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Fiscal Decentralisation, Local Institutions and Public Goods Provision: Evidence from Indonesia[*]

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Abstract

Using data from the Indonesian Family Life Surveys, we study the impact of fiscal decentralisation in Indonesia on local public spending across communities characterised by different types of informal and formal institutions. Our results provide new evidence that fiscal decentralisation led to a significant increase in community spending on social infrastructure (health and education) in communities which observed strict adherence to customary laws and had a tradition of local democracy. We argue that investment in transport and communication facilitates exchange with outsiders and improves the outside options of community members, thus making it more difficult to sustain intra-community cooperation. Consequently, communities which enjoy a high level of cooperation in collective activities benefit less from investing in transport and communication and are more inclined to invest in social infrastructure.

Keywords: Decentralisation; Democratisation; Collective activities; Mutual Co-operation; Traditional laws; Social and physical infrastructure; Local public spending; Indonesia
JEL Codes: D02, H41, O43

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1 Introduction

In recent years, the potential of improving public service delivery in developing countries through political and fiscal decentralisation has received a great deal of attention, both from policy institutions and within the academic literature (World Bank 2004; Bardhan and Mookherjee 2006). Decentralisation, it has been argued, can be an effective tool in ensuring the quality of public service delivery because local government have greater accountability to the population and better information about the needs of the community.

However, there are potential problems relating to the decentralised provision of public services: public investments at the community level can have spillovers outside of the community that are not taken into account by local government; and the local elite can capture and divert public spending for their own needs (Bardhan, 2002).

Since fiscal decentralisation provides greater decision-making power to local governments, its impact on public goods provision should, arguably, depend on the quality and nature of local institutions (Bardhan and Mookherjee, 2000). For example, Beard (2007) finds that community development efforts in Indonesia are driven by the principle of reciprocity, with participants contributing in order to receive benefits. Therefore, household integration in social networks is a strong predictor of their contribution to community development efforts. Decentralisation can, therefore, lead to different outcomes if democracy and mutual cooperation are practised at the local level compared to situations where power is concentrated in the hands of the local elite. The question as to whether and how local institutions mediate the effects of fiscal decentralisation has received limited attention in the literature.

This paper attempts to bring both theoretical insights and empirical evidence to this under-researched topic. We develop a theoretical model to derive the optimal choice of public goods across communities which differ in terms of their adherence to traditional laws. These laws prescribe how each community member should contribute to collective activities as well as the punishment for falling short of these prescriptions. We argue that public goods which facilitate communication and exchange with outsiders (such as roads, public transport, telephone facilities, etc.) will improve the outside options of community members and, thus, make it more difficult to enforce community-level punishments prescribed by traditional laws. Therefore, the higher the existing level of participation in collective acitvities and adherence to traditional laws, *ceteris paribus*, the less incentive the community has in investing in such infrastructure.

Taking the theory as a benchmark, we examine the impact of fiscal decentralisation in Indonesia, which came into effect in 2001, on public spending at the community level.[1] The decentralisation laws 22/1999 and 25/1999 (subsequently revised in laws 32/2004 and

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[1] We use the term 'community' to refer to both rural villages (*desa*) and urban communities (*kelurahan*) in Indonesia.

33/2004) devolved control over spending on public goods from the central government to lower level administrative authorities and gave them full autonomy to decide how to spend the funds provided by the central government. Traditional institutions have, historically, played an important role in community life in Indonesia, up to and during the colonial period. The influence of these institutions weakened following independence, under the Suharto administration, but arguably, experienced a resurgence after Suharto left power (Davidson and Henley, 2007). Today, there is considerable variation in the extent to which communities adhere to traditional rules when undertaking collective projects, deciding upon the village leader, etc.

The Indonesian Family Life Surveys (IFLS) provide information on adherence to traditional law, as well as investment spending on different public goods at the community level. We use the 1997 and 2007 rounds of the IFLS to estimate the effect of fiscal decentralisation on public spending at the community level, and investigate whether the effects on spending differed across villages with different levels of adherence to traditional law, within the same district. We take the share of the central government's direct contribution in a community's public spending budget as a measure of centralised fiscal control for that community. This share declined, broadly, across Indonesian communities following decentralisation but it fell by *less* in geographically larger communities and communities which were more distant from the district headquarters, the administrative level to which fiscal decisions were devolved. We exploit this variation to estimate the impact of fiscal decentralisation on local public spending. The two rounds of data enable us to control for time-invariant district characteristics as well as time-varying characteristics at the district-level.

Our estimates indicate that fiscal decentralisation had led to a *decline* in investments as a share of total public spending in communities that had a tradition of democracy or observed strict adherence to customary laws. However, communities which had *both* a tradition of democracy and adhered to customary laws experienced a sharp increase in investments which more than offsets the decline noted above. For the latter communities, we also find that decentralisation led to a shift in public spending towards investment in social goods, with no change in the share going into investments in communications and road infrastructure, which provides partial support for the theory.

The existing empirical literature has analysed the effects of decentralisation on public policy using, predominantly, cross-country data (see, for example, Davoodi and Zou (1998), De Luca et al. (2002), De Mello and Barenstein (2001), Fishman and Gatti (2002)). Enikolopov and Zhuravskaya (2007) use cross-section and panel data from about 75 developing and transition countries to argue that decentralisation works better with strong national parties that allow local leaders to be chosen locally, rather than when the national parties are weak and, to avoid political competition, these weaker parties appoint local leaders as administrative subordinates. This approach, however, is not ideal, as pointed out by the authors, since there

are different strata of sub-national regions, and public policy decisions may be decentralised to different levels.

Hence, it is important to focus on sub-national regions as the unit of analysis when investigating the effects of fiscal decentralisation. There are a limited, but growing, number of studies that have focused on the political economy of public goods provision at the local level. Besley, Pande and Rao (2005, 2007) use data from a survey conducted in 2002 in southern India to consider the effects of attending community meetings and the characteristics of community leaders on access to public goods in a community. The authors use inter-village variation in the key explanatory variables (participation in village meetings or leader's characteristics) to identify the causal effect of various political economy variables on access to public goods. Along similar lines, Bandeira and Levy (2010) use the 1997 Indonesian Family Life Survey to exploit cross-village variation in public finance, governance and ethnic composition to identify a causal effect of ethnic diversity and governance on public goods provision. Further, Martinez-Bravo et al. (2012) and Padro-i-Miguel et al. (2013) investigate the effect of the introduction of village-level elections on the provision of public goods provision in rural China. Martinez-Bravo et al. (2012) finds that the elections increased local accountability and Padro-i-Miguel et al. (2013) find that the effects were larger in villages with greater religious homogeneity.

A number of recent papers have also looked at the effects of fiscal decentralisation and related changes on the provision of public goods in Indonesia. For example, Lewis and Osterman (2014) investigate the effects of intergovernmental transfers on capital spending at the district-level over the period 2003-2009 using a GMM approach. Kis-Katos and Sjahrir (2014), also finds that expenditure decentralisation led to increased investment in public infrastructure at the district-level, with larger effects in districts which initially had lower levels of infrastructure.

A related literature looks at effects of Indonesia's democratisation and political decentralisation on a range of government outcomes. Martinez-Bravo (2014) uses the first round of democratic elections in Indonesia following political decentralisation to investigate how the method of selection of village heads – appointment or election – affects electoral outcomes across villages. She finds that the alignment of electoral results at the village- and district-levels is greater for villages with appointed heads as opposed to elected heads, and argues that appointed heads have greater incentive to exert effort or manipulate village-level electoral outcomes to signal their political alignment with higher-level authorities. A number of other studies have made use of the exogenous variation in the timing of introduction of direct elections at the district-level to study the effects of 'democratisation' on various outcomes. Skoufias et al. (2011) and Kis-Katos and Sjahrir (2014, cited above) look at how the composition of public expenditures changed as a result of the introduction of direct elections. Valsechhi (2013) finds that the incidence of corruption increased after the intro-

duction of direct elections, while Mukherjee (2014) finds that the switch from appointments to direct elections at the district level increased the extent of redistributive policies, including transfers to poor households from social protection programmes.

We are not aware of any research in the literature that explicitly examines the impact of fiscal decentralisation across communities with different types of local institutions, in Indonesia or elsewhere. This is the main contribution of our paper.

The composition of public spending and public goods has become the key instrument for policies for economic development (IMF and World Bank 2003). In recent years, development assistance to heavily indebted poor countries has been made conditional on increase on certain categories of public spending that are thought to be pro-poor. In particular, components of public spending aimed at reducing poverty levels focuses on education, health, agriculture, safety nets, infrastructure, rural development and others (IMF and World Bank 2003). This practice has its roots in the works of Aschauer (1989), Barro (1991), Easterly and Rebelo (1993), Devarajan et al. (1996). Aschauer (1989) argued that investment in core infrastructure like streets, railways, airports has the most explanatory power for private sector productivity in the United States. Along similar lines Easterly and Rebelo (1993) suggested that public investment in infrastructure boosts economic growth. Barro (1991) further argued that productive spending on education (which develops human capital) and defence (which protects property rights) are growth enhancing. In this respect, a distinction is often made between social and physical infrastructural goods. While investment in physical (e.g., transport and communications) infrastructure will facilitate production of both goods and services, investment in health and education will contribute to healthy and educated workers, and thereby improve labour productivity.

Most existing studies find positive growth effects of transport, communications, health and education alike, an important exception being Devarajan et al. (1996). Devrajan et al. (1996) examined the growth effects of the composition of public spending for economic growth in the developing regions and surprisingly found that unlike the OECD region, the current spending has positive growth effect while capital spending (on transport, communication, health, education etc) has negative growth effects. The latter can be attributed to the possibility that public expenditures in developing-country governments have been biased excessively towards capital expenditures at the expense of current expenditures, thus reducing the rate of return on capital investments.

We contribute to this literature by highlighting and investigating an important characteristic of capital investments that improve access to external markets for remote communities. By improving the outside options of community members, such investments can weaken the functioning of informal institutions that rely on the threat of social exclusion, and therefore local authorities can potentially be reluctant to make such investments. This reasoning has been implicit in the literature on the functioning of informal institutions, discussed in Section

3.1.

The paper is developed as follows. In Section 2, we provide an overview of fiscal decentralisation and community-level institutions in Indonesia. In Section 3.1, we discuss the theoretical literature which provides a starting point for our model on local public goods expenditures. The model is presented in section 3.2, and the optimal choice of public investments are derived in section 3.4. The econometric model and the indentification strategy are discussed in sections 4 and 5 respectively. Section 6 provides a description of the data. The econometric results are discussed in Section 7. Our conclusions are presented in Section 8.

2 Fiscal Decentralisation and Local Institutions in Indonesia

2.1 Fiscal Decentralisation

In 1999, the Indonesian government passed two laws, namely Law 22/1999 and 25/1999, which stipulated that fiscal authority and responsibility for a large number of public services would be granted to provincial (*provinci*) and district (*kabupaten/kotamadya*) governments. The decentralisation laws were passed by the new president Habibie, following a thirty-year period of highly centralised fiscal control that characterised Suharto's regime (Bardhan and Mookherjee, 2006; Kis-Katos and Sjahrir 2014).

According to laws 22/1999 and 25/1999, the central government would retain responsibility in just five areas: national security, foreign policy, monetary policy, finance and development planning, justice and law enforcement. All other public services, including the health, education and infrastructure, would become the responsiblity of district and village (*desa/kelurahan)* governments, with a more minor role being granted to provincial governments (Brodjonegoro, 2001; Bardhan and Mookherjee, 2006).

Despite the shift in the responsibility for providing public services, the task of revenue collection remained primarily in the hands of the central government. To ensure that the lower-level authorities had sufficient resources to undertake their new responsibilities, a new system of intergovernmental funds transfer was introduced through the decentralisation laws. The most important component of this system was a 'general allocation' grant provided to provincial and district-level governments according to a 'fiscal needs' formula.[2] Under Law 25/1999, the provincial, district and village government authorities would have freedom to

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[2]The district governments received grants from the central government for a 'General Allocation Fund' according to the following 'fiscal needs' formula (Brodjonegoro 2001):

$$\text{Central Gov't. Grant} = \text{average local expenditure} \times$$
$$\tfrac{1}{4} [\text{population index} + \text{area index} + \text{construction price index} + \text{poverty index}]$$

decide how to spend the funds provided by the central government (Brodjonegoro 2001).

These changes also led to a dramatic shift in the sources of revenues for village governments. Data from the village finance module in the IFLS shows a substantial increase in the share of revenues that came from the district-level government and a corresponding decline in the share of revenues from the central government, between 1997 and 2007 (see Table 1). In 1997, on average, nearly a third of the revenue came from direct grants made by the central government in Jakarta. In 2007, the central government's average contribution in village budgets had fallen to 6.6% . By contrast, the average contribution from the district-level government had risen from 9% to 41% between 1997 and 2007. The share of total revenues generated within the village itself remained roughly unchanged between 1997 and 2007.

Thus, the creation of the 'general allocation' grant significantly increased the role of district-level government in public spending decisions at the village level. It stands in contrast with various grants provided by the central government during the New Order Regime that were generally earmarked for specific uses. For example, in the early 1970s, the government set up the autonomous regional subsidy (SDO) scheme, to cover the cost of paying regional government employees; and the Presidential Instruction (Inpres) scheme which provided grants directed, in part, towards particular uses specified by the central government (Resosudarmo and Vidyattama 2007).

It is important to note that the decentralisation laws did not specify any discretionary funds to be made available directly to village level governments. However, it is possible that the fiscal decentralisation process expanded the role of village government in local public spending to the extent that they were able to influence decisions at the district-level or had discretion over the use of funds obtained from the district headquarters. Specfically, the Law 22/1999 stipulated the creation of elected village councils (*Badan Perwakilan Desa* or BPD) which, together with the village head, would decide the village budget (Antlov 2003). Upon approval at the village level, the village governing body would bring an annual allocation plan of expenditures on local public goods to the district-level government for approval and financing. Chowdhury, Yamauchi, Dewina (2009) argue that the likelihood of approval would depend on the level of financial contribution at the village-level and the availability of resources at the district-level. Antlov (2003) provides a case study of these regulations in pratice based on observations in a village in West Java in 2001. The village BPD approved a budget of Rp 80 million with funds allocated for regular infrastructure development projects including road and irrigation improvements as well as funds to build an office for the BPD. It received a Rp 50 million grant from the district level government to implement the budget and financed the remainder from local revenues on house-tax, tolls,

and income from a marketplace.[3] [4]

One of the questions asked in the community survey of the 2007 IFLS is whether the village government was involved in the construction of facilities and infrastructure by the district government. Some level of involvement was reported in 82% of the villages (196 out of 313), and involvement at the planning stage was reported in 63% of villages. Moreover, in answer to the question 'who determines the village budget?', the village government was reported as being the sole authority in 20% of cases (63 out of 313), and the village was reported as being responsible alongside some higher-level administration in a further 25% of cases (77 out of 313). Unfortunately a comparision with the year 1997 is not possible as these questions were not asked in the earlier survey.

In the following sections, we investigate the impact of the shift in the source of revenues for village governments on infrastructure development and social spending at the village level. The descriptive statistics in Table 1 show that the average share of spending on physical infrastructure (which includes roads, public transport and telecommunications) increased substantially, from 6.5% to nearly 50% of the village development fund. The average share of spending on social development, which includes education, health, community services and women's development increased marginally from about 10% to 13%.

2.2   Village Institutions

The concept of *adat* laws or norms have played an important role in the understanding of political, social and legal institutions in Indonesia at the community-level.[5]   The term refers to 'customs, traditions, rules or practices that guide social life and decision-making in Indonesian communities' (Buttenheim and Nobles, 2009).   They encompass a range of matters in family and community affairs, including marriage, inheritence, dispute resolution,

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[3]In urban communities (*kelurahan*), Law 34/1999 stipulated the creation of *dewan kelurahan*, consultative assemblies which had less power than the BPD in rural communities but a similar aim of improving democracy and civic participation in public decision-making at the community-level (Okamoto 2014).

[4]It is worth noting that Law 22/1999 was followed by implementing regulations and decrees that potentially affected the role of village councils in practice across districts and over time. For example, Antlov (2003) highlights that Ministerial Decision 64/1999 – one of the first implementing regulations of Law 22/1999 – provided guidelines for the new village institutions that, in a number of instances, contradicted or distorted the spirit of the original law. Law 32/2004 was intended to provide clarity and address the contradictions stemming from the original law (Duncan 2007). The new law moderated the role of the BDP in spending decisions, making them consultative bodies to reduce potential conflict with the village head, but retained the original aim of strengthening village-level democracy. For example Article 209 of the law states that "the Village Consultative Body endorses village regulations along with the village head in addition to accommodating and channeling public aspirations". Thus, while Law 32/2004 may have shifted the balance of power between the village head and the BPD, it retained the overall organisational structure that would enable the village governing body to participate in local public spending decisions together with the district-level government.

[5]In the following discussion, we use the terms 'community' and 'village' synonymously to refer to both rural villages (*desa*) and urban communities (*kelurahan*) in Indonesia.

mutual assistance activities and common property management (ibid; Kato, 1988; Bowen 1986; Warren and McCarthy 2002).

'*Adat* law' was recognised by the colonial administration in the Dutch Indies as part of a dual legal system in which natives were subject to 'their own religious laws, institutions and customs so far as they were not in conflict with generally recognized principles of equity and justice ...' (Fasseur 2007). In an effort to promote national unity, the post-colonial Suharto regime took a more heavy-handed approach, and 'no political rights were allowed to follow from cultural difference or ethnic identity' (Davidson and Henley, 2007: Chapter 1).

Notable among the administrative reforms undertaken by the Suharto regime was the 1979 Village Law, which introduced a uniform system of local governance throughout Indonesia based on the administrative structure of Javanese villages (Kato, 1988). The main components of the community government consisted of a village head (*Kepala Desa*), and a Village Deliberation Council (*Lembaga Musyawarah Desa* or LMD) as the legislative body.[6] A third component of community government, introduced through a Presidential decree in 1980, was the Village Cabinet (*Lembaga Ketahanan Masyarakat Desa* or LKMD) which was designed to assist the village head in planning and executing development projects. (Bebbington et al., 2006).

The village head effectively selected the members of both these organisations and also had the power to veto decisions made by the body. The village head, in turn, was legally accountable to the district head rather than the community (Bebbington et al., 2006).

Over time, the new system of local governance introduced by the Suharto regime, including administrative bodies at the district and community level, significantly undermined the authority of *adat* leaders and their ability to enforce *adat* rules (Kato 1988). Nevertheless, *adat* law remained salient and relevant to rural life in Indonesia during the Suharto regime. Based on the knowledge and information of a local expert, the Indonesian Family Life Surveys (IFLS) classified all communities in terms of their 'adherence to adat laws'. In nearly 80% of rural communities and 75% of urban communities, *adat* laws were reported to be 'feared' and sometimes or 'almost never broken' in the 1997 survey. Using the same dataset, Bandiera and Levy (2010) find a strong correlation (73%) between community governance according to *adat* law and current practice.

In the following years, Indonesia witnessed major economic and political changes, including the East Asian Financial crisis, the end of the Suharto regime and the beginning of the process of fiscal decentralisation. By 2007, adherence to *adat* laws appear to have declined significantly with 61% of rural communities and 45% of urban communities reporting that they were 'feared' and 'sometimes broken' or 'almost never broken' (see Table 2).

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[6]Although the word 'village' appears in the names of these administrative offices, they applied to both rural (*desa*) and urban (*kelurahan*) communities. In the literature on Indonesia, the word 'village' refers to the smallest official administrative unit in both rural and urban areas.

For the purpose of this paper, the relevant *adat* rules and laws are those that prescribe community members to participate in collective activities requiring mutual cooperation. In Table 3A, we present data from the IFLS which provides a snapshot of the nature and range of these activities. As shown in the table, in about 85% of the surveyed communities, there was, according to 'traditional law', at least one community group that relied on an ethic of mutual cooperation for activities related to security, food security, health, education, construction and infrastructure, and assistance to community members. In over 80% of the communities, the 'traditional law' prescribed community activities to assist community members in difficulty through disbursement of money, food or public service. Similar proportions were reported for 'current practice' regarding these groups and activities.[7] Thus, in communities where adherence to *adat* laws was strong, community members were expected to participate in, and could expect to benefit from, a range of collective activities.

Communities which practise strong adherence to *adat* laws typically have weaker infrastructure, e.g. paved roads, public transport, and fewer facilities, e.g. banks, markets, post office, telecommunications offce, etc. They are also more likely to be classified as rural and located further from administrative headquarters at the district level. However, unlike transport and communications infrastructure, the infrastructure for health and education in *adat* communities is at par with, if not better than, that in non-*adat* communities (see Table 6).

Transport and communications infrastructure, it can be argued, would provide community members greater opportunity to form economic and social links outside of the community. These would strengthen their outside options and thus, it has been argued in the literature, weaken the ability of community leaders to enforce customary rules by punishing violaters (Aldashev et al., 2012a, 2012b). As shown in Table 4, individuals who break the *adat* rules of their community can face significant penalties, including the payment of fines, ostracism and even, in some cases, expulsion from the community. As expected, the penalties are more severe in communities which practise stronger adherence to *adat* laws.

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[7]Relatedly, a 2004 survey conducted for the evaluation of the World Bank's Second Urban Poverty Project (UPP2), found that the level of participation among community (*kelurahan)* members in the construction of public infrastructure was 47%, with 59% of respondents giving "tradition" or "obligation" as the main reason for their participation. Furthermore, 37% of the cost of village public goods was covered by the community members themselves. (Rao 2005).

3   A Model of Cooperation in Collective Activities and *Adat* Norms

3.1   Related Literature

One of the ways in which a group can ensure that its members adhere to a set of prescribed rules in social and economic interactions is by excluding those who violate them, at least temporarily, from the benefits of group membership. This reasoning plays an important role in theoretical explanations of the functioning of informal insurance groups (Kimball 1988, Fafchamps 1992, Coate and Ravallion 1994); in which members of the group comply with the rules of mutual insurance because they value the benefits of being part of the group, and the extent of mutual insurance in turn depends on the extent to which this insurance is valued by its members.

Similar mechanisms have been proposed to explain the effectiveness of joint liability credit contracts in eliciting high repayment rates (Besley and Coate 1995), and contract enforcement in the context of medieval trade (Greif 1993). According to this kind of reasoning, the extent to which a group can enforce its rules of behaviour is affected by the benefits of group membership, which in turn depends on the outside options that its members have. Consequently, as the outside options of the members improve, the ability of the group to enforce its rules declines. Kranton (1996) develops a theoretical model of 'reciprocal exchange' (i.e. goods or services are given in exchange for future compensation in kind) where this mechanism is in effect: as markets develop, individuals have more opportunity to engage in trade outside of informal, personalised exchange; the cost of social exclusion thus declines, which in turn makes it more difficult to sustain honest behaviour in reciprocal exchange.

Similary, Platteau (2006) has argued that social norms of informal insurance and communal land rights in traditional village communities become less effective as market integration provides outside opportunities to a rural population. Hoff and Sen (2005) explore the consequences of this type of tension between informal, personalised exchange and market-based exchange in the context of a kin system. They argue that the tension provides a kin group the incentives to take collective action to restrict its members from migrating to the modern sector even if doing so might raise aggregate welfare. Thus, the kin group can lead to a kind of poverty trap. In the context of informal insurance, Wahhaj (2010) argues that the insuring group will find it in its interest to prescribe behaviour that restrict the ability of its members to self-insure (such as a prescription of excessive consumption) as this increases the value of the service provided by the insuring group and makes it easier to enforce the rules of mutual insurance using a threat of social exclusion from the group.

Platteau (2000: Chapter 5) provides a survey of an ethnographic literature on a variety of social norms and beliefs in traditional societies which make it costly for individuals to engage

in behaviour – such as wealth accumulation – which would make them less dependant on solidary networks. Arguably, these norms and beliefs play the type of function suggested by Hoff and Sen (2005) and Wahhaj (2010).

The theoretical contribution of the present paper is to extend the reasoning highlighted above to the context of local public expenditures. Just as a kin group may wish to engage in collective action which limits the outside options of its members, a community may choose, collectively, to restrict the type of public investments that would enable its members to engage better with the outside economy. Moreover, these incentives should be stronger in communities that have more intra-community exchange to protect. If such incentives are present, they should have implications for – and be apparent in – a process of fiscal decentralisation. We explore these ideas formally in sections 3.2 to 3.4.

It should be noted that there is an existing theoretical literature on collective action and the provision of public services, reviewed, for example, by Banerjee, Iyer and Somanathan (2007). This literature relates different characteristics of a group – including group size, the distribution of benefits and cohesion within the group to the level of public goods provision, compared to the first-best level. Our approach is closest to that of Miguel and Gugerty (2004), who argue that a group with stronger social networks has greater ability to impose sanctions on group members who free-ride; and therefore should be able to generate a higher level of public goods. However, unlike this literature, we distinguish between public goods which support interactions within communities and across communities, and relate group solidarity to the *type* of public good provided.

3.2   Setup

Imagine a community consisting of nm members, divided into m groups of n individuals each. They have the ability to engage in a collective activity which yields a good or service for the community according to the following production function:

$$f\left(\mathbf{e}\right) = A \prod_{j=1}^{m} \left(\sum_{i=1}^{n} e_{ij} \right)^{\alpha}$$

where $\mathbf{e} = (e_{11}, .., e_{n1}, e_{12}, .., e_{n2}, .., e_{nm})'$ describes the amount of labour allocated to the activity by each community member, A is a productivity parameter and $\alpha < \frac{1}{m}$. This production function is such that the labour contribution of individuals within the same group are perfect substitutes but the labour contribution of individuals across groups are not. The group categories may be men and women, the youth and elderly, etc.

The assumption that $\alpha < \frac{1}{m}$ means that the production function exhibits decreasing returns to scale which is a reasonable assumption if the collective activity involves working with a natural resource or other economic assets which is available in limited quantities.

Community members can also sell their labour on the market. The wage rate is w, but individuals have to incur a transaction cost equal to τ per unit of labour. The transaction cost could involve transport costs or the cost of finding work which may be affected by the quality of road links and communications infrastructure. Community members also have the means to purchase the good or service provided by the collective activity on the market at a price p. Here again, they face a transaction cost equal to τ per unit purchased.[8] An individual has a total of 1 unit of labour available that can be allocated between the collective activity and the labour market. Thus, if an agent provides e units of labour to the collective activity, and purchases X_m units from the market, then the agent's budget equation is given by

$$(p + \tau) X_m + Y \leq (1 - e) (w - \tau)$$

where Y is the level of monetary expenditures on other goods. We assume that the individual has quasi-linear preferences, as represented by the following utility function:

$$U(X, Y) = u(X) + Y$$

where X is the total amount of the good obtained either through the collective activity or the market and $u'(X), u''(X) < 0$.

There is an *adat* rule which specifes how much time each community member should contribute to the activity, and the way in which its proceeds will be divided among community members. For simplicity, we assume that the *adat* specifies the same labour contribution and equal shares of the proceeds for all community members (however, our main results will apply for more complex distributional rules as well). Let us denote the prescribed labour contribution as e_{adat} and let $\lambda = \frac{1}{nm}$ be the share of proceeds of the collective activity given to each community member.

The game is infinitely repeated and future consumption is discounted at a rate β per period.

3.3 Contribution to the Collective Activity

Let us denote by $e^{fb}(A, w, \tau)$ the efficient level of contribution to the collective activity when all community members contribute equally and obtain equal shares of the output. We obtain $e^{fb}(A, w, \tau)$ by solving the following optimisation problem.

$$\max_{e, X_m, Y} u\left(\lambda A (ne)^{m\alpha} + X_m\right) + Y$$

subject to

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[8]For ease of notation, we assume that the transaction cost for the labour market and the goods market are the same. But this has no bearing on the main insights of the model.

$$(p + \tau) X_m + Y \leq (1 - e)(w - \tau)$$

$$X_m, Y \geq 0$$

Using the first-order conditions, we can show that if $e^{fb}(A, w, \tau) \in (0, 1)$, then the first-best level of contribution to the collective activity satisfies the following equation:

$$\alpha A \, (ne)^{m\alpha - 1} u' \left(\lambda A \, (ne)^{m\alpha} + X_m \right) = (w - \tau)$$

To simplify the analysis, we focus on the case where the two following conditions hold (the precise parameter values for which these conditions hold are shown in the Theoretical Appendix):

Condition 1 *Each group is large enough that the marginal product of labour in the collective activity for one community member is close to zero, given any level of effort $e > 0$ by other community members.*

Condition 2 *The price of the good X is sufficiently high such that an individual would not purchase it on the market when it is being provided through the collective activity.*

When Condition 1 holds, the marginal utility of contributing to the collective activity is lower than the marginal utility of selling one's labour on the market and using it to purchase other goods. Therefore, community members will not contribute to the collective activity in the absence of any enforcement mechanism. How, then, can cooperation in the collective activity be sustained? We take the approach that a community member who fails to make the labour contribution prescribed by the *adat* rule is excluded from the future proceeds from the collective activity. The discussion in the previous section and Table 3 shows that there is sufficient evidence along these lines to justify such an approach.

Let us denote by (X_{aut}, Y_{aut}) the consumption bundle enjoyed by an individual who has been excluded from the collective activity. A community member i in group g who no longer has access to the good produced through the collective activity would have to buy it from the market. This person would also provide all her available labour on the market. That is, the person would choose $e_{ig} = 0$. The utility maximisation problem for such an individual can be written as

$$\max_{X,Y} u(X) + Y \tag{1}$$

subject to

$$(p + \tau) X + Y \leq (w - \tau) \tag{2}$$

$$X, Y \geq 0 \tag{3}$$

If the optimisation problem in (1) has an interior solution, then the following equation, obtained from the first-order conditions, must hold at the optimum:

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$$u'(X) = (p + \tau) \tag{4}$$

Combining the tangency condition in (4) with the budget equation in (2), we obtain a unique solution for (X_{aut}, Y_{aut}).

Let us denote by (X_{adat}, Y_{adat}) the consumption bundle enjoyed by the community members when everyone abides by the *adat* rules. If all community members follow the *adat* rules, then the output from the collective activity is given by

$$
\begin{aligned}
f(e_{adat}, .., e_{adat}) &= A \prod_{j=1}^{m} \left(\sum_{i=1}^{n} e_{adat} \right)^{\alpha} \\
&= A (n e_{adat})^{m\alpha}
\end{aligned}
$$

Each community member receives a fraction λ of this output. Under Condition 2, the community members do not purchase any quantity of good X from the market when they receive a share of the proceeds from the collectivity. Therefore, $X_{adat} = \lambda A (n e_{adat})^{m\alpha}$. They are able to sell labour equal to $(1 - e_{adat})$ on the market and use their entire wage earnings to buy good Y. Therefore, $Y_{adat} = (1 - e_{adat})(w - \tau)$.

If a community member were to deviate from the *adat* rule, then she would not provide any labour to the collective activity (due to Condition 1). This would provide the individual extra earnings equal to $(w - \tau) e_{adat}$. She would continue to enjoy the proceeds of the collective activity in the current period (before being subject to social exclusion the next period) and therefore, under Condition 2, will not use any of the extra earnings on good X. The extra earnings are all spent on good Y. Also, by Condition 1, the loss in output from the collective activity as a result of her deviation will be negligible. Therefore, she would continue to enjoy a level of consumption of good X approximately equal to X_{adat}. Thus, the utility gain from deviation is equal to

$$U(X_{adat}, w - \tau) - U(X_{adat}, (1 - e_{adat})(w - \tau)) = e_{adat}(w - \tau) \tag{5}$$

However, the deviation will lead to social exclusion in subsequent periods. She will have the autarkic consumption bundle (X_{aut}, Y_{aut}) instead of the *adat*-based consumption bundle of (X_{adat}, Y_{adat}). This would translate into a utility loss of

$$\frac{\beta}{1 - \beta} [U(X_{adat}, Y_{adat}) - U(X_{aut}, Y_{aut})] \tag{6}$$

We assume that the community also has the means to impose additional punishment of size Ψ on those who deviate [this will be used primarily for comparative statics exercises later on]. Using the expressions in (5) and (6), we can state that the level of cooperation prescribed by the *adat* rule can be sustained if and only if

$$e_{adat} (w - \tau) \leq \frac{\beta}{1 - \beta} [U (X_{adat}, Y_{adat}) - U (X_{aut}, Y_{aut})] + \Psi \qquad (7)$$

The left-hand side of (7) represents the gain from deviation from the collective activity. The right-hand side represents the cost of social exclusion. Thus, the inequality provides an upper-bound on the level of cooperation that can be sustained in the collective activity. Let us denote this upperbound by $\bar{e} (A, w, \tau, \Psi)$.

An increase in A, which measures productivity in the collective activity, has no effect on the gain from deviation but raises the cost imposed by social exclusion. Therefore, raising A would make it easier to sustain cooperation within the community; i.e. it would tend to increase $\bar{e} (A, w, \tau, \Psi)$. A decline in the transaction cost τ will tend to increase the gain from deviation but lower the cost imposed by social exclusion. Therefore, lowering τ will make it more difficult to sustain cooperation within the community.

Note that, by varying Ψ, we can allow communities to vary exogenously in terms of the level of sustainable cooperation. Traditional *adat* rules would have prescribed a high level of cooperation in the collective activity, but as access to markets improve, the value of $\bar{e} (A, w, \tau, \Psi)$ will decline below the level originally prescribed. Thus, $\bar{e} (A, w, \tau, \Psi)$ can also be regarded as a measure of the community's adherence to traditional *adat* rules, with smaller values corresponding to more relaxed *adat* rules. Formally, we can prove the following result.

Proposition 1 *Suppose $0 < \bar{e} (A, w, \tau, \Psi) < e_{fb} (A, w, \tau)$ and Conditions 1 and 2 hold. The highest possible level of cooperation in (i.e. labour contribution to) the collective activity is increasing in τ, the cost of market transactions and in A, the productivity of the collective activity.*

Proof. *See Theoretical Appendix.* ∎

3.4 Optimal Choice of Investment in Public Infrastructure

Next, we investigate the optimal choice of investment in public infratructure across communities that vary in terms of the level of cooperation in collective activities and adherence to *adat* rules. We distinguish between infrastructure and services that would (i) improve communications and facilitate exchange with outsiders, such as public roads, public transport, telecommunications and postal services; and (ii) facilitate communication and collective activities within the community, such as meeting spaces, clubs, public services related to health and education, etc. Both communal activities and market activities are likely to benefit from the two types of investment but it is reasonable to assume that the first category of infrastructure is more beneficial for market-based exchange with outsiders and that the latter is more beneficial to community activities.

For simplicity, we assume that there are just two types of public infrastructure, social infrastructure denoted by K_s and physical infrastructure denoted by K_p. The productivity of

the collective activity A depends only on the level of social infrastructure and the transaction costs of market exchange depends only on the level of physical infrastructure:

$$A = A(K_s) \tag{8}$$

$$\tau = \tau(K_p) \tag{9}$$

Assumption 1 $A(K_s), \tau(K_p) \geq 0$ and $A'(K_s) > 0$ and $\tau'(K_p) < 0$ for all $K_s, K_p \geq 0$.

The key implications of the model will remain valid if we allow both types of infrastructure to affect the value of both types of activity as long as (i) social infrastructure is relatively more important for productivity in the collective activity compared to its effect on market transaction costs (τ) and (ii) the opposite holds for physical infrastructure.

From the inequality in (7), it is evident that investing in social infrastructure will increase the cost of social exclusion, and therefore increase the viability of cooperation in the collective activity. On the other hand, investing in physical infrastructure will decrease transaction costs of market-based exchange; therefore, it would decrease the cost of social exclusion and make it more difficult to sustain mutual cooperation in the community. These factors imply that, in making public investment decisions, communities with different levels of cooperation in the collective activity face different trade-offs.

Formally, consider a community with an initial stock of physical instracture K_{p0} and social infrastructure K_{s0} and a pot of money B allocated for further infrastructural investments. Given this setting, we can analyse what investment choices the community would make to maximise the benefit for the community members. The maximisation problem for the optimal investment choice can be written as follows.

$$\max_{I_s, I_p} U\left(\lambda A(K_s)(ne)^{m\alpha}, (1-e)(w - \tau(K_p))\right) \tag{10}$$

subject to

$$K_s = K_{s0} + I_s, \; K_p = K_{p0} + I_p$$
$$B \geq I_s + I_p, \; I_s \geq 0, \; I_p \geq 0$$
$$e = e^*(K_s, K_p, \Psi)$$

where $e^*(K_s, K_p, w, \Psi) = \bar{e}(A(K_s), w, \tau(K_s), \Psi)$ represents the maximum sustainable level of cooperation in a community with infrastructure (K_s, K_p) and exogenous punishment Ψ. Using the maximisation problem in (10), we can establish the following result.

Proposition 2 *For a community with a given level of initial infrastructure and budget, the optimal choice of social investment is weakly increasing, and the optimal choice of physical investment is weakly decreasing, in the initial level of cooperation (and Ψ) if Assumption 1 holds and the relative risk aversion exhibited by the function $u(.)$ is smaller than 1.*
Proof. *See Theoretical Appendix.* ∎

The condition that the utility function $u\left(.\right)$ exhibits relative risk aversion smaller than 1 in Proposition 2 is essentially a restriction on how quickly the marginal utility from the good provided by the collective activity can decline: if the marginal utility declines too quickly, then communities with a higher initial level of collective activity may prefer to invest more in physical infrastructure rather than social infrastructure.

Note that Proposition 2 relates to the *optimal* choice of public investments by a community. There are a number of reasons why the actual investment choices may not maximise the welfare of community members. For example, if public spending decisions are made at a higher administrative level, then investment choices may not take into account the adverse effects of improved market opportunities on cooperation in collective activities within the community. On the other hand, in communities where there is local control over its public spending decisions, and these decisions are made by consensus or by local officials who aim to promote the collective interest of the community, we would expect the investment choices to be closer to the optimum described in Proposition 2.

As described in Section 2, the Indonesian central government pursued a policy of modernisation and homogenisation during the Suharto regime. Therefore, we would not expect the choice of public investments at the village level to vary systematically across communities with high versus low levels of participation in collective activities during this perod (after controlling for the existing level of infrastructure, etc.) The passage of the decentralisation laws in Indonesia in 1999 substantially increased the control of village governments over public investment decisions. On the basis of Proposition 2, we can argue that in communities with high levels of cooperation in collective activities and governance institutions more conducive to efficient outcomes, this shift in fiscal control should have increased the share of public spending on social goods and decreased that on physical infrastructure – relative to communities where such governance institutions were absent or had low levels of participation in collective activities. This reasoning can be summarised in the following theoretical prediction.

Prediction 1 *For the subset of communities where governance institutions were conducive to efficient decision-making, those with higher levels of participation in collective activities will invest a greater share of the budget on social investments and a smaller share on physical investments, following the introduction of fiscal decentralisation (controlling for the initial level of capital stock and the size of the available budget).*

4   Econometric Model

We can test Prediction 1 using an econometric model as follows. Let y_{git} be the share of the public good g (where $g = s$ for social infrastructure and $g = p$ for physical infrastructure)

in the total expenditures budget of community i in period t. Let K_{sit} and K_{pit} be the stock of social and physical infrastructure respectively in community i in period t. Let M_{it} be a measure of the extent of cooperation in collective activities in community i in period t. Let F_{it} be a measure of control over fiscal spending at the community-level, and D_{it} a binary variable indicating whether the community makes collective decisions through a democratic process. Finally, let $\mathbf{X}_{it}$ be a vector of other characteristics of community i in period t. We propose the following linear relationship between y_{git} and the other variables:

$$
\begin{aligned}
y_{git} \;=\; & \mathbf{X}_{it}\boldsymbol{\beta}_x + \beta_s K_{sit} + \beta_p K_{pit} + \beta_m M_{it} + \beta_d D_{it} + \beta_f F_{it} \\
& + \beta_{md}\left(M_{it} \times D_{it}\right) + \beta_{mf}\left(M_{it} \times F_{it}\right) + \beta_{df}\left(D_{it} \times F_{it}\right) \\
& + \beta_{mdf}\left(M_{it} \times D_{it} \times F_{it}\right) \\
& + \delta_i + \tau_t + \left(\delta_i \times \tau_t\right) + u_{it}
\end{aligned}
\tag{11}
$$

where $\boldsymbol{\beta}_x, \beta_b, \beta_s, \beta_p, \beta_{md}, \beta_{mf}, \beta_{df}$ and β_{mdf} are parameters to be estimated. The term δ_i represents district fixed-effects, τ_t represents year fixed-effects and u_{it} is an error term. The error term captures other factors that may influence the community's spending decisions in period t. Our parameter of interest is β_{mdf}. According to Prediction 1, $\beta_{mdf} + \beta_{mf} > 0$ for social investments and $\beta_{mdf} + \beta_{mf} < 0$ for physical investments.

The year fixed-effects capture changes due to any policies or economic shocks that impacted all communities across Indonesia in the same manner. The district-level government had an important role to play in public spending decisions at the village-level, particularly after the introduction of fiscal decentralisation as discussed in Section 2. The district fixed-effects and the district-year fixed effects (represented by the interaction term $\delta_i \times \tau_t$) capture the effects of unobserved common policies pursued by the district administration across communities under its control within a given period (e.g., change of district boundaries), as well as district-level time-varying shocks.

5   Identification Strategy

The fiscal decentralisation episode in Indonesia provides a convenient setting for testing the theoretical predictions because, as discussed in Section 2, it brought about sharp changes in the extent of local control over budgetary decisions within a span of a few years.

The parameter β_{mdf} represents a triple-difference: the change in public spending shares before and after fiscal decentralisation, differenced across communities with and without a tradition of democracy in local politics, then differenced across communities with low and high levels of particpation in collective activities. Our estimate of the impact of fiscal decentralisation on local public spending is likely to be biased if the change in fiscal control across communities was correlated with other unobserved community characteristics

with time-varying effects on public spending decisions. Therefore, we need to find instrument(s) to focus on a particular source of variation in fiscal control across communities in the post-decentralisation period uncorrelated with factors that had a direct effect on public investments at the community-level.

We instrument for local fiscal control using interaction terms involving a year-dummy and variables measuring (i) the distance from the community to the district headquarters, and (ii) the geographical size of the community. Arguably, communities situated closer to the district headquarters had better access to – and cultural or ethnic proximity with – district-level officials. These factors could faciliate access to district-level funds for projects initiated at the community-level in the post-decentralisation period. The availability of funds can also vary systematically by the size of the community in both the pre- and post-decentralisation periods, with geographically larger communities more likely to have natural resources that can be used to generate revenues. Both the distance and size variables are exogenous to decisions made at the community-level and, barring a few exceptions, did not change in the post-decentralisation period.[9] To limit the possibility that these instruments proxy for other community-level characteries, we also include controls for the community's population, the proportion of households in the community that are classified as being poor, whether the community is rural, and whether it has access to the sea.

Thus, the first-stage equation can be written as follows:

$$F_{it} = \mathbf{X}_{it}\boldsymbol{\beta}_{1x} + (\mathbf{X}_{it} \times d_{2007})\boldsymbol{\gamma}_{1x} + \tau_{1t}d_{2007} + \delta_{1i} + (\delta_{1i} \times d_{2007}) + \upsilon_{it} \qquad (12)$$

where $\mathbf{X}_{it}$ is a vector of community-level characteristics including the geographic size of the community and its distance from the district headquarters; d_{2007} is a dummy-variable which takes a value of 1 in 2007 (thus indicating the post-decentralisation period in our sample) and zero otherwise; and $\boldsymbol{\beta}_{1x}$ and $\boldsymbol{\gamma}_{1x}$ are vectors of coefficients to be estimated. We also include district fixed-effects (δ_{1i}), and their interactions with the year dummy d_{2007} for the reasons given in the preceding section. Finally, υ_{it} represents an i.i.d error term.

As noted in Section 2, following fiscal decentralisation, the central government provided grants to different districts using a 'fiscal needs' formula based on various district-level characteristics. These factors would be invariant across communities within the same district and, therefore, variations in the central government grant in 2007 stemming from the 'fiscal needs' formula would be subsumed in the district-year fixed effects.

Following the estimation of (12), we compute the 'predicted' values of F_{it} using only the 2007 dummy, the 'distance to the district headquarters' and the 'community geographic size' variables. The predicted values replace F_{it} in (11) for the second-stage estimation.

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[9]Some district demarcations changed between 1997 and 2007 but these boundaries are fixed by the central administration in Jakarta. Given these changes, the 'distance to district headquarters' is a time-varying variable for our sample of communities. Only 3 communities changed size between 1997 and 2007. While we retain these communities for the subsequent analysis, dropping them does not materially change our results.

We can then use (11) to obtain an unbiased estimate of β_{mdf} if the following two identifying assumptions hold: (i) the level of participation in collective activities and democratic decision-making within communities was not affected by the fiscal decentralisation process; (ii) the level of participation in collective activities and democratic decision-making are not correlated with unobserved community characteristics (i.e. those not included in $\mathbf{X}_{it}$) that influence the effect of fiscal decentralisation on local public spending.[10]

The first assumption is unlikely to hold: Pal and Roy (2014) show that the fiscal decentralisation in Indonesia had a significant impact on local politics. To address this issue of endogeneity, we take two measures. First, we use in our analysis only the subsample of communities where the level of particpation in collective activities did not, in fact, change over the period under consideration (1997 - 2007). Second, we use in our econometric model a variable indicating whether the community had a *tradition* of democratic decision-making rather than whether the *current practice* involves democratic decision-making. The former is, by definition, exogenous to the process of fiscal decentralisation.

We argue that the second identifying assumption is plausible given that we are able to control for a range of important community characteristics (population poverty rate, whether it is rural or urban, whether it is coastal) as well as all unobserved district level time trends as captured by the district-year fixed-effects.

6   Data and Measurement of Variables

The empirical analysis uses community-level data obtained from the Indonesian Family Life Survey (IFLS) data. In addition to household level data akin to that in the Living Standards Measurement Surveys, the IFLS provides very detailed information on communities (alternatively labelled villages - desa or kelurahan). In particular, each round of the IFLS contains information on 313 rural and urban communities drawn from 13 provinces including Jakarta, Bali, Java (central, east and south), Sumatra (north, west and south), Lampung, West Nusa Tenggara and South Kalimantan (for further details on the data see Frankenberg and Thomas, 2000; Strauss et al. 2009). Although the IFLS was conducted in 1993, 1997, 2000, 2007, only the IFLS rounds 1997 and 2007 contain information on community's adherence to *adat* laws and nature of governance. Therefore, we make use of the 1997 and 2007 rounds only. The choice of these rounds also fits our empirical strategy where we use the introduction of fiscal decentralisation in 2001 as a natural experiment.

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[10]Note that these identifying assumptions are akin to those required for the estimation – of the effect of village elections and ethnic fractionalisation on village outcomes – carried out by Padro-i-Miguel, Qian and Yao (2013).

6.1 Local Fiscal Control

We measure 'local fiscal control' using the share of the village government budget that came from revenue transfers from the central government. As noted in Section 2, this share fell from an average of 33% in 1997 to an average of 6.6% in 2007. This decline was compensated by an increase in transfers from the district-level government; to the extent that a village government had a say in infrastructure planning and budgetary decisions at the district level, we argue that this represented an improvement in local fiscal control. Therefore, we interpret a high value for the central government's share as indicating a low level of local fiscal control and vice-versa. Specifically, we define a variable SHNCGOV as the proportion of community revenues that does not come from the central government grant and use it for F_{it} in equation (11).

Table 1 provides summary statistics on the source of revenues and share of spending on different types of public goods in 1997 and 2007. It is evident that the share of the funds received directly from the central government fell sharply following decentralisation; however, this decline was accompanied by an increase in the share of the funds received from the district-level governments.

We present a number of scatter plots to illustrate how the share of the central government grant in the village budget changed between 1997 and 2007. Figure 2 plots the share of the central government grant in 2007 against the corresponding share for 1997. In 1997, the shares are dispersed along the unit interval in a roughly uniform manner but in 2007, the shares equal zero in a large number of communities. Thus, we have the share of the central government grant dropping by different amounts across communities between 1997 and 2007, with the drops being largest in communities which were heavily reliant on these grants in the pre-decentralisation period.

Figure 1 shows the scatter plot of the share of central government grant in the village budget against the distance of the village from the district headquarters. The relationship between the central government grant share and distance is roughly negative in 1997 but it turns positive in 2007. In other words, communities situated closer to district headquarters were relatively more reliant on central government grants in the pre-decentralisation period but they became relatively less reliant following decentralisation. Figure 1a shows the corresponding scatter plot for the geographic size of the village. While there is no clear pattern in 1997, it is clear that by 2007 the larger communities were more reliant on the central government grant. In the subsequent analysis, we exploit the shifts in the relationship between the share of the central government grant and the village size and distance to headquarters to identify the effects of fiscal decentralisation on public goods investments.

6.2 Participation in Collective Activities and *Adat* Laws

Recall that, in the theoretical model, we distinguish between communities exhibiting high and low levels of participation in collective activities. We posited that the *adat* rules specify the nature and extent of the contribution that community members should make to collective activities.

The IFLS data place each community into one of four possible categories: (i) traditional laws are almost never broken; (ii) traditional laws are sometimes broken; (iii) traditional laws are frequently broken and (iv) only a few people understand traditional laws. We classify a community as an *adat* community if *adat* laws are 'almost never broken' and a non-*adat* community otherwise. Overall, a smaller proportion of sample communities adhered strictly to *adat* law in 2007 than in 1997 (see Table 2).

As described in Section 2, *adat* rules generally prescribe how each community member should contribute to collective activities as well as the punishment for falling short of these prescriptions. Therefore, we argue that communities where *adat* rules are generally ignored or forgotten, cooperation in traditional collective activities are also weak. On the other hand, communities where *adat* rules are adhered to, the level of cooperation in traditional collective activities ought to be strong. In our analysis, we use the extent of a community's adherance to traditional *adat* rules as a measure of its (ability to sustain) cooperation in collective activities. This is captured by a binary variable ADAT that takes a value 1 if the community strictly adheres to *adat* rules and 0 otherwise. For the empirical analysis, we use this variable for M_{it} in equation (11).

The IFLS community questionnaire also includes a number of questions relating to mutual cooperation. Respondents are asked whether there is 'an ethic of mutual cooperation' within the community and who participates in 'mutual cooperation activities'. Moreover, there are questions on whether there are community groups working on specified activities (e.g. neighbourhood security, neighbourhood improvement, etc.). While the 1997 survey included questions on both the traditional law and current practice relating to mutual cooperation activities, the 2007 survey only had questions on the former. Therefore, these questions do not provide a clear picture about the importance of collective activities within each community in the year of the survey. Nevertheless, we use them to construct an alternative measure of collective activities within the community, MUTUAL-COOP, which takes a value of 1 if – "according to traditional law" – there is a community group for construction and infrastructure projects and 0 otherwise.

Table 3 shows the correlation between the ADAT variable and the practice of mutual cooperation activities in the survey communities. In 1997 communities for which ADAT = 1 were more likely to have mutual cooperation groups than communities for which ADAT = 0, with the difference being significant for rural villages (*desa*). But there is a sharp rise

in mutual cooperation activities in both types of communities in 2007, and the differences in the rates of participation become statistically insignificant. This rise may be due to a resurgence of values related to customary practices and *adat* laws observed since the start of the decentralisation process in Indonesia (see Davidson and Henley 2007). As the classification based on *adat* laws are more stable across the two years than the classification based on mutual cooperation activities, we regard it as a more reliable measure of participation in collective activities at the community-level.

6.3 Governance

Using the IFLS data, we can classify communities according to the level of democratisation in local governance. The 1997 and 2007 rounds of the IFLS included questions on the process of selecting the community leader according to traditional law. Answers to this question are coded as: (i) all residents engage in consensus building, (ii) local elites decide, (iii) decided by local institutions, (iv) voting, (v) appointed by the government and (vi) other. We classify the local polity as .democratic. if a leader is selected by free and fair elections with all community members having the right to vote (codes (i) and (iv), and .oligarchic. if a leader is selected by community elites (codes (ii), (iii) and (v)). The incidence of oligarchies potentially reflects the scope for elite capture. It is not clear how 'others'.(code (vi) selected the local leader, and so we exclude these communities from our analysis. Using this data, we define a binary variable DEMOCRACY which takes a value of 1 for .democratic. communities and 0 for oligarchic.communities. In the empirical analysis, we use this variable for D_{it} in equation (11).

Table 5 summarises the information on the selection of community leaders across communities in 1997 and 2007 using this classification. The data shows substantial differences in the selection process between the two years. However, as the question relates to the process prescribed by traditional law, the variable should, by definition, be time-invariant. We attribute the differences in the data between the two rounds of survey to differences in the way the question may have been interpreted in the two years of the survey: the 1997 survey included questions on both the current practice and the practice according to traditional law while the 2007 survey included only the latter.

We consider the variable from the 1997 round as more reliable because of the distinction it made between the current practice and the traditional law. Therefore, in our analysis, we use only the 1997 variable as a single time-invariant indicator for whether the community had a tradition of local democracy.[11]

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[11]However, using the 2007 variable instead makes little difference in the subsequent analysis. Our estimation sample includes only communities for which adherence to *adat* laws did not change between 1997 and 2007. For this subsample, the value of the DEMOCRACY variable remains the same between in 1997 and 2007.

6.4 Physical and Social Infrastructure

The aim of the paper is to examine how local institutions shape the provision of different types of public goods. Therefore, we focus on a number of basic infrastructural goods that could directly impact on sustainable livelihoods and provide opportunities for all, especially for the poor. The list of 'physical' infrastructural goods we consider includes the community's access to cemented local roads , access to motorised public transport including buses and boats, access to a public telephone office, and access to a post office. Local roads and motorised public transport can subtantially reduce the disadvantages associated with geographical isolation and remoteness and are, therefore, potentially important tools for economic development and poverty alleviation. Similarly, the availability of public telephone services and post offices could substantially reduce the disadvantages associated with location and distance. Using principal components methods, we generate a composite infrastructural goods index consisting of the afore-mentioned physical infrastructural goods (labelled PCINFRA). We compare these physical infrastructural goods with a community's access to two important 'social' goods: namely, the number of government schools and health centres per 100 community members.

Other community-level variables used in the analysis include the population and area of the community, binary variables indicating whether it is rural and whether it has access to the sea, and the distance of the community from the district headquarters. These variables were all obtained from the IFLS community survey.

6.5 Public Spending

We aim to determine the spending composition of public investments in the sample communities, which is an important element for economic development policies (see, e.g., Aschauer (1989), Barro (1991), Easterly and Rebelo (1993), Devrajan et al. (1996)).

The IFLS data provides details of the community budget and we use this information to calculate the share of public spending that is allocated to different types of investment. We classify (i) spending on education, health, community services and women's development as 'social investments' and (ii) spending on physical infrastructure and village enterprises as 'physical infrastructural investments'. The remainder of community public budget goes to the maintenance of local infrastructure, the payment of salaries and other administrative expenses. We construct variables SHSOC and SHINFRA defined, respectively, as the proportion of total development spending on social goods, and the proportion of total development spending on physical infrastructure. We use these variables for y_{sit} and y_{pit} respectively in equation (11).

Figure 3 shows scatter plots of the share of public spending on social goods and physical infrastructure, with the share of spending in 1997 on the horizontal axis and the share of

spending in 2007 on the vertical axis. The plots show that there was a good deal hetero-geneity in spending shares in both years. But, importantly, most of the dots for spending on physical infrastructure appear above the diagonal while most of the dots for spending on social infrastructure appear below the diagonal, which means that the share spending on physical infrastructure increased and that on social infrastructure decreased across most communities between 1997 and 2007. This pattern is consistent with the descriptive statistics in Table 1.

7   Results and Analysis

In this section, we present and analyse our results. The raw dataset contains complete information for 311 sample communities. For the reasons explained in Section 5, we restrict the sample to communities in which adherence to *adat* laws did not change between 1997 and 2007. This leaves us with an estimation sample of 195 communities (the level of adherence changed in 116 communities). The regression sample is further restricted because of missing observations in the left-hand side variables. The final sample for the regression analysis includes 159 communities and 233 observations (Tables 8, 9 and 10).

Given the potential endogeneity of the share of the central government grant as a measure of fiscal control, we focus our analysis on the instrumented fixed effects estimates of equation (11). The first stage estimates are shown in Table 7. The instrumented estimates of the share of public spending on physical infrastructure and social infrastructure in Tables 8, 9 and 10. We cluster all standard errors at the community level to minimise the problem of autocorrelation of errors over time within districts.

7.1   First-Stage Estimates for Fiscal Control

Our first task is to find a convincing instrument for the measure of community's fiscal control. To this end we first obtain the district-level FE-OLS estimates of equation (12). We include not only the set of explanatory variables (see section 5), but also a set of its interactions with the year-dummy variable d_{2007} (which takes a value of 1 for the year 2007 and 0 otherwise). In addition to our key identifying variables, namely, the distance of the community from the district headquarters and the geographic size of the community, we include a number of community characteristics including population, proportion of village households identified as poor, and binary variables indicating whether the community is rural and whether it has access to sea. The standard errors of the estimates are clustered at the district-level to minimise the problem of correlation over time for a given district.

In Table 7, column 1 shows the estimates of SHNCGOV for the full sample while column 2 shows those for communities with stable *adat*. We focus our attention on the interaction

terms which represent the differential effects of various community characteristics after fiscal decentralisation and find that these estimates are generally stable across the different samples that we consider.

While the share of the grant that is from the central government (in the community public spending budget) fell across communities on average in 2007, the estimates indicate that the decline was more muted in more rural, populous, and geographically larger communities. The effect of coastal location in 2007 is only significant for the full sample (column 1), but not in other subsamples.

The estimates indicate that, for communities further from the district headquarters, the central government grant constituted a larger share of total revenues in 2007 (i.e. following fiscal decentralisation). These estimates are consistent with the idea that communities closer to the district headquarters had better access to funds from the district government and, therefore, became less dependent on direct transfers from the central government following fiscal decentralisation. Note that the corresponding coefficient for the distance variable on its own is close to zero and statistically insignificant in each specification. This suggests that the variable is not serving as a proxy for other community-level characteristics that may influence transfers from the central government.

The estimates also indicate that in geographically larger communities the central government grant constituted a smaller share of total revenues in 1999 but this relationship effectively disappears in the post-decentralisation period.

We test the relevance of the two instruments in determining the share of the central government grant. The F-statistic for a joint test of significance of the two instruments (disdhq*2007 and vsize*2007) is 9.75 with a p-value of 0.001 (see Table 7), thus rejecting the null hypothesis that neither instrument has an effect in determining the share of central grant.

We use the interaction of the estimated coefficients of the distance and geographic size variables and the year dummy to calculate the fitted values for the share of the central government grant. The fitted values are then used as the relevant community-level instruments for the estimation of public spending shares on social and physical infrastructure at the second stage, as laid out in equation (12). In doing so we also test the validity of the instrument with a view to show that it is not correlated with the residual of various public spending shares estimated at the second stage. These F-statistics for instrument validity are reported in Tables 8, 9 and 10 (see further discussion below).

7.2   The Impact of Fiscal Decentralisation on Public Investments

In Tables 8, 9 and 10 we report IV estimates for equation (11), with F_{it} instrumented as described in Section 5. Our baseline estimates are shown in columns 1-3 of Table 8, where the

governance variable used, DEMOCRACY, takes a value of 1 if the community in question had a tradition of choosing its head on the basis of voting or a consensus decision among all members of the community.

Recall that the share of the community budget not funded by central government, SHNC-GOV, is our preferred measure of local fiscal control. Therefore, the effect of fiscal decentralisation can be represented by changes in this variable. In the regression, this variable, on its own, has a statistically insignificant effect on the share of investment in both social and physical infrastructure. The coefficient for social infrastructure, in particular, is close to zero. In words, there is no evidence that, in communities that did not have a tradition of democracy and did not practise strict adherence to *adat* norms, decentralisation had an effect on the proportion of public spending that went into investment in social or physical infrastructure.

The coefficient of the interaction term involving SHNCGOV and ADAT is negative and statistically significant in the case of total investment at the 1% level. The corresponding coefficients for social and physical infrastructure are also negative but statistically insignificant. The interaction term for SHNCGOV and DEMOCRACY also has negative estimated coefficients for total investment, social infrastructure and physical infrastructure, although it is statistically significant only in the first two instances. Therefore, there is evidence that fiscal decentralisation led to a *decline* in investment shares in communities that had *either* a tradition of democracy *or* observed strict adherence to *adat* norms.

Finally, we turn to the triple-interaction term ADAT x DEMOCRACY x SHNCGOV. There is a large, positive and statistically significant effect on both total investments and investment in social infrastructure. This means that communities that had *both* a tradition of democracy and observed strict adherence to *adat* norms experienced an additional effect from fiscal decentralisation, specifically a strong increase in total investments and social investments. The corresponding effect for physical infrastucture investments, although positive, is statistically insignificant.

For the subset of communities with a tradition of democracy, those with strict adherence to *adat* norms experienced a larger shift towards social investments.[12] The corresponding effect for physical investments is negative but statistically insignificant.[13] Assuming that ADAT $= 1$ represent communities with a high levels of participation in collective activities (as argued in Section 6), and communities for which DEMOCRACY $= 1$ make their investment choices optimally following decentralisation, these effects can be checked against our

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[12]The effect is given by the sum of the coefficients of the interaction terms DEMOCRACY x Gov't Share and DEMOCRACY x ADAT x Gov't Share; i.e. 1.265 - 0.125 = 1.140 . An F-test for the null hypothesis that the sum of the coefficients is equal to zero is rejected at the 5% level (the F-statistic and p-value are shown at the bottom of Table 8).

[13]The total effect is 0.345 - 0.512 = -0.167, and this is insignificantly different from zero (F-statistic and p-value shown at the bottom of Table 8).

theoretical predictions. The greater shift towards social investments for ADAT communities conforms to the theory. The theory also predicted a shift away from physical infrastructural investments by ADAT communities and, although the corresponding estimates are statistically insignificant, the negative sign is consistent with this prediction.

At the bottom of the table, we provide results for tests on instrument relevance, instrument validity and over-identification. We cannot reject the null that the over-identification restrictions are valid, which suggest that the instruments do not have any direct effects on the outcome variables.

In Tables 9 and 10, we provide second-stage estimates for alternative measures of collective activities and local democracy within communities. Specifically, in Table 9, we replace the variable DEMOCRACY with CONSENSUS which indicates whether, according to traditional law, 'all residents engaged in consensus building to select the village head'. The estimated coefficients, shown in columns 1-3 in Table 9, are less precisely estimated than our previous set of results. The estimated coefficients are smaller in size and statistically insignificant. This suggests that the villages where the head is chosen by voting, as opposed to consensus-building, may be important in driving the main results. In Table 10, we replace ADAT with the variable MUTUAL-COOP which takes a value of 1 in communities where, according to traditional law, there was a community group for construction/infrastructure projects based on an ethic of mutual cooperation. The estimates are, broadly, in line with our estimates using the ADAT variable. Communities which either practised mutual cooperation (in community groups for construction/infrastructure projects) or had a tradition of democracy experienced a decline in the share of social investments, and a statistically insignificant effect on the share of physical investments. But communities which had both a tradition of democracy and practised mutual cooperation experienced an additional shift towards social investments (signficiant at the 5%) and away from physical infrastructural investments (signfiicant at the 10% level).

We show the FE-OLS estimates of (11) in columns 4-6 of Tables 8 and 9. The estimated coefficients of the interaction terms involving SHNCGOV are similar to those obtained using the IV approach but the point estimates are generally smaller. Note that changes in SHCGOV between the two time periods are potentially endogenous, particularly as the transfer of funds from the central government in the post-decentralisation period was based on a 'fiscal needs formula' (see Section 2) based on community characteristics such as population, geographical size, poverty rate, etc. To the extent that these same community characteristics directly affected public investments following decentralisation, our FE-OLS estimates of the impact of fiscal decentralisation would be biased. The FE-IV estimation addresses this issue by excluding, at the second-stage, the part of the variation in the central government grant share which is correlated with these characteristics.

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8 Concluding Comments

Improving the quality of public services available to the masses is, potentially, an important tool for poverty alleviation in developing countries; and the potential role of fiscal decentralisation in this process has been discussed extensively in the literature (World Bank 2004a). Since decentralisation provides greater decision-making power to local governments, its impact on public goods provision should, arguably, depend on the quality and nature of local institutions.

With this motivation, this paper investigated, both theoretically and empirically, the impact of fiscal decentralisation on local public spending in communities in Indonesia using two rounds of the Indonesian Family Life Surveys. Specifically, we explored how fiscal decentralisation affects the share of public spending on goods which facilitate communication and exchange with outsiders (collectively called 'physical infrastructure') and health and education (collectively called 'social goods') across communities which differ in terms of their adherence to traditional laws and tradition of local democracy.

We developed a theoretical model to show that if mutual cooperation in collective activities within communities are sustained by the threat of social exclusion, then the optimal choice of investment in infrastructure that faciliate exchange with outsiders is, *ceteris paribus*, lower in communities where the existing level of cooperation is higher. In the context of fiscal decentralisation in Indonesia, we derived the theoretical implication that communities with strong adherence to *adat* laws – which promote an ethic of mutual cooperation and prescribe social sanctions against those who engage in deviant behaviour – would allocate a greater share of public spending on social investments and a smaller share on physical infrastructural investments relative to other communities.

Our empirical analysis shows that the effect of fiscal decentralisation on public spending at the community-level is heterogenous. Fiscal decentralisation led to a *decline* in investments as a share of total public spending in communities that had either a tradition of democracy or observed strict adherence to traditional laws. However, communities which had *both* a tradition of democracy and adhered to traditional laws experienced a sharp increase in investments which more than offsets the decline noted above.

For the latter communities, we also find that decentralisation led to a shift in public spending towards investment in social goods, with no significant change in the share going into investments in communications and road infrastructure, which provides partial support for the theory.

These results highlight the role of heterogeneous institutions (both formal and informal) on public spending patterns following the introduction of fiscal decentralisation.

9   Theoretical Appendix

Condition 1: We derive below the parameter values for which Condition 1 holds: Suppose that all community members, except individual l in group k contribute a level of effort equal to e. Then we obtain

$$
\begin{aligned}
f\left(\mathbf{e}\right) &= A\left(\left(n-1\right)e+e_{lk}\right)^{\alpha}\prod_{j\neq k}\left(ne\right)^{\alpha}\\
&= A\left(\left(n-1\right)e+e_{lk}\right)^{\alpha}\left(ne\right)^{\left(m-1\right)\alpha}
\end{aligned}
$$

$$
\Longrightarrow\quad \frac{\partial f}{\partial e_{ik}}=\alpha A\left(\left(n-1\right)e+e_{ik}\right)^{\alpha-1}\prod_{j\neq k}\left(ne\right)^{\alpha} \tag{13}
$$

$$
\Longrightarrow\quad \frac{\partial f}{\partial e_{lk}}\Big|_{e_{lk}=0}=\alpha\frac{A\left[\left(n-1\right)e\right]^{\alpha}\left(ne\right)^{\left(m-1\right)\alpha}}{\left(n-1\right)e}
$$

$$
\begin{aligned}
&= \alpha\frac{A\left(\frac{n-1}{n}\right)^{\alpha}\left(ne\right)^{\alpha}\left(ne\right)^{\left(m-1\right)\alpha}}{\left(\frac{n-1}{n}\right)ne}\\
&= \alpha\frac{A\left(\frac{n-1}{n}\right)^{\alpha}\left(ne\right)^{m\alpha}}{\left(\frac{n-1}{n}\right)ne}\\
&= \frac{\alpha A}{\left(\frac{n-1}{n}\right)^{1-\alpha}\left(ne\right)^{1-m\alpha}}
\end{aligned}
$$

Therefore

$$
\lim_{n\to\infty}\frac{\partial f}{\partial e_{lk}}\Big|_{e_{lk}=0}=0
$$

It is evident from (13) that $\frac{\partial f}{\partial e_{lk}}$ is decreasing in e_{lk}. Therefore,

$$
\lim_{n\to\infty}\frac{\partial f}{\partial e_{lk}}=0 \text{ for any } e_{lk}>0
$$

Therefore, for any $\varepsilon>0$, and $e_{ij}=e$ for all $ij\neq lk$, $\exists n_{0}$ such that for $n>n_{0}$, $\frac{\partial f}{\partial e_{lk}}<\varepsilon$.

Condition 2: We derive below the parameter values for which Condition 1 holds: Suppose that e is the prescribed level of effort in the collective activity. Then the level of provision of good X through the collective activity is given by

$$
f\left(\mathbf{e}\right)=A\left(ne\right)^{m\alpha}
$$

Then, if an individual i spends all his labour earnings on good Y, his level of consumption of good X is simply his share of the proceeds of the collective activity: $\lambda A\left(ne\right)^{m\alpha}$.

Then the marginal utility for individual i per unit of money spent on good X is given by

$$
\frac{u'\left(X\right)}{p+\tau}=\frac{u'\left(\lambda A\left(ne\right)^{m\alpha}\right)}{p+\tau}
$$

And the marginal product per unit of money spent on good Y is

$$v'(Y) = v'((1-e)(w-\tau))$$

Therefore, individual i would not make any expenditures on X if and only if

$$v'((1-e)(w-\tau)) \geq \frac{u'(\lambda A(ne)^{m\alpha})}{p+\tau}$$

Proof. of Proposition 1: If $\bar{e}(A, w, \tau, \Psi) < e_{fb}(A, w, \tau)$, then we must have the condition in (7) holding with equality at $e = \bar{e}(A, w, \tau, \Psi)$:

$$(1-\beta)e(w-\tau) = \beta[U(X_{adat}, Y_{adat}) - U(X_{aut}, Y_{aut})] + (1-\beta)\Psi \tag{14}$$

Furthermore, we must have, at $e = \bar{e}(A, w, \tau, \Psi)$,

$$(1-\beta)(w-\tau) > \beta\left[mn\lambda\alpha A(ne)^{m\alpha-1}u'(\lambda A(ne)^{m\alpha}) - (w-\tau)\right] \tag{15}$$

If (15) did not hold, then increasing e marginally above $\bar{e}(A, w, \tau, \Psi)$ would increase the cost of social exclusion by more than it would raise the gain from deviation. This would imply that a level of cooperation above $\bar{e}(A, w, \tau, \Psi)$ is sustainable, which contradicts the definition of $\bar{e}(A, w, \tau, \Psi)$.

Taking the derivative throughout (14) w.r.t. τ, we obtain, at $e = \bar{e}(A, w, \tau, \Psi)$,

$$(1-\beta)\left[\frac{\partial\bar{e}}{\partial\tau}(w-\tau) - e\right] = \beta\left[\frac{\partial\bar{e}}{\partial\tau}mn\lambda\alpha A(ne)^{m\alpha-1}u'(\lambda A(ne)^{m\alpha}) - \frac{\partial\bar{e}}{\partial\tau}(w-\tau) - (1-e) - (-1-X_{aut})\right]$$

(since $\frac{du(X_{adat})}{d\tau} = \frac{\partial\bar{e}}{\partial\tau}mn\lambda\alpha A(ne)^{m\alpha-1}u'(\lambda A(ne)^{m\alpha})$, $\frac{dY_{adat}}{d\tau} = -\frac{\partial\bar{e}}{\partial\tau}(w-\tau) - (1-e)$ and $\frac{dU(X_{aut}, Y_{aut})}{d\tau} = -1 - X_{aut}$ using the Envelope Theorem).

$$\implies \frac{\partial\bar{e}}{\partial\tau}\left[(1-\beta)(w-\tau) - \beta mn\lambda\alpha A(ne)^{m\alpha-1}u'(\lambda A(ne)^{m\alpha}) + \beta(w-\tau)\right] = (1-\beta)e - \beta(1-e) + \beta($$

$$\implies \frac{\partial\bar{e}}{\partial\tau} = \frac{e + (1-\beta) + X_{aut}}{(w-\tau) - \beta mn\lambda\alpha A(ne)^{m\alpha-1}u'(\lambda A(ne)^{m\alpha})}$$

The numerator on the right-hand side of (16) is positive by construction. The denominator on the right-hand side of (16) is positive because of the condition in (15). Therefore, we obtain $\frac{\partial\bar{e}}{\partial\tau} > 0$. $\blacksquare$

Similarly, taking the derivative throughout (14) w.r.t. A, we obtain, at $e = \bar{e}(A, w, \tau, \Psi)$,

$$\frac{\partial\bar{e}}{\partial A}(1-\beta)(w-\tau) = \beta\left[\frac{\partial\bar{e}}{\partial A}mn\lambda\alpha A(ne)^{m\alpha-1} + \lambda(ne)^{m\alpha}\right]u'(\lambda A(ne)^{m\alpha}) - \beta\frac{\partial\bar{e}}{\partial A}(w-\tau)$$

$$\implies \frac{\partial\bar{e}}{\partial A} = \frac{\beta\lambda(ne)^{m\alpha}u'(\lambda A(ne)^{m\alpha})}{(w-\tau) - \beta mn\lambda\alpha A(ne)^{m\alpha-1}u'(\lambda A(ne)^{m\alpha})} \tag{17}$$

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The numerator on the right-hand side of (17) is positive by construction. The denominator on the right-hand side of (17) is positive because of the condition in (15). Therefore, we obtain $\frac{\partial \bar{e}}{\partial A} > 0$.

Proof. of Proposition 2: Consider a community where the initial level of infrastructure is represented by the parameters K_{s0} and K_{p0} and the exogenous punishment for violating the *adat* norm is equal to Ψ. Let us denote by $\left(I_s^*, I_p^*\right)$ the optimal investment choice in this community for a specified budget B, as defined by the maximisation problem in (10). By construction, the maximum sustainable level of effort in the collective activity following such an investment choice is equal to $e^*\left(K_{s0} + I_s^*, K_{p0} + I_p^*, w, \Psi\right)$.

Taking the derivative of the maximand in (10) w.r.t. I_s and I_p we obtain, respectively, the following expressions:

$$\frac{dU\left(.\right)}{dI_s} = A'\left(K_s\right)\lambda\left(ne\right)^{m\alpha} u'\left(\lambda A\left(K_s\right)\left(ne\right)^{m\alpha}\right)\left(1 - \Omega\right)$$

$$\frac{dU\left(.\right)}{dI_p} = -\tau'\left(K_p\right) + e\tau'\left(K_p\right)\left(1 - \Omega\right) + \left[\left(1 - \beta\right) + X_{aut}\right]\Omega$$

where $K_s = K_{s0} + I_s^*$ and $K_p = K_{p0} + I_p^*$ and $\Omega = \frac{u'(.)A(K_s)\alpha(ne)^{m\alpha-1}-(w-\tau(K_p))}{u'(.)A(K_s)\alpha(ne)^{m\alpha-1}-(w-\tau(K_p))/\beta}$. It can be shown that if the utility function $u\left(.\right)$ exhibits relative risk aversion less than 1, then $\frac{d\Omega}{de} < 0$ and $\frac{d}{de}\left[A\left(K_s\right)\lambda\left(ne\right)^{m\alpha} u'\left(\lambda A\left(K_s\right)\left(ne\right)^{m\alpha}\right)\right] > 0$.[14] It follows that $\frac{d^2U(.)}{dedI_s} > 0$ and $\frac{d^2U(.)}{dedI_p} < 0$.

Let us denote by $I_s^*\left(K_{s0}, K_{p0}, \Psi\right)$ and $I_p^*\left(K_{s0}, K_{p0}, \Psi\right)$ the solution to the optimisation problem in a community with exogenous punishment Ψ. If $\Psi' > \Psi$ then, using Proposition 1 and Assumption 1, $e^*\left(K_s, K_p, \Psi'\right) > e^*\left(K_s, K_p, \Psi\right)$ for any $K_s, K_p > 0$. Therefore, if the

---

[14]To obtain the second result, note that

$$\frac{d}{dy}\left[f\left(y\right)u\left(f\left(y\right)\right)\right] = f\left(y\right)u''\left(f\left(y\right)\right)f'\left(y\right) + f'\left(y\right)u'\left(f\left(y\right)\right)$$

Therefore,

$$\frac{d}{dy}\left[f\left(y\right)u\left(f\left(y\right)\right)\right] > 0 \iff -f\left(y\right)\frac{u''\left(f\left(y\right)\right)}{u'\left(f\left(y\right)\right)} < 1$$

It follows that if relative risk aversion is smaller than 1 then

$$\frac{d}{de}\left[A\left(K_s\right)\lambda\left(ne\right)^{m\alpha} u'\left(\lambda A\left(K_s\right)\left(ne\right)^{m\alpha}\right)\right] = Z > 0$$

To obtain the first result, note that

$$\frac{d\Omega}{de} = \frac{Z\left[u'\left(.\right)A\left(K_s\right)\alpha\left(ne\right)^{m\alpha-1} - \left(w - \tau\left(K_p\right)\right)/\beta\right] - Z\left[u'\left(.\right)A\left(K_s\right)\alpha\left(ne\right)^{m\alpha-1} - \left(w - \tau\left(K_p\right)\right)\right]}{\left[u'\left(.\right)A\left(K_s\right)\alpha\left(ne\right)^{m\alpha-1} - \left(w - \tau\left(K_p\right)\right)/\beta\right]}$$

$$= \frac{Z\left(w - \tau\left(K_p\right)\right)\left(1 - \beta\right)}{\beta u'\left(.\right)A\left(K_s\right)\alpha\left(ne\right)^{m\alpha-1} - \left(w - \tau\left(K_p\right)\right)}$$

The denominator in this last expression is negative according to the reasoning in the proof of Proposition 1 while all the terms in the numerator are positive. Therefore, $\frac{d\Omega}{de} < 0$.

optimisation problem has an interior solution in the case of the community with exogenous punishment Ψ, we must have $\frac{dU(.)}{dI_s} > \frac{dU(.)}{dI_p}$ at $I_s = I_s^*(K_{s0}, K_{p0}, \Psi)$ and $I_p = I_p^*(K_{s0}, K_{p0}, \Psi)$ for a community with exogenous punishment Ψ'. Therefore, the optimal choice of investment will involve a higher value of I_s and a smaller value of I_p in the latter community.

Suppose the optimisation problem has a corner solution in the case of the community with exogenous punishment Ψ, such that $I_s^*(K_{s0}, K_{p0}, \Psi) = 0$. Then $\frac{dU(.)}{dI_s} < \frac{dU(.)}{dI_p}$ at $I_s = I_s^*(K_{s0}, K_{p0}, \Psi)$ and $I_p = I_p^*(K_{s0}, K_{p0}, \Psi)$ in this community. Given the signs of the cross-partial derivatives provided above, we must have $\frac{dU(.)}{dI_s} \leq \frac{dU(.)}{dI_p}$ or $\frac{dU(.)}{dI_s} > \frac{dU(.)}{dI_p}$ at $I_s = I_s^*(K_{s0}, K_{p0}, \Psi)$ and $I_p = I_p^*(K_{s0}, K_{p0}, \Psi)$ for a community with exogenous punishment Ψ'. In the first case, we obtain the identical corner solution. In the second case, the optimal choice of investment will involve a higher value of I_s and a smaller value of I_p in the latter community. Reasoning along the same lines, we can make the necessary argument if the corner solution in community Ψ is such that $I_p^*(K_{s0}, K_{p0}, \Psi) = 0$. ∎

References

[1] Aldashev, G., I. Chaara, J-P, Platteau, Z. Wahhaj (2012a). "Using the Law to Change the Custom", *Journal of Development Economics*, March 2012.

[2] Aldashev, G., I. Chaara, J-P, Platteau, Z. Wahhaj (2012b). "Modern Law as a Magnet to Reform Unfair Customs", *Economic Development and Cultural Change*, July 2012.

[3] Amemiya, T. (1974) 'The Nonlinear Two-Stage Least-Squares Estimator' Journal of Econometrics2: 105-110.

[4] Anderson, B.R. O'G. (2001). Introduction. In: Anderson, B.R. O'G. (Ed.), Violence and the state in Suharto's Indonesia (pp. 9–19). Ithaca, NY: Southeast Asian Program Publications, Cornell University.

[5] Antlov, H. (2003). "Village Government and Rural Development in Indonesia: The New Democratic Framework", *Bulletin of Indonesian Economic Studies*, Vol. 39(2), pp. 193-214.

[6] Aschauer, D. (1989). 'Is government spending productive?', Journal of Monetary Economics 23, pages 177-200.

[7] Bandiera, O. and G. Levy (2010). "Diversity and the Power of the Elites in Democratic Societies: A model and a test," *CEPR Discussion Papers* 7985.

[8] Banerjee, A., L. Iyer, and R. Somanathan. (2007). "Public Action for Public Goods", in *Handbook of Development Economics*, edited by T. Schultz and J. Strauss, Vol. 4, pages 3117-3154.

[9] Bardhan, P. (2002). 'Decentralization of Governance and Development', Journal of Economic Perspectives, 185-205.

[10] Bardhan, P. and D. Mookherjee (2006). *Decentralization and Local Governance in Developing Countries*, MIT Press.

[11] Barro, R. (1991). 'Economic growth in a cross-section of countries', Quarterly Journal of Economics 106, pages 407-444.

[12] Bebbington, A., L. Dharmawan, E. Fahmi and S. Guggenheim (2006). "Local Capacity, Village Governance, and the Political Economy of Rural Development in Indonesia", *World Develoment*, Vol. 34(11).

[13] Bertrand, M. E. Duflo and S. Mulainathan. (2004). 'How Much Should We Trust Differences-In-Differences Esimates?'The Quarterly Journal of Economics (2004) 119 (1): 249-275.

[14] Besley, Timothy & Coate, Stephen, 1995. "Group lending, repayment incentives and social collateral," Journal of Development Economics, Elsevier, Vol. 46(1), pp. 1-18, February 1995.

[15] Besley, T., R. Pande. and V. Rao. 2005. 'Participatory Democracy in Action: Survey Evidence from India', Journal of European Economic Association Papers and Proceedings, Vol. 3 (2-3), pp. 648-657, April - May 2005.

[16] Bowen, J. (1986). "On the Political Construction of Tradition: Gotong Royong in Indonesia", *Journal of Asian Studies*, Vol. 45(3), pp. 545-561.

[17] Brodjonegoro, B. 2001. 'Indonesian Intergovernmental Transfer in Decentralization Era: The Case of General Allocation Fund', Paper Presented at the International Symposium on Intergovermental Transfers in Asian Countries, Asian Tax and Public Policy Program, Hitotsubashi University, Tokyo, February 2001. (Accessed at http://www.econ.hit-u.ac.jp/~kokyo/symposium/PDF/Indonesia.PDF)

[18] Bun, M. and T. Harrison. 2014. OLS and IV estimation of regression models including endogenous interaction terms', Working Paper WP 2014-3, Drexel University.

[19] Buttenheim, A. and J. Nobles (2009). "Ethnic diversity, traditional norms, and marriage behaviour in Indonesia", *Population Studies*, Vol. 63(3), pp. 277-294.

[20] Chowdhury, S., F. Yamauchi, and R. Dewina (2009). "Governance Decentralization and Local Infrastructure Provision in Indonesia", IFPRI Discussion Paper 00902, October 2009.

[21] Coate, S. and M. Ravallion, 1993. "Reciprocity without commitment: characterisation and performance of informal risk-sharing arrangements", Journal of Development Economics, Vol. 40, pp. 1–24.

[22] Davidson, J. and D. Henley (2007). *The Revival of Tradition in Indonesian Politics: The Deployment of Adat from Colonialism to Indigenism*, Taylor and Francis.

[23] Devarajan, S, V. Swaroop. and H-F Zhu. 1996. 'The Composition of Public Spending and Growth in Developing Countries', Journal of Monetary Economics, Vol. 37, pages 313-344.

[24] Davoodi, H. and H. Zoo. 1998. "Fiscal Decentralization and Economic Growth: A Cross-Country Study", Journal of Urban Economics, Vol. 45, pages 244-257.

[25] De Luca, M., M. Jones, M. Tula. 2002. "Black Rooms or Ballot Boxes: Candidate Nomination in Argentina", Comparative Political Studies, Vol. 35, pages 413-436.

[26] de Mello, L. and M. Barenstein. 2001. "Fiscal Decentralization and Governance: A Cross-Country Analysis", IMF Working Paper No. WP/01/71.

[27] Duncan, C.R. (2007). "Mixed Outcomes: The Impact of Regional Autonomy and Decentralization on Indigenous Ethnic Minorities in Indonesia", Development and Change, Vol. 38(4), pp. 711-733.

[28] Easterly, W. and S. Rebelo, 1993. 'Fiscal policy and economic growth: An empirical investigation', Journal of Monetary Economics, Vol. 32, pages 417-458.

[29] Enikolopov, R. and E. Zhuravskaya. 2007. "Decentralization and Political Institutions", Journal of Public Economics, Vol. 91, pages 2261-2290.

[30] Fafchamps, M., 1992. "Solidarity Networks in Preindustrial Societies: Rational Peasants with a Moral Economy", Economic Development and Cultural Change, Vol. 41(1), October 1992.

[31] Fasseur, C. (2007). "Colonial Dilemma: Van Vollenhoven and the Struggle between Adat Law and Western Law in Indonesia" in *The Revival of Traditionl in Indonesian Politics: The Deployment of Adat from Colonialism to Indigenism* edited by Davidson, J. and D. Henley, Taylor and Francis.

[32] Frankenberg, E. and D. Thomas. (2000). "Study Design and Results from Waves 1 and 2," Santa Monica, CA, Rand, DRU - 2238, Volumes 1-7, NIA/NICH.

[33] Greif, Avner., 1993. "Contract Enforceability and Economic Institutions in Early Trade: The Maghribi Traders' Coalition", The American Economic Review, Volume 83

[34] Hoff, K. and A. Sen, 2005. "The Kin System as a Poverty Trap?", World Bank Policy Research Working Paper No. 3575, April 2005.

[35] IMF and World Bank. 2003. *Heavily Indebted Poor Countries (HIPC) Initiative: Status of Implementation*, mimeo.

[36] Kato, T. (1989). "Different Fields, Similar Locusts: Adat Communities, and the Village Law of 1979 in Indonesia", *Indonesia*, Vol. 47, pp. 89-114.

[37] Kelejian, H. (1971) 'Two -Stage Least Squares and the Econometric Systems Linear in Parameters and Non-linear in Endogenous Variables', Journal of the American Statistical Association 66(334): 373-74.

[38] Kimball, M., 1988. "Farmers' cooperatives as behaviour toward risk", American Economic Review, 78 (1988), pp. 224–232

[39] Kis-Katos, K., B. Suharnoko. 2011. "Does Local Government's Responsiveness Increase with Decentralization and Democratization? Evidence from sub-nation budget allocation in Indonesia", Manuscript.

[40] Kis-Katos and Sjahrir (2014)). 'The Impact of Fiscal and Political Decentralization on Local Public Investments in Indonesia.' IZA discussion paper No. 7884

[41] Kranton, R., 1996. "Reciprocal Exchange: A Self-Sustaining System", The American Economic Review, Vol. 86(4), September 1996, pp. 830-851

[42] Lewis and Osterman (2014) Local Government Capital Spending in Indonesia: Impact of Intergovernmental Fiscal Transfers. Public Budgeting and Finance 33 (1): 76-94.

[43] Martinez-Bravo, M., G. Padro-i-Miguel, N. Qian, Y. Yao. (2012). "The Effects of Democratization on Public Goods and Redistribution", NBER Working Paper 18101.

[44] Martinez-Bravo, M. 2014. "The Role of Local Officials in New Democracies: Evidence from Indonesia", American Economic Review, 104(4), pp. 1244-87.

[45] Miguel, E. and M. Gugerty. 2005. 'Ethnic diversity, social sanctions, and public goods in Kenya', Journal of Public Economics, 89: 11, 2325.

[46] Mukherjee (2014) Accountability of Public Officials under Appointments and Elections - Evidence from Indonesia', mimeo Cornell University.

[47] Okamoto, M. (2014). "Jakartans, Institutionally Volatile", Journal of Current Southeast Asian Affairs, Vol. 33(1), pp. 7-27.

[48] Padro-i-Miguel, G., N. Qian, Y. Yao. (2013). "Social Fragmentation, Public Goods and Elections: Evidence from China", CDDRL Working Paper Number 130, April 2013, Stanford University.

[49] Platteau, J.P., 2006. "Solidarity Norms and Institutions in Agrarian Societies: Static and Dynamic Considerations" in Handbook of the Economics of Giving, Altruism and Reciprocity, edited by S. Kolm and J. Mercier Ythier. North Holland.

[50] Rao, V. (2005). "Symbolic Public Goods and the Coordination of Collective Action: A Comparison of Local Development in India and Indonesia", *World Bank Policy Research Working Paper* 3685, August 2005.

[51] Resosudarmo and Vidyattama 2007

[52] Skoufias, E., A. Narayan, B. Dasgupta, K. Kaiser. 2011. "Electoral Accountability, Fiscal Decentralization and Service Delivery in Indonesia", Policy Research Working Paper 5614, World Bank.

[53] Strauss, J., F. Witoelar, B. Sikoki and A. M. Wattie (2009). "The 4th Wave of the Indonesian Family Life Survey (IFLS4): Overview and Field Report," WR - 675/1 - NIA/NICHD.

[54] Valsechhi (2013) 'Political Centralization and Corruption: Evidence from a New Democracy', Manuscript.

[55] Wahhaj, Z., 2010. "Social Norms and Individual Savings in the Context of Informal Insurance", Journal of Economic Behavior and Organization, Vol. 76(3), December 2010, pp. 511-530

[56] Warren, Carol, and John F. McCarthy (2002). "Adat regimes and collective goods in the changing political constellation of Indonesia." *Shaping Common Futures: Case Studies of Collective Goods, Collective Actions in East and Southeast Asia.* Routledge, London.

[57] Warsono and Ruksamin (2014) 'The Obstacles of Implementation of Village Allocation Fund Program in the North Konawe Southeast Sulawesi', Journal of Management and Sustainability 4 (3): 175-183

[58] World Bank. 2004. World Development Report. Making Services Work for the Poor. World Bank and Oxford University Press.

Table 1. Changes in Community Revenues and Public Spending 1997-2007

Variables	1997 Mean (sd)	2007 Mean (sd)	Variables	1997 Mean (sd)	2007 Mean (sd)
			Total spending ('000 Rp) on		
Share of spending [1] on					
Social Infrastructure	0.1078 (0.1153)	0.1284 (0.1955)	Social Infrastructure	164 (318)	1057.2 (2633)
Physical infrastructure	0.0658 (0.0839)	0.4992 (0.3691)	Physical infrastructure	75.1 (135.4)	1540 (2659)
Share of revenues [2] from			Total revenue ('000 Rp) from		
Central Government	0.3291 (0.3119)	0.0663 (0.1745)	Central Government	67.32 (164.3)	146.6 (528)
Provincial Government	0.1444 (0.2920)	0.1345 (0.2681)	Provincial Government	135.16 (376)	673.8 (2086)
District Government	0.0911 (0.1877)	0.4066 (0.3479)	District Government	2214 (63.37)	523.3 (898.4)
Local Funds	0.3786 (0.3781)	0.3925 (0.3256)	Local Funds	235.5 (726)	2393.7 (100961)

Note: [1] Total community spending includes spending on new investment (social and physical infrastructure), maintenance of local public goods and also that on paying salaries and transfers. [2] Total community revenue is generated from grants from central, provincial and district governments and also funds raised from local communities. The remaining balance is accounted for by various governmental transfers under different development programmes. All nominal variables are measured at 2010 price level.

Table 2. Adherence to *Adat* laws across Rural (*desa)* and Urban (*kelurahan*) Communities 1997-2007

	1997 (% of total communities)		2007 (% of total communities)	
	Rural (*desa*)	Urban (*kelurahan*)	Rural (*desa*)	Urban (*kelurahan*)
Adat laws are never broken	38.41	24.81	28.69	21.63
Adat laws are sometimes broken	40.58	51.13	35.25	23.56
Adat laws are frequently broken	1.45	3.76	9.84	20.67
Only a few understand *Adat* laws	19.57	19.55	26.23	34.13

Note: Percentages are based on responses to questions in the community questionnaire in IFLS2 and IFLS4 regarding the extent to which community members follow *adat* laws.

Table 3A: Practice of Mutual Cooperation and Collective Activities within Communities, 1997

	traditional law		current practice	
	frequency	%	frequency	%
Community Activity conducted on a routine basis	200	73.8%	203	74.9%
Community Groups that use Principle of Mutual Cooperation	233	86.0%	229	84.5%
… for security	20	7.4%	16	5.9%
… food security	3	1.1%	3	1.1%
… health, education, economy	44	16.2%	50	18.5%
… construction/infrastructure	69	25.5%	68	25.1%
… assist community member	82	30.3%	73	26.9%
… other	15	5.5%	16	5.9%
Community Activity for assisting members in difficulty	223	82.3%	223	82.3%
N	271		271	

Note: Figures are based on responses to the following questions in the *Adat* module of the IFLS2 community survey: "Is there a community activity (or organization) that is conducted on a routine basis that was formed by members of this village?", "Are there community groups in this village that utilize the principle of mutual cooperation?", and "What is the main purpose of this activity?" The subcategories "security", "food security", etc. refer to community groups that carry out those activities and use an ethic of mutual cooperation.

Table 3B. Practice of Mutual Cooperation across *Adat* and non-*Adat* Communities 1997-2007

	1997 % of communities with mutual cooperation groups			2007 % of communities with mutual cooperation groups		
	ADAT=1	ADAT=0	T-stat	ADAT=1	ADAT=0	T-stat
Desa	94.23	76.47	2.5350**	100	100	-
Kelurahan	93.93	88.66	0.8691	100	0.9421	1.6339
	1997 % of communities with coop groups for community infrastructure			2007 % of communities with coop groups for community infrastructure		
	ADAT=1	ADAT=0	T-stat	ADAT=1	ADAT=0	T-stat
Desa	41.51	27.06	1.7684*	95.40	91.43	0.8492
Kelurahan	18.18	13.53	0.6764	95.56	89.02	1.3235

Note: Mutual cooperation groups refer to community groups that make use of an ethic of 'mutual cooperation' for various collective activities relating to security, health, education, infrastructure projects, assisting community members in difficulty, etc. See Bowen (1986) for further information. The signs *, **, and *** indicate significance at 10%, 5%, and 1% level respectively.

Table 4. Sanctions for breaking *Adat* Rules, 2007

	Adat Communities		*Non-Adat* Communities	
	Frequency	%	Frequency	%
No Sanctions	14	18.4	85	34.8
Minor Sanctions	29	38.2	109	44.7
Major Sanctions	33	43.4	50	20.5
Total	76	100	244	100

Note: 'Major Sanctions' include fines, ostracism, social exclusion and corporal punishment. 'Minor Sanctions' include giving advice.

Table 5. Method of Selection of Community Leaders 1997-2007

	All Communities			
	1997		2007	
	Rural (*Desa*)	Urban (*Kelurahan*)	Rural (*Desa*)	Urban (*Kelurahan*)
Consensus	38	53	15	18
Voting	64	50	100	78
Oligarchy	18	89	5	96
Total	120	192	120	192
	Stable Adat Communities			
	1997		2007	
	Rural (*Desa*)	Urban (*Kelurahan*)	Rural (*Desa*)	Urban (*Kelurahan*)
Consensus	23	26	17	32
Voting	41	27	38	30
Oligarchy	4	36	5	35
Total	68	89	63	97

Note: We use information on the method of selection of leaders in 1997 and 2007 to classify communities into three types: 'consensus building' among community members, 'voting' and 'oligarchies' where the leader is elected by the local elite (religious or legal leaders) or government officials.

Table 6. Inter-Community Variation in Public Goods Provision

Variables	1997: Full sample			2007: Full sample		
	Adat communities	non-*Adat* communities	t-stat	*Adat* communities	non-*Adat* communities	t-stat
Access to bus services	0.18	0.31	-2.3428**	0.29	0.34	-0.7985
Access to paved roads	0.71	0.84	-2.6038**	1.00	0.94	0.8034
Public telephone office	0.32	0.58	-4.2565***	0.71	0.77	-0.9906
Access to a post office	0.15	0.31	-2.7917**	0.16	0.28	-2.0745**
Government schools per 100 people	2.15	1.41	2.2371**	1.52	1.42	0.3448
Government health facilities per 100 people	1.07	0.51	2.5505**	1.84	1.82	0.0827
Share of public spending on physical infrastructure	0.068	0.065	0.2371	0.48	0.51	-0.4187
Share of public spending on social infrastructure	0.13	0.11	0.7331	0.14	0.13	0.2377
	1997: Stable *Adat*			2007: Stable *Adat*		
Variables	*Adat* communities	non-*Adat* communities	t-stat	*Adat* communities	non-*Adat* communities	t-stat
Access to bus services	0.18	0.33	-1.4070	0.36	0.37	0.1098
Access to paved roads	0.68	0.87	-2.2868**	0.99	1	0.5046
Public telephone office	0.36	0.60	-2.1362**	0.55	0.82	-2.9463***
Access to a post office	0.23	0.33	-0.967	0.09	0.34	-2.3603**
Government schools per 100 people	1.82	1.32	0.9135	1.60	1.20	-0.812
Government health facilities per 100 people	1.30	1.01	1.111	1.95	1.73	0.5476
Share of public spending on physical infrastructure	0.05	0.07	-0.6479	0.32	0.50	1.4201
Share of public spending on social infrastructure	0.15	0.11	1.2474	0.33	0.13	2.8511***

Note: The signs *, **, and *** indicate significance at 10%, 5%, and 1% level respectively.

Table 7. First-Stage Estimates for Share of Revenues Not Provided by the Central Government

VARIABLES	(1) All SHNCGOV	(2) Stable Adat SHNCGOV
Distance from DHQ	0.00173	-0.00491
	(0.00141)	(0.00317)
Log(Popn)	0.119***	0.127***
	(0.0274)	(0.0322)
Log(Size)	0.0193	0.0436***
	(0.0136)	(0.0154)
Rural	0.108**	0.102
	(0.0523)	(0.0607)
Sea	0.129***	0.121*
	(0.0460)	(0.0685)
% of Poor Households	0.0126	-0.0184
	(0.0395)	(0.0505)
Year 2007	1.345***	1.466***
	(0.248)	(0.288)
Year07*Distance from DHQ	-0.00335**	-0.00506**
	(0.00162)	(0.00205)
Year07*Log(Popn)	-0.0870***	-0.0809**
	(0.0319)	(0.0369)
Year07*Log(Size)	-0.0248*	-0.0605***
	(0.0140)	(0.0212)
Year07*Rural	-0.172***	-0.146**
	(0.0607)	(0.0707)
Year07*Sea	-0.120**	-0.115
	(0.0552)	(0.0693)
Year07*Poor(%)	Dropped	Dropped
Constant	-1.679***	-1.789***
	(0.204)	(0.268)
District FE	Yes	Yes
District*Year FE	Yes	Yes
Instrument relevance[1]: F (p-val)	-	9.75 (0.001)***
Communities	305	191
Observations	515	320
R-squared	0.378	0.425

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
DHQ stands for District Head Quarter.
[1] Instrument relevance was tested for H0: (year07*disdhq =
Year07*log(size) = 0) after the first stage regression.

Table 8. District FE Estimates of Spending Shares on Public Investment using Democracy & Stable *Adat* Communities

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
		IV estimates			Non-IV estimates	
	Total Invest	SHINFRA	SHSOC	Total Invest	SHINFRA	SHSOC
SHNCGOV IV	0.474	0.508	-0.034			
	(0.290)	(0.324)	(0.192)			
Adat	0.546**	0.364	0.181	0.342	0.305	0.037
	(0.212)	(0.250)	(0.151)	(0.320)	(0.407)	(0.245)
Democracy	0.444***	0.319**	0.125	0.193**	0.057	0.136*
	(0.120)	(0.143)	(0.100)	(0.089)	(0.086)	(0.071)
Adat*Democracy	-1.160***	-0.386	-0.774**	-0.601	-0.309	-0.292
	(0.262)	(0.464)	(0.387)	(0.380)	(0.479)	(0.334)
Adat*SHNCGOV IV	-0.875**	-0.589	-0.287			
	(0.346)	(0.378)	(0.222)			
Democracy*SHNCGOV IV	-0.636***	-0.512**	-0.125			
	(0.171)	(0.212)	(0.127)			
Adat*Democracy*SHNCGOV IV	1.610***	0.345	1.265**			
	(0.384)	(0.655)	(0.544)			
SHNCGOV				0.196*	0.123	0.073
				(0.112)	(0.119)	(0.075)
Adat*SHNCGOV				-0.551	-0.460	-0.091
				(0.405)	(0.465)	(0.270)
Democracy*SHNCGOV				-0.319**	-0.191	-0.128
				(0.124)	(0.129)	(0.086)
Adat*Democracy*SHNCGOV				0.885*	0.196	0.689
				(0.498)	(0.595)	(0.436)
Constant	0.314	0.516	-0.203	0.559	0.610	-0.050
	(0.544)	(0.534)	(0.307)	(0.503)	(0.487)	(0.282)
Communities	159	159	159	159	159	159
Instrument validity[1]: F (p-value)	1.62 (0.20)	1.46(0.23)	0.97(0.32)			
F stat [2]	9.53***	1.17	4.57**			
Over-id test[3]:Chi-sq (p value)	12.3 (0.01)	13.4(0.00)	13.6 (0.005)			
Hansen J-stat p-value	0.12	0.17	0.64			
Observations	233	233	233	233	233	233
R-squared	0.648	0.613	0.251	0.657	0.630	0.280

Other control variables are community population, size, distance from district head quarter, if rural, community's access to sea, share of poor households and also initial stock of physical infrastructure, government schools and government health centres. We also include district, year and (district*year dummies). [1] We test whether the instrument is correlated with the second stage regression residuals respectively in columns (1)-(6). [2] A test of the theoretical prediction: H0: (Adat*SHNCGOV IV + Adat*Democracy *SHNCGOV IV) = 0. [3] Test of over-identification: We use Hansen J-test and report the p-value. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 9. District FE Estimates of Spending Shares on Public Investment using Consensus & Stable *Adat* Communities

	(1)	(2)	(3)	(4)	(5)	(6)
	IV estimates			Non-IV estimates		
	Total Invest	SHINFRA	SHSOC	Total Invest	SHINFRA	SHSOC
SHNCGOV IV	0.112	0.144	-0.032			
	(0.261)	(0.283)	(0.193)			
Adat	-0.304	0.258	-0.561**	-0.199	0.323	-0.522**
	(0.186)	(0.265)	(0.264)	(0.180)	(0.202)	(0.215)
Consensus	0.109	0.004	0.105	0.045	-0.051	0.096
	(0.182)	(0.195)	(0.122)	(0.110)	(0.108)	(0.106)
Adat*Consensus	0.030	-0.188**	0.218**	0.081	-0.277***	0.359***
	(0.094)	(0.094)	(0.108)	(0.101)	(0.106)	(0.124)
Adat*SHNCGOV IV	0.338	-0.443	0.781**			
	(0.269)	(0.371)	(0.364)			
Consensus*SHNCGOV IV	-0.268	-0.079	-0.188			
	(0.245)	(0.260)	(0.143)			
Adat*Consensus*SHNCGOV IV	0.006	0.222	-0.216	0.130	0.283*	-0.153
	(0.176)	(0.187)	(0.173)	(0.145)	(0.157)	(0.140)
SHNCGOV				-0.026	-0.035	0.008
				(0.061)	(0.057)	(0.046)
Adat*SHNCGOV				0.140	-0.428*	0.568**
				(0.209)	(0.220)	(0.236)
Consensus*SHNCGOV				-0.192	-0.029	-0.162
				(0.138)	(0.145)	(0.121)
Constant	0.494	0.686	-0.192	0.620	0.743	-0.122
	(0.510)	(0.526)	(0.292)	(0.484)	(0.477)	(0.278)
Communities	159	159	159	159	159	159
IV validity[1]: F (p-value)	1.17 (0.28)	1.13 (0.29)	1.34 (0.25)			
F stat [2]	4.82**	1.02	2.47*			
Over-identification test[3]						
Chi-square (p value)	2.7 (0.26)	2.64(0.26)	2.63 (0.27)			
Hansen J-stat – p-value	0.68	0.75	0.35			
Observations	233	233	233	233	233	233
R-squared	0.637	0.601	0.262	0.657	0.629	0.284

Other control variables are community population, size, distance from district head quarter, if rural, community's access to sea, share of poor households and also initial stock of physical infrastructure, government schools and government health centres. We also include district, year and (district*year dummies). [1] We test whether the instrument is correlated with the second stage regression residuals respectively in columns (1)-(6). [2] A test of the theoretical prediction: H0: (Adat*SHNCGOV IV + Adat*Consensus *SHNCGOV IV) = 0. [3] Test of over-identification: We use Hansen J-test and report the p-value. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Table 10. District FE IV Estimates of Spending Shares on Public Investment using Mutual Cooperation & Stable *Adat* Communities

VARIABLES	(1) Total invest	(2) Physical invest	(3) Social invest
SHNCGOV IV	0.319	0.040	0.279
	(0.293)	(0.306)	(0.182)
Mutual-Coop	0.078	-0.185	0.263*
	(0.162)	(0.210)	(0.155)
Democracy	0.314**	0.004	0.310***
	(0.148)	(0.181)	(0.103)
Mutual-Coop* Democracy	-0.109	0.389	-0.498**
	(0.249)	(0.296)	(0.221)
Mutual-Coop*SHNCGOVIV	-0.070	0.309	-0.378**
	(0.225)	(0.283)	(0.178)
Democracy*SHNCGOV IV	-0.427**	-0.018	-0.408***
	(0.207)	(0.267)	(0.156)
Mutual-Coop*Democracy*SHNCGOV IV	0.009	-0.649*	0.658**
	(0.316)	(0.386)	(0.265)
Constant	0.270	0.534	-0.265
	(0.545)	(0.539)	(0.340)
Instrument validity[1]: F (p-value)	0.00 (1.00)	0.00 (1.00)	0.00 (1.00)
F-test[2]	0.06 (0.81)	1.62 (0.20)	2.41 (0.10)*
Over-identification test[3]			
Hansen J-stat – p-value	0.54	0.46	0.62
Communities	159	159	159
Observations	233	233	233
R-squared	0.637	0.595	0.163

Other control variables are community population, size, distance from district head quarter, if rural, community's access to sea, share of poor households and also initial stock of physical infrastructure, government schools and government health centres. Key explanatory variable Mutual-Coop takes a value 1 if all members participate in mutual cooperation activities for the construction of public infrastructure. We also include district, year and (district*year dummies). [1] We test whether the instrument is correlated with the second stage regression residuals respectively in columns (1)-(6). [2] A test of the theoretical prediction: H0: (Mutual-Coop*SHNCGOV IV + Mutual-Coop*Democracy *SHNCGOV IV) = 0. [3] Test of over-identification: We use Hansen J-test and report the p-value. Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Appendix

Table A1. Definitions and Summary Statistics of Regression Variables for Communities with Stable *Adat*

| Variable	Definitions	Mean	Std. Dev.
SHINFRA	Share of total community spending on new road, transport, etc.	0.2610	0.3276
SHSOC	Share of total community spending on new schools, health centres.	0.1359	0.1782
Total investment	Sum total of physical and social investment	0.4048	0.3263
Central Grant	Share of community's total revenue from central grants	0.1759	0.2766
Adat	1 if the community strictly adheres to *adat* law	0.125	0.3313
Mutual-Coop	1 if all members participate in mutual cooperation activities for the construction of public infrastructure.	0.5062	0.5003
Democracy	1 if the leader is elected by voting or consensus building	0.8602	0.3473
Consensus	1 if the leader is elected by consensus building	0.2885	0.4534
Physical infrastructure	A composite index of community's access to bus, paved road, po, pto,…using principal components analysis	0.0558	1.0205
Govt schools per 100 people	Number of government schools per 100 popn	1.4136	2.5354
Govt health centres per 100 people	Number of govt health centres (puskesmas, posyandu etc) per 100 popn	1.4116	1.1677
Community population	Natural logarithm of community population	8.7998	0.9297
Community size	Natural logarithm of community's geographic area	5.5204	1.6494
Rural	1 for *desa* and 0 for *keluharan*	0.4265	0.4955
Sea	1 if the community has access to sea	0.6985	0.4597
Distance from district head quarter	Distance of the community in km from the district head quarters	4.5435	8.9813
Poor	Fraction of total community households who are poor	0.2426	0.4295

Figures

Figure 1. Scatterplots of Share of Central Government Grant as a function of Village distance from District Headquarters
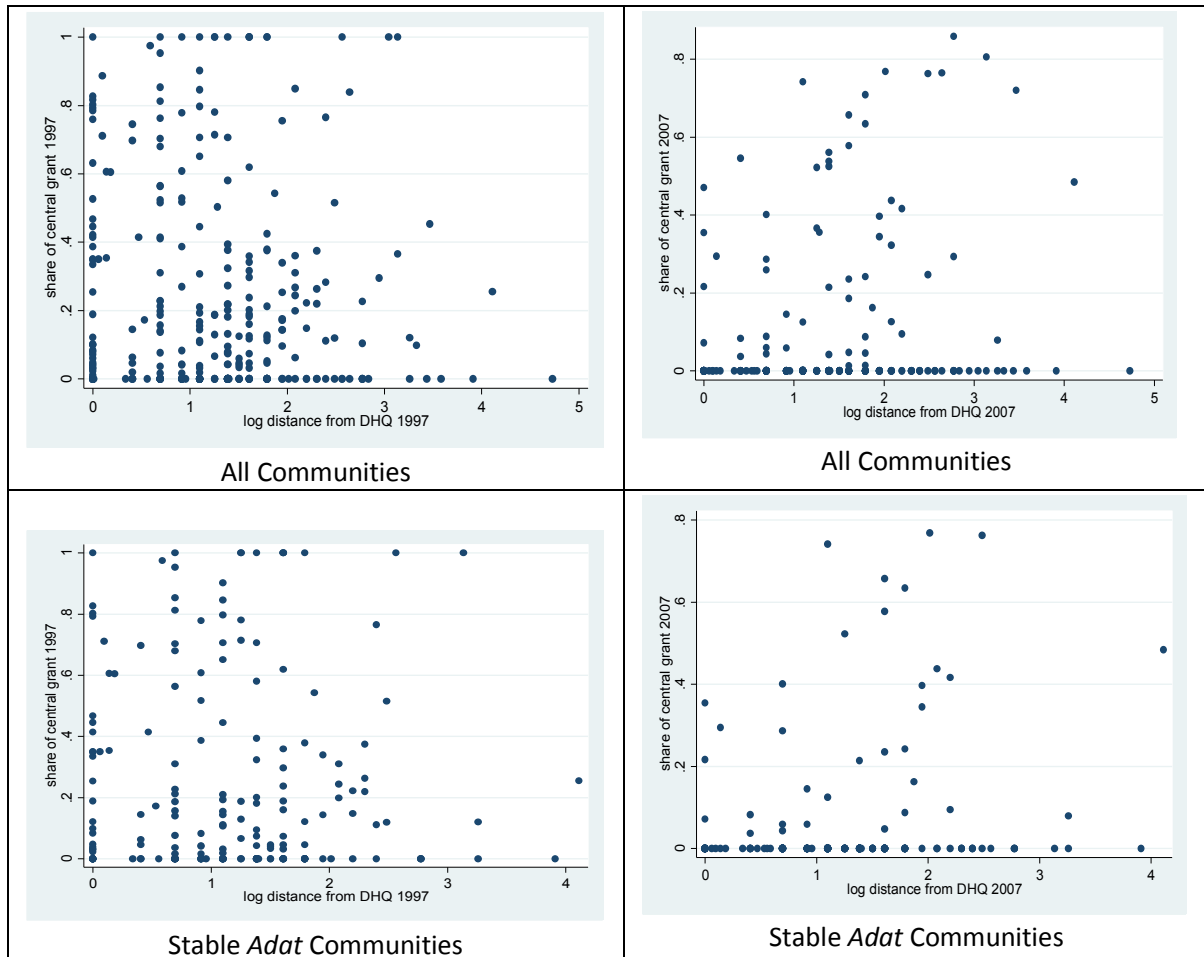
Note: The figures show scatter plots of the share of the central government grant in total revenues against log(1+Distance to District Headquarters) in 1997 and 2007 for (i) all communities and (ii) communities for which adherence to *adat* laws did not change between the two years.

Figure 1a. Scatterplots of Share of Central Government Grant as a function of Village Size
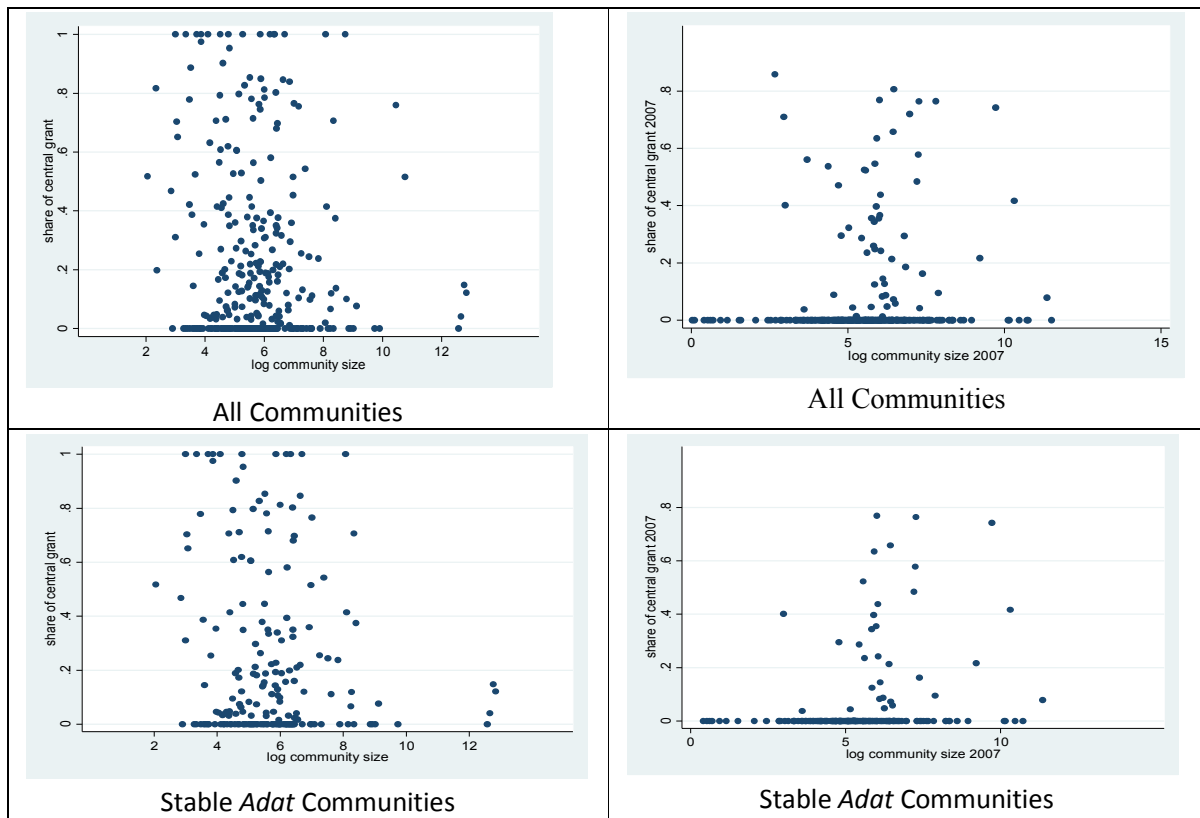
All Communities

All Communities

Stable *Adat* Communities
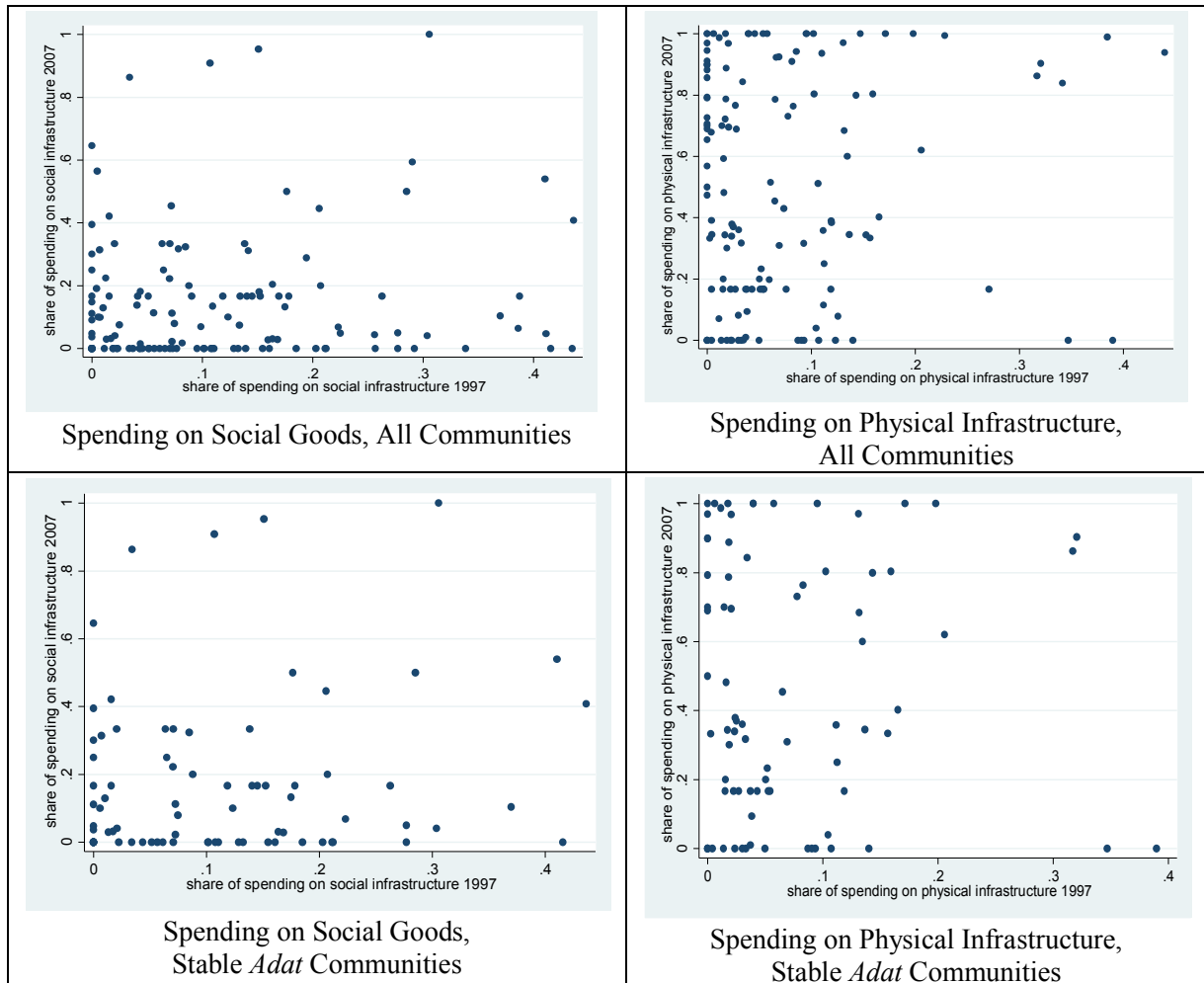
Stable *Adat* Communities

Note: The figures show scatter plots of the share of the central government grant in total revenues against log(Community Size) in 1997 and 2007 for (i) all communities and (ii) communities for which adherence to *adat* laws did not change between the two years.

Figure 2. Scatterplots of Share of Revenue from Local Funds and Central Government in 2007 as a function of that in 1997

Local funds, All Communities

Local funds, Stable *Adat* Communities

Central Gov't. Grant, All Communities

Central Gov't. Grant, Stable *Adat* Communities

Note: The figures show scatter plots of the share of (a) community revenues and (b) central government grant in total revenues in 2007 against that in 1997 for (i) all communities and (ii) communities for which adherence to *adat* laws did not change between the two years.

Figure 3. Scatter plots of Spending Shares in 2007 against that in 1997

Spending on Social Goods, All Communities

Spending on Physical Infrastructure,
All Communities

Spending on Social Goods,
Stable *Adat* Communities

Spending on Physical Infrastructure,
Stable *Adat* Communities

Note: The figures show scatterplots of the share of total spending in (a) social goods and (b) physical infrastructure for (i) all communities and (ii) communities for which adherence to *adat* laws did not change between the two years.