Decentralization Synergies and their Welfare Effects in Indonesia

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Abstract

Decentralization has dramatically altered governance in developing countries. However, the empirical evidence on its welfare effects has been limited and ambiguous. I argue that this ambiguity is due to a misidentification of different types of decentralization – namely administrative, political and fiscal – and their synergies. In order to test this claim, the paper employs a unique Indonesian panel of village level outcomes and a difference-in-differences estimation strategy with village level fixed effects. I show that use of a naïve specification that only considers political or administrative decentralization as separate treatments while neglecting their synergies leads to an omitted variable bias problem. Results from a more complete specification suggest that districts that have both types of decentralization display significantly greater welfare improvements compared to those that face only political or administrative decentralization or no decentralization at all. I also provide evidence on improvements in governance.

Keywords: Decentralization, Elections, Administrative, Political, Fiscal, Institutions

JEL Codes: D72, D73, O43

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1 Introduction

Decentralization has been an important component to many reforms of developing-country governance, yet remarkably little is known about its effects on public welfare. There are two opposing schools of thought. The first holds decentralization to be welfare increasing because it enhances accountability and facilitates the flow of information between the public and the relevant authorities. This can lead to responsive and efficient local governments and reduced social and political tensions (Bardhan, 2002; Faguet, 2014). Alternatively, decentralization may reduce welfare due to excessive rent-seeking, elite capture, overspending, scale inefficiency and degraded quality of public goods (Prud'homme, 1994). There is no consensus on which school of thought is correct. It is an unresolved empirical question. The effects should depend on the inter-linkages between local and federal government, and on the institutions that define principal-agent relations (Mookherjee, 2015).

I argue that the ambiguity in the current literature is a result of a failure to differentiate alternative types of decentralization. In most empirical studies, decentralization of a particular type is generalized as "complete decentralization". However, one type of decentralization can differ from another because of the differences in their associated characteristics such as *accountability* or *efficiency*. Treating all types of decentralization as the same confounds their specificities. Moreover, neglecting their synergies could result in an omitted variable bias problem. For instance, an economy that is decentralized with *efficiency* enhancing institutions would perform differently if it is also decentralized with institutions that improve *accountability*.

The theoretical literature generally classifies decentralization as administrative, political or fiscal (Rondinelli, 1981; Treisman, 2007). "Administrative decentralization" refers to appointing or indirectly electing local officials for implementing centrally designed policies. "Political decentralization" makes local officials accountable to their citizens through direct elections with independent decision making authority in designing and/or implementing policies. Finally, "fiscal decentralization" involves delegation of public expenditure and/or revenue related responsibilities to local officials. Identification of these different types

of decentralization and their synergies may have important implications for accurate estimation. In this paper, I address the identification problem by analyzing complementarities between administrative and political decentralization under universal fiscal decentralization across Indonesian districts.

The notion of complementarities among different types of decentralization is clarified with the following example. Consider a developing country with a centralized government and communities of different sizes and heterogeneous preferences for public goods.[1] According to the first generation federalism literature (Tiebout, 1956; Oates, 1972), administrative decentralization – i.e. appointing local officials for each heterogeneous group – will ensure efficient resource allocation in this country. But when local officials are centrally appointed, there might arise what I call a *double principal-agent (P-A)* problem due to political economy issues like corruption. In the first *double P-A* problem central government is the principal who provides contracts to local officials. In this case, if the central government desires high effort from local officials, monitoring costs can be high due to the distance between them. In the other *double P-A* problem citizens are the principal and the central government is the agent. Citizens must incentivize the central government, through voting and other means, to monitor local officials. However, it can be costly for heterogeneous citizens to coordinate and punish the ruling central government for their weak monitoring. So, both P-A problems jointly reduce the incentives for local officials to maximizing community welfare.

In such a society where administrative decentralization might fail due to corruption, a feasible mechanism to ensure high effort from local officials is through political decentralization in the form of locally held direct elections. The gains from administrative decentralization would be reaped fully only if it is complemented with the elements of political decentralization. The Indonesian case parallels this example, albeit under a universal fiscal decentralization. On the one hand, implementing only administrative decentralization in some districts increased resources at the disposal of local public officials but without any change in accountability. On the other hand, treating some of the districts with only political decentralization increased accountability but not resources. In contrast, a synergy results in increased administrative efficiency and greater accountability when both types were implemented simultaneously.

[1] This is an accurate description of the Indonesian case.

Indonesia provides an ideal setting for a comparative analysis of different types of decentralization and their synergies. After the fall of Suharto's authoritarian regime, various decentralization and democratization reforms were implemented throughout Indonesia. The identification strategy used in this paper exploits the timing of these district level administrative and political decentralization processes. In this context, administrative decentralization refers to the gradual splitting of districts, which led to an increase in indirectly elected district heads until the introduction of direct elections in 2005. Political decentralization refers to the direct elections of district heads, which occurred as the terms of the existing, indirectly elected, district heads ended. Owing to these developments, there were four different types of districts by 2008: those that had split; those that had elections; those that split and had an election; and those that had none of the above.

Most of the empirical literature on decentralization measures welfare changes only at a macroeconomic level which fails to capture heterogeneous treatment effects within decentralized units. I use village level outcomes to overcome these limitations. Using a census of Indonesian villages, called PODES, I have constructed a unique panel of about 94% of the villages observed in the baseline. This permits me to employ a more robust specification of difference-in-differences with villages fixed effects.

The specific questions addressed in this study are:

1. Does decentralization affect the provision of public goods?

2. Do these effects depend on the synergies between different types of decentralization?

3. Does a failure to account for such synergies result in an omitted variable bias problem?

This paper presents two sets of findings. The first shows that administrative decentralization (district splitting) results in greater provision of public goods, and thus larger welfare gains, than those observed from political decentralization (elections).

The second set of findings, which is a unique contribution of this paper, relates to the synergistic effects between the two types of decentralization. Specifically, all village level welfare measures show significant improvements in districts that faced both a split and an election. These effects are larger in magnitude and significance compared to those observed for villages in districts that faced only a split or an election or no decentralization at all. This result has strong implications for existing studies focusing only on one type of decentralization while ignoring their joint effects. A possible explanation for their synergistic effect is that the districts having more fiscal resources (due to splitting) and higher accountability (due to direct elections) are likely to perform better than districts treated with just one of these changes. These results hold over a longer period as well, using PODES-2011 instead of PODES-2008.

I further extend my analysis to account for the intensity of administrative decentralization. After the original districts were split, population and land area were unevenly divided between districts. Assuming an inverse relationship between the size of a constituency and the ease of governance, I assign a higher intensity of treatment to the new districts with smaller populations or land area. I find that higher intensity of treatment, i.e. a smaller population or land area, brings greater improvements to welfare.

In order to understand the channels for these positive effects, I provide suggestive evidence in terms of changes in governance quality. Specifically, I show that although two different groups of split districts faced similar increases in revenue, developmental expenditures increased only for those which faced an additional increase in accountability via direct elections.

This paper is organized as follows. The next section discusses the existing decentralization literature. The political economy of Indonesian decentralization is discussed in the third section. In the fourth section I describe the background for the empirical study by discussing the treatment, the data, the empirical model and tests of parallel trends. I present results in the fifth section, while the sixth section concludes.

2 Understanding Decentralization: A Literature Review

The process of decentralization involves the formation of a system of nested self-governments characterized by transparency, accountability, competition, participation and cooperation (Faguet, 2014). According to the World Bank decentralization is defined as "the transfer of authority and responsibility for public functions from the central government to intermediate and local governments or quasi-independent government organizations and/or the private sector." Note that, decentralization itself does not imply democracy; however, it can play an important role in deepening democracy and improving governance (Weingast, 2014).

Scholars consider decentralization to be one of the most consequential reforms in recent decades (Faguet, 2014; Rodden, 2006). Due to its multifaceted nature, the study of decentralization has been addressed in many different ways. None of these approaches are mutually exclusive; they differ in terms of how they compartmentalize different aspects of decentralization. I discuss three well-known approaches below.

One approach strives to understand the different implications of decentralization in a developed versus developing country context. In the case of developed economies, the theories relating to the first generation of fiscal federalism by Tiebout (1956) and Oates (1972) are well-suited. These theories focus on efficiencies and inefficiencies of decentralization with an assumption of a benevolent social planner and of voters' ability to reveal their preferences – by voting with their feet – for local public goods. But these assumptions do not hold in developing countries where political and fiscal incentives to cheat could threaten the stability of a federal system. The second generation theories move away from those of the first generation by focusing on issues of political economy and corruption (Bardhan, 2002; Mookherjee, 2015; Weingast, 2014). To this end, the second generation of fiscal federalism models the behavior of self-interested political agents functioning in an imperfect institutional environment. Such models allow for the possibility of elite capture, corruption and clientelism.

In a second approach to the study of decentralization, Faguet (2014) distinguishes between policy-relevant[2] and governance outcomes[3], identifying the latter as more important than the former. The significance of outcomes related to governance is reflected in the manifestos of countries who seek decentralization as a means to increase participation and involvement of citizens in local governance.

A final approach to the study of decentralization involves classifying the various types of decentralization as administrative, political or fiscal (Ribot, 2002; Treisman, 2007). These different types of decentralization characterize prevailing governance institutions. Whether a country is decentralized into one or more than one type would define the ensuing structure and quality of governance. My paper relates to this approach of understanding decentralization and its effects. Below, I discuss these three types of decentralization and related empirical research.

Administrative decentralization

Administrative decentralization refers to the transfer of administrative responsibilities to local authorities for implementing programs and policies designed at a central level. It is considered to be one of the weakest forms of decentralization because local officials are accountable to the central government only, and have minimal decision making authority. Many countries have found it convenient to first adopt administrative decentralization before further delegating decision making authority. For example, the Indonesian government had identified districts as administrative units in the 1950s, but these districts were not given fiscal powers until 2001.

Empirical studies of administrative decentralization mostly focus on the devolution of responsibilities for the provision of public services such as health, sanitation and education. These studies have shown positive welfare effects from increased efficiency of service delivery (Alderman, 1998; Coady, 2001), better informed local officials (Carneiro et al., 2015; Azfar et al., 2001) and community participation (Galasso et al., 2001; Wade, 1997). In the Indonesian case, Burgess et al. (2011) have shown that the splitting of

[2] Examples include accountability, responsiveness, use of power, political stability, and political competition.
[3] Examples of policy relevant outcomes include the provision of public goods and services and more equitable budgets across regions.

Indonesian districts led to increased deforestation.

Political decentralization

Political decentralization enhances local accountability, and when local officials are able to make expenditure decisions, it can ensure tailor-made policies for locally homogenous groups (Wallis and Oates, 1988). On the one hand, moving from a centralized state to a politically decentralized one re-orients local officials' incentives from following the central government directives to fulfilling local citizens' needs. On the other hand, local government can be susceptible to capture by powerful local elites, which often fails to increase accountability (Bardhan and Mookherjee, 2006). Political decentralization is the strongest form of decentralization because the agents – local authorities – are directly accountable to their principals – local voters. A famous case of political decentralization occurred in India, where during the 1990s elections were constitutionally formalized and made compulsory for village level governments, known as *gram panchayat*. Many empirical studies have shown positive and significant welfare effects from reforms related to village level elections (Foster and Rosenzweig, 2001; Anderson et al., 2012; Chattopadhyay and Duflo, 2004).

There are two kinds of studies related to political decentralization in Indonesia. One group focuses on intermediate outcomes, such as public expenditure, while the other group has considered public good outcomes related to health and education. Martinez-Bravo (2014) has shown that appointed village heads, inherited from the Suharto-regime, led to greater electoral fraud and clientelistic spending compared to newly elected village heads because of different incentive structures. Sjahrir et al. (2014), while analyzing the determinants of excessive administrative spending, show that the proliferation of districts did not lead to increased administrative spending, and that direct elections did not have a role in curtailing waste. Skoufias et al. (2011) and Mukherjee (2014) use district level data to study the effects of district elections on various education and health related outcomes. While the former finds no effect of elections on such outcomes, the latter finds an increase in the number of public doctors, health workers and public teachers.

In contrast to the above studies, my research shows that there is a joint effect of administrative and political decentralization, which is hidden when they are analyzed separately.

Fiscal decentralization

Fiscal decentralization is a mix of the other two, whereby public revenue/expenditure related powers are given to local authorities. Most of the decentralization literature has focused on estimating the impact of fiscal decentralization at a macroeconomic level. The relationship between fiscal decentralization and economic growth is ambiguous. For example, in the case of OECD countries, Thornton (2007) does not find any significant relationship between fiscal decentralization and economic growth. Using the same sample of OECD countries but including controls for political and administrative decentralization, Rodrguez-Pose and Ezcurra (2011) conclude that fiscal decentralization has a significantly negative effect on economic growth. Conversely, Iimi (2005) uses an instrumental variables technique to find that fiscal decentralization positively affects economic growth in a sample of 51 countries. A major limitation with these cross-country studies is that they do not account for within-country variation.

In the case of Indonesia, Pal and Roy (2015) conduct a before and after comparison to show the effects of universal district level fiscal decentralization on grassroots politics and local development. They argue that communities with homogenous socio-cultural characteristics experienced a change in leader selection methods that contributed to a positive impact on local development.

3 Political Economy of Decentralization in Indonesia

In this paper I hypothesize that the joint effect – or synergy – of different types of decentralization should have a stronger effect than the impact of just one type of decentralization by itself. In the Indonesian context, the effect is likely to be positive due to the characteristics of the country's political economy and geography. In particular, regional heterogeneity, enhanced competition, need-based revenue sharing systems, and a balance of power between central and local governments all suggest positive effects from decentralization and its synergies. I discuss these below.

According to Oates (1972), decentralization is a preferred option if differences across regions are large and spillovers are small. Such a situation applies to Indonesia. The country is geographically heterogeneous, and is the world's largest archipelagic state with more than 17000 islands. Most of the country is unevenly covered in forests. The role of such heterogeneity in the Indonesian process of decentralization has been previously described by Fitrani et al. (2005). The authors argue that the splitting of districts was conditional upon characteristics such as geographical dispersion, political and ethnic diversity, and natural resource wealth, among others. Such heterogeneity reduces the possibility of spillovers in the provision of many public goods. Also, under such circumstances it would be efficient to have local governments provide public goods so that they may be tailored to local preferences.

A key role of decentralization is to enhance competition among local governments to attract mobile resources. According to Myerson (2014), competition should motivate politicians to offer better public services at a lower corruption price. Burgess et al. (2011) have shown increased competition due to splitting, although it was in the form of increased illegal deforestation and reduced timber prices. However, splitting coupled with elections could have changed the form of competition in order to render positive welfare effects. This argument resembles Faguet (2014)'s point that "[s]ubjecting public office to elections is what changes the incentives politicians throughout a system face when that system is decentralized. Electionless decentralization does not have the same effect." Other signs of efficient/healthy competition come from Martinez-Bravo and Mukherjee (2015) who have shown that districts which had an appointed district head for a longer period displayed greater levels of corruption.

A third characteristic of Indonesian decentralization is related to the problems in achieving federal stability. According to Riker (1964) there are two forces that work to prevent federal stability: *centripetal forces*, whereby local governments survive at the mercy of a central government; and *fissiparous forces*, whereby the central government depends on local governments to remain in power. Under both forces it is difficult to maintain federal stability, but one solution to achieve stability is to have a balance of power. According to Faguet and Poschl (2015), "higher level governments are better at redistribution

and stabilization and hence should levy broader-based taxes; but lower-level governments are better at eliciting preference and time-and-place information, and hence should have significant expenditure responsibility." There seems to be a similar balance of responsibilities between the central government and local governments in Indonesia. This balance of power is discussed further below.

Indonesian law bestows fiscal expenditure making powers to districts in areas such as education and healthcare, while the central government retains responsibility for national policies, such as national defense and foreign relations. This way of separating responsibilities goes hand-in-hand with Montesquieu et al. (1900)'s idea that multi-tier institutions can have advantages of both large and small size. Similarly, the power to raise revenue is largely confined to the central government; this parallels Weingast (2014)'s idea of the *limit condition* on the local elected representatives, in terms of powers given to them, for the success of a decentralized democracy. Lastly, the post-Suharto regime moved the country to a multi-party system at the national and local levels, creating incentives for parties to move in both upward (central) and downward (local) directions.

Finally, Indonesian decentralization does not seem to be affected by the problem of *tragic brilliance*, which is defined by Weingast (2014) as the central government's efforts to influence election outcomes at local levels through centralized policies and taxation authority. In essence, *tragic brilliance* forces citizens to vote for local candidates supported by the party in control of the central government. In Indonesia, however, the election of district heads did not depend on the central government's discretionary fiscal authority. And while local governments did not have revenue raising powers, revenue sharing by the central government was need based and depended on factors such as the human development index, district area, and population (Eckardt and Shah, 2006).

4 Decentralization in Indonesia: Background, Data, Empirical Strategy and Identification

4.1 Background

The legacy of the existing structure of government in Indonesia dates back to the Dutch colonial rule in the early 20th century. Districts and municipalities were formed in order to carry out administrative tasks. After colonial rule, the country oscillated between varying degrees of centralization until settling on the "guided democracy" of Sukarno, the first president of Indonesia. Sukarno ruled as an authoritarian until 1967; afterwards, the authoritarian rule continued in a different garb, popularly known as the "new order" regime, under President Suharto for another thirty one years, until 1998.

After the fall of Suharto's authoritarian regime in May 1998, Indonesia adopted various "big bang" decentralization reforms. These reforms affected all five tiers of the Indonesian government structure (Figure 1). The power to govern was largely shared between central and district governments.[4] The transfer of power to district governments during 2000-2009 involved major reforms which can be categorized as fiscal, administrative and political decentralization, with the latter two comprising the treatments considered in this paper. I discuss these reforms below.

Fiscal decentralization (autonomous expenditure making power for districts)

With the benchmark laws of 1999 and 2004 (Law 22/1999 & 32/2004) district governments were given full autonomy to "govern and administer the interests of the local people" across about fifteen areas while the central government retained responsibility over five national level functions (foreign relations, national defense, legislations, macroeconomic policies and religious affairs). District governments were responsible for forming policies and making expenditure decisions in areas such as health, education, local infrastructure, public order and peace. Although district governments did not have the authority to collect major taxes, they were entitled to shares of central government revenue in the form of general

[4] Note that I refer districts for both *Kabupaten* and *Kota*. The former is more rural while the latter is more urban.

allocation grants (DAU), taxes, special allocation grants (DAK) and natural resource revenue. This resulted in a doubling of per capita revenue for districts between 2000 and 2010. While district level policy decisions were made by a local assemblies and district head, the district heads generally had more power over decision making.

Fiscal decentralization was universal, and so it is not considered as a separate treatment in this paper since there is no variation across districts. Yet there are a few important takeaways from this reform. Revenue shares for districts increased due to these reforms, and district heads gained the power to influence spending. But until 2003 their appointment was contingent upon local assemblies, which were comprised of multiple parties. This arrangement may have led to collusion between the assemblies and district heads.

Administrative decentralization (the splitting of districts)

Administrative decentralization refers to the proliferation of districts and indirectly elected district heads. The number of districts increased from less than 300 in the year 2000 to about 500 in 2007 (Figure 2).[5] The formation of a new district also led to the formation of a new capital, a new assembly, and additional administrative staff. Some of the reasons for splitting as proposed by Fitrani et al. (2005) included geographic dispersion, political and ethnic diversity, natural resources and scope for bureaucratic rent seeking. However, there were no specific rules for splitting, and administrative delays often made it difficult for many districts to directly influence the process and the timing of a split.

In this paper, I define the proliferation of district heads as "administrative decentralization", which is slightly different from the commonly used definition. Administrative decentralization is defined as the increase in centrally appointed local officials subordinated to a central government. However, between 1999 and 2003 district heads in Indonesia were appointed by locally elected assemblies (not the central government), which were comprised of multiple parties. Nevertheless, the notion used here is similar

[5] Some of the districts were split during 1999-2000 as a pilot, however, they were not given autonomous power until 2001. Hence I consider them as having split in 2001. Also, it took at least one year before the newly created districts could operate by themselves; hence, I consider the districts that split in 2007 as part of control group.

as the district heads were not downwardly accountable to their citizens. Moreover, the district head's appointment depended on a group of elected representatives. Thus the only difference between this case and the canonical definition is that Indonesian district heads were appointed by the local, not central government, authorities.

The splitting of districts took place in sub-periods: 2001 to 2003 and 2007 to 2009. There was a moratorium on splitting from 2004 to 2006, which coincided with direct elections for district heads. One of the identification strategies used in this paper, drawn from Burgess et al. (2011) and Bazzi and Gudgeon (2015), will exploit this moratorium on splitting.

Political decentralization (direct election of district heads)

The first ever democratic parliamentary elections were held in 1999, in order to elect central and district assemblies (Figure 3).[6] These elections happen every five years in which multiple parties are allowed to compete. Between 1999 and 2004 legislatures of elected district assemblies appointed district heads when the terms of the existing, centrally appointed, district heads ended.[7] Since these heads were appointed by local legislatures, they did not generally have enough power to make independent decisions. Furthermore, there were possibilities of collusion between the two bodies for advancing their mutual self-interests. To address these issues, a new law was introduced in 2004, stipulating that from 2005 onwards district heads were to be chosen through direct elections once the terms of the existing, indirectly elected, district heads ended. The timing of these elections was random since the term of an existing district head was historically path dependent. These elections had two implications for governance at the district level. First, district heads became accountable to their citizens, and their term no longer depended on legislatures. Second, they were vested with substantial fiscal powers through fiscal decentralization.

[6] Although provinces (equivalent to a state in many countries) are another hierarchical level between central government and districts, they mainly have a coordinative role between districts and the central government. Autonomy to govern, as in decision making powers over various public policy issues, rests with district heads. See Figure 1.

[7] Usually, a district head's term is five years. Before the 1999 elections, district heads were appointed by the Ministry of Home Affairs.

To summarize, between 2000 and 2008 there were four sets of districts based on governance structure: those that split; those that had elections; those that split and had an election; and those that had none of the above. Moreover, both the splitting and the elections occurred over time.

4.2 Data

Data on splitting and elections

Data on the timing and location of district splitting comes from the Central Bureau of Statistics (BPS) in Indonesia. I treat new districts as well as their original counterparts as split districts. I obtained information on election dates from Burgess et al. (2011).[8] This dataset contains information on the end of terms for the last indirectly elected district head, as well as the timing of the first direct elections.

Village level data

I obtain village level outcomes from the 2000, 2008 and 2011 waves of the Indonesian Village Potential Statistics (PODES). This village census survey contains socio-economic information from more than 68,000 villages, and includes data on schools, health centers, electricity, roads, markets and industries. The survey is conducted once every three years. A limitation of this data is that it is not a panel. I therefore use the names of villages, sub-districts, districts and codes of districts and provinces to create a unique panel, containing 92% of the villages in the baseline. Table A1 describes the sample that was created for the analysis. Out of 68,783 villages in the baseline, I was unable to match 5,365 villages between 2000 and 2008. A comparison of the included and lost villages is presented in Table A2. Both the samples have similar means across all the parameters, except for villages in plain regions and proportion of agricultural households.[9]

The outcomes that I focus on at the village level broadly fall under the category of public goods and services for which district governments were directly responsible. These outcomes include education,

[8] I am grateful to Benjamin Olken at MIT for generously sharing this data.
[9] I don't include Jakarta in the analysis because districts in Jakarta are not autonomous. I also don't include Maluku and Irian Jaya provinces in the analysis due to frequent conflicts and political instability.

health, infrastructure and public order. The educational outcomes include the number of public junior high schools and the distance to a private or public junior high school.[10] Indicators for health related resources include the availability and distance measures for community health centers (*puskesmas*) which are exclusively financed by district governments. The availability of doctors is also used to proxy for health related resources.[11] Infrastructure is measured by the availability of wide roads, street lights, and the share of households with electricity. For public order, I use the availability and distance to police stations.

4.3 Summary statistics

Table 1 presents summary statistics for the three treatment groups – villages in a district that faced a split, faced an election, or had both a split and an election. This table also includes summary statistics for the control group of villages. The majority of the villages are rural across all groups, although the rural share is slightly higher for the districts that were treated with both a split and an election. Consequently, we see a slightly higher proportion of agricultural households in villages that belonged to districts treated with both a split and an election. However, the proportion of agricultural land is similar across all groups. The geography and topography of the villages are similar as well, with most of the villages located in inland plain regions. The proportion of male and female voters is the same. The number of industrial units, mosques and primary schools are reported per 1000 individuals. All of these variables show similar average values across the treatment and control groups.

[10] I focus only on junior high school because primary education was almost universal in Indonesia before decentralization, and senior secondary education was usually funded by provinces.

[11] There is no information on whether doctors are public or private, but a major portion of local government expenditure was directed towards hiring personnel which included teachers and doctors (Mukherjee, 2014).

4.4 Empirical strategy

Binary treatment

In order to estimate the effects of different types of decentralization and their synergies I use the following difference-in-differences estimation strategy with village level fixed effects:

$$Y_{idt} = \alpha_i + \beta_1 Post_t + \beta_2(Election * Post)_{dt} + \beta_3(Split * Post)_{dt} + \beta_4(Split * Election * Post)_{dt} + \epsilon_{idt} \quad (1)$$

Y_{idt} represents outcomes for village i in district d at time t. The variables *Post*, *Election* and *Split* are dummies for year, election and split respectively for each district d. β_1 is a dummy for the follow-up period, and β_2, β_3 and β_4 capture the effect of having only an election, only a split and both respectively. Village fixed effects absorb the village specific time invariant unobservables, including the treatment group effects. The inclusion of village fixed effects makes this specification stronger than the usual difference-in-differences estimation strategy by relaxing the assumption of uncorrelated fixed characteristics and unobservables. Examples of time invariant unobservables that are not necessarily common across all individual units within a treated group could include characteristics related to geographical or political boundaries. For instance, a proportion of villages within a district could be located in resource rich regions which could be correlated with the treatments as well as the outcomes.

Due to the nature of the topic under study, there are considerable restrictions on the number of controls that can be used. Because time invariant controls are captured by the village fixed effects, whereas time varying characteristics would be endogenous to decentralization. For example, urbanization of a rural village could depend on its distance to the newly created district headquarter which is a result of splitting of districts.

I assume that the error terms are uncorrelated with the treatment, and I provide evidence for this through various identification tests in the next sub-section (see subsection 4.5). These tests are mainly used to identify the causal effects of a split and its interaction terms, since elections can be considered

random due to the path dependence of their timing.

Intensity of treatment: duration, size and distance

Both splitting and elections were spread over time, meaning different districts faced decentralization at a different point in time. To exploit variation in the length of time since a district was decentralized, the following specification was used.

$$Y_{idt} = \alpha_i + \beta_1 Post_t + \beta_2(Election\_months * Post)_{dt} + \beta_3(Split\_months * Post)_{dt} + \beta_4((Split * Election)\_months * Post)_{dt} + \epsilon_{idt} \quad (2)$$

This specification is similar to specification 1. The difference is that now the treatments are in terms of number of months since decentralization. Moreover, for the follow-up period PODES-2011 has been used instead of PODES-2008 because the differential welfare effects from the timing of decentralization should be greater in the medium term rather than the short term.

There were other heterogeneities in the intensity of treatment due to the splitting of districts. Two of the three heterogeneities are at district level while the third is at village level. The first two heterogeneities are differences in district population size and district land area in the post-splitting period. The third heterogeneity, the distance to a district headquarter, was a direct result of the formation of a new district. For such heterogeneities in treatment due to the nature of splitting, I estimate the following specification.

$$Y_{idt} = \alpha_i + \beta_1 Post_t + \beta_2(Election * Post)_{dt} + \beta_3(Intensity * Post)_{dt} + \beta_4(Intensity * Election * Post)_{dt} + \epsilon_{idt} \quad (3)$$

The only difference between specifications 1 and 3 is that the former had dummies for treatment, whereas in the latter specification *Split* has been replaced with *Intensity*. These heterogeneous intensity of treatments are captured using the following formulae.

1. Heterogeneity in population (post-split)

$$Change\ in\ population\ share = 1 - \frac{Population\ post\text{-}split}{Population\ pre\text{-}split}$$

2. Heterogeneity in land size (post-split)

$$Change\ in\ land\ size\ = 1 - \frac{Land\ size\ post\text{-}split}{Land\ size\ pre\text{-}split}$$

3. Heterogeneity in distance to district HQ (post-split)

$$\%\ change\ in\ dist.\ = ln(Dist.\ to\ district\ HQ\ pre\text{-}split) - ln(Dist.\ to\ district\ HQ\ post\text{-}split)$$

In the first two cases, consider a district with an original population size (or area) of 100. After splitting, for instance, district A gets 70 percent of the population and district B gets 30 percent. Since a smaller population would imply better administrative efficiency, I assign a treatment of 0.30 to district A and a treatment of 0.70 to district B. The same applies to land area. Hence, a lower share of the original population, or of the original area, in the post period is considered to be a greater intensity of treatment. Both population and land area intensities are created using baseline data. Lastly, the change in distance to a district headquarter is calculated using the logarithmic difference in a village's distance to the HQ before and after the split.

4.5 Identification

District splitting was not random. In this section, I discuss various tests to confirm that this poses minimal threats to the identification strategy. First, Figure 5 shows that the three treatment groups and the control group were following similar trends across various public goods in the pre-treatment period. All of these outcomes are roughly parallel implying an absence of any differential trend in the pre-treatment period, and confirming that the treatments are uncorrelated with the random error. Table 2 provides a test for this claim by estimating equation 1 for all the outcomes. It shows regression results for district level outcomes assuming that the treatment happened between 1996 and 2000. In this regression I assigned fake treatments in the pre-treatment period to the three treatment groups that faced only a

split or only an election or faced both a split and an election. All the coefficients are insignificant, which is essentially a test of significance for the parallel trends plotted in Figure 5.[12]

In an alternative identification test I assign a fake split to the districts that did not divide during the period under analysis, but did divide after 2007. However, the election treatment was accurately assigned. Unlike in the previous case, the outcomes are at a village level and the years 2000 and 2008 correspond to the baseline and the end-line respectively. The results of this identification test are presented in Table 3. The coefficients on the variable of interest, i.e. the interaction between "fake split" and elections, are not as robustly significant as they are for the main results below. There is a significant positive change at the 5% level of significance for the dummy on health centers and for the proportion of households with electricity, and at the 10% level of significance for the police station dummy. These effects could be due to the treatment of elections or could be out of pure chance but not due to a fake split treatment. Such irregularities in significant effects suggest that the actual treatments were uncorrelated with unobservables.

I also conduct a falsification test using those public goods as outcomes for which district governments were not responsible, such as hospitals and primary schools. Since decentralization was not intended to affect these outcomes, this test should not find any relationship between them. According to Table 4 almost all the coefficients are insignificant, particularly the ones associated with the treatment of both elections and a split. This further strengthens the claim that the main results of this paper are indeed causal and unaffected by some unidentified relationship.

5 Results

Binary Treatment

The main results are presented in Table 5 through 7 for various village level outcomes in the years 2000 and 2008. In these tables each outcome is estimated using three separate models. The first two

[12] For parallel trends analysis in Figure 5 and Table 2, I use INDO-DAPOER data from the World Bank for the years 1996 and 2000.

columns are based on naïve specifications that consider a split or an election as separate treatments. The third column uses the robust specification 1 that has only a split, only an election and their interaction as treatments. A comparison between the first two columns and the third column indicates whether the synergy between two separate decentralization types has a stronger effect compared to just one type.

Table 5 shows that the availability of community health centers, doctors, and the number of junior high schools per 1000 people all increased as a result of decentralization. Specifically, in the districts that were treated with an election as well as a split, the proportion of villages having a health center or a doctor rose by about 3-4 percentage points which is roughly a 25 percent increase in the baseline proportion of villages. The number schools per 1000 people increased by 50 percent compared to the mean.

Table 6 presents results for infrastructure related public goods. In terms of these outcomes as well the villages in the districts that experienced both a split and direct elections observed better provision of public goods compared to other villages. The villages in jointly treated districts witnessed the largest increase in the share of households with electricity. On average, they had about 7 percent more households with electricity which is 12 percent of the mean. Also, the proportion of jointly treated villages with wider roads increased by about 4 percentage points but with a marginal increase over the mean of 89 percent. The high initial level is likely due to the special focus on road improvements during the Suharto regime in the early 1990s (Gertler et al., 2016). The availability of street lights is not as precisely estimated as the other outcome variables. Note that the effect of decentralization is also not as big for this outcome. However, the proportion of villages with police stations increased by about 37% over the mean.

The availability of public goods does not offer much insight into the situation of those villages that did not experience an increase in these items. For this reason, Table 7 reports the impact of decentralization on distance to health centers, schools and police stations. These were the only variables for which distance measures were available in the data. The results for these measures are consistent with those for the availability measures presented in Table 5 and 6. The average distance to health centers was reduced for the villages in the districts with both a split and an election by about 2.2 kilometers, or a reduction of

about 25% over the mean distance. Distance to junior high schools was reduced by 35%, while distance to police stations was reduced by 16%. Thus, a treatment of administrative and political decentralization not only increased the availability of public goods, but their accessibility as well.

It would be interesting at this point to briefly highlight some results from the existing literature. The only comparable studies are by Skoufias et al. (2011) and Mukherjee (2014). Both use district level data to study the effects of elections on education and health related indicators. The former finds no effect while the latter finds an increase in the number of public doctors and health workers (at 1% significance), and the number of public school teachers (at 10% significance).

Medium term impacts

The results so far relate to outcomes in the period immediately following decentralization. A possible concern could be that these results are due to some dynamics driven by the process of decentralization itself, which might fade after a short period of time. In order to address such concerns, I have done a medium term analysis using PODES 2011 as the follow-up period rather than PODES 2008. In the medium term analysis, I did not modify the treatment and control groups despite the fact that between 2008 and 2011 some additional districts were treated. This is due to missing information on treatment after 2008. In any case, this permits comparing the results with the same set of districts that were treated in the short term, and it should lead to a downward bias since some villages in the control group might have been treated between 2008 and 2011. Table 8 presents the results estimated with specification 1. It is clear that the effects are largest for the districts that faced both a split and an election. Most of the estimates are similar to those from the shorter period of time.

The findings from short and medium terms have two important implications. One is that a greater degree of decentralization has stronger welfare effects. It is likely that the efficiency gains and increased per capita fiscal resources from administrative decentralization act in concert with the increases in accountability from political decentralization to result in higher levels of public welfare. The second implication is that studies that neglect the joint effects of decentralization may be affected by omitted variable bias.

Intensity of treatment

Table 9 shows the results of heterogeneity in the timing of treatment using specification 2, while the effects of heterogeneity in population size, land area and distance to district HQ due to splitting are presented in Table 10 through 12. The main argument of this paper, i.e. that synergies have stronger effects, continues to hold since the villages belonging to the districts that were treated with both an election and a split display significantly greater welfare improvements compared to the villages in the districts with just one type of decentralization, or no decentralization at all.

In terms of timing, on average there is a significantly positive advantage of having both an election and a split for one additional month (Table 9). For example, having both treatments for one more month is associated with an increase in the availability of junior high schools by 0.15 for a population of 100,000. Similarly, across all outcomes there is a positive effect from having the synergy of an election and a split for an additional month, although for police stations the effect is significant only at the 10.5% level.

Table 10 and 11 show the welfare effects from changes in population size and land area. In both the tables the effect of the synergy is almost always higher than the separate effect of a split or an election. In Table 10, a village in a district receiving a lower population share has a higher chance of getting a public good. For instance, a 20% lower population translates into a 20% higher treatment which leads to one percent additional villages getting a health center. The same holds for the effect of a reduction in land area as per Table 11. Table 12 shows the intensity of treatment due to changes in a village's distance to a newly created district headquarters. Although the estimated coefficients are not all statistically significant, the signs are as expected; reducing the distance to the district headquarters leads to an increase in the availability of public goods.

Robustness check

The identification strategy used in this paper is simple and intuitive. However, as discussed in subsection 4.5 above, district splitting was not random. In that section, I presented various identification tests

which strongly suggest that the results in this paper are not affected by non-randomness in splitting. As a final robustness check I also use the identification strategy of Burgess et al. (2011) and Bazzi and Gudgeon (2015). This test exploits randomness in splitting over time. According to Figure 3, the splitting of districts was spread over two sub-periods with a moratorium on splitting during 2004-06. The districts that were about to be split in 2004 were delayed until 2007. I re-estimate specification 1 where the control group includes only the districts that were split in the post-moratorium period. Thus, the comparison now is only within the groups that split, while the other treatment, the election of district heads, stays random since it was historically path-dependent. The results are shown in Table 13. All of the key findings remain qualitatively unchanged.

On the quality of governance

It is difficult to obtain data on governance quality. I present some suggestive evidence on this aspect of the Indonesian decentralization in Table 14 and 15. The results in Table 14 are produced using specification 1. The district level yearly expenditure and revenue data come from the World Banks' INDO-DAPOER dataset, which is available from 2001 onwards. The outcome variables are defined as follows. For each district, I calculated the average yearly per capita expenditure and per capita revenue before and after their treatment period. So, if a district was treated in 2006, the pre-treatment data is the average per capita expenditure from 2001 through 2005, and the post-treatment data is the same average from 2006 through 2008.[13] The newly formed districts were assigned the per capita values of their original district in their pre-split years.

The first four columns in Table 14 report expenditures in education, health, agriculture and administration as a proportion of revenue, and the last column reports the percentage change in revenue. Splitting caused an increase in district revenue by about 33-34% compared to the districts that were not split. For the districts that faced only elections there were no significant changes in their expenditure or revenue. But the districts that faced only a split and no election saw a significant increase in administrative

[13] Since there was no pre and post period for the control group, I chose 2005 as the cut-off year to divide their pre and post-period which falls in the middle of 2001-2008 period.

expenditure only, and no significant change in areas such as education, health and agriculture. In fact, these districts saw a fall in educational expenditure. Comparing this with our group of interest, i.e. the districts that faced both elections and a split, development-related expenditure increased significantly in health and agriculture by about 1% of total revenue which is a one-third and one-fourth increase over the baseline averages respectively. There was no significant change in educational expenditure, but more interestingly, administrative expenditure also did not change despite an increase in revenue. So although the two different groups of split districts faced similar increases in revenue, development expenditure increased only in those districts that faced an increase in accountability via direct elections.

Table 15 presents an alternative analysis to understand changes in the quality of governance. The results in this table are based solely on PODES-2008 because similar data was not available in PODES-2000. Thus, these results are from a simple cross-sectional comparison across districts in the post-period. PODES-2008 contains two relevant village-level questions to assess the differences in the quality of district governance. The first question asks whether a village received any assistance from the district government to carry out village level development, and the second asks the amount of the assistance that was received. Using this information, I ran a cross-sectional analysis to compare districts across different treatment groups. As evident from the first column, there was no significant difference in the proportion of villages receiving any assistance from district government; about 91% of the villages were receiving some assistance. In terms of per capita revenue, however, the villages belonging to the districts that faced only a split received about 60% more revenue compared to the control group. But the villages belonging to the districts that faced both a split and an election received about 80% more revenue. So, the change in the amount of village assistance increased more in the districts treated with both types of decentralization further confirming better governance in such districts.

6 Conclusion

The empirical evidence on the welfare effects of decentralization has been limited and ambiguous. In this paper I have argued that the ambiguity in the existing literature regarding the effects of decentralization

is due to an inadequate characterization of the types of decentralization and their synergies. To test this claim, I have utilized the case of multiple Indonesian reforms in the post-Suharto era because it is ideal for comparing the separate and the synergistic effects of different types of decentralization.

The empirical investigation shows that administrative and political decentralization jointly have stronger positive effects compared to just one kind of decentralization or no decentralization at all. The Indonesian districts that were treated with both types of decentralization observed the biggest gains of about 25 to 50 percent of the mean across various public goods. Moreover, within the treated districts, the ones that had higher intensity of treatment – in terms of duration, size and distance – exhibited stronger positive effects. I also compared the changes in district revenue and expenditure to explore governance quality as a possible channel through which decentralization affected public goods. The results show that despite a similar increase in revenue for the districts that were split, developmental expenditures increased by 25 to 30 percent in health and agriculture only for those that also had elections.

So, the studies that fail to account for interactions between different types of decentralization miss empirically important dimensions of their impacts and their relative importance. A specific dimension, explored in this paper, was the complementary effects of factors such as higher fiscal resources and improved targeting (due to splitting) as well as increased accountability (due to elections). With higher resources and improved targeting the provision of public goods become feasible and efficient while enhanced accountability work as an effective enforcement mechanism.

This paper primarily focuses on the change in the provision of public goods, but offers little insight about the beneficiaries of increased public goods. Future work using the Indonesian Family Life Survey will involve a household level analysis to study the effects of the synergies on the change in the consumption of public goods such as government schools and community health centers by heterogeneous groups of households. Such analysis will be helpful in further exploring the possibilities of elite capture, and whether synergies mitigate it.

Decentralization synergies appear in other developing countries as well providing fertile ground for further empirical investigation. In the case of India, public goods improved in administratively decentralized villages only when they gained elected bodies in the 1990s (Foster and Rosenzweig, 2001; Chattopadhyay and Duflo, 2004). However, in neighboring Pakistan, repeated decentralization efforts have failed because local governments were created by military regimes to help them sustain power, albeit in the absence of democratically elected local governments (Cheema et al., 2015). In Bolivia, one of the most successful decentralization cases, public investment patterns improved significantly due to multiple decentralization reforms such as an increase in the number of municipalities, devolution of fiscal powers and increased accountability through direct local elections (Faguet, 2004).

Such examples of the existence of synergies, along with the empirical test in this paper, have strong implications for policymaking. In recent decades, numerous centrally sponsored programs in areas such as health and education have been decentralized at the local level in various countries. A lot of these reforms lack one or the other component of local governance, such as spending responsibilities, decision-making autonomy or accountability. While designing decentralization policies, policymakers must take a comprehensive approach of devolving powers and ensuring accountability following all the three types of decentralization – administrative, fiscal and political. If they fail to do so, partial decentralization may lead to incomplete realization of the benefits of their efforts due to the inefficient provision of public goods.

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Figures and Tables

Background

Figure 1: The administrative structure of the Indonesian government, 2007

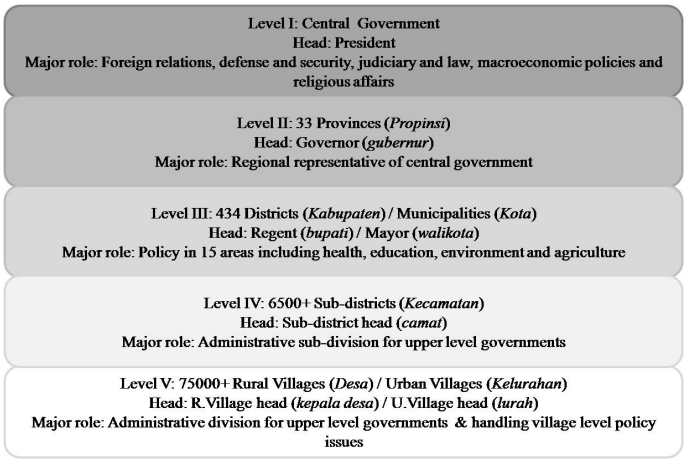


Figure 2: Evolution of number of districts/municipalities during 2001-07

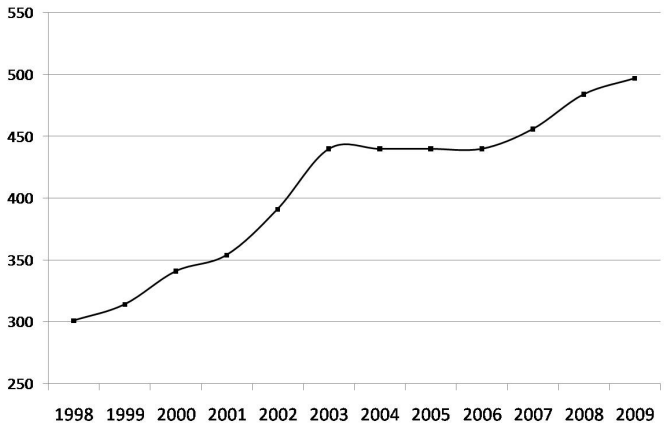


Figure 3: Timeline of decentralization process in Indonesia

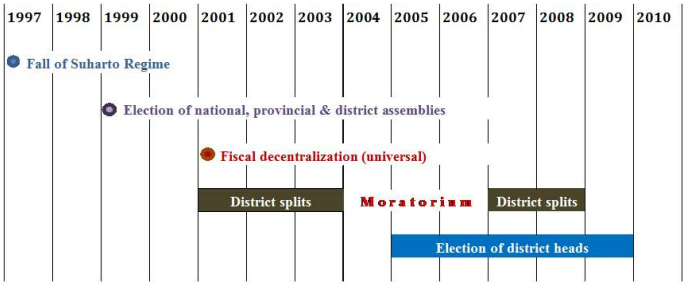


Figure 4: Districts that were treated with elections, splitting or both (as of 2007)

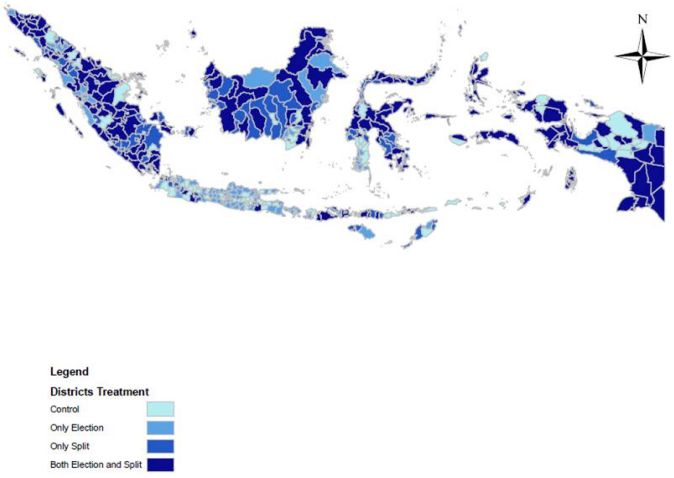
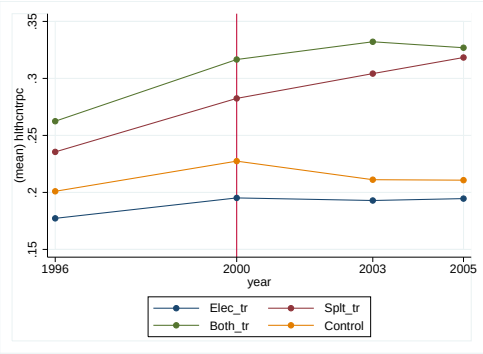
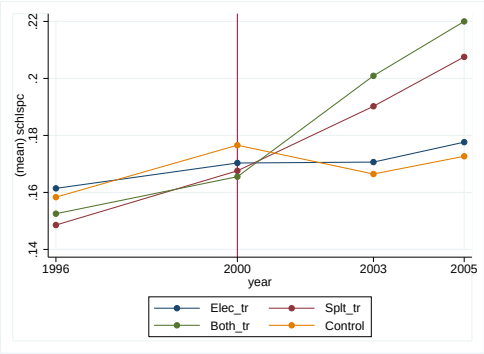


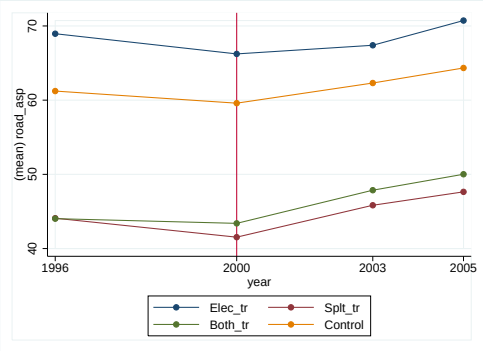
Figure 5: Parallel trends



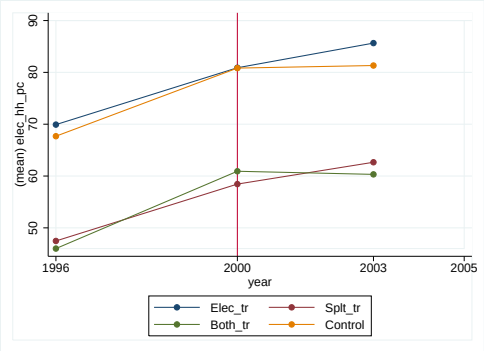
Healthcenters per 1000 individuals



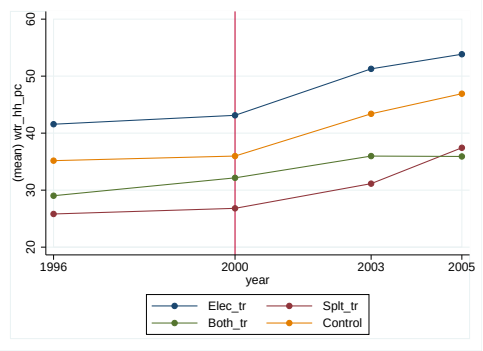
Number of schools per 1000 individuals



Mean of proportion of villages with asphalt roads in a district



Mean of proportion of households with electricity in a district



Mean of proportion of households with safe water in a district

District level INDO-DAPOER data by World Bank for the years 1996 and 2000 is used for these figures.

Table 1: Summary statistics for baseline (2000)

	(1) Control	(2) Split	(3) Election	(4) Both
Rural villages	0.71	0.69	0.75	0.86
	(0.45)	(0.46)	(0.43)	(0.35)
Villages in plain regions	0.76	0.76	0.75	0.73
	(0.42)	(0.43)	(0.43)	(0.45)
Villages next to water body	0.13	0.15	0.18	0.21
	(0.34)	(0.35)	(0.39)	(0.41)
Proportion of 1999 female voters	0.49	0.49	0.49	0.50
	(0.10)	(0.11)	(0.05)	(0.05)
Proportion of agri. HH	0.58	0.56	0.66	0.74
	(0.36)	(0.35)	(0.34)	(0.30)
Proportion of agri. land	0.58	0.58	0.58	0.59
	(0.31)	(0.31)	(0.32)	(0.30)
No. of food/leather industries	1.44	2.14	1.29	1.47
	(5.82)	(8.03)	(6.82)	(8.88)
No. of mosques	3.03	2.87	2.22	2.44
	(3.04)	(2.54)	(2.44)	(2.30)
No. of primary schools	0.98	0.95	1.15	1.17
	(0.65)	(0.55)	(0.84)	(0.90)
Observations	18740	17669	8961	14093

Means reported. Standard deviations are in parenthesis.

Number of industries, mosques and primary schools are for every 1000 individuals.

Weights are village population share within a district.

Table 2: Test for parallel trends in pre-treatment period

	Health-centers	Jr. secondary schools	Roads	Electricity	Water
Split*Post	0.03*	0.00	0.10	0.16	1.55
	(0.02)	(0.01)	(2.09)	(2.90)	(2.01)
Election*Post	-0.00	-0.01*	-0.64	-1.34	0.63
	(0.01)	(0.01)	(0.95)	(1.61)	(2.87)
Election*Split*Post	0.03	0.01	3.37	4.83	5.10
	(0.02)	(0.01)	(2.69)	(5.20)	(3.82)
N	526	526	526	526	526
R^2	0.23	0.11	0.05	0.57	0.07

*0.10 **0.05 ***0.01. District level INDO-DAPOER data by World Bank for the years 1996 and 2000 is used for this regression. Clustered standard errors at province level are in parentheses. Health-centers and Jr. secondary schools: number per '000 population, Roads: proportion of villages with asphalt roads, Electricity and Water: proportion of total households. Weights are district population share within a province.

Table 3: Test for parallel trends in post-treatment period

	(1) Health-centers	(2) Doctors	(3) Schools	(4) Roads	(5) Street lights	(6) Electricity	(7) Police stations
Split*Post	-0.02**	-0.02	0.00	-0.04***	0.07***	0.08***	0.05***
	(0.01)	(0.02)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)
Election*Post	0.01	0.02*	-0.01**	-0.01***	0.00	0.01**	0.01
	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)
Election*Split*Post	0.04**	0.02	0.01	-0.01	-0.05*	0.03**	0.05*
	(0.02)	(0.03)	(0.01)	(0.01)	(0.03)	(0.02)	(0.03)
N	72,821	72,821	72,820	72,583	72,821	72,820	72,821
R^2	0.00	0.04	0.01	0.00	0.17	0.29	0.03

*0.10 **0.05 ***0.01. PODES-2000 and PODES-2008 are used for this regression. Clustered standard errors at baseline district level are in parentheses. Here the split treatments are given to all those districts that have not yet split, but will split in future. Health-centers: dummy for disitrict community center (*Puskesmas*), Doctors: dummy for doctors available in a village, Schools: number of junior high school per '000 people, Street lights: dummy for street lights available in a village, Electricity: proportion of households getting electricity, Police stations: dummy for police station available in a village. Weights are village population share within a district.

Table 4: Falsification test

	(1) Hospitals	(2) Primary schools	(3) Universities	(4) Places of worship
Split*Post	-0.02*	-0.00	-0.01	0.13***
	(0.01)	(0.00)	(0.01)	(0.03)
Election*Post	0.01*	-0.00	-0.00	0.10***
	(0.01)	(0.00)	(0.00)	(0.03)
Election*Split*Post	-0.02	-0.00	-0.00	0.01
	(0.01)	(0.00)	(0.01)	(0.03)
N	118,913	118,913	118,914	118,913
R^2	0.09	0.00	0.01	0.00

*0.10 **0.05 ***0.01. PODES-2000 and PODES-2008 with specification (1) are used for this regression. This table reports results from all those public goods for which district governments were not responsible. Clustered standard errors at baseline district level are in parentheses. Hospitals: dummy for hospital in a village, Primary schools: number of primary high school per '000 people, Universities: number of universities per '000 people, Places of worship: number of worshipping places, such as mosques or churches, per '000 people. Weights are village population share within a district.

Table 5: Decentralization synergies and public goods: Health and education

	Health-centers			Doctors			Jr. high schools		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Split*Post	0.03***		0.01	0.03***		0.01	0.03***		0.02***
	(0.01)		(0.01)	(0.01)		(0.01)	(0.00)		(0.00)
Election*Post		0.02***	0.01		0.03***	0.02*		0.02***	-0.01**
		(0.01)	(0.01)		(0.01)	(0.01)		(0.00)	(0.00)
Election*Split*Post			0.03***			0.04***			0.04***
			(0.01)			(0.01)			(0.00)
N	83,575	100,994	118,914	83,575	100,994	118,914	83,574	100,993	118,913
R^2	0.01	0.01	0.01	0.05	0.05	0.05	0.02	0.02	0.02
Y-Mean	0.11	0.11	0.11	0.15	0.15	0.15	0.08	0.08	0.08

*0.10 **0.05 ***0.01. PODES-2000 and PODES-2008 with specification (1) are used for this regression. Clustered standard errors at baseline district level are in parentheses. In order to keep the control group same as full-specification, districts that faced only election (split) are not included in control group of split (election) specification. Health-centers: dummy for disitrict community center (*Puskesmas*), Doctors: dummy for doctors available in a village, Schools: number of junior high school per '000 people. Weights are village population share within a district.

Table 6: Decentralization synergies and public goods: Infrastructure

	Wide roads			Street lights			Police stations			Electricity		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Split*Post	0.04***		0.05***	0.02**		0.01	0.01		-0.02	0.05***		0.01*
	(0.00)		(0.01)	(0.01)		(0.01)	(0.01)		(0.01)	(0.00)		(0.01)
Election*Post		0.02***	-0.01**		0.01	-0.00		0.02**	0.01		0.04***	0.01
		(0.00)	(0.00)		(0.01)	(0.01)		(0.01)	(0.01)		(0.00)	(0.00)
Election*Split*Post			0.04***			0.02**			0.03***			0.07***
			(0.01)			(0.01)			(0.01)			(0.01)
N	82,814	100,427	118,021	83,575	100,994	118,914	83,575	100,994	118,914	83,574	100,993	118,913
R^2	0.03	0.01	0.02	0.16	0.16	0.16	0.03	0.04	0.04	0.31	0.31	0.31
Y-Mean	0.89	0.89	0.89	0.43	0.43	0.43	0.08	0.08	0.08	0.57	0.57	0.57

*0.10 **0.05 ***0.01. PODES-2000 and PODES-2008 with specification (1) are used for this regression. Clustered standard errors at baseline district level are in parentheses. In order to keep the control group same as full-specification, districts that faced only election (split) are not included in control group of split (election) specification. Wide roads: dummy for wide roads in a village, Street lights: dummy for street lights available in a village, Police stations: dummy for police station available in a village, Electricity: proportion of households getting electricity. Weights are village population share within a district.

Table 7: Decentralization synergies and distance to health-centers, schools and police stations (in kms)

	Health-centers			Schools			Police stations		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Split*Post	-2.05***		-1.68***	-1.53***		-1.26***	-1.36***		-0.68*
	(0.20)		(0.32)	(0.15)		(0.19)	(0.29)		(0.39)
Election*Post		-0.98***	0.40***		-0.67***	0.43***		-0.93***	-0.07
		(0.16)	(0.15)		(0.13)	(0.12)		(0.25)	(0.24)
Election*Split*Post			-2.25***			-1.68***			-1.75***
			(0.23)			(0.17)			(0.37)
N	83,575	100,994	118,914	83,575	100,994	118,914	78,381	94,731	111,593
R^2	0.03	0.02	0.03	0.05	0.04	0.05	0.06	0.06	0.06
Y-Mean	8.11	8.11	8.11	4.75	4.75	4.75	10.76	10.76	10.76

*0.10 **0.05 ***0.01. PODES-2000 and PODES-2008 with specification (1) are used for this regression. Clustered standard errors at baseline district level are in parentheses. In order to keep the control group same as full-specification, districts that faced only election (split) are not included in control group of split (election) specification. Distance measures are in terms of kilometers from the village head office for the variables for which data was available. Weights are village population share within a district.

Table 8: Decentralization synergies and public goods in a medium term (PODES-2011 as post period)

	(1) Health-centers	(2) Doctors	(3) Schools	(4) Roads	(5) Street lights	(6) Electricity	(7) Police stations
Split*Post	0.01*	0.00	0.06***	0.05***	0.05***	0.07***	-0.02**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Election*Post	-0.01	0.01	-0.03	-0.01***	-0.01	-0.01**	0.00
	(0.01)	(0.01)	(0.02)	(0.00)	(0.01)	(0.00)	(0.01)
Election*Split*Post	0.03***	0.02	0.07***	0.05***	0.06***	0.14***	0.01
	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)
N	116,939	116,939	116,938	116,162	116,939	116,938	116,939
R^2	0.01	0.04	0.04	0.03	0.16	0.44	0.03
Y-Mean	0.11	0.15	0.08	0.89	0.43	0.57	0.08

*0.10 **0.05 ***0.01. PODES-2000 and PODES-2011 with specification (1) are used for this regression. Clustered standard errors at baseline district level are in parentheses. Health-centers: dummy for disitrict community center (*Puskesmas*), Doctors: dummy for doctors available in a village, Schools: number of junior high school per '000 people, Wide roads: dummy for wide roads in a village, Street lights: Dummy for street lights in a village, Electricity: proportion of households getting electricity, Police stations: dummy for police station available in a village. Weights are village population share within a district.

Table 9: Decentralization synergies and public goods: Heterogeneity in timing

	(1) Health-centers	(2) Doctors	(3) Schools	(4) Wide roads	(5) Electricity	(6) Police stations
Split_months*Post	-0.0000	-0.0000	0.0002***	0.0008***	0.0005***	0.0001
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Election_months*Post	-0.0005**	0.0002	-0.0017***	-0.0008***	-0.0020***	0.0007**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
(Election*Split)_months*Post	0.0010***	0.0008**	0.0015***	0.0011***	0.0034***	0.0007
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
N	116939	116939	116938	116162	116938	116939
R^2	0.01	0.04	0.04	0.03	0.44	0.03
Y-Mean	0.11	0.15	0.08	0.89	0.57	0.08

*0.10 **0.05 ***0.01. PODES-2000 and PODES-2011 with specification (3) are used for this regression. Clustered standard errors at baseline district level are in parentheses. Health-centers: dummy for disitrict community center (*Puskesmas*), Doctors: dummy for doctors available in a village, Schools: number of junior high school per '000 people, Wide roads: dummy for wide roads in a village, Electricity: proportion of households getting electricity, Police stations: dummy for police station available in a village. Weights are village population share within a district.

Table 10: Decentralization synergies and public goods: Heterogeneity in intesity of splitting (Population)

	(1) Health-centers	(2) Doctors	(3) Schools	(4) Wide roads	(5) Electricity	(6) Police stations
Intensity*Post	0.01	0.04**	0.03***	0.10***	0.01	-0.04*
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)
Election*Post	0.00	0.02***	-0.01***	-0.01***	-0.00	0.01
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.01)
Intensity*Election*Post	0.05***	0.09***	0.07***	0.06***	0.10***	0.05*
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.03)
N	118,905	118,905	118,904	118,012	118,904	118,905
R^2	0.01	0.05	0.02	0.03	0.31	0.04
Y-Mean	0.11	0.15	0.08	0.89	0.57	0.08

*0.10 **0.05 ***0.01. PODES-2000 and PODES-2008 with specification (2) are used for this regression. Clustered standard errors at baseline district level are in parentheses. Health-centers: dummy for disitrict community center (*Puskesmas*), Doctors: dummy for doctors available in a village, Schools: number of junior high school per '000 people, Wide roads: dummy for wide roads in a village, Electricity: proportion of households getting electricity, Police stations: dummy for police station available in a village. Weights are village population share within a district.

Table 11: Decentralization synergies and public goods: Heterogeneity in intesity of splitting (Land area)

	(1) Health-centers	(2) Doctors	(3) Schools	(4) Wide roads	(5) Electricity	(6) Police stations
Intensity*Post	-0.00	0.03*	0.00	0.05***	-0.00	-0.04*
	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)
Election*Post	0.00	0.02**	-0.02***	-0.02***	-0.01	0.01
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.01)
Intensity*Election*Post	0.05***	0.08***	0.05***	0.05***	0.08***	0.05**
	(0.02)	(0.02)	(0.01)	(0.01)	(0.01)	(0.02)
N	118,867	118,867	118,866	117,975	118,866	118,867
R^2	0.01	0.05	0.02	0.02	0.30	0.04
Y-Mean	0.11	0.15	0.08	0.89	0.57	0.08

*0.10 **0.05 ***0.01. PODES-2000 and PODES-2008 with specification (2) are used for this regression. Clustered standard errors at baseline district level are in parentheses. Health-centers: dummy for disitrict community center (*Puskesmas*), Doctors: dummy for doctors available in a village, Schools: number of junior high school per '000 people, Wide roads: dummy for wide roads in a village, Electricity: proportion of households getting electricity, Police stations: dummy for police station available in a village. Weights are village population share within a district.

Table 12: Decentralization synergies and public goods: Heterogeneity in intesity of splitting (Distance to district HQ)

	(1) Health-centers	(2) Doctors	(3) Schools	(4) Wide roads	(5) Electricity	(6) Police stations
Intensity*Post	0.01	-0.03***	-0.00	-0.03***	-0.01**	0.01
	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.01)
Election*Post	-0.01	0.01*	-0.03***	-0.03***	-0.02***	0.00
	(0.01)	(0.01)	(0.00)	(0.00)	(0.00)	(0.01)
Intensity*Election*Post	-0.01	-0.04***	-0.00	-0.01*	-0.02***	-0.01
	(0.01)	(0.01)	(0.00)	(0.00)	(0.01)	(0.01)
N	118,914	118,914	118,913	118,021	118,913	118,914
R^2	0.01	0.05	0.02	0.02	0.30	0.04
Y-Mean	0.11	0.15	0.08	0.89	0.57	0.08

*0.10 **0.05 ***0.01. PODES-2000 and PODES-2008 with specification (2) are used for this regression. Clustered standard errors at baseline district level are in parentheses. Health-centers: dummy for disitrict community center (*Puskesmas*), Doctors: dummy for doctors available in a village, Schools: number of junior high school per '000 people, Wide roads: dummy for wide roads in a village, Electricity: proportion of households getting electricity, Police stations: dummy for police station available in a village. Weights are village population share within a district.

Table 13: Alternative specification based on splitting moratorium

	Health-centers		Doctors		Schools		Wide roads		Street lights		Electricity		Police stations	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Split*Post	0.03***	0.01	0.05***	0.04***	0.00	-0.01	0.03***	0.04***	-0.04***	-0.04***	0.02**	-0.02**	0.02**	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.01)	(0.01)	(0.01)	(0.01)
Election*Split*Post		0.04***		0.06***		0.01		0.02**		-0.04**		0.04***		0.04***
		(0.01)		(0.01)		(0.01)		(0.01)		(0.02)		(0.01)		(0.01)
N	53,699	53,699	53,699	53,699	53,698	53,698	53,014	53,014	53,699	53,699	53,698	53,698	53,699	53,699
R^2	0.01	0.01	0.05	0.06	0.03	0.03	0.03	0.03	0.16	0.16	0.32	0.32	0.04	0.04
Y-Mean		0.10		0.10		0.09		0.81		0.26		0.44		0.08

*0.10 **0.05 ***0.01. PODES-2000 and PODES-2008 with specification (1) are used for this regression. This table reports comparison within only split districts and hence the districts that were treated with election are excluded here. Clustered standard errors at baseline district level are in parentheses. Health-centers: dummy for disitrict community center (*Puskesmas*), Doctors: dummy for doctors available in a village, Schools: number of junior high school per '000 people, Wide roads: dummy for wide roads in a village, Street lights: Dummy for street lights in a village, Electricity: proportion of households getting electricity, Police stations: dummy for police station available in a village. Weights are village population share within a district.

Governance quality

Table 14: Decentralization synergies and governance quality (Change in district level expenditure as a proportion of total revenue and percentage change in per capita revenue)

	(1) Edu.	(2) Health	(3) Agri.	(4) Admin.	(5) Rev. p.c.
Split*Post	-0.07***	-0.00	0.01	0.06**	0.33***
	(0.02)	(0.00)	(0.01)	(0.03)	(0.07)
Election*Post	0.02	0.01*	0.00	-0.02	0.02
	(0.02)	(0.00)	(0.00)	(0.02)	(0.03)
Election*Split*Post	-0.01	0.01**	0.01**	0.01	0.34***
	(0.01)	(0.01)	(0.00)	(0.03)	(0.07)
N	876	876	875	869	889
R^2	0.24	0.39	0.23	0.04	0.89
Y-Mean	0.33	0.06	0.04	0.32	75.09

*0.10 **0.05 ***0.01. District level INDO-DAPOER data by World Bank for the years 2001 through 2008 is used for this regression. Clustered standard errors at province level are in parentheses. Edu.: District level educational expenditure as a proportion of revenue, Health: District level health expenditure as a proportion of revenue, Agri.: District level agricultural expenditure as a proportion of revenue, Admin.: District level administrative expenditure as a proportion of revenue, Rev. p.c.: Log of district level per capita revenue. Weights are district population share within a province.

Table 15: Decentralization synergies and governance quality (District government assistance to village governments in 2008)

	(1)	(2)
	Whether a vilage received assistance	Amount of assistance (p.c. mn. IDR)
Split	0.02	0.03**
	(0.02)	(0.01)
Election	0.02	0.01
	(0.02)	(0.01)
Election*Split	-0.02	0.04***
	(0.02)	(0.01)
N	52,973	49,272
R^2	0.01	0.00
Control-Mean		0.05

*0.10 **0.05 ***0.01. PODES-2008 used for this regression. The results report a cross sectional comparison between different treatment groups. Clustered standard errors at province level are in parentheses. 'Whether a village received assistance': dummy for a village receiving any assistance from district government, 'Amount of assistance (p.c. mn. IDR)': Total value of per capita assistance received by village from district govenment. Weights are village population share within a district.

Appendix

Table A1: Sample description of baseline villages

	Districts	Villages
Original census sample	314	68,783
Lost (in panel creation)	-	5,365
Excluded provinces (Jakarta, Maluku and Irian Jaya)	23	3,955
Final sample (by treatment groups)		
Control	105	18,740
Split	28	8,961
Election	103	17,669
Both	55	14,093

Table A2: Matching panel and lost sample for baseline (2000)

	(1) Panel Sample	(2) Lost Sample
Rural villages	0.71	0.71
	(0.45)	(0.45)
Villages in plain regions	0.76	0.67
	(0.42)	(0.47)
Villages next to water body	0.16	0.15
	(0.37)	(0.36)
Proportion of 1999 female voters	0.49	0.50
	(0.10)	(0.07)
Proportion of agri. HH	0.58	0.67
	(0.36)	(0.35)
Proportion of agri. land	0.56	0.56
	(0.32)	(0.32)
No. of food/leather industries	1.54	1.47
	(6.69)	(5.08)
No. of mosques	2.69	2.76
	(2.68)	(2.50)
No. of primary schools	0.97	1.05
	(0.97)	(0.79)
Observations	63417	5365

Means reported. Standard deviations are in parenthesis.

The panel sample is the sample used for main analysis. The lost sample is the 8% sample lost in creating the panel.

Number of industries, mosques and primary schools are for every 1000 individuals.

Weights are village population share within a district.