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**Does local governments' responsiveness increase
with decentralization and democratization?
Evidence from sub-national budget allocation in
Indonesia**

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Does local governments' responsiveness increase with decentralization and democratization? Evidence from sub-national budget allocation in Indonesia

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Abstract

We investigate the effects of Indonesian decentralization and democratization on budget allocation at the sub-national level. Based on panel data for 271 Indonesian districts over 13 years, we address the determinants of local investment expenditures in education, health and infrastructure. We find that local governments' responsiveness increased with decentralization considerably: districts with relatively lower levels of public service delivery increased their investments by relatively more after decentralization. We find that fiscal and administrative decentralization had a clear impact on local budget allocation while there is no evidence for additional improvements in responsiveness of local governments due to the political decentralization and democratization process. Our evidence reflects thus improvements in local targeting irrespective of the strength of the political competition at the local level.¹

Key words

Decentralization, democratic elections, budget allocation, Indonesia

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¹ For a more recent version, see University of Freiburg IEP Discussion Paper Vol. 25 (Jan. 2014) at http://www.vwl.uni-freiburg.de/iwipol/discussion_papers/DP25_Kis-Katos_Sjahrir_The_Impact_of_Fiscal_and_Political_Decentralization.pdf

Introduction

Decentralization has played a major role on the agenda for institutional reform throughout the world. Internal and external pressures forced many developing countries to increase the administrative, fiscal and political powers granted to the lower tiers of the government. To understand how these changes affected the quality of local public service delivery is of crucial policy importance. Indonesia's decentralization and democratization of the last decade offers a large-scale natural experiment to study the interactions between various forms of decentralization, and their effects on local public service delivery. Decentralization has led to an extensive devolution of fiscal and administrative powers to local governments, while the introduction of democratic and later direct elections increased electoral accountability at the local level. All these changes were introduced with the aim to improve local public policies; the goal of this paper is to disentangle their effects on the responsiveness of local public investment expenditures to gaps in local public service delivery.

The overall effects of decentralization on public service delivery are theoretically ambiguous. Inter-jurisdictional competition for attracting mobile citizens should result in higher responsiveness to local needs (Tiebout 1956), although mobility in developing countries might not be high enough for this effect to dominate (Bardhan 2002). Informational advantages on the side of local governments (Hayek 1948) are also expected to improve the allocative efficiency of public expenditures. These benefits increase with regional heterogeneity of preferences and decrease with spillovers in public goods provision across regions (Oates 1972, Besley and Coate 2003). However, decentralization in developing countries can also bring disadvantages: when the mechanisms of local accountability are relatively weak, local elites can capture the process of public service delivery and disfavor the poor (Bardhan and Mookherjee 2005, 2006a). Improvements in electoral accountability are thus an important prerequisite for efficient local public goods provision (Seabright 1996).

The existing empirical evidence shows that fiscal and administrative decentralization can indeed lead to improved public service delivery. Faguet (2004) documents that in Bolivia decentralization empowered especially the smaller and poorer districts, which resulted in a higher overall responsiveness to local needs and a shift of public expenditures towards education, health and sanitation. Solé-Ollé and Esteller-Moré (2005) find that after decentralization, Spanish provinces' investment expenditures on roads and education became more responsive to changes in output, users and costs. Several other studies show local outcomes improving with the degree of fiscal decentralization. Barankay and Lockwood (2007) find that in Switzerland education outcomes improve with the increasing share of education expenditures by local counties relative to the Swiss cantons. Cross-country analyses also show various outcomes to be improving with fiscal decentralization (see e.g., Robalino et al. 2001, Khalegian 2004 and Jimenez-Rubio

2010 for health, or Fisman and Gatti 2002 and de Mello and Barenstein 2001 for corruption).²

However, there is also a growing body of evidence on deficiencies of accountability in decentralized settings. Empirical evidence documents a serious extent of elite capture (Reinikka and Svensson 2004), as well as missing benefits from decentralization to the very poor (e.g., Bardhan and Mookherjee 2006b, Galiani, Gertler and Schargrodsky 2008).³ Experimental evidence shows that in Indonesia top-down monitoring has had a larger impact on curbing corruption than local monitoring which was subject to local elite capture (Olken 2007).⁴ Another strand of the literature shows that the increasing electoral representation of constituencies affects the targeting of local service delivery. Elected village heads in China tend to provide more public services relative to the appointed cadres (Zhang et al 2004). In India, political geography and politician's identity affected the distribution of public goods (Besley et al 2004). Under political decentralization, the cross-country analysis by Enikolopov and Zhuravskaya (2007) argues that the presence of strong national political parties can mitigate local capture by acting as a disciplining device for local politicians.

Indonesia provides a unique opportunity to compare the effects of decentralization and democratization across sub-national units. Its large size and vast economic and social diversity result in large variation in fiscal structure and levels of public service delivery. The effects of Indonesian decentralization and democratization processes can be distinguished due to differences in their timing: while the "big-bang" of fiscal (expenditure) and administrative decentralization took place in all districts at once (in 2001), the timing of both first democratically elected government heads and first direct elections was determined fairly exogenously (due to term limitations stipulated by the law) and varied considerably across the districts.

Our study is the first to investigate the effects of decentralization on the responsiveness of local fiscal expenditures to local needs in Indonesia, and comparing the effects of fiscal and administrative decentralization to those of democratization. Empirical evidence on decentralization and service delivery in Indonesia is limited and suggests changes in the local governments' fiscal behavior after decentralization. Local governments' spending has been correlated with the local poverty levels, while taxes and savings have been related to the average income levels (Lewis 2005). Kruse et al (2009) find that health spending at the local level is mostly driven by the size of the central government's transfers

² Informational advantages seem to play a key role in the success of decentralization. For instance, localities are found to be considerably better at targeting anti-poverty programs than the central government (see Alderman (2002) for Albania and Galasso and Ravallion (2005) for the Food-for-Education Program in Bangladesh). However, targeting inequalities can arise if not only expenditure but also revenue decentralization takes place (Ravallion, 2007).

³ This stays in strong contrast with the policy expectations on the large benefits from decentralization for the poorest (World Bank 2003a).

⁴ Further experimental results show that the effects of local public monitoring on public service delivery are strongly context-specific: Björkmann and Svensson (2009) document large improvements in monitoring of health care services in Uganda after a NGO campaign, while Banerjee et al. (2010) find no improvements through beneficiary monitoring in the educational sector in India.

and it increases the overall utilization of public health care facilities. But regional autonomy also seems to hurt the local investment climate since local governments tend to misuse business licenses and permits (Kuncoro 2006, Henderson and Kuncoro 2010).

We base our analysis on a uniquely rich dataset that contains consistent time series for 13 years of public investment expenditures by 271 Indonesian districts in three major sectors, education, health and infrastructure. We explain the evolution of these investment expenditures by panel models including district and time fixed effects, while also controlling for the level of public service delivery in the previous period, district revenues, district GRDP, and urbanization. Our central explanatory variables consist of indicators for decentralization and the timing of first democratic as well as first direct elections. We measure the effects of decentralization through an average decentralization effect but also through the fiscal channel of increased district's revenues, and compare the effects of decentralization with those of democratization and direct elections. If districts with relatively lower levels of public service delivery invested *ceteris paribus* more in public infrastructure after decentralization and/or democratization, we could conclude that local governments became more responsive to some externally defined gaps in public service delivery. In order to investigate these issues, we focus on the interactions between our main explanatory variables and the lagged level of public service delivery (representing “needs”).

Our main findings document that following decentralization local governments indeed became more responsive to local gaps in public service delivery. Local public expenditures in all three sectors increased due to increasing local fiscal size (fiscal decentralization); in education and health the average increase in investment expenditures was even larger than what can be explained by the fiscal revenue effect only. More importantly, in these two sectors investment expenditures increased by more in those districts where the level of public service delivery was originally lower. This demonstrates increasing responsiveness of local governments' investment expenditures to gaps in public service delivery after decentralization.

By contrast, we do not find strong effects of the democratization process. The overall effects of democratic elections of the government heads are qualitatively similar to those of decentralization but in general not statistically significant. Direct elections of local heads, phased in starting with 2004, did not change our measures of responsiveness. Changes in responsiveness are also unrelated to the strength of local political competition, measured by the concentration of party power in local parliaments.

The remainder of this paper is organized as follows. Section 2 discusses the decentralization process in Indonesia. Section 3 describes the empirical approach including the data and the empirical model tested. Section 4 presents the results of our empirical analysis. Section 5 provides conclusions.

Decentralization in Indonesia

Decentralization in Indonesia was triggered by the democracy movement and long suppressed dissatisfaction with the centralized government. After severely hit by the 1997 economic crisis, Indonesians called for democracy and forced Soeharto to step down and end his 33 years old authoritarian 'New Order' regime. At the same time, the country faced disintegration threats from regions with history of armed conflicts such as Aceh and East Timor and from natural resource rich regions such as Papua. These regions had long been suppressing dissatisfaction with the centralistic government and unequal distribution of power and wealth.

The first democratic elections in 1999 marked the beginning of the new era. The caretaker government, led by Habibie, conducted a more open general election in June 1999 that involved 48 political parties as opposed to only three parties under the 'New Order' regime. The opposition party (PDIP at that time) won the elections with almost 34 percent of the votes,⁵ but Suharto's political party (Golkar) was still strong and came second.⁶ This new election changed the composition not only of the national but also of local parliaments. The decentralization process progressed rapidly. The parliament approved the decentralization laws in May 1999 (Law 22/1999 on regional autonomy and law 25/1999 on intergovernmental fiscal relations). In 2001, the deadline set by the parliament, the central government transferred 67 percent of its 3.9 million civil servants, some government assets and documentation to the regions (World Bank 2003b). The new intergovernmental fiscal scheme resulted in a doubling of the central government transfers to the regions as compared to 1999 (World Bank 2007). Indonesia decentralized in all dimensions – political, fiscal and administrative – simultaneously.

Administrative decentralization involved two newly autonomous levels of government, provinces and *Kabupaten* (districts)/*Kota* (cities). Only the governmental functions of defense, security, justice, foreign affairs, fiscal affairs and religion remained in the hands of the central government. Provinces were set to coordinate and perform the functions affecting more than one local government. All other functions became the responsibility of local governments.⁷ The two levels of autonomous government have no hierarchic relationship, but provincial governors acted as the central government's representatives in the region. Administrative decentralization increased the number of local governments by almost 40 percent, from 26 provinces and 292 local governments in 1999 to 33 provinces and 451 local governments in 2008.⁸ Some of these newly created local governments lacked human resources and infrastructure to deliver public services (Decentralization Support Facility 2007). The splitting of districts resulted from fiscal incentives, nat-

⁵ Source: Homepage of General Election Commission (KPU). <http://www.kpu.go.id>.

⁶ This was due to Indonesia's special democratic transition, which accommodated all major political power instead of distancing the new democratic regime from the old 'New Order' (Aspinall 2010).

⁷ In addition, Law 22/1999 also mandated sectoral responsibilities for local governments (*bidang pemerintahan wajib*) including health, education, public works, environment, communications, agriculture, industry and trade, investment, land, cooperatives, and manpower and infrastructure. However, it was unclear which functions within these sectors should local governments perform (World Bank, 2007).

⁸ Numbers are based on General Allocation Grant (DAU) data published by the Ministry of Finance.

ural resource endowments, geographic dispersion, and political and ethnic diversity (Fitriani et al 2004). In October 2004, Indonesia redesigned its decentralization by issuing the revised versions of the decentralization laws (Law 32/2004 on regional autonomy and Law 33/2004 on intergovernmental fiscal relations). Law 32/2004 introduced local direct elections to strengthen local accountability, while also giving provinces supervisory powers (instead of powers of coordination) and strengthening their role as representatives of the central government, particularly in the area of planning and budgeting.

Political decentralization took place in two distinct steps. Law 22/1999 gave autonomy to the newly democratically elected local parliaments (*Dewan Perwakilan Rakyat Daerah/DPRD*) to elect the heads of local governments. However, local parliaments still needed to work with the heads of local governments from the ‘New Order’ regime until the latter’s term ended. Thus, at the end of their tenure, the heads of local governments were gradually substituted by those elected by the members of the local parliaments (cf. Table 1):⁹ in 178 districts the heads of local governments were already democratically elected by the new local parliaments before the administrative and fiscal decentralization took place in 2001, while by the end of 2004 almost all local governments were headed by democratically elected leaders. The second step of political decentralization introduced direct elections of regional government heads and DPRD members (by the new Law 32/2004), and abolished reservations for the military. Direct elections of the heads of regional governments, however, were implemented only gradually as the central government allowed the incumbents to finish their 5-year term.¹⁰ The first local direct elections (*Pemilihan Langsung Kepala Daerah/Pilkada*) were conducted in the second half of 2005; by the end of 2007 more than half of the local governments have already held direct elections. Overall, timing of office entry for both the democratically elected as well as the directly elected local government heads were purely based on the tenure of the incumbent, which was path-dependent and historically predetermined. Thus, we consider variations in the timing of the first democratically and later the first directly elected local heads of governments as exogenous, and will use them to identify the effects of political decentralization on the responsiveness of public expenditures to local needs.

Fiscal decentralization resulted in a new system of intergovernmental fiscal relations, although it mostly affected the expenditure side. By 2007 regional governments have managed 36 percent of total government expenditures but only 10 percent of total government revenues; most taxes have been still set and administered by the central government (World Bank 2007). Prior to decentralization, all provincial and local expenditures were earmarked and were administered through line ministries’ offices at the provincial and local government level. The main revenue sources included the Subsidy for Autonomous Regions (*Subsidi Daerah Otonom/SDO*) which were earmarked for salaries and recurrent expenditures and the Presidential Instruction Fund (*Dana Inpres*) which was

⁹ Law 5/1974 stipulated the term of 5 years with one possible reappointment. Those who were already in office for the second term could not be reelected by the 1999 democratic parliament.

¹⁰ Law 32/2004 (Art. 234) states that the head of the local government can stand only once for reelection. Those who were serving their second term already were not allowed to enter local direct elections. See Hofman and Kaiser (2006) and Schiller (2009) for a discussion.

earmarked for development projects (World Bank 2003b). In the aftermath of fiscal decentralization regions receive central government transfers to secure the provision of basic public services subject to local needs and capacity, while the transfers also aim at equalizing differences between regions. These transfers are redistributed in form of shared tax and natural resource revenues, and payments from the General Allocation Grants (*Dana Alokasi Umum/DAU*) and the earmarked Special Allocation Grant (*Dana Alokasi Khusus/DAK*).¹¹

After decentralization, large parts of the three sectors included in our analysis (education, health, and infrastructure) became the sole responsibility of the local governments. For instance, local governments are responsible for the first nine years of education, which include six years of primary and three years of junior secondary education.¹² Although the division of roles and responsibilities is not entirely clear, local governments became also responsible for the majority of primary healthcare services, their financing and human resources (World Bank 2008a). For instance, the operation of health clinics (*Puskesmas*), which are the main providers of primary health services to the communities, has been financed by local governments since decentralization. In terms of physical infrastructure, the responsibility for roads, transportation and water services was transferred to the local governments. From the network of national, provincial and district roads, the local governments are responsible for the latter. They are also responsible for the water services and own the local water supply utilities (PDAM, *Perusahaan Daerah Air Minum*) (World Bank 2007).

Real per capita development expenditures by the local governments have been steadily rising since 1999 (cf. Figure 1), which shows a large increase in the fiscal scope at the local level. The increases were largest in health development expenditures, which started from relatively low levels as compared to education and infrastructure, and increased by 21 percent until 2007. After decentralization, the variation in infrastructure expenditures increased strongly across districts, while education expenditures were also slightly diverging; health expenditures were the only category that had a lower coefficient of variation in 2007 than in 1994. Lately, we have also seen some local governments catching up in terms of expenditures as coefficients of variation have been decreasing since 2005 for infrastructure and since 2004 for education.

At the same time, service coverage in education, health and physical infrastructure has also been improving. While primary school attendance has been almost universal for the last decade,¹³ the gaps in junior secondary school enrollment rates are still considerable. This is partly because of lack in physical infrastructure. In 1999 there was only one junior

¹¹ The resource rich provinces of Nanggroe Aceh Darusalam (NAD) and Papua also receive payments from the Special Autonomy Fund (*Dana Otsus*) which aims at accelerating development in both provinces. In addition, Papua receives a higher share of the Natural Resource Shared Revenue (World Bank 2007).

¹² In principal, local governments are also responsible for senior secondary education, but in practice the majority of it is funded by the province. For discussions on the funding arrangements between the provincial and local governments see World Bank (2005, 2008b, 2008c) and Australia-Nusa Tenggara Assistance for Regional Autonomy (2009).

¹³ The large increases in primary school attendance were partly due to large-scale school construction programs in the mid-eighties (Duflo 2001).

secondary school for 400 children aged 13 to 15 years old and in 2006 the ratio improved with one school accommodating 300 children. The share of villages with paved roads also increased somewhat (from 55 to 58 percent from 1999 to 2007), while on average there was also one additional health clinic (*Puskesmas*) built per 10,000 of population. The variation across local governments in public service coverage levels is large. Some local governments have one school for less than 150 junior secondary aged children while others have only one school for almost 1000 children. In many cities in Java and Sumatra virtually all roads are paved while rural local governments in e.g., Central Kalimantan have less than 6 percent of their roads paved. The coverage of education, health and infrastructure remains relatively unchanged, with a slight converging in terms of education (cf. Figure 1, lower right panel).

Empirical approach

Data

Our panel dataset includes 271 local governments (*kabupaten/kota*) in Indonesia from 1994 to 2007. The time period is restricted by data availability, especially by the availability of local budget data, but contains both observations from both before and after decentralization (twice 7 years). We chose the local governments as our unit of observation because administrative and fiscal decentralization in Indonesia transferred resources and responsibilities for basic services directly to the level of local governments. Our main source of local government budget data is the Regional Financial Information System (*Sistem Informasi Keuangan Daerah/SIKD*) of the Ministry of Finance.¹⁴ This database allows us to access both expenditure and revenue data, but fiscal years have to be adjusted in order to make the pre and post decentralization budget comparable.

The number of local governments increased significantly after decentralization due to administrative splitting and proliferation of new local governments (cf. Section 2). To overcome this issue we treat the new districts jointly with their ‘origin’ districts, which leaves us with 292 local governments.¹⁵ Due to missing data problems we had to exclude all local governments in Aceh and Papua, and also opted for excluding the structurally different capital Jakarta; thus our final dataset consists of 271 local governments.

Our main variable of interest is development expenditures per capita by sector, which mainly involves capital expenditures. We focus on these development expenditures only, because due to changes in local budget reporting rules we are unable to construct salaries and recurrent expenditures by sector.¹⁶ We focus on the sectors of education, health

¹⁴ See <http://www.djpk.depkeu.go.id>.

¹⁵ Before decentralization (in 1999) Indonesia had 292 districts, excluding districts in the capital Jakarta. It is unclear how many of them existed officially in the year of 2000, but in 2001 there were 336 districts that received DAU.

¹⁶To map and match the different budget rules we follow the mapping procedure developed by the World Bank. For more details on the mapping procedure see World Bank (2005, 2009). For sectoral mapping see World Bank (2007).

and infrastructure. These three mandatory sectors constitute more than half of the local government development budgets in 2007. The infrastructure sector consists of public works and transportation, including the extension and maintenance of roads, bridges, and the irrigation, sanitation and transportation networks (World Bank, 2005, 2007, 2008c). It excludes expenditures on the electricity sector as these were not decentralized.

We use indicators of the level of public service coverage for measuring public service delivery. Our main source of data is Indonesia's Central Bureau of Statistics (*Badan Pusat Statistik/BPS*).¹⁷ As our main variable of interest (development expenditures) reflects capital investments, we selected indicators that can proxy the needs for investing into the public infrastructure of each sector. At the same time we focus on indicators that reflect well the roles and responsibilities of the districts under the decentralization regime.¹⁸ For education our main public service indicator is the junior secondary schools density per 100 children aged 13 to 15 years old (junior secondary school aged children in Indonesia). After decentralization local governments became responsible for the first nine years of education, and the investment expenditures on junior secondary schools are the second largest item after the expenditures on primary education (World Bank 2007). Our preferred indicator for public sector coverage in the health sector is given by the ratio of health clinics (*Puskesmas*) to 10,000 of population. We decided to focus on *Puskesmas*, as they provide a wider array of primary health services than the integrated health service points (*Posyandu*), which often operate without relying on a fix infrastructure and hence involve less infrastructure investments, while hospitals are mainly shared with the province. For physical infrastructure we use the share of villages with paved roads as the main indicator, which captures well the level of infrastructure in the district.¹⁹ We minimize the risk of overlaps with the national or provincial roads because roads in the village are part of the districts' own road network.

Our indicator variable for democratically appointed head of local governments takes one if the head was elected by the local parliament which resulted from the more democratic 1999 elections. The timing of the appointment was based on the term limits of the head in office at that time, as all local heads (appointed previously by Soeharto's 'New Order' regime) were allowed to complete their term limit of five years. We identify their appointment date and tenure of local government heads based on a list of local government heads from the Ministry of Home Affairs. Those who were elected after the new democratic elections in June 1999 are identified as democratically elected.²⁰

Our indicator for directly elected heads takes one if the head was elected directly in a local direct election (*Pilkada*), which started in 2005. Their timing was once again based on the term of the head in office at that time, which were exogenously given. We collected data on *Pilkada* from various sources that include the General Election Commission

¹⁷ See <http://www.bps.go.id>.

¹⁸ Table A.1 in the Appendix shows the list and definitions of the various public service coverage indicators that we have built and tested.

¹⁹ Once again, other proxies for physical infrastructure (access to clean water, markets, or bus terminals, cf. Table A.1) yield virtually the same results.

²⁰ For those appointed in the last quarter of 1999 the dummy for democratic head is equal one starting only in the year 2000 (no head was appointed in the third quarter of 1999).

(KPU), the desk Pilkada at the Ministry of Home Affairs, The Asia Foundation and the World Bank. We combined information from all these sources to create a dataset that shows how many districts have conducted *Pilkada* and therefore have a directly elected head.²¹ If the elections took place in the last quarter of a year, however, both the democratically and the directly elected head indicators take one only in the following year. This reflects better the reality of budget policy because the elected head could only revise the ongoing budget before the last quarter of each year.²²

A further set of variables controls for the influence of the distribution of political power within the district. We measure high political concentration in a district by quantifying the distribution of political power since the first local parliamentary elections in 1999. Political concentration is measured by a Herfindahl index. This variable is based on election data from the General Election Commission (KPU).

As to our additional controls, data on district revenues and sectoral provincial expenditures comes from the Regional Financial Information System (SIKD) of Ministry of Finance,²³ information on splitting districts has been derived from the list of districts that receive capitation grants (DAU) in each year and the laws that create them. We treat new districts as autonomous when they receive separate fiscal transfers from the central government. We use the list to identify the number of districts every year and the laws to identify their origin. Urbanization rates and the real gross regional domestic product come from the Central Bureau of Statistics (BPS).

Empirical Model

We measure the effects of decentralization on the expenditure structure by jointly estimating the determinants of real per capita local expenditures in the sectors of education, health, and infrastructure in a seemingly unrelated regression (SUR) framework. The three regressions for the sectors ($S=E,H,I$) take the following form:

$$EXP_{it}^S = \beta^S_0 PSD_{it-1}^S + \beta^S_1 DEC_{it} + \beta^S_2 REV_{it} + X_{it}'\delta^S + \mu^S_t + \lambda^S_i + \varepsilon^S_{it} \quad (S=E,H,I) \quad (1)$$

The dependent variables EXP_{it} stand for the natural logarithm of the per capita annual development expenditures of the local government i in year t in one of the three sectors. They measure thus expenditures that are spent on extending or maintaining the public infrastructure in education, health, or transportation and irrigation. We estimate (1) with fixed effect panel data models that factor out the time-constant district-specific differences in the average size of expenditures λ^S_i . As sectoral fiscal decisions are interrelated and underlie the same budget constraint, we allow for a contemporaneous correlation between the error terms of the three equations ($\varepsilon^E_{it}, \varepsilon^H_{it}, \varepsilon^I_{it}$), and estimate the three equations jointly by feasible generalized least squares (FGLS). Moreover, clustering error terms at the district level corrects for potential auto correlation. All regressions include

²¹ We cross-checked our combined dataset with a list of *Pilkada* from the Ministry of Home Affairs and the General Election Commission, and also by performing an internet search of news.

²² See Law 22/1999 article 86 and Law 32/2004 article 183.

²³ Data on sectoral province expenditure in each district is unavailable. Therefore we distribute the provincial expenditure according to district population size.

a set of time fixed effects μ_t that control for common macroeconomic and policy shocks.²⁴

We capture the relationship between local public service delivery and development expenditures by including the lagged level of local public infrastructure in the given sector PSD_{it-1} as a control. We use the lagged levels of this variable in order to exclude the possibility of instantaneous feedback from investments to public infrastructure.²⁵ For the education sector, PSD_{it-1} is proxied by junior secondary school density (per school aged population), in health by health clinic density (No. of *Puskesmas* to 10,000 of population), and in infrastructure by the share of villages with paved roads.²⁶ A negative sign for the coefficient β_0 would imply that districts with relatively lower levels of public service coverage spend more on physical public infrastructure, which is what we would expect.

The indicator variable DEC_{it} takes one for years after decentralization and zero otherwise. As fiscal and administrative decentralization were introduced in 2001 as a “big-bang” policy change, for these forms of decentralization DEC_{it} does not vary across local units only over time and becomes an indicator for a structural break DEC_t . However, it varies across local governments for our two measures of democratic decentralization as there is substantial variation in the timing of the first democratically elected and later directly elected local government heads (cf. Section 2). As these resulted from applying the term limit rules to local government heads already in office, they are exogenous to district expenditures as well as other underlying measures of local governance. Regressions also include the natural logarithm of the local p.c. revenues not earmarked for other sectors REV_{it} , which controls for the intensity of fiscal devolution to the local governments, and should be relatively closely related to differences in expenditure size.²⁷ This control is also capturing the direct effects of fiscal decentralization which increased the size of non-earmarked local revenues considerably.

Further controls in vector \mathbf{X}_{it} include the natural logarithm of the regional GDP p.c. (in order to proxy for differences in wealth), urbanization rates, the natural logarithm of the p.c. development expenditures of the province in the given sector, and an indicator for splitting districts. We control for urbanization because of potential benefits of scale: in more urban environments less infrastructure investment is required in p.c. terms to reach the same level of coverage with the less urban environment. We also include sectoral development expenditures at the provincial level as jointly financed projects might lead to a positive correlation between provincial and local expenditures in a given sector, although we minimize expenditure overlaps by focusing mainly on indicators that are solely under local government’s responsibility. We also control for splitting districts:

²⁴ We have to drop one additional time effect as the average administrative/fiscal decentralization effect is measured over the second seven years.

²⁵ We are less concerned about the potential endogeneity of past public service utilization as this rather reflects the total stock of past public investments.

²⁶ These measures reflect quite well potential needs for extending the public physical infrastructure (cf. Section 3.1), and focus on responsibilities of the local governments. We also experimented with other conceivable measures of service coverage (secondary school enrollment rates, share of villages with access to clean water, etc.); our overall results are not sensitive to the choice of public service coverage measures.

²⁷ We excluded the earmarked grants (DAK) for other sectors from the total revenue, except for the sector analyzed.

changing district boundaries increases the need for some of the public investments as after the administrative splits districts might have ended up with missing hospitals, schools or roads.²⁸

In order to measure the effects of decentralization on the responsiveness of local development expenditures to gaps in local public service delivery, we augment equation (1) by including additional interactions between the lagged levels of public service coverage and our indicators of decentralization (and revenue size):

$$EXP_{it} = \beta_0 PSD_{it-1} + \beta_1 DEC_{it} + \beta_2 REV_{it} + \gamma_1 PSD_{it-1} \times DEC_{it} + (\gamma_2 REV_{it} \times DEC_{it}) + X_{it}'\delta + \lambda_i + \mu_t + \varepsilon_{it} \quad (2)$$

Our main coefficient of interest is thus given by γ_1 , which shows by how much did the responsiveness to gaps in public service delivery change after decentralization; the total effect of public service coverage after decentralization is given by $\beta_0 + \gamma_1$. A negative γ_1 would imply that local governments became more responsive to local needs after decentralization by increasing their development expenditures by more in places where local public service coverage was lower. In order to compare the effects of fiscal/administrative with those of the political decentralization, in some specifications we interact public service coverage with two different decentralization measures at the same time.

Theoretically, the various decentralization measures can be expected to capture different mechanisms. For given revenue size, the interaction of the indicator for fiscal and administrative decentralization with lagged public service coverage captures potential improvements in the sectoral targeting of development expenditures, which might be due to informational advantages at the local level. By contrast, our democratization indicators measure the effects of decreasing central control on political careers of the local heads of governments and the added effects of the new electoral accountability. This net accountability effect could result both in improvements of the responsiveness to local needs but also in local elite capture of the not yet fully developed electoral process. Furthermore, the effects of democratic and direct elections might also differ as direct elections increase the direct accountability of the local heads of governments to their constituencies as opposed to their parties. The relative importance of democratic and direct elections once again depends on the strength of disciplining power of the party (in democratic elections) as compared to the disciplining power of the electorate (in direct elections). We also test for the disciplining power of an opposition in an indirect way by interacting responsiveness to public service coverage gaps with political concentration in the local parliaments.

²⁸ As noted earlier (cf. Section 2), district splits followed mainly economic and political incentives and so might also reflect revenue prospects of the districts.

Results

The results from our baseline specification (eq. 1) are shown in Table 3 separately for the three sectors. Columns (1), (3) and (5) introduce the indicator for fiscal and administrative decentralization, while controlling for district wealth, urbanization, provincial expenditures, splitting districts, and time effects. We see that local development expenditures on education and physical infrastructure more than doubled, those on health infrastructure more than tripled in the period after decentralization. Columns (2), (4) and (6) show that a large part of this effect was due to increases in fiscal revenues that are distributed to the districts. When we control for the revenue effect, the effect of decentralization vanishes for education and health, and even turns negative for infrastructure. This shows that investment into physical infrastructure expenditure decreased after decentralization relative to other sectors.

Most of the additional controls are also showing the expected signs, although we do not find a significant correlation between service coverage levels and development expenditures over the full time period. However, we find that with growing p.c. GRDP regions invested more in all sectors, but this effect can be mostly explained by increases in their revenue size. Higher urbanization results in significantly lower expenditure sizes in infrastructure once revenue size has been controlled for; this might reflect scale effects in building public infrastructure in more urbanized areas. Coefficients on the other sectors are also negative but not significant. There is also evidence for complementarity between the expenditures of different tiers of the government. Local development expenditures are positively related with provincial expenditures both in education and physical infrastructure; this is not surprising as large infrastructure projects are likely to be co-financed by the districts and the province. Finally, as expected, districts that contain splitting administrative units have also tended to spend more on public infrastructure: part of this effect is once again due to their higher revenues (which were either following or causing the splits), but partly it reflects the needs for additional public schools, clinics or even roads after administrative splits.

Table 4 presents our main results on the effects of fiscal and administrative decentralization on the responsiveness of the development expenditures to local needs (from eq. 2). Additionally to all previous controls, these specifications include an interaction term between the decentralization indicator and the lagged level of public service coverage in the given sector. For investments into the education infrastructure we see a significant increase in responsiveness (negative β coefficient) once we control for the increase in revenue elasticity after decentralization (column 2). The significantly positive PSD coefficient even suggests that once changes in the revenue elasticity are controlled for, relatively less endowed districts were spending even less on education before decentralization. We also see clear improvements in responsiveness to local gaps in public service infrastructure in the health sector. The second interaction terms between the decentralization indicator and fiscal revenues (in columns 2 and 4) also shows that the revenue elasticity of these expenditures increased considerably after decentralization for invest-

ments in the first two sectors. Thus, local governments started to invest more into health and education infrastructure in places with relatively low public service coverage, and this spending also became more closely coupled to their own revenue size. These findings support the idea of informational advantages of local governments that seem to have improved the targeting efficiency of health and education investments after the fiscal and administrative decentralization. By contrast, investments into physical infrastructure seem to follow a different logic: we find no significant changes in responsiveness to gaps in paved road coverage neither before nor after decentralization (column 5), and the revenue elasticity of these expenditures also did not change after decentralization (column 6).²⁹

Table 5 compares the effects of fiscal and administrative decentralization in 2001 with the effects of electoral reforms in the democratization process: the first democratic elections of local government heads (introduced between 1999 and 2004) and the first direct elections of local heads (introduced starting with 2005) (cf. Table 1). Overall, these results are far from conclusive. Districts with democratically elected government heads seem to have started to spend less on education and more on infrastructure and responsiveness decreased significantly for investments in the education sector, once the effects of fiscal and administrative decentralization are controlled for. The introduction of direct elections does not show overall strong effects, except for a slight increase in education expenditures. Table 6 elaborates these results further by adding information on the concentration of power within the local parliaments and building interactions with the election types and PSD levels. The effects of democratic elections are now insignificant for health and physical infrastructure and are only significant once again for education. Expenditures under democratically elected governors did become less responsive to PSD levels, and also did increase under governors working with more concentrated parliaments; changes in local responsiveness after democratization did not depend on the strength of the partisan power. In a similar vein, changes of responsiveness were not related to the distribution of parliamentary power after the second major electoral reform introduced direct elections. Contrasted to the much more clear-cut evidence of the administrative and fiscal decentralization, the democratization process does not seem to have yielded consistent changes in the budgeting process.

One explanation of the less conclusive democracy results could lie in the very specific form of Indonesian local parliamentary democracy which is strongly consensus based, with loyalties more concentrated along committee than along party lines (Sherlock 2004, 2011). The selling of party nominations to aspiring candidates (Buehler and Tan 2007, Lindsay 2009, and Buehler 2010) results in a system with almost random candidate-party and coalition relationships (Mietzner 2006).

The tables in the Appendix address some further robustness issues. Table A2 decomposes the changes in revenue elasticity of expenditures after fiscal decentralization into discretionary and nondiscretionary revenue as well as revenue earmarked for the given sector

²⁹ These differences do not come from the fact that village roads are a less significant item in infrastructure expenditures: the results are the same when we use other indicators of physical infrastructure like access to clean water, or the density of bus-stops or local markets.

by the central government. We see that after decentralization, the importance of both discretionary and non-discretionary revenue increased considerably whereas sectoral earmarked revenue lost its former importance almost completely.

One might be concerned whether the increase in responsiveness is just capturing the effects of a recovery from the Indonesian monetary crisis of 1997/98, and has less to do with fiscal and administrative decentralization. We test the validity of this explanation in Table A3, by controlling for interactions between the two main crisis years (1998 and 1999) and PSD levels as well as fiscal revenues. If our decentralization results were just driven by a post-crisis recovery effect, the PSD interaction with decentralization should lose significance. We see that responsiveness was better during than before the crisis years in the education sector, and expenditures in all sectors were also more closely responding to revenues than before. Nonetheless, our decentralization effects stay stable and show improvements in responsiveness.

Conclusion

Our paper investigated the effects of administrative and fiscal as well as political decentralization in Indonesia. Indonesia's vast regional diversity as well as the large scale big-bang decentralization and the accompanying democratization process offer a valuable case study on the effects of decentralization on local public service delivery. We studied this process by estimating fixed effect panel models explaining local investments in public infrastructure in three sectors: education, health, and physical infrastructure, and defining local needs based on past levels of public service coverage. Our main findings show that fiscal and administrative decentralization increased the responsiveness of local governments to gaps in local public service coverage, and this effect cannot be explained by increases in the districts' fiscal revenues only. The effects of democratization are less clear-cut. We find no conclusive overall effects of either the early party representation based democratization or the later introduction of direct elections (after controlling for fiscal decentralization), if anything, responsiveness might have deteriorated in the education sector with democratically elected heads. These results thus also show that the improvements in targeting that came from administrative and fiscal decentralization were less sensitive to the political processes. One explanation for this

The beneficial effects of fiscal and administrative decentralization highlight the role of local informational advantages that can lead to better targeting of public infrastructure investments and an increased local responsiveness to public service delivery gaps. At the same time we do not see strong (or at least only see some) adverse effects of political decentralization; especially, our results do not allow us to trace a consistent presence of local elite capture.

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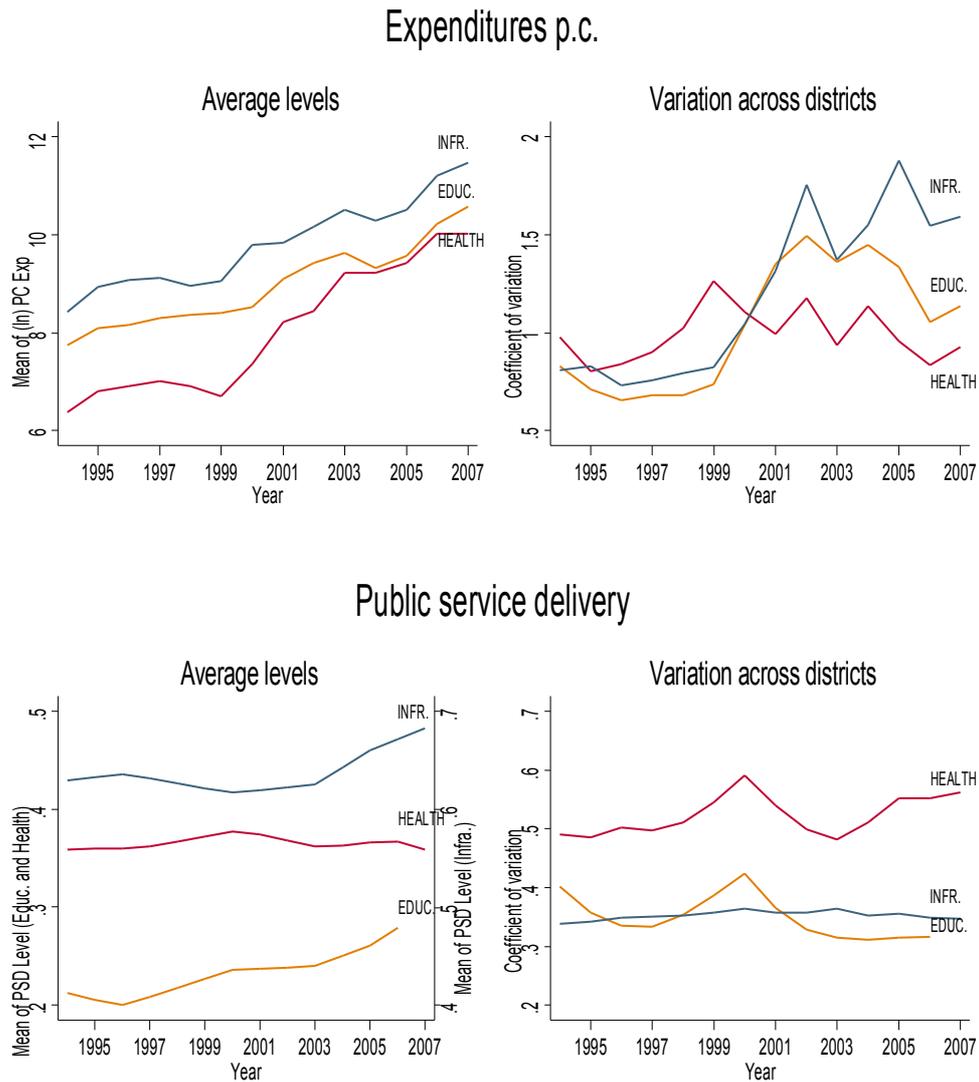
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Appendix

A1. Figures

Figure 1: Evolution of per capita development expenditures and PSD levels by sector



Notes: Levels of public service delivery include 1) the ratio of junior secondary schools to 100 junior secondary school aged children for education, 2) the ratio of health clinics to 10,000 of population (both measured on the left scale of the lower left panel), and 3) the percentage share of villages with paved roads for infrastructure (measured on the right scale of the lower left panel).

A2. Tables**Table 1: The democratization process**

| Year | No. districts | Local government heads who are | | Directly elected Number |
|------|---------------|--------------------------------|------|-------------------------|
| | | Democratically elected Number | % | |
| 1999 | 292 | 42 | 14.4 | |
| 2000 | 299 | 111 | 37.1 | |
| 2001 | 336 | 178 | 53.0 | |
| 2002 | 348 | 208 | 59.8 | |
| 2003 | 370 | 316 | 85.4 | |
| 2004 | 410 | 392 | 95.6 | |
| 2005 | 434 | 434 | 100 | 204 |
| 2006 | 434 | 434 | 100 | 278 |
| 2007 | 434 | 434 | 100 | 305 |

Note: Starting with 2005 all directly elected heads are considered democratically appointed. *Source:* List of heads of regional governments from Min. of Home Affairs, The World Bank, Asia Foundation. Local direct election data comes from the Min. of Home Affairs, KPU, Asia Foundation, The World Bank.

Table 2: Descriptive statistics

| | Mean | Std. Dev. | Min | Max |
|--|--------|-----------|--------|--------|
| <i>ln</i> Dev. Exp. (p.c.) on education | 9.203 | 1.152 | 4.252 | 13.746 |
| <i>ln</i> Dev. Exp. (p.c.) on health | 8.259 | 1.517 | 2.780 | 12.413 |
| <i>ln</i> Dev. Exp. (p.c.) on infrastructure | 10.044 | 1.285 | 2.451 | 15.072 |
| PSD level in education | 0.256 | 0.090 | 0.051 | 0.956 |
| PSD level in health | 0.455 | 0.231 | 0.076 | 2.268 |
| PSD level in infrastructure | 0.654 | 0.250 | 0.038 | 1 |
| Decentralization | 0.474 | 0.499 | 0 | 1 |
| Democratic head | 0.306 | 0.461 | 0 | 1 |
| Directly elected head | 0.088 | 0.283 | 0 | 1 |
| <i>ln</i> Fiscal revenue p.c. | 12.358 | 1.179 | 9.479 | 16.084 |
| <i>ln</i> Real GRDP p.c. | 15.218 | 0.619 | 12.432 | 18.152 |
| Urbanization rate | 0.379 | 0.316 | 0.006 | 1 |
| <i>ln</i> Dev. Exp. p.c (prov.) on education | 7.856 | 1.026 | 5.602 | 11.396 |
| <i>ln</i> Dev. Exp. p.c (prov.) on health | 7.311 | 1.226 | -0.168 | 10.658 |
| <i>ln</i> Dev. Exp. p.c (prov.) on infrastructure | 9.081 | 0.940 | 6.433 | 13.137 |
| Splitting districts | 0.061 | 0.240 | 0 | 1 |
| <i>ln</i> Discretionary fiscal revenue (p.c.) | 11.105 | 1.475 | 7.966 | 15.801 |
| <i>ln</i> Earmarked fiscal revenue for educ. (p.c.) | 6.887 | 3.461 | 0 | 12.046 |
| <i>ln</i> Earmarked fiscal revenue for health (p.c.) | 6.055 | 3.180 | 0 | 11.451 |
| <i>ln</i> Earmarked fiscal revenue for infra. (p.c.) | 7.509 | 3.607 | 0 | 12.304 |
| <i>ln</i> Non-discretionary fiscal revenue educ. (p.c.) | 11.906 | 1.108 | 8.790 | 14.729 |
| <i>ln</i> Non-discretionary fiscal revenue health (p.c.) | 11.932 | 1.089 | 8.831 | 14.741 |
| <i>ln</i> Non-discretionary fiscal revenue infra. (p.c.) | 11.851 | 1.152 | 7.094 | 14.728 |
| Crisis years (1998-1999) | 0.148 | 0.355 | 0 | 1 |
| Political concentration index | 0.209 | 0.122 | 0.026 | 0.756 |

Note: Number of observations is 3320 for 271 local governments except for political concentration index which started only in 1999.

Table 3: Decentralization and development expenditures (SUR FE panel results)

| Dependent | <i>ln</i> Development expenditures (p.c.) on | | | | Infrastructu re |
|--|--|---------------------|---------------------|--------------------|---------------------|
| | Education | | Health | | |
| | (1) | (2) | (3) | (4) | |
| PSD level (t-1) | 0.059 (0.23) | 0.028 (0.12) | -0.063 (0.24) | -0.112 (0.43) | -0.419 (1.18) |
| Decentralization | 2.755 (29.39)*** | 0.234 (1.41) | 3.563 (32.66)*** | 0.933 (0.92) | 2.504 (20.30)*** |
| <i>ln</i> Fiscal revenue p.c. | | 0.802 (10.56)*** | | 0.833 (9.29)*** | |
| <i>ln</i> Real GRDP p.c. | 0.122 (1.67)* | 0.149 (0.13) | 0.245 (2.28)** | 0.126 (1.18) | 0.285 (3.13)*** |
| Urbanization rate | -0.281 (1.07) | -0.408 (0.76) | -0.057 (0.22) | -0.194 (1.17) | -0.200 (0.68) |
| <i>ln</i> Sectoral development exp. p.c. (prov.) | 0.057 (2.41)** | 0.047 (2.02)** | 0.015 (0.62) | 0.010 (0.42) | 0.213 (4.92)*** |
| Splitting districts | 0.269 (3.97)*** | 0.118 (5.17)*** | 0.158 (2.12)** | 0.338 (0.04) | 0.510 (6.61)*** |
| Time effects | Yes | Yes | Yes | Yes | Yes |
| No. observations | 3320 | 3320 | 3320 | 3320 | 3320 |

Note: All models are estimated by SUR fixed effects panel data models (GLS). Robust z statistics, clustered at the district level, are reported in parentheses. Number of districts is 271. The PSD (public service delivery) indicators are given by the number of junior high schools per 100 junior high school aged children, the number of health clinics (Puskesmas) per 10,000 of population for health, and the share of villages with paved roads for infrastructure.

***, **, * denote significance at the 1, 5, and 10% level.

Table 4: Decentralization and responsiveness of expenditures (SUR FE panel results)

| Dependent | <i>ln</i> Development expenditures (p.c.) on | | | | |
|---|--|---------------------|---------------------|---------------------|---------------------|
| | Education | | Health | | Infrastruc- ture |
| | (1) | (2) | (3) | (4) | (5) |
| PSD level (t-1) | -0.020 (0.08) | 0.481 (1.98)** | 0.149 (0.58) | 0.286 (1.21) | -0.288 (0.82) |
| Decentralization | 193 (0.74) | -2.627 (5.39)*** | 1.239 (4.16)*** | -1.534 (1.51) | -0.218 (0.78) |
| <i>ln</i> Fiscal revenue p.c. | 0.801 (10.55)*** | 0.718 (11.34)*** | 0.809 (9.14)*** | 0.721 (10.73)*** | 0.924 (11.77)*** |
| Decentralization X PSD level (t-1) | 0.125 (0.52) | -0.852 (2.97)*** | -0.455 (3.04)*** | -0.788 (4.35)*** | -0.218 (1.36) |
| Decentralization X <i>ln</i> Fiscal revenue p.c. | | 0.379 (6.05)*** | | 0.310 (3.89)*** | |
| Time effects | Yes | Yes | Yes | Yes | Yes |
| Further controls | Yes | Yes | Yes | Yes | Yes |
| No. observations | 3320 | 3320 | 3320 | 3320 | 3320 |

Note: All models are estimated by SUR fixed effects panel data models (GLS). The PSD (public service delivery) indicators are given by the number of junior high schools per 100 junior high school aged children, the number of health clinics (Puskesmas) per 10,000 of population for health, and the share of villages with paved roads for infrastructure. Further controls include *ln* Real GRDP p.c., Urbanization rate, and *ln* Sectoral development expenditures p.c. at the province level, and an indicator for district splits (cf. Table 3). Robust z statistics, clustered at the district level, are reported in parentheses. Number of districts is 271. ***, **, * denote significance at the 1, 5, and 10% level.

Table 5: The impact of democratically/directly elected local heads on responsiveness (SUR FE panel results)

| Dependent | <i>ln</i> Development expenditures (p.c.) on | | | | |
|--|--|---------------------|---------------------|---------------------|---------------------|
| | Education | Health | Infrastructure | | |
| | (1) | (2) | (3) | (4) | (5) |
| PSD Level (t-1) | 0.371 (1.49) | 0.456 (1.84)* | 0.294 (1.24) | 0.295 (1.26) | -0.286 (0.82) |
| Decentralization | -1.654 (1.63) | -4.538 (2.56)** | -4.410 (2.62)*** | -1.406 (1.40) | -2.651 (5.25)*** |
| <i>ln</i> Fiscal revenue p.c. | 0.718 (10.82)*** | 0.717 (7.89)*** | 0.894 (11.30)*** | 0.717 (10.74)*** | 0.722 (7.93)*** |
| Decentralization X <i>ln</i> Fiscal revenue p.c. | 0.101 (3.92)*** | 0.103 (1.42) | 0.312 (1.38) | 0.308 (6.08)*** | 0.379 (6.10)*** |
| Decentralization X PSD Level (t-1) | -1.399 (3.88)*** | -0.767 (2.68)*** | -0.788 (3.98)*** | -0.823 (4.55)*** | -0.096 (0.57) |
| Democratic head | -0.238 (2.27)** | | 0.221 (0.42) | | 0.030 (2.03)** |
| Democratic head X PSD Level (t-1) | 1.015 (2.81)*** | | -0.011 (0.08) | | -0.201 (1.37) |
| Directly elected head | | 0.107 (1.90)* | | -0.407 (0.99) | |
| Directly elected head X PSD Level (t-1) | | -0.576 (0.90) | | 0.198 (1.21) | |
| Time effects | Yes | Yes | Yes | Yes | Yes |
| Further controls | Yes | Yes | Yes | Yes | Yes |
| Observations | 3320 | 3320 | 3320 | 3320 | 3320 |

Note: All models are estimated by SUR fixed effects panel data models (GLS). The PSD (public service delivery) indicators are given by the number of junior high schools per 100 junior high school aged children, the number of health clinics (Puskemas) per 10,000 of population for health, and the share of villages with paved roads for infrastructure. Further controls include *ln* Real GRDP p.c., Urbanization rate, and *ln* Sectoral development expenditures p.c. at the province level, and an indicator for district splits (cf. Table 3). Robust z statistics, clustered at the district level, are reported in parentheses. Number of districts is 271. ***, **, * denote significance at the 1, 5, and 10% level.

Table 6: *The impact of political concentration under democratically/ directly elected head (SUR FE panel results)*

| Dependent | <i>ln</i> Development | | | | |
|---|-----------------------|---------------------|---------------------|---------------------|---------------------|
| | Education | | Health | Infrastructure | |
| | (1) | (2) | (3) | (4) | (5) |
| Decentralization X PSD level (t-1) | -1.654 (4.59)*** | -1.081 (3.34)*** | -0.995 (4.79)*** | -1.004 (5.35)*** | -0.136 (0.77) |
| <i>ln</i> Fiscal revenue p.c. | 0.887 (15.78)*** | 1.117 (11.80)*** | 1.010 (12.21)*** | 0.978 (15.69)*** | 1.102 (15.38)*** |
| Decentralization X <i>ln</i> Fiscal revenue p.c. | 0.466 (7.78)*** | 0.477 (2.82)*** | 0.502 (6.27)*** | 0.471 (7.79)*** | 0.200 (2.90)*** |
| Democratic head | -0.468 (2.46)** | | -0.136 (1.09) | | 0.120 (0.52) |
| Democratic head X PSD level (t-1) | 1.579 (2.34)** | | 0.177 (0.74) | | -0.133 (0.44) |
| Democratic head X Political Concentration Index | 1.218 (2.01)** | | 0.820 (1.45) | | 0.502 (0.51) |
| Democratic head X Political Concentration Index X PSD level (t-1) | -3.318 (1.35) | | -1.159 (1.05) | | -0.505 (0.40) |
| Directly elected head | | 0.441 (0.96) | | -0.230 (1.15) | |
| Directly elected head X PSD level (t-1) | | -1.118 (0.64) | | 0.646 (1.47) | |
| Directly elected head X Political Concentration Index | | -1.664 (0.52) | | 2.314 (1.74)* | |
| Directly elected head X Political Concentration Index X PSD level (t-1) | | 3.721 (0.27) | | -3.497 (1.16) | |
| Observations | 3266 | 3266 | 3266 | 3266 | 3266 |

Note: All models are estimated by SUR fixed effects panel data models (GLS). The PSD (public service delivery) indicators are given by the number of junior high schools per 100 junior high school aged children, the number of health clinics (Puskesmas) per 10,000 of population for health, and the share of villages with paved roads for infrastructure. All models include as further controls time effects, Decentralization indicator, baseline PSD level, *ln* Real GRDP p.c., Urbanization rate, and *ln* Sectoral development expenditures p.c. at the province level, and an indicator for district splits (cf. Table 3). Robust z statistics, clustered at the district level, are reported in parentheses. Number of districts is 271. ***, **, * denote significance at the 1, 5, and 10% level.

Table A1: Public service delivery indicators tested

| PSD Indicators | Description | Source |
|---|---|---------|
| Education | | |
| Net enrollment rate by age group (primary 7-12 y.o., jnr. second. 13-15 y.o., senior sec. 16-18 y.o.) | No. of students within the age group enrolled/ No. of children within the age group | Susenas |
| Gross enrollment rate by age group | No. of students enrolled / No of children within the age group | Susenas |
| School ratio by age group | No of schools / No of people within the age group | Podes |
| Health | | |
| Puskesmas (Health clinic) ratio | No. of puskesmas/10,000 of population | Podes |
| Hospital Ratio | No. of hospitals/10,000 of population | Podes |
| Posyandu (Integrated health service) ratio | No. of posyandu/10,000 of population | Podes |
| Doctors Ratio | No. of doctors/10,000 of population | Podes |
| Share of births attended by skilled workers | No. of births attended by skilled workers/Total births | Susenas |
| Share of below 5 y.o. with complete immunization | No. of 5 y.o. with complete immunization/No. of 5 y.o. | Susenas |
| Infrastructure | | |
| Share of hh.s with access to clean water | No. of hh.s with access to clean water/ No. of HH | Susenas |
| Share of villages with paved road | No. of villages with paved road/No. of villages | Podes |
| Share of villages with market | No. of villages with paved road/No. of villages | Podes |
| Share of villages with bus terminal | No. of villages with bus terminal/No. of villages | Podes |

Note: Susenas is the annual National Survey of Social Economics, Podes is the village census (every three years), both from the Central Bureau of Statistics (BPS). See <http://www.bps.go.id>. In years with no Podes rounds indicators are estimated by linear projections.

Table A2: Decentralization and responsiveness of development expenditures with decomposition of fiscal revenue (SUR FE panel results)

| Dependent | ln Development expenditures (p.c.) on | | | | |
|---|---------------------------------------|----------------------|---------------------|----------------------|--------------------|
| | Education | | Health | | Infrastructure |
| | (1) | (2) | (3) | (4) | (5) |
| PSD Level (t-1) | 0.188 (0.75) | 0.267 (1.48) | 0.240 (0.99) | 0.079 (0.37) | -0.317 (0.89) |
| Decentralization | 0.144 (0.52) | -3.622 (3.94)*** | 1.246 (4.19)*** | -3.733 (5.02)*** | 0.531 (1.62) |
| Decentralization X PSD Level (t-1) | -0.228 (0.94) | -0.381 (1.50) | -0.610 (4.14)*** | -0.052 (0.37) | -0.124 (0.70) |
| ln Discretionary revenue p.c. | 0.434 (10.04)*** | 0.447 (4.01)*** | 0.368 (7.13)*** | 0.321 (8.07)*** | 0.340 (5.82)*** |
| Decentralization X ln Discretionary revenue p.c. | | 0.380 (5.65)*** | | 0.248 (3.55)*** | |
| ln Sectoral earmarked revenue p.c. | 0.131 (11.47)*** | 0.758 (24.29)*** | 0.148 (10.15)*** | 0.901 (52.13)*** | 0.054 (2.54)** |
| Decentralization X ln Sectoral earmarked revenue p.c. | | -0.681 (20.60)*** | | -0.865 (43.50)*** | |

Table A2: continued

| Dependent | ln Development expenditures (p.c.) on | | | | |
|---|---------------------------------------|--------------------|--------------------|--------------------|--------------------|
| | Education | | Health | | Infrastructure |
| | (1) | (2) | (3) | (4) | (5) |
| <i>ln</i> Non-discretionary revenue p.c. | 0.231 (4.57)*** | 0.018 (0.38) | 0.278 (4.16)*** | -0.062 (1.09) | 0.223 (3.75)*** |
| Decentralization X <i>ln</i> Non-discretionary revenue p.c. | | 0.366 (5.09)*** | | 0.610 (6.87)*** | |
| Time effects | Yes | Yes | Yes | Yes | Yes |
| Further controls | Yes | Yes | Yes | Yes | Yes |
| No of Obs | 3320 | 3320 | 3320 | 3320 | 3320 |

Note: All models are estimated by SUR fixed effects panel data models (GLS). The PSD (public service delivery) indicators are given by the number of junior high schools per 100 junior high school aged children, the number of health clinics (Puskesmas) per 10,000 of population for health, and the share of villages with paved roads for infrastructure. Further controls include *ln* Real GRDP p.c., Urbanization rate, and *ln* Sectoral development expenditures p.c. at the province level, and an indicator for district splits (cf. Table 3). Discretionary revenue (pre-decentralization)=own source revenue + shared tax revenue + shared non-tax revenue, discretionary revenue (post-decentralization)=own source revenue + shared tax revenue + shared natural resource revenue + (DAU - salary component), sectoral earmarked revenue (pre-decentralization)= sectoral INPRES, sectoral earmarked revenue (post-decentralization) = sectoral DAK, non-discretionary revenue (pre-decentralization)=SDO+INPRES for other sector+carry over+ borrowing, non-discretionary revenue (post-decentralization)=salary+DAK for other sectors+carry over+borrowing. Robust z statistics, clustered at the district level, are reported in parentheses. Number of districts is 271. ***, **, * denote significance at the 1, 5, and 10% level.

Table A3: Decentralization and responsiveness of development expenditures with crisis (SUR FE panel results)

| Dependent | <i>ln</i> Development expenditures (p.c.) on | |
|--|---|---------------------|
| | Education (1) | Health (2) |
| PSD Level (t-1) | 0.572 (2.37)** | 0.231 (0.96) |
| Decentralization | -5.472 (6.20)*** | -3.409 (3.32)*** |
| Decentralization X PSD Level (t-1) | -0.961 (3.36)*** | -0.727 (3.91)*** |
| <i>ln</i> Fiscal revenue p.c. | 0.707 (10.66)*** | 0.729 (7.93)*** |
| Decentralization X <i>ln</i> Fiscal revenue p.c. | 0.451 (6.92)*** | 0.364 (4.43)*** |
| Crisis years (1998-1999) | -3.709 (5.91)*** | -3.396 (3.93)*** |
| Crisis years X PSD Level (t-1) | -0.525 (1.78)* | 0.152 (0.85) |
| Crisis years X <i>ln</i> Fiscal revenue p.c | 0.328 (5.97)*** | 0.270 (3.48)*** |
| Time effects | Yes | Yes |
| Further controls | Yes | Yes |
| Observations | 3320 | 3320 |

Note: All models are estimated by SUR fixed effects panel data models (GLS). The PSD (public service delivery) indicators are given by the number of junior high schools per 100 junior high school aged children, the number of health clinics (Puskesmas) per 10,000 of population for health, and the share of villages with paved roads for infrastructure. Further controls include *ln* Real GRDP p.c., Urbanization rate, and *ln* Sectoral development expenditures p.c. at the province level, and an indicator for district splits (cf. Table 3). Robust z statistics, clustered at the district level, are reported in parentheses. Number of districts is 271. ***, **, * denote significance at the 1, 5, and 10% level.

Table A4: *The impact of political concentration under democratically/directly elected head in non-splitting districts (SUR FE panel results)*

| Dependent | <i>ln</i> Development | | | | |
|--|-----------------------|---------------------|---------------------|---------------------|---------------------|
| | Education | | Health | Infrastructure | |
| | (1) | (2) | (3) | (4) | (5) |
| Decentralization X PSD level (t-1) | -1.499 (3.73)*** | -0.973 (2.73)*** | -1.007 (4.35)*** | -1.062 (5.05)*** | -0.139 (0.77) |
| <i>ln</i> Fiscal revenue p.c. | 0.894 (15.51)*** | 1.121 (15.47)*** | 1.005 (11.98)*** | 0.970 (14.27)*** | 1.103 (15.06)*** |
| Decentralization X <i>ln</i> Fiscal revenue p.c. | 0.490 (7.72)*** | 0.498 (6.29)*** | 0.558 (6.68)*** | 0.213 (7.71)*** | 0.216 (2.95)*** |
| Democratic head | -0.478 (2.28)** | | -0.189 (1.39) | | 0.096 (0.35) |
| Democratic head X PSD level (t-1) | 1.622 (2.15)** | | 0.267 (0.98) | | -0.106 (0.31) |
| Democratic head X Political Concentration Index | 1.317 (1.99)** | | 1.309 (2.27)** | | 0.824 (0.74) |
| Democratic head X Political Concentration Index X PSD level (t-1) | -3.875 (1.43) | | -2.161 (1.86)* | | -0.892 (0.65) |
| Directly elected head | | 0.238 (0.48) | | -0.297 (1.47) | |
| Directly elected head X PSD level (t-1) | | -0.361 (0.19) | | 0.804 (1.81)* | |
| Directly elected head X Political Concentration Index | | -0.549 (0.16) | | 2.454 (1.87)* | |
| Directly elected head X Political Concentration Index X PSD level (t-1) | | -0.816 (0.06) | | -4.087 (1.36) | |

Note: All models are estimated by SUR fixed effects panel data models (GLS). The PSD (public service delivery) indicators are given by the number of junior high schools per 100 junior high school aged children, the number of health clinics (Puskesmas) per 10,000 of population for health, and the share of villages with paved roads for infrastructure. Further controls include *ln* Real GRDP p.c., Urbanization rate, and *ln* Sectoral development expenditures p.c. at the province level, and an indicator for district splits (cf. Table 3). Robust z statistics, clustered at the district level, are reported in parentheses. The number of observations is 3064 in all models. Number of districts is 271. ***, **, * denote significance at the 1, 5, and 10% level

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