Chapter 7

The Effect of Local Government Separation on Public Service Provision in Indonesia: A Case of Garbage Pickup Services in Urban Areas

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Abstract

This chapter estimates the correlation effect of creating smaller local governments in Indonesia on the provision of public goods, using a household panel dataset covering the years 1993 to 2014. During this time period, the number of second-tier local governments increased from 290 to 514, with most of the increase occurring after the introduction of decentralisation in 2001. Such a splitting of administrations can lead to more efficient provision of public goods, although the literature on the topic suggests mixed results. We examine the effects of district splitting on public garbage collection service in urban areas of more than 100,000 people and population density over 1,500 persons per square kilometre, on the assumption that garbage pickup needs are essentially the same in all such areas. Our simple estimation finds that urban residents living in local governments that have recently experienced a separation have a lower probability of access to public garbage collection services.

Keywords: garbage collection, Indonesia, proliferation, decentralisation, urbanisation

7.1. Introduction

The World Bank estimates that the percentage of urban residents in low-and middle-income countries was 50% in 2018, up from 36% in 1990.[34] As the urban population continues to explode in developing countries, the role of local governments becomes more important, as urban dwellers need appropriate public goods and services such as

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[34] World Bank Open Data. https://data.worldbank.org/ (accessed on 17 January 2020).

safe drinking water, a sewage system, and solid waste management (UN-HABITAT, 2016). As home to the world's second-largest megacity, Jakarta (Demographia, 2018), Indonesia has experienced a relatively high pace of urbanisation, with its percentage of urban residents skyrocketing from 31% in 1990 to 55% in 2018. Using household survey data (Susenas) and community-level census data (PODES) from 1999 to 2017, Higashikata (2019) showed how, during this period, Indonesia improved its citizens' access to safe drinking water, basic sanitation, and solid waste management. Nationally, the share of people with access to safe water services increased from 39.5% in 1999 to 70.8% in 2017, and the percentage with basic sanitation services rose from 30.4% in 1999 to 60.6% in 2016. The share of households with safe drinking water and basic sanitation has grown not only in urban districts (*kota*) but also in rural ones (*kabupaten*).

On the other hand, progress was slower with regard to access to garbage collection, as the percentage of Indonesians receiving this service grew only from 21.9% in 1999 to 31.6% in 2014. The difference in the rate of progress appears to be related to particular characteristics of those services. As Higashikata (2019) explained, the main sources of safe drinking water and basic sanitation, respectively, are retail bottled water and septic tanks, both of which are available privately. In contrast, garbage collection is provided predominantly by local governments. According to the fifth wave of the Indonesian Family Life Survey (IFLS), conducted in 2014–2015 and covering 311 communities, 154 of the surveyed communities used a collection service as their primary means of garbage disposal, and 84.4% of these indicated that the service was at least partly managed by government.

In Indonesia, local governments have become responsible for providing public services since the introduction of decentralisation in 2001. In addition, many local districts have been divided. Indonesia had 290 districts in 1993; as of 2019, there were 514. This type of local government proliferation can bring about a preferable resource allocation, in which each of the newly created local government provides public goods efficiently for its residents. This improvement in resource allocation is partly due to the greater similarity of preferences for public goods in smaller localities, although there have been few studies of this mechanism or evaluations of its effects (Grossman and Lewis, 2014). There exist many studies on instances of local government amalgamation in the Organisation for Economic Co-operation and Development (OECD) countries, where such mergers are expected to achieve cost efficiencies in local administration. But studies of the effect of the size of local governments on residents' social welfare have yielded inconsistent results. For example, Andrews and Boyne (2009) reported on the achievement of economies of

scale through amalgamation in England, but Blom-Hansen, et al. (2016) suggested that after Danish municipal mergers, the cost savings gained in some areas were offset by higher spending in other areas.

This chapter examines whether the creation of smaller local governments can provide public goods to residents and respond to their needs more effectively. To do so, we analyse information on garbage collection in urban areas of Indonesia. We define urban areas as having a total population of more than 100,000 people as well as high population density (at least 1,500 people per square kilometre [km]). We assume that residents living in urban areas have similar preferences with regard to the public goods they wish to receive from local governments. We identify the correlation effect of changes in local government size on residents' welfare by means of a comparison between districts affected by proliferation and those that have not divided. Our analysis shows that households living in districts that participated in a separation had a lower probability of access to public garbage pickup services.

The next section of this chapter explains the background of urbanisation and decentralisation in Indonesia. Section 7.3 presents the household-level panel data we used for our analysis and describes our benchmark estimation results. It also contains a check of the robustness of our benchmark estimation. Section 7.4 summarises our conclusions.

7.2. Urbanisation and Decentralisation in Indonesia

7.2.1. Urban Areas in Indonesia

The literature on urbanisation in Indonesia traditionally uses dichotomous information identifying areas as either urban or rural, as constructed by the Indonesian statistics office (BPS). Indonesia has about 80,000 administrative communities (*desa/kelurahan*). BPS classifies these communities as either urban (*perkotaan*) or rural (*pedesaan*) based on calculated scores related to population density, share of agricultural households, and access to public facilities such as schools, hospitals, markets, and hotels. If the aggregate total score is 10 or more, the BPS identifies the community as urban.

Hashiguchi and Higashikata (2016) analysed urbanisation trends based on this BPS definition, finding that the average total score for urbanisation increased from 6.2 points in 2002 to 7.5 points in 2011. The difference of 1.3 points was explained primarily by the decrease in the share of agricultural households (0.7 points), followed by increased access to public facilities (0.5 points). The contribution attributable to change in population

density was only 0.1 points. Their paper suggests that the publicly available urban variable provided by BPS does not appropriately reflect the actual agglomeration of Indonesia's population.

It is expected that the demand for garbage collection services will increase with urbanisation, because it becomes difficult for urban dwellers to dump their trash into nearby holes or burn it. To examine the impact of urban growth on garbage issues, we use an urban area panel dataset based on population agglomeration information constructed by Higashikata and Hashiguchi (2017). They used population census data from 2000 and 2010 as well as community-level Geographical Information System data to construct their urban area panel dataset, following a definition from OECD (2012). They calculated community-level population density first and then identified contiguous and densely inhabited areas with population density of over 1,500 people/km^2 where the total population was greater than 100,000.

According to the urban area dataset, which covered 97% of all communities in the country, Indonesia had 76 urban areas in 2000 and 86 in 2010. As our analysis covers the period from 1993 to 2014, we assumed that the communities counted as urban areas in both 2000 and 2010 also belonged to densely populated clusters before 2000.

7.2.2. Decentralisation in Indonesia

Indonesia introduced a radical decentralisation process in 2001 as part of its democratisation following the fall of Soeharto in 1998. Under the Law on Regional Governance (No.22/1999) and the Law on Fiscal Balance between the Central Government and the Regions (No.25/1999) enacted in 1999, all authority except the responsibility for the oversight of religion and military power were devolved to districts (Hofman and Kaiser, 2006). Along with the implementation of decentralisation, as already noted, Indonesia also experienced a great number of district splits, which caused the total number of local administrations to expand from 290 in 1993 to 514 as of 2014. Fitrani, Hofman, and Kaiser (2005) suggested that the proliferation of districts after 2001 was especially common in regions that were large in area, with ethnic diversity among their sub-districts.

These decentralised governments with smaller jurisdictions were expected to provide public goods and services more efficiently through electoral accountability, especially after the implementation of direct elections of local heads in 2005. District heads would face difficulty winning re-election if the local electorate was not satisfied by the provision of public goods, as demonstrated by a study conducted in Brazil (de Janvry, Finan, and

Sadoulet, 2012). But the literature on the effects of decentralisation in Indonesia has yielded mixed results. Pepinsky and Wihardja (2011), who applied the synthetic control method, found no evidence that decentralisation had any effect on national economic development. Kaiser, Pattinasarany, and Schulze (2006), relying on household survey data, showed that respondents perceived improvement in decentralised services such as education, health, and administration. Pierskalla and Sacks (2017) suggested that the splitting of districts and the introduction of direct elections for district heads were negatively associated with some forms of violence; i.e. violence was less common where these changes were introduced. Meanwhile, Burgess, et al. (2012) revealed that under some conditions, such as where political jurisdictions were large enough to maintain some control over wood markets, dividing the district led to more extensive deforestation through illegal logging.

7.2.3. Access to Garbage Pickup Services for Households in Urban Areas from 1993 to 2014

Estimation strategy

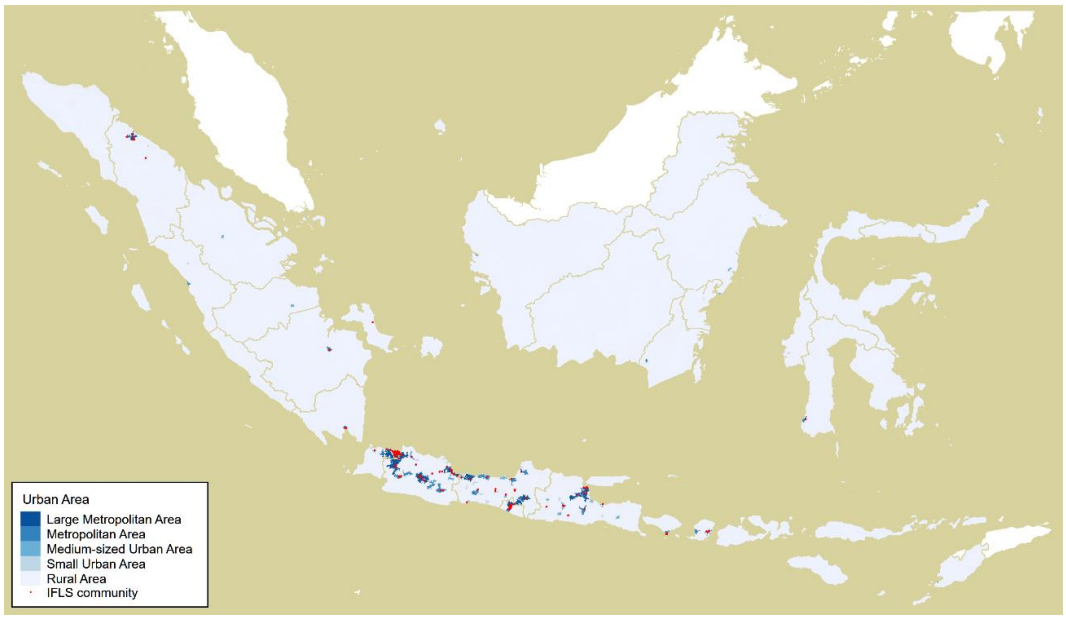
To identify the effects of district splitting on public service provision under decentralisation in Indonesia, we compared access to garbage collection services in district that had and had not experienced proliferation. We focused on residents in urban areas, where the demand for sanitation services would be greater. We employed a simple reduced-form model:

$$y_{i,k,t} = \alpha + \beta\, Decentralization_t \cdot Split_{k,t} + \delta\, Decentralization_t + \gamma Split_{k,t} + Trend_t + Household_i + Year_t + e_{i,k,t} \quad (1)$$

where $y_{i,k,t}$ is a dummy variable that takes the value of 1 if a household *i* in a district (*kabupaten/kota*) *k* during a year t has access to this service; $Decentralisation_t$ is a decentralisation dummy that takes the value of 0 up to 2001 and 1 after 2001; $Split_{k,t}$ is a variable that captures the effects of proliferation, taking the value of 1 if a region *k* has experienced a split and decreasing gradually over time. In our benchmark estimation, we assumed that the effects of district separation decrease according to the simple reciprocal function $Split_t = 1/(1 + t - t_0)$, where t_0 is the year in which the district legally split. $Trend_t$ is a variable to capture the time trend. $Household_i$ and $Year_t$ are household and year dummies, respectively, to control for household-specific and year-specific effects.

As we would like to find out the impacts of the splitting of districts under decentralisation, we are interested in the coefficient of the cross-term of $Decentralisation_t$ and $Split_{k,t}$.

Figure 7.1. IFLS Communities in Urban Areas (2000)



IFLS = Indonesian Family Life Survey.
Notes: We excluded the provinces of Papua, West Papua, Maluku, and North Maluku here because there are no IFLS communities in those provinces. The figure shows the locations of urban areas and of the IFLS communities located in urban areas. In 2000, Indonesia had seven large metropolitan areas (total population more than 1.5 million), 16 metropolitan areas (500,000 to 1.5 million), 23 medium-sized urban areas (200,000 to 500,000), and 30 small urban areas (100,000 to 200,000). Those communities that we cannot merge with the urban population data are treated as rural areas for ease of representation.
Source: Author's calculation.

Data

We used household panel data from the Indonesian Family Life Survey (IFLS), conducted by the RAND Corporation. The IFLS is designed to represent the Indonesian population. The first wave of the IFLS involved interviews with 7,224 households covering 312 communities, and 92% of these households (i.e. any member of the IFLS 1 households) were re-interviewed in the latest wave of IFLS 5, conducted in 2014–2015 (Strauss, Witoelar, and Sikoki, 2016).

We matched IFLS communities with the urban area dataset as in Higashikata and Hashiguchi (2017). We used 120 communities that were counted as urban areas in both 2000 and 2010 for our analysis. The IFLS communities that we succeeded in matching with our urban area dataset are depicted in Figure 7.1.[35]

[35] As sub-district names and codes of IFLS communities are available, we pooled community information

Figure 7.2. Descriptive Statistics: Access to Public Garbage Pickup Service by Households in Districts that did or did not Experience a Split from 1993 to 2014

HH = household.
Source: Author's calculation.

The number of sample households used for our analysis was 7,055, composed of 1,411 households over five rounds. We selected only those households who had lived in urban areas and had never migrated out of the communities where they lived in 1993. Among this group, the percentage who had access to any type of garbage collection service was 31.6% in 1993 and increased to 51.6% in 2014.

To identify those who had access to public trash pickup services, we referred to the community information in the IFLS. Since its second wave, the IFLS has asked about the organisations that manage community trash collection. The questionnaire permits respondents to choose one or more items amongst government, private entities, nongovernmental organisations, and others. In addition, the questionnaire asked in what

belonging to the sub-districts using the PODES series. Next, we identified the demographic characteristics of district heads and secretaries such as age, sex, and educational level, as well as the number of dwellers by gender and the distance from the district capital, from both the IFLS waves and the PODES series as keys to enable accurate matching. Coincidentally, IFLS waves are collected in almost exactly the same years in which BPS collects PODES information. Then we compared the community characteristics from the third wave of the IFLS (in 2000) with PODES 2000, the fourth IFLS wave (2007-2008) with PODES 2008, and the fifth IFLS wave (2014–2015) with PODES 2014. Eventually, we succeeded in matching IFLS communities with PODES villages for 120 communities. For more details, see Higashikata and Hashiguchi (2017).

year the pickup service started. We classified all households living in communities where the community survey revealed that the service was at least partly managed by government as using a public garbage collection service. As we do not have information on how garbage was collected for the first IFLS wave, we regard a community as having had access to a public trash pickup service from 1993 if a respondent of the community, when answering the question about public services in the second IFLS wave, said that they used trash services before 1993. Applying this assumption, we find that 16.3% of the sample of urban dwellers had access to this public service in 1993 and that the rate increased to 42.2% as of 2014.

Furthermore, 1,209 households (85.7% of the sample) never experienced the splitting of a district from 1990 to 2014. We compared the households without experience of proliferation and those who had experienced at least one district division during the time period of our observations; the trends of the two groups are depicted as in Figure 7.2. It appears that the group of respondents who had experienced a district separation had seen relatively slow progress toward access to garbage pickup service.

Analysis

Table 7.1 displays the ordinary least square (OLS) estimation results of the effect of a district split on the probability of urban household access to the garbage collection system using Equation (1). The first column in Table 7.1 suggests that the proliferation of districts had a negative correlation effect on households' access to garbage pickup services if they experienced a division of the district in which they lived. Compared with households in non-separated districts, the probability of access to this public service decreased, on average, by 22.2 ((−0.581+ 0.359) × 100) percentage points after 2001 if the district division had just happened. Then, in the second year after the separation, the probability of access to public garbage collection was still 11.1 percentage points ((−0.581 + 0.359) × 1/2 × 100) lower; in the fourth year after the separation, the difference between households in non-separated and separated was 5.6 percentage points ((−0.581 + 0.359) × 1/4 × 100). Meanwhile, the decentralisation dummy was positive and statistically significant even if we control time trends, so all urban households had a higher probability of access to public garbage services by 14.7 percentage points under the decentralised system.

Table 7.1. Estimation Results: All Households in Urban Areas from 1993 to 2014

	(1) All	(2) Java	(3) Java w/o Jakarta
Decentralisation * Split	−0.581***	−0.601***	−0.534***
	(0.078)	(0.084)	(0.101)
Decentralisation dummy	0.147*	0.184*	0.177*
	(0.064)	(0.071)	(0.072)
Effects of split	0.359***	0.357***	0.341***
	(0.048)	(0.048)	(0.085)
Time trend	*Yes*	*Yes*	*Yes*
Year dummy	*Yes*	*Yes*	*Yes*
Household dummy	*Yes*	*Yes*	*Yes*
Observations	7055	6040	4955

Notes: Robust standard errors clustered at community level are presented in parentheses. + significant at 10%, * significant at 5%, ** significant at 1%, and *** significant at 0.1%.
Source: Author's estimation.

Next, we select samples on the island of Java and estimate the effect of splits there. As the proliferations that occurred in Indonesia took place primarily on the outer islands and not in Java, we find a large amount of heterogeneity between Java and the outer islands. Although we have controlled for the difference amongst districts using a household-level fixed effects model, the unobservable heterogeneity might still affect the estimation results shown in column (1). The second column in Table 7.1 shows the estimation result without including households from the outer islands, and we find that the coefficients are almost the same as those in the first column. In column (3), we also exclude households from Jakarta province. Jakarta is the capital city and has special administration authority; the districts located in Jakarta province do not have the same authority as those in other districts. The estimation results in column (3) are slightly smaller in magnitude, but basically the same as those in columns (1) and (2).

Robustness check

In this subsection, we present the results of our robustness checks. First, we evaluated whether changing the definition of an urban area affects the results. We shifted the threshold from 1,500 persons/km^2 to 1,000, 2,500, and 3,500. As shown in panel A of Table 7.2, all the coefficients of the cross term except column (1) are negative and statistically significant. This may reflect the heterogeneity between Java and the outer islands that have fewer congested areas. We also find that the point estimators of the coefficients take almost the same value even if the threshold is changed from 1,500 persons/km^2 to 3,500.

Next, we assessed whether a change in how we represent the effects of district splitting leads to different estimation results. In our benchmark estimation, we assumed that the splitting effect depreciated at a rate represented by $1/(1+t-t_0)$. We adopted other depreciation rates to check robustness. First, we assumed that newly created governments do not require as much time to adjust to their new circumstances as posited in our benchmark estimation. Panel B in Table 7.2 shows the results if we adopt $Split_t = 1/(1+t-t_0)^2$. According to this estimation, it would take only 1 year for a new jurisdiction to decrease the effect of the separation by 75%, whereas in our benchmark estimation it would take 4 years to achieve the same level. Under this new assumption, the coefficients of the cross term are generally negative and statistically significant as in Panel A, and the absolute values become larger than those of Panel A.

On the other hand, Panel C shows the results under the assumption that separated districts need more time to adjust to their new situation than in the benchmark estimation. Here we adopted $Split_t = 1/(1+t-t_0)^{0.5}$, under which it would take 15 years for a district to reduce the impact of a split by 75%. Under this setting, we again have almost all negative coefficients except in column (1).

In short, changing the assumptions regarding the time needed for adjustment does not significantly affect the results. It seems that the splitting of administrations leads to negative effects on residents in congested urban areas, especially on Java, from the perspective of public garbage collection service provision.

Table 7.2: Robustness Check

Threshold for population density	1000/km²			1500/km²			2500/km²			3500/km²		
	(1) All	(2) Java	(3) Java w/o Jakarta	(4) All	(5) Java	(6) Java w/o Jakarta	(7) All	(8) Java	(9) Java w/o Jakarta	(10) All	(11) Java	(12) Java w/o Jakarta
Panel A: $1/(1+t-t_0)$												
Decentralisation * Split	−0.086	−0.391***	−0.358***	−0.581***	−0.601***	−0.534***	−0.575***	−0.610***	−0.511***	−0.564***	−0.611***	−0.498*
	(0.319)	(0.109)	(0.097)	(0.078)	(0.084)	(0.101)	(0.095)	(0.100)	(0.143)	(0.118)	(0.125)	(0.200)
Decentralisation dummy	0.110*	0.149**	0.140**	0.147*	0.184*	0.177*	0.155	0.220*	0.219+	0.187	0.268*	0.313+
	(0.048)	(0.053)	(0.052)	(0.064)	(0.071)	(0.072)	(0.095)	(0.103)	(0.115)	(0.123)	(0.132)	(0.161)
Effects of split	−0.062	0.185+	0.196*	0.359***	0.357***	0.341***	0.354***	0.352***	0.317*	0.325***	0.323***	0.273
	(0.278)	(0.100)	(0.088)	(0.048)	(0.048)	(0.085)	(0.062)	(0.062)	(0.127)	(0.076)	(0.078)	(0.172)
Panel B: $1/(1+t-t_0)^2$												
Decentralisation * Split	−0.174	−0.536**	−0.515**	−0.866***	−0.887***	−0.792***	−0.869***	−0.906***	−0.745*	−0.834***	−0.883***	−0.679+
	(0.435)	(0.184)	(0.166)	(0.133)	(0.131)	(0.211)	(0.157)	(0.156)	(0.294)	(0.184)	(0.186)	(0.390)
Decentralisation dummy	0.109*	0.145**	0.137**	0.143*	0.179*	0.174*	0.150	0.214*	0.217+	0.180	0.259+	0.311+
	(0.047)	(0.052)	(0.051)	(0.063)	(0.070)	(0.071)	(0.094)	(0.102)	(0.114)	(0.121)	(0.131)	(0.160)
Effects of split	0.024	0.369*	0.378*	0.686***	0.686***	0.625**	0.671***	0.673***	0.555+	0.619***	0.625***	0.456
	(0.437)	(0.180)	(0.161)	(0.126)	(0.118)	(0.209)	(0.141)	(0.133)	(0.288)	(0.160)	(0.154)	(0.375)
Panel C: $1/(1+t-t_0)^{0.5}$												
Decentralisation * Split	−0.023	−0.301**	−0.282**	−0.441***	−0.458***	−0.418***	−0.435***	−0.466***	−0.402**	−0.430***	−0.472***	−0.399*
	(0.278)	(0.091)	(0.085)	(0.078)	(0.083)	(0.092)	(0.097)	(0.101)	(0.120)	(0.115)	(0.120)	(0.163)
Decentralisation dummy	0.108*	0.151**	0.141**	0.148*	0.186*	0.178*	0.158	0.223*	0.219+	0.190	0.272*	0.312+
	(0.048)	(0.054)	(0.052)	(0.064)	(0.072)	(0.072)	(0.097)	(0.105)	(0.116)	(0.125)	(0.135)	(0.163)
Effects of split	−0.072	0.112	0.124+	0.226***	0.222***	0.222***	0.224***	0.216***	0.211*	0.202**	0.192**	0.185
	(0.194)	(0.075)	(0.066)	(0.042)	(0.041)	(0.061)	(0.053)	(0.054)	(0.090)	(0.062)	(0.064)	(0.121)
Time trend	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Year dummy	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Household dummy	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*	*Yes*
Observations	10075	8425	7340	7055	6040	4955	4370	3855	2770	3135	2740	1730

km² = square kilometre, w/o = without. Notes: Robust standard errors clustered at community level are presented in parentheses. + significant at 10%, * significant at 5%, ** significant at 1%, and *** significant at 0.1%.
Source: Author's estimation.

7.4 Conclusion

This chapter provides evidence on the effects of newly created smaller jurisdictions on public service provision. We focused on garbage pickup in urban areas, a service that is expected to be provided by local governments in Indonesia since the introduction of decentralisation. Using longitudinal household panel data, our benchmark analysis shows that the splitting off of districts had negative effects on urban dwellers' access to this service. We also verified the robustness of our results by testing the effects of changing the definition of urban areas or the equation used to estimate new local administration's adjustment time period. The study finds a negative relationship between the splitting of a district and the provision of public trash collection services, although we should note the possibility that after the splitting of a district, local governments might allocate more resources to providing other public goods or services, as Blom-Hansen, et al. (2016) suggested in their study of Danish amalgamations. In addition, it is difficult to evaluate whether the ongoing process of proliferation in Indonesia has been too excessive. By way of comparison, Japan still has around 1,700 local governments even after implementing a recent large-scale amalgamation of municipalities, though its population is about half of Indonesia's. Further research is needed to achieve a comprehensive understanding of the impact of decentralisation in Indonesia.

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