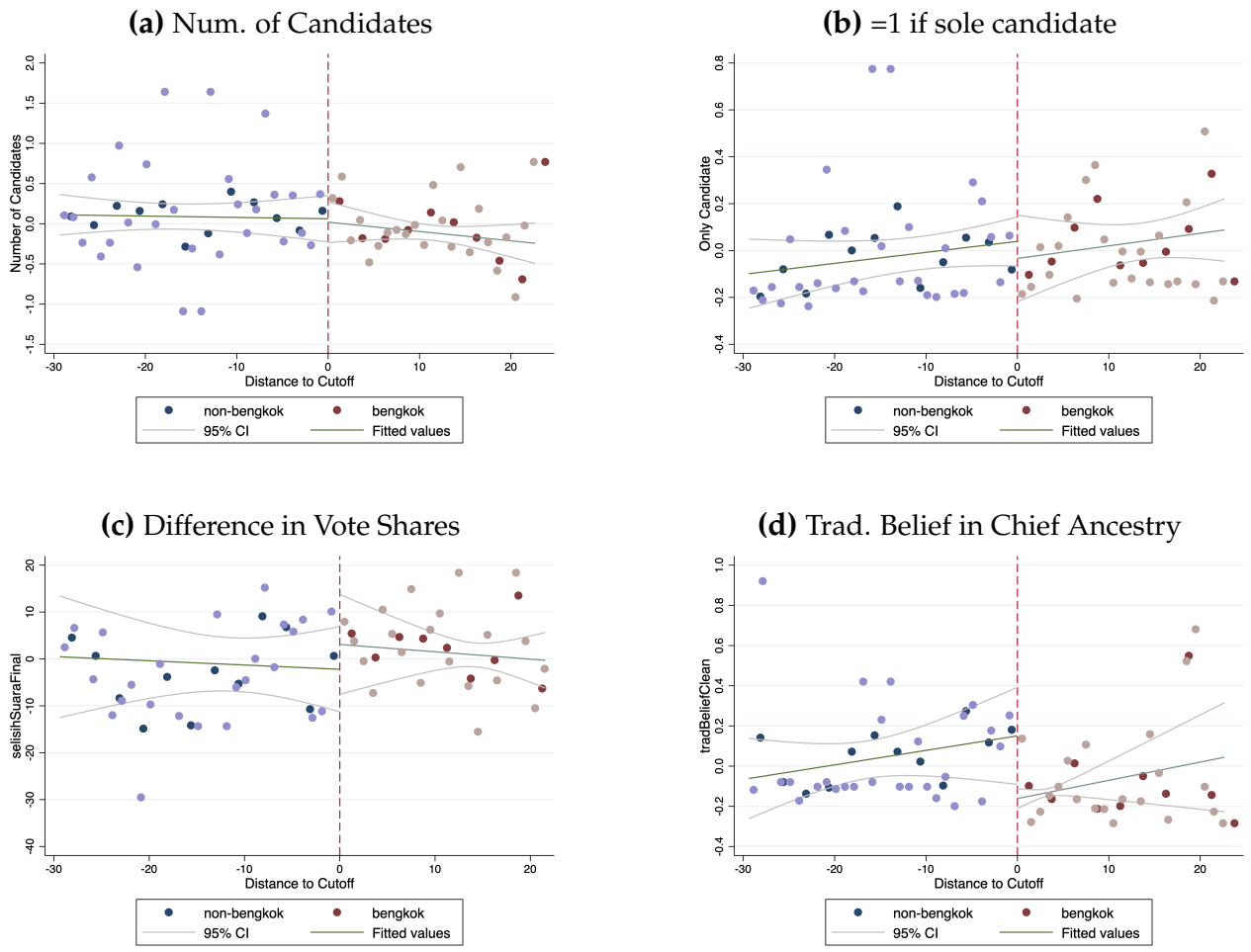
Source: Census 2000 data. Each dot and solid line plots the point estimate and 90% confidence interval on Bengkok$_{fuzzy,v}$ from jointly estimating equations (1) and (2) at the individual-level and pooled at 5 year cohort-levels. First cohort pooled at 10-year level (1920-1930) due to the smaller cohort size. Each regression allows for a local linear trend estimated separately on each side of the discontinuity, uses a triangular kernel and the Calonico et al. (2014) optimal bandwidth. Each regression is jointly estimated following equations (1) and (2). All regressions control for whether a village had ever split, cohort-year, gender, and include a nearest-border segment fixed effect. Standard errors are clustered at the subdistrict level.

Figure 11: RD Plots: *Bengkok* Villages, Political Selection and Re-election Incentives



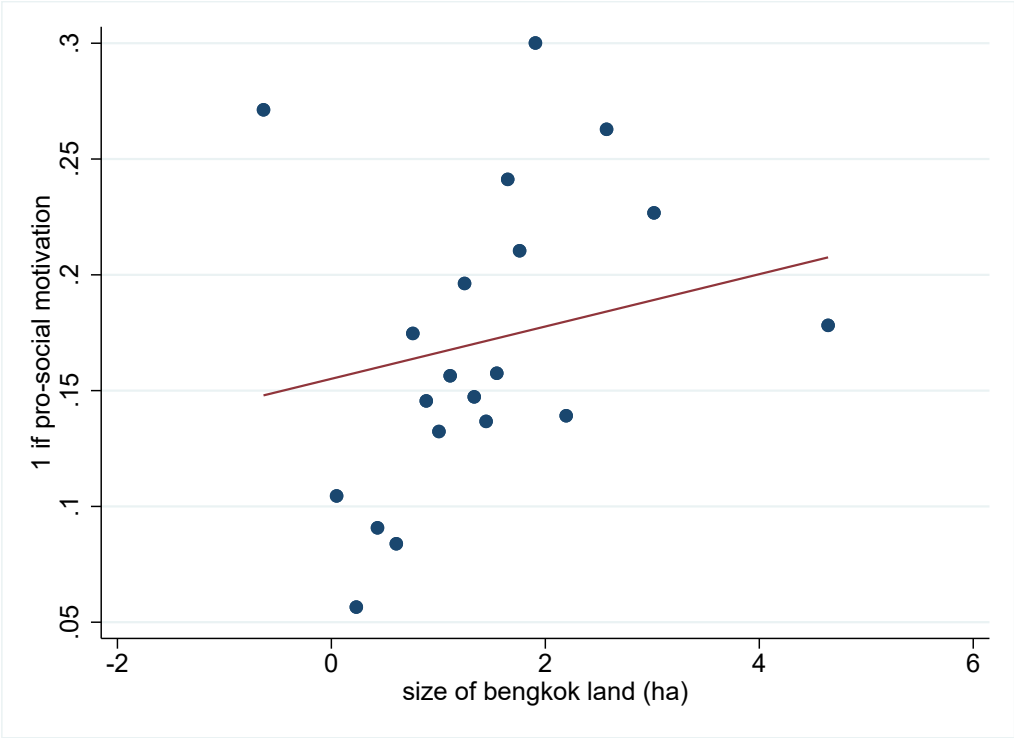
Notes: Darker (lighter)-shaded dots give the average value of the specified outcome variable for villages falling within 2.5km (1km) distance bins. Distance to cutoff refers to the distance between a village centroid and the closest point on the Cirebon–Priangan border, in kilometers. The dotted vertical line represents the Cirebon–Priangan border. Negative (positive) values of distance give the distance of villages South (North) of the Cirebon–Priangan border with villages to the North having had persistently larger plots of *bengkok* land. Solid line trends are predicted values from a regression of the specified variable on a linear polynomial in distance to the border that allows for a local linear trend estimated separately on each side of the discontinuity, uses a triangular kernel and a bandwidth of 30km. Each regression is jointly estimated following equations (1) and (2). All regressions control for whether a village had ever split, whether a chief's electoral term coincided with the end of Suharto rule, and include a nearest-border segment fixed effect. Standard errors clustered at the sub-district (*kecamatan*) level and figures show 95% confidence intervals. The order of these plots correspond to the order of outcomes in Table 5.

Figure 12: RD Plots for Political Competition Outcomes



Notes: Darker (lighter)-shaded dots give the average value of the specified outcome variable for villages falling within 2.5km (1km) distance bins. Distance to cutoff refers to the distance between a village centroid and the closest point on the Cirebon–Priangan border, in kilometers. The dotted vertical line represents the Cirebon–Priangan border. Negative (positive) values of distance give the distance of villages South (North) of the Cirebon–Priangan border with villages to the North having had persistently larger plots of *bengkok* land. Solid line trends are predicted values from a regression of the specified variable on a linear polynomial in distance to the border that allows for a local linear trend estimated separately on each side of the discontinuity, uses a triangular kernel and a bandwidth of 30km. Each regression is jointly estimated following equations (1) and (2). All regressions control for whether a village had ever split, whether a chief's electoral term coincided with the end of Suharto rule, and include a nearest-border segment fixed effect. Standard errors clustered at the sub-district (*kecamatan*) level and figures show 95% confidence intervals. The order of these plots correspond to the order of outcomes in Table 6.

Figure 13: Correlation Plot: Pro-Social Motivation and Size of *bengkok* Land



Notes: On the y-axis: "=1 if pro-social motivation" is an indicator variable that takes the value of 1 if, in response to our question: "Why did you choose to run for office?", a past or current living chief answered that it was to give back to and/or serve the village(rs). Figure is a binscatter of "=1 if pro-social motivation" on the size of *bengkok* land that a village chief would stand to cultivate. Binscatter includes a border-segment fixed effect, a linear polynomial in latitude and longitude, and baseline controls of whether a village had ever split. The inability to interview dead or extremely old chiefs leads to a smaller sample size and hence, we include all chiefs that ever ran for office between 1979-2014 and include indicator variables for whether a chief's electoral term coincided with the end of Suharto rule, began between 2000 to 2009, or began after 2010.

Table 1: Balance on Geographic and Pre-Treatment Characteristics

	Within 30 km			Within 10 km			RD Estimates	
	North	South	Std. err.	North	South	Std. err.	RD coefficient	Std. err.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Geographic Characteristics:								
Elevation	498.04	432.04	(47.06)	455.12	442.36	(54.90)	5.51	(30.37)
Ruggedness	0.15	0.21	(0.04)	0.14	0.13	(0.03)	0.13	(0.06)**
Medium texture soil (%)	0.43	0.66	(0.07)***	0.53	0.84	(0.07)	0	(0.00)*
Avg. Rainfall	283.12	287.67	(1.59)**	283.12	283.12	(0.00)***	0	(0.00)
Wet Rice Potential Yield (kg)	2161.10	2145.92	(5.92)*	2158.76	2151.89	(6.07)	-5.84	(2.08)***
Coffee Potential Yield (kg)	623.46	624.40	(3.32)	619.22	620.31	(3.87)	-4.09	(2.02)**
> 0 *rivers*	0.46	0.60	(0.08)	0.52	0.60	(0.13)	0.02	(0.11)
Obs.	87	101		46	52		49	
Population Characteristics:								
Ethnic Sunda Share (%)	0.97	0.95	(0.01)**	0.97	0.95	(0.01)*	0.02	(0.02)
Obs.	55	65		37	52		47	
Population Density (1819)	0.22	0.27	(0.14)	0.24	0.31	(0.22)	-0.04	(0.28)
Obs.	14	10		11	6		24	

Note: For 1819 population density, unit of observation is at the sub-district level measured in terms of persons per hectare and RD estimates refer to entire 30 km bandwidth, given the small sample size in 1819. Source: 1819 Dutch archival records. Details of other variable sources are described in Appendix Table B.1. The unit of observation is at the village polygon level. Columns (1), (2), (4), and (5) present the mean of the variable. Columns (3) and (6) present clustered standard errors for difference in means clustered at the subdistrict level. North and South indicate whether a village is located north of my study boundary, i.e. a *bengkok* village, or south of my study boundary, i.e. a *non-bengkok* village. Columns (7) and (8) present the estimated RD coefficient and standard error using the corresponding variable as its outcome using a local linear specification estimated separately on each side of the study boundary and a triangular kernel. The RD MSE optimal bandwidth is determined using the procedure by Calonico et al. (2014). Column (7) uses the average of all optimal bandwidths (4.83 km). Controls include a border-segment fixed effect and whether a village had ever split.

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

Table 2: First Stage Results: Jumps in Size of Chief *Bengkok* Across Historical Border

	Bengkok Size (ha) (1)	*Bengkok* Size (ha) (2)
T	2.408**	1.932***
	(1.025)	(0.577)
Distance	−0.111	0.026
	(0.125)	(0.017)
T * Distance	0.149	−0.088**
	(0.181)	(0.038)
Observations	67	186
Bandwidth	5.99	30.00

Note: Standard errors clustered at the subdistrict level. All regressions include a local linear specification estimated separately on each side of the study boundary and use a triangular kernel. In Column (1), the narrow bandwidth of 5.99 is calculated by taking the average of all optimal Calonico et al. (2014) bandwidths across my main outcomes. Unit of observation is at the village level. Outcome in column (1) - (2) is the average size of *bengkok* land awarded to the elected chief as reported in our survey data. T is an indicator for whether a village is on the northern side of the historical Cirebon-Priangan border; "Distance" is distance to the closest border point in kilometers. Regressions control for an indicator that equals 1 if a village had ever split and a border segment fixed effect.

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

Table 3: *Bengkok* Villages and Village Funds

	(1)	(2)	(3)	(4)
Panel A: Informal Taxation	Villager Contributions, IHS 1993		% Informal Taxes Collected	
bengkok	0.531**	0.426**	28.001***	12.907***
	(0.214)	(0.195)	(10.728)	(4.816)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	45	185	33	143
Clusters	10	22	8	20
Bandwidth	4.52	30.00	3.59	30.00
Mean Dep. Var.	10.91	11.17	58.79	67.13
Std. Dev. Var.	0.931	0.857	18.029	19.111
Mean Dep. Var. (RP)	39945	50797		

	(1)	(2)	(3)	(4)
Panel B: District-Level Funds	District Funds, IHS 1996		Govt and Own Village Funds	
bengkok	2.407**	2.064*	0.123*	0.145**
	(1.211)	(1.118)	(0.073)	(0.068)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	70	185	199	628
Clusters	11	22	11	22
Bandwidth	6.49	30.00	6.67	30.00
Mean Dep. Var.	4.79	5.27	0.21	0.26
Std. Dev. Var.	3.377	2.802	0.409	0.437
Mean Dep. Var. (RP)	2765	1357		

	(1)	(2)	(3)	(4)
Panel C: Central and Province	Central Government, IHS 1996		Province Government, IHS 1996	
bengkok	−0.021	0.006	−0.086	0.140
	(0.016)	(0.049)	(0.291)	(0.503)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	70	185	81	185
Clusters	11	22	11	22
Bandwidth	6.55	30.00	7.93	30.00
Mean Dep. Var.	9.44	9.48	1.02	1.03
Std. Dev. Var.	0.199	0.335	3.136	2.939
Mean Dep. Var. (RP)	6511	7172	3001	1561

Note: Standard errors clustered at the subdistrict level. All regressions include a local linear specification estimated separately on each side of the study boundary and use a triangular kernel. Each regression is jointly estimated following equations (1) and (2). Optimal bandwidths are chosen following Calonico et al. (2014) and are reported in kilometers. Unit of observation is at the village level except for % *Informal Taxes Collected* which is at the village-chief level, and *Govt and Own Village Funds* which is at the village-chief, development-project level. All regressions control for an indicator that equals 1 if a village had ever split and a border segment fixed effect. In addition, regression of % *Informal Taxes Collected* control for whether a chief's electoral term coincided with the end of Suharto rule and regression of *Govt and Own Village Funds* controls for both the former and whether a development project is a road project, the most common project in our survey data. *Villager Contributions* measures the amount of funds collected from villagers. % *Informal Taxes Collected* measures the percentage of informal taxes, collected successfully by village chiefs, as a percentage of their annual target. *District Funds* measures the amount of funds from district-level government sources. *Govt and Own Village Funds* equals one if a development project was constructed using both government and villager contributions, and zero otherwise. *Central Government* and *Province Government Funds* measures the amount of funds from Central and Provincial government sources, respectively.

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

Table 4: *Bengkok* Villages and Contemporary Development

	(1)	(2)	(3)	(4)
Panel A: Schools (1983)	num. of non-INPRES		num. of INPRES	
bengkok	0.392**	0.621***	0.268	0.067
	(0.173)	(0.187)	(0.185)	(0.191)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	75	182	86	182
Clusters	11	22	11	22
Bandwidth	7.51	30.00	8.59	30.00
Mean Dep. Var.	2.59	2.47	1.16	1.38
Std. Dev. Var.	1.285	1.140	0.838	0.949

	(1)	(2)
Panel B: Infrastructure (1980-1996)	Infrastructure Index	
bengkok	0.415**	0.313**
	(0.204)	(0.128)
Bandwidth choice	Optimal	Wide
Observations	108	360
Clusters	11	22
Bandwidth	5.32	30.00
Mean Dep. Var.	-0.04	-0.01
Std. Dev. Var.	0.885	0.969

	(1)	(2)	(3)	(4)
Panel C: Education & Prosperity	Years of Education		=1 if Agricultural Job	
bengkok	0.454***	0.297**	−0.086***	−0.054
	(0.101)	(0.122)	(0.030)	(0.036)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	62550	248462	41212	182682
Clusters	10	22	10	22
Bandwidth	4.83	30.00	4.84	30.00
Mean Dep. Var.	7.16	6.77	0.23	0.39
Std. Dev. Var.	3.146	2.857	0.422	0.489

Note: Standard errors clustered at the subdistrict level. All regressions include a local linear specification estimated separately on each side of the study boundary and use a triangular kernel. Each regression is jointly estimated following equations (1) and (2). Optimal bandwidths are chosen following Calonico et al. (2014) and are reported in kilometers. Unit of observation in Panels A and B is at the village level. Unit of observation in Panel C is at the individual, villager-level. All regressions control for an indicator that equals 1 if a village had ever split and a border segment fixed effect. In addition, regression in Panel B controls for survey year. Regressions in Panel C control for cohort-year and gender. *num. of non-INPRES* measures the number of bottom-up village schools. *num. of INPRES* measures the number of top-down, Central government-constructed schools. *Infrastructure Index* is comprised of three variables indicating the presence of safe water sources, aspalt road, and safe garbage disposal between 1986-1996. I construct this index following (Kling et al., 2007) by standardising each variable, averaging across all three standardised variables, and standardising the average. *Years of Education* measures the number of years of education for all individuals aged 21-40 years old. *=1 if Agricultural Job* is an indicator variable that takes the value of 1 if an individual has an agricultural job and 0 otherwise, for all individuals aged 21-40 years old.

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

Table 5: *Bengkok* Villages, Political Selection and Re-election Incentives

	(1)	(2)	(3)	(4)
Panel A: Chiefs	Years of Education		=1 if Civil Servant	
bengkok	0.480	0.651*	0.221***	0.112**
	(0.368)	(0.345)	(0.037)	(0.048)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	77	249	65	249
Clusters	11	22	10	22
Bandwidth	5.26	30.00	4.52	30.00
Mean Dep. Var.	9.53	9.52	0.12	0.13
Std. Dev. Var.	3.068	2.916	0.331	0.335

	(1)	(2)
Panel B: Re-Election Incentives	=1 if incumbent ran	
bengkok	0.022	−0.078*
	(0.076)	(0.046)
Bandwidth choice	Optimal	Wide
Observations	96	292
Clusters	11	22
Bandwidth	5.67	30.00
Mean Dep. Var.	0.22	0.28
Std. Dev. Var.	0.416	0.448

Note: Standard errors clustered at the subdistrict level. All regressions include a local linear specification estimated separately on each side of the study boundary and use a triangular kernel. Each regression is jointly estimated following equations (1) and (2). Optimal bandwidths are chosen following Calonico et al. (2014) and are reported in kilometers. Unit of observation is at the village chief level. All regressions control for an indicator that equals 1 if a village had ever split, whether a chief's electoral term coincided with the end of Suharto rule, and a border segment fixed effect. *Years of Education* measures the number of years of education of a village chief. *=1 if Civil Servant* takes the value of 1 if a chief worked in the civil service before becoming a chief, and 0 otherwise. *=1 if incumbent ran* takes the value of 1 if a chief re-ran for elections in the subsequent term.

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

Table 6: *Bengkok* Villages and Political Competition

	(1)	(2)	(3)	(4)
Panel A: Political Competition I	Num. of Candidates		=1 if sole candidate	
bengkok	0.200	0.035	−0.080**	−0.054
	(0.130)	(0.088)	(0.040)	(0.060)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	74	249	87	249
Clusters	11	22	11	22
Bandwidth	5.13	30.00	5.76	30.00
Mean Dep. Var.	2.22	2.21	0.16	0.16
Std. Dev. Var.	0.955	0.855	0.370	0.372

	(1)	(2)	(3)	(4)
Panel B: Political Competition II	Difference in Vote Shares		Trad. Belief in Chief Ancestry	
bengkok	−0.582	1.026	−0.068	−0.189
	(0.999)	(1.868)	(0.083)	(0.115)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	40	155	75	183
Clusters	9	20	11	21
Bandwidth	4.56	30.00	5.95	30.00
Mean Dep. Var.	22.13	26.60	0.21	0.18
Std. Dev. Var.	15.902	16.492	0.412	0.386

Note: Standard errors clustered at the subdistrict level. All regressions include a local linear specification estimated separately on each side of the study boundary and use a triangular kernel. Each regression is jointly estimated following equations (1) and (2). Optimal bandwidths are chosen following Calonico et al. (2014) and are reported in kilometers. Unit of observation for regression of *Trad. Belief in Chief Ancestry* is at the village-level. Unit of observation for all other regressions is at the village-chief election level. All regressions control for an indicator that equals 1 if a village had ever split, whether a chief's electoral term coincided with the end of Suharto rule, and a border segment fixed effect. *Num. of Candidates* measures the number of candidates that ran for election. *=1 if sole candidate* takes the value of 1 if an election was uncontested. *Difference in Vote Shares* measures the vote margin between the winning chief and the runner-up. *Trad. Belief in Chief Ancestry* takes value of 1 if villagers typically believe that a chief should belong to a traditional ruling family.

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

Table 7: *Bengkok* Villages and Proportion of Chiefs Cultivating Farmland After Assuming Office

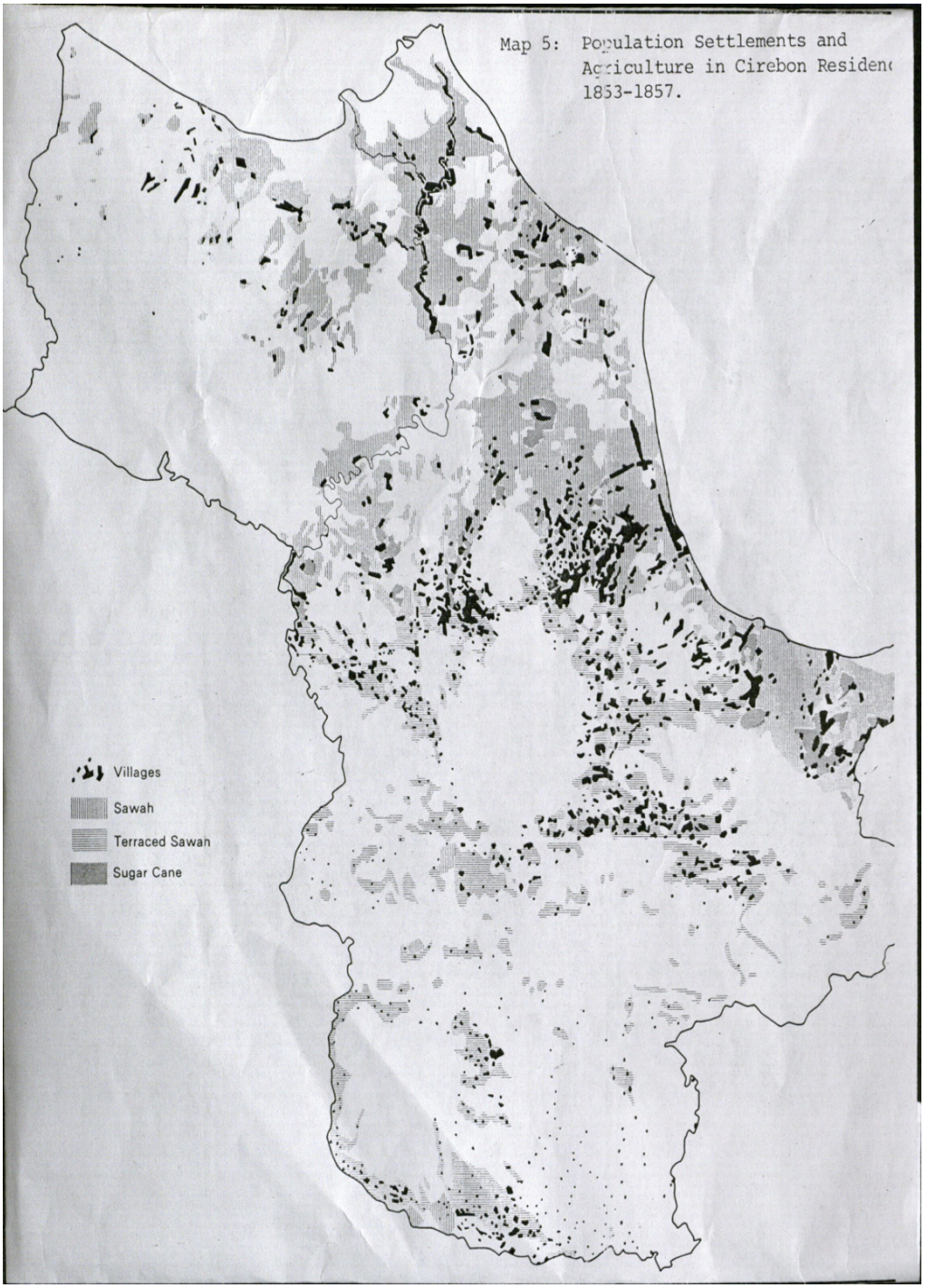
	=1 if cultivated farmland (1)	=1 if cultivated farmland (2)
bengkok	0.060**	0.072**
	(0.024)	(0.029)
Bandwidth choice	Optimal	Wide
Observations	117	240
Clusters	11	22
Bandwidth	8.05	30.00
Mean Dep. Var.	0.95	0.96
Std. Dev. Var.	0.222	0.190

Note: Standard errors clustered at the subdistrict level. All regressions include a local linear specification estimated separately on each side of the study boundary and use a triangular kernel. Each regression is jointly estimated following equations (1) and (2). Optimal bandwidths are chosen following Calonico et al. (2014) and are reported in kilometers. Unit of observation is at the chief level. All regressions control for an indicator that equals 1 if a village had ever split, whether a chief's electoral term coincided with the end of Suharto rule, and a border segment fixed effect. *=1 if cultivated farmland* takes the value of 1 if a chief cultivated farm-land only after entering office.

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

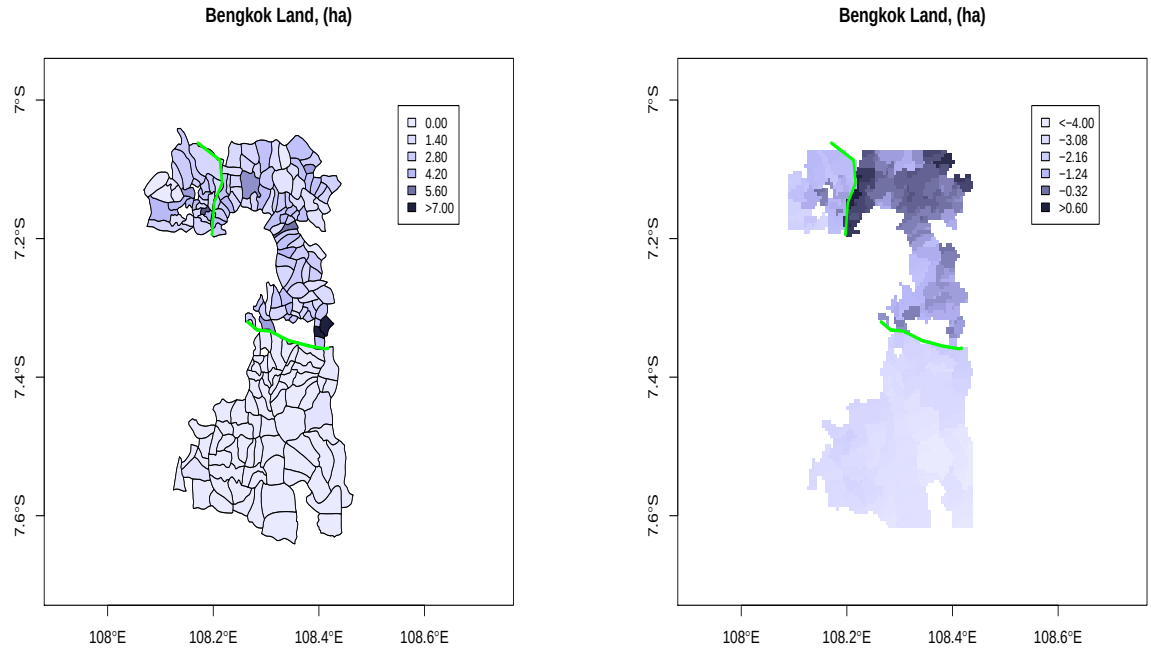
Appendix Tables and Figures

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 Cirebon–Priangan border and in Central Cirebon, away from my study border. Source: Fernando (1982).

Figure A.2: First-stage Spatial RD Graph: Actual vs Predicted Y Values of Size of *bengkok* Land Awarded to Chiefs



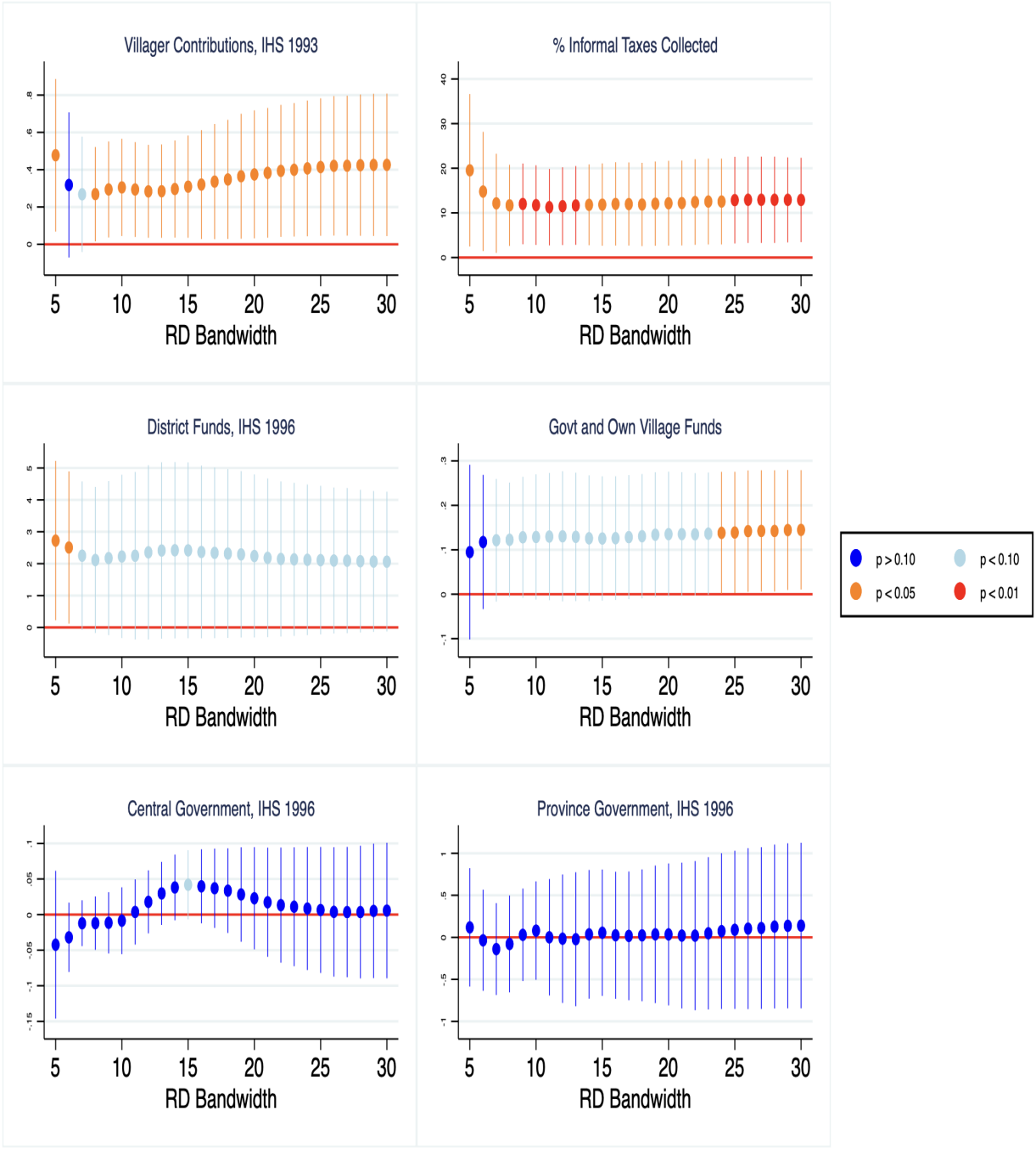
(a) Actual **(b)** Predicted

Notes: 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. Figure A shows actual data values plotted at the village-level. Figure B shows predicted values, for a finely spaced grid of longitude-latitude coordinates, from a regression of the size of *bengkok* land awarded to chiefs, on latitude, longitude, an indicator for being on the Cirebon side of the border, whether a village had ever split and a nearest-border segment fixed effect.

Figure A.3: 1853 Dutch Maps

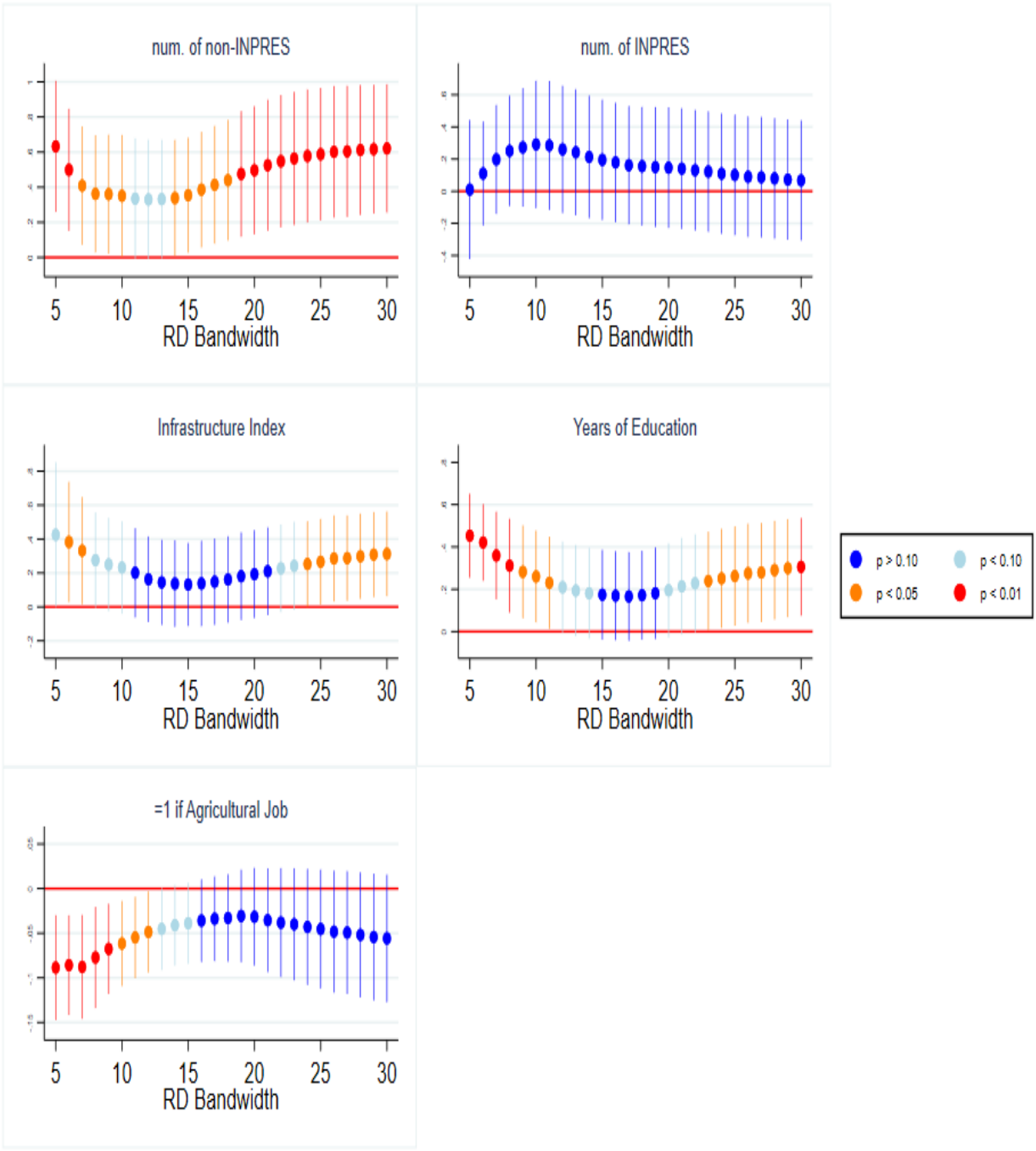
These maps were created by Dutch cartographers simultaneously with a village-level land use survey at a scale of 1:2 500 (1cm to 25m). Reproduction was allowed only after those in charge of statistical survey declared that land use was displayed correctly.

Figure A.4: *Bengkok* Villages and Village Funds: Robustness to RD Bandwidth



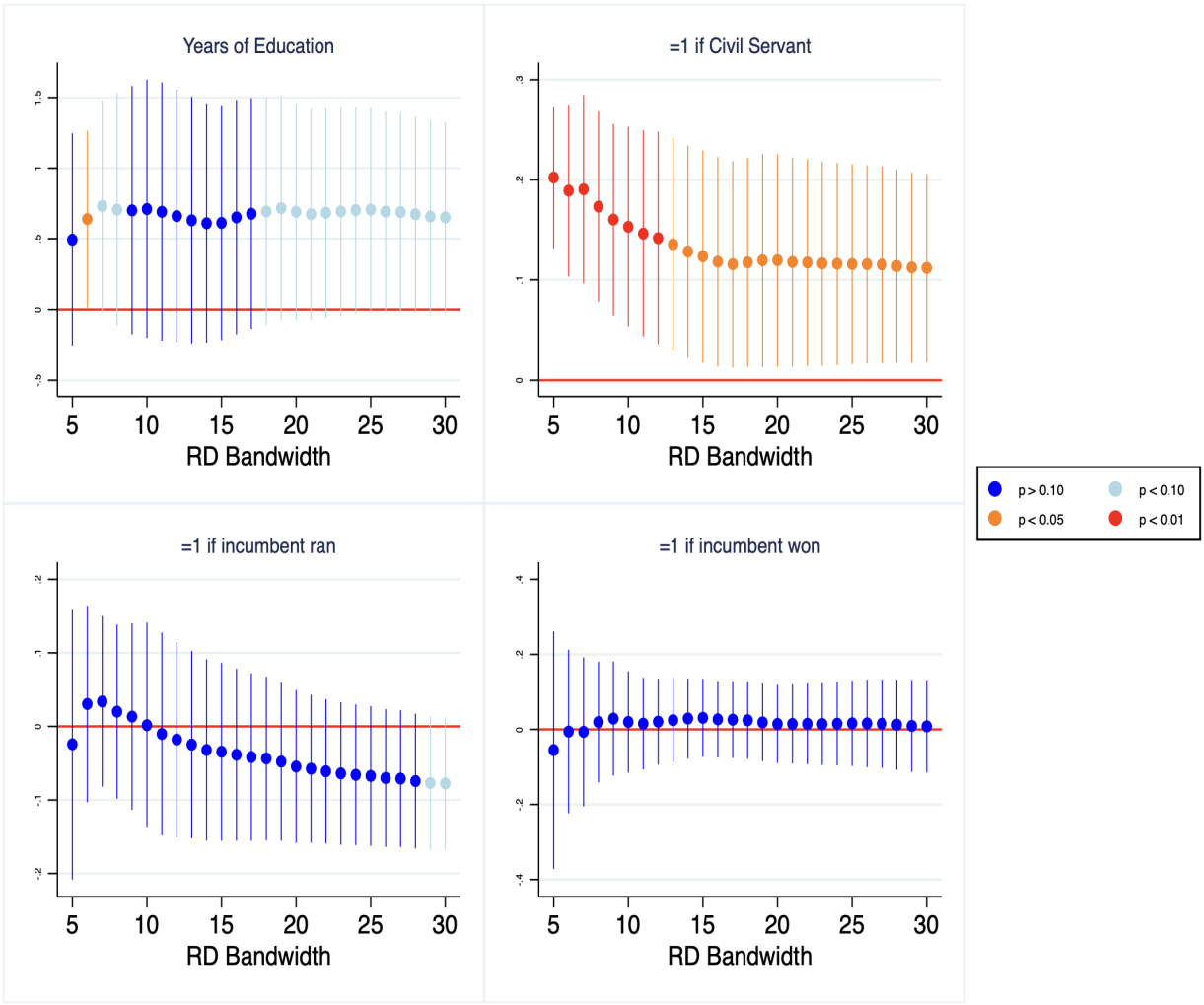
Notes: Standard errors clustered at the sub-district level. All regressions include a local linear specification estimated separately on each side of the Cirebon–Priangan boundary. All regressions control for whether a village had ever split, and include a nearest-border segment fixed effect. In addition, both Panel (b) and (d) controls for whether a chief's electoral term coincided with the end of Suharto rule. Panel (d) additionally controls for whether the development project was a road project, the most common type of project in our survey data. Regressions use a triangular kernel following Cattaneo et al. (2019). Figure shows point estimates and 95% confidence intervals.

Figure A.5: *Bengkok* Villages and Contemporary Development: Robustness to RD Bandwidth



Notes: Standard errors clustered at the sub-district level. All regressions include a local linear specification estimated separately on each side of the Cirebon–Priangan boundary. All regressions control for whether a village had ever split and nearest border segment fixed effects. In addition, individual-level regressions of *years of education* and *agricultural job*, control for gender and age-cohort. Regression of *infrastructure index* controls for survey year. All regressions use a triangular kernel following Cattaneo et al. (2019). Figure shows point estimates and 95% confidence intervals.

Figure A.6: *Bengkok* Villages, Political Selection and Re-election Incentives: Robustness to RD Bandwidth



Notes: Standard errors clustered at the sub-district level. All regressions include a local linear specification estimated separately on each side of the Cirebon–Priangan boundary. All regressions control for whether a village had ever split, nearest border segment fixed effects, and an indicator variable for whether a chief's term of office coincided with the end of Suharto's rule. All regressions use a triangular kernel following Cattaneo et al. (2019). Figure shows point estimates and 95% confidence intervals.

Table A.1: Villager Contributions: Breakdown by Purpose

	(1) No Bengkok	(2) Bengkok	(3) All
For village development projects	0.26	0.39	.64
For paying salary of village officials	0.20	0	0.20
For operational use	0.38	0.23	0.60

Notes: Source: Primary survey data. Percentages do not add up to 100% as respondents could report more than one purpose for villager contributions.

Table A.2: *Bengkok* Villages and Village Funds:
Alternative RD Specification: Linear Polynomial in Latitude and Longitude

	(1)	(2)	(3)	(4)
Panel A: Informal Taxation	Villager Contributions, IHS 1993		% Informal Taxes Collected	
bengkok	0.217***	0.514**	4.500***	14.388***
	(0.080)	(0.226)	(1.374)	(4.775)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	46	186	34	144
Clusters	10	23	8	21
Bandwidth	4.52	30.00	3.59	30.00
Mean Dep. Var.	10.94	11.17	59.26	67.22
Std. Dev. Var.	0.939	0.861	17.970	19.074
Mean Dep. Var. (RP)	41142	50569		

	(1)	(2)	(3)	(4)
Panel B: District-Level Funds	District Funds, IHS 1996		Govt and Own Village Funds	
bengkok	1.811*	1.948*	0.143**	0.206***
	(0.938)	(1.101)	(0.060)	(0.071)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	71	186	199	623
Clusters	11	23	11	23
Bandwidth	6.49	30.00	6.67	30.00
Mean Dep. Var.	4.82	5.24	0.22	0.26
Std. Dev. Var.	3.363	2.821	0.416	0.436
Mean Dep. Var. (RP)	2734	1350		

	(1)	(2)	(3)	(4)
Panel C: Central and Province	Central Government, IHS 1996		Province Government, IHS 1996	
bengkok	−0.012	0.023	−0.129	0.100
	(0.025)	(0.059)	(0.586)	(0.600)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	71	186	82	186
Clusters	11	23	11	23
Bandwidth	6.55	30.00	7.93	30.00
Mean Dep. Var.	9.44	9.49	1.01	1.03
Std. Dev. Var.	0.198	0.349	3.119	2.932
Mean Dep. Var. (RP)	6503	7274	2964	1553

Note: Standard errors clustered at the subdistrict level. All regressions include a local linear specification in latitude and longitude and use a triangular kernel. Each regression is jointly estimated following equations (1) and (2). I use the same optimal bandwidths as in Table 3. Unit of observation is at the village level except for *% Informal Taxes Collected* which is at the village-chief level, and *Govt and Own Village Funds* which is at the village-chief, development-project level. All regressions control for an indicator that equals 1 if a village had ever split and a border segment fixed effect. In addition, regression of *% Informal Taxes Collected* control for whether a chief's electoral term coincided with the end of Suharto rule and regression of *Govt and Own Village Funds* controls for both the former and whether a development project is a road project, the most common project in our survey data. *Villager Contributions* measures the amount of funds collected from villagers. *% Informal Taxes Collected* measures the percentage of informal taxes, collected successfully by village chiefs, as a percentage of their annual target. *District Funds* measures the amount of funds from district-level government sources. *Govt and Own Village Funds* equals one if a development project was constructed using both government and villager contributions, and zero otherwise. *Central Government* and *Province Government Funds* measures the amount of funds from Central and Provincial government sources, respectively.

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

Table A.3: *Bengkok* Villages and Contemporary Development:
Alternative RD Specification: Linear Polynomial in Latitude and Longitude

	(1)	(2)	(3)	(4)
Panel A: Schools (1983)	num. of non-INPRES		num. of INPRES	
bengkok	0.357***	0.617***	0.217*	0.015
	(0.116)	(0.205)	(0.123)	(0.163)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	76	183	87	183
Clusters	11	23	11	23
Bandwidth	7.51	30.00	8.59	30.00
Mean Dep. Var.	2.58	2.46	1.16	1.39
Std. Dev. Var.	1.278	1.142	0.834	0.953

	(1)	(2)
Panel B: Infrastructure (1980-1996)	Infrastructure Index	
bengkok	0.541***	0.433***
	(0.164)	(0.150)
Bandwidth choice	Optimal	Wide
Observations	110	362
Clusters	11	23
Bandwidth	5.32	30.00
Mean Dep. Var.	-0.04	-0.02
Std. Dev. Var.	0.881	0.972

	(1)	(2)	(3)	(4)
Panel C: Education & Prosperity	Years of Education		=1 if Agricultural Job	
bengkok	0.189***	0.357***	−0.110***	−0.076*
	(0.049)	(0.124)	(0.020)	(0.044)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	63977	250112	42178	184238
Clusters	10	23	10	23
Bandwidth	4.83	30.00	4.84	30.00
Mean Dep. Var.	7.16	6.77	0.23	0.40
Std. Dev. Var.	3.132	2.851	0.423	0.490

Note: Standard errors clustered at the subdistrict level. All regressions include a local linear specification polynomial in latitude and longitude and use a triangular kernel. Each regression is jointly estimated following equations (1) and (2). I use the same optimal bandwidths as in Table 4. Unit of observation in Panels A and B is at the village level. Unit of observation in Panel C is at the individual, villager-level. All regressions control for an indicator that equals 1 if a village had ever split and a border segment fixed effect. In addition, regression in Panel B controls for survey year. Regressions in Panel C control for cohort-year and gender. *num. of non-INPRES* measures the number of bottom-up village schools. *num. of INPRES* measures the number of top-down, Central government-constructed schools. *Infrastructure Index* is comprised of three variables indicating the presence of safe water sources, aspalt road, and safe garbage disposal between 1986-1996. I construct this index following (Kling et al., 2007) by standardising each variable, averaging across all three standardised variables, and standardising the average. *Years of Education* measures the number of years of education for all individuals aged 21-40 years old. *=1 if Agricultural Job* is an indicator variable that takes the value of 1 if an individual has an agricultural job and 0 otherwise, for all individuals aged 21-40 years old.

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

Table A.4: *Bengkok* Villages, Political Selection and Re-election Incentives: Alternative RD Specification: Linear Polynomial in Latitude and Longitude

	(1)	(2)	(3)	(4)
Panel A: Chiefs	Years of Education		=1 if Civil Servant	
bengkok	0.210	0.768*	0.100**	0.077**
	(0.267)	(0.396)	(0.045)	(0.033)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	76	247	64	247
Clusters	11	23	10	23
Bandwidth	5.26	30.00	4.52	30.00
Mean Dep. Var.	9.54	9.50	0.16	0.13
Std. Dev. Var.	3.048	2.919	0.366	0.336

	(1)	(2)	(3)	(4)
Panel B: Re-Election Incentives	=1 if incumbent ran		=1 if incumbent won	
bengkok	−0.018	−0.016	0.078	0.067
	(0.027)	(0.062)	(0.099)	(0.062)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	95	290	13	80
Clusters	11	23	8	19
Bandwidth	5.67	30.00	3.63	30.00
Mean Dep. Var.	0.21	0.28	0.23	0.39
Std. Dev. Var.	0.410	0.448	0.439	0.490

Note: Standard errors clustered at the subdistrict level. All regressions include a local linear polynomial in latitude and longitude. Each regression is jointly estimated following equations (1) and (2). I use the same optimal bandwidths as in Table 5. Unit of observation is at the village chief level. All regressions control for an indicator that equals 1 if a village had ever split, whether a chief's electoral term coincided with the end of Suharto rule, and a border segment fixed effect. *Years of Education* measures the number of years of education of a village chief. *=1 if Civil Servant* takes the value of 1 if a chief worked in the civil service before becoming a chief, and 0 otherwise. *=1 if incumbent ran* takes the value of 1 if a chief re-ran for elections in the subsequent term.

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

Table A.5: *Bengkok* Villages and Colonial Policy

	(1)	(2)	(3)	(4)
Panel A: 1853 Land Use	% Land Settled		% Land Grew Coffee	
bengkok	2.056	0.940	−4.490*	1.917*
	(1.834)	(1.382)	(2.404)	(1.053)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	42	185	33	185
Clusters	9	22	9	22
Bandwidth	4.15	30.00	3.46	30.00
Mean Dep. Var.	14.25	5.95	4.96	2.11
Std. Dev. Var.	12.650	8.563	9.188	5.236

	(1)	(2)	(3)	(4)
Panel B: Road Density	1853		1945	
bengkok	0.887	0.617	1.575	−0.042
	(1.562)	(0.494)	(1.528)	(0.571)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	65	185	42	185
Clusters	11	22	9	22
Bandwidth	5.90	30.00	4.24	30.00
Mean Dep. Var.	2.81	1.58	6.90	3.45
Std. Dev. Var.	3.827	3.022	4.903	4.224

	(1)	(2)
Panel C: Railroad Density	1945	
bengkok	−0.031	−0.243
	(0.364)	(0.328)
Bandwidth choice	Optimal	Wide
Observations	88	185
Clusters	11	22
Bandwidth	8.79	30.00
Mean Dep. Var.	0.66	0.34
Std. Dev. Var.	1.952	1.391

Note: Unit of observation is at the village-level. Standard errors clustered at the subdistrict level. Following my main regression specifications, I control for an indicator for whether a village had ever experienced a split and border fixed effects. All measures calculated from 1853 and 1945 Dutch maps overlaid over 2000 village border polygons. The unit of measure for road and rail density is meters per hectare. Standard errors clustered at the sub-district level. *% Land Settled* divides the area covered by housing settlements, over the total area within a village polygon and is a proxy for village development in 1853. *% Land Grew Coffee* divides the area covered by coffee fields, over the total area within a village polygon.

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

Table A.6: *Bengkok* Villages and Contemporary Development: Robustness to Differences in Historical Coffee Cultivation (1853)

	(1)	(2)
Panel A: Schools (1983)	num. of non-INPRES	
bengkok	0.392**	0.637***
	(0.183)	(0.206)
Bandwidth choice	Optimal	Wide
Observations	79	182
Clusters	11	22
Bandwidth	7.71	30.00
Mean Dep. Var.	2.56	2.47
Std. Dev. Var.	1.268	1.140

	(1)	(2)
Panel B: Infrastructure (1980-1996)	Infrastructure Index	
bengkok	0.231*	0.214**
	(0.134)	(0.095)
Bandwidth choice	Optimal	Wide
Observations	234	650
Clusters	11	22
Bandwidth	6.12	30.00
Mean Dep. Var.	0.00	-0.01
Std. Dev. Var.	0.616	0.615

	(1)	(2)	(3)	(4)
Panel C: Education & Prosperity	Years of Education		=1 if Agricultural Job	
bengkok	0.448***	0.283**	−0.093***	−0.060
	(0.089)	(0.123)	(0.036)	(0.039)
Bandwidth choice	Optimal	Wide	Optimal	Wide
Observations	66040	248462	35946	182682
Clusters	10	22	9	22
Bandwidth	4.99	30.00	4.36	30.00
Mean Dep. Var.	7.15	6.77	0.24	0.39
Std. Dev. Var.	3.160	2.857	0.429	0.489

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

B Further Supplementary Materials

B.1 Description of Falsification Test Across Adjacent District Border-Pairs in Figure 9

I proceed in three steps. First, I use data from the 1996 village census and restrict my sample to all rural villages on Java (urban villages do not receive *bengkok*), and exclude any rural villages (adjacent border-pairs) in (bordering) the greater Jakarta area or Yogyakarta, an independent Sultanate/Kingdom whose villages are ruled under a different governance structure. I then overlay all remaining district borders on Java onto village polygons and exclude any district borders that overlap with provincial borders.

Second, each district could potentially be adjacent to more than one district. Hence, for each district, I randomly draw a single adjacent district-border pair.

Third, for each adjacent district-border pair, I randomly assign one of the two districts into treatment and calculate the average differences, at the village-level, in 1996 district funds between treated and non-treated districts, using the same specification as equations (1) and (2) and the optimal Calonico et al. (2014) bandwidth.

Last, to avoid variations in district-funding due to differences in topography that are uncharacteristic of my study area, I exclude adjacent district-border pairs that are unbalanced on elevation. I also exclude those that are unbalanced on village-level *bengkok*, given that these large differences in *bengkok* could have occurred for other plausibly non-exogenous reasons that I cannot account for. District-border pairs that are too short in length and hence, have insufficient villages for estimation purposes are also excluded from my analysis.

Table B.1: Data Sources

Data	*Source*	*Content*	*Time Span*	*Variable*
1. Village Chiefs and Elections	Author's original survey	Universe of local village chiefs	1979 -1996	Size of *bengkok*, percentage of informal taxes collected, indicator for development projects using government and own village funds, years of education, ex-civil servant job indicator, re-ran in an election indicator, number of candidates, difference in vote shares, traditional belief in chief ancestry, indicator for farmland cultivation
2. Village Development	*Potensi Desa* (Village Potential)	Universe of local villages	1983-1996	Number of (non-)INPRES schools, infrastructure index, village funds
	Population Census	Universe of Individuals	2000	Ethnic Sunda share, villagers years of education, indicator for whether a villager had an agricultural job
3. Population Density	National Archives of Indonesia (ARSIP, Jakarta)	Historical population density data	1819	1819 Population density
4. Geospatial	SRTM	Village level geospatial measures	2000	Elevation, ruggedness, medium texture soil, average rainfall, rivers
	FAO-GAEZ	Village level geospatial measures	2000	Wet rice potential yield and coffee potential yield
5. Colonial Policy	Historical Dutch Maps	Universe of villages	1853, 1945	Percent of village land settled, percent of land with coffee cultivation, road density, railroad density