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Abstract

We examine the effect of inter-group fiscal competition on within-group violent conflict. Using a triple difference design, we exploit exogenous variation in the degree to which villages in sub-districts compete for public funds. We find that higher competition between villages reduces conflict but only up to moderate levels of competition. The conflict-reducing effects of competition are largest in the most ethnically fractionalized and segregated villages and exist regardless of the eventual outcome of the competition. Our results are consistent with external competition favoring coordination within otherwise divided communities and boosting village identity relative to ethnic identity.

Keywords: Community-Driven Development, Competition, Conflict.
JEL codes: D74, O12, H40.

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1 Introduction

In the last two decades, the number of low intensity violent conflicts has escalated among non-state and regional groups, driving a significant disruption of social norms, political instability and loss of productive resources (World Bank, 2018). These types of conflict are common in fragile institutional environments where they often become endemic. A growing literature has shown that violent conflicts can be exacerbated in divided and ethnically diverse communities (Montalvo and Reynal-Querol, 2005; Esteban, Mayoral and Ray, 2012; Arbatli et al., 2020). First, population diversity can lead to a lack of mutual trust and low social capital, elements that generally help to prevent violent hostility (Alesina and La Ferrara, 2002; Arbatli et al., 2020). Second, population diversity implies heterogeneous preferences over public goods and redistribution which makes it more difficult to overcome coordination and collective action problems. Population diversity and group identity are generally endogenous and can be shaped by various factors such as shared experiences (Bazzi et al., 2019; Depetris-Chauvin, Durante and Campante, 2020; Lowe, 2021)[1] and external competition (Campbell, 1965; Eifert, Miguel and Posner, 2010; François, Fujiwara and Van Ypersele, 2018; Sambanis, Skaperdas and Wohlforth, 2015). For instance, Eifert, Miguel and Posner (2010) find that electoral competition is associated with a stronger ethnic identity, and François, Fujiwara and Van Ypersele (2018) highlight a disciplining effect of competition on free-riding within the workplace, whereby under performing free-riders within an organisation face a greater collective punishment when firms experience more intense market competition.

Our paper builds on this thinking by studying the role of fiscal competition as a potential policy lever to reduce internal conflict. We consider whether economic incentives to compete with out-groups can reduce conflict within otherwise divided communities by favoring coordination and discouraging free-riding behavior. We address this question in the context of the competitive allocation of grants to villages under Indonesia's signature Community Driven Development (CDD) program – the *Kecamantan Development Program* (KDP).

The goal of the KDP was to encourage development of local public works as well as local state capacity. The program functioned as a tournament where villages (contestants) competed against each other for public works grants (prizes). In particular, sub-districts (*Kecamantans*) received block grants from the national government and villages within a sub-district could submit a proposal to compete for funds to build roads, schools and hospitals. The maximum amount any village could receive was capped. Furthermore, block-grants to sub-districts were fixed regardless of the number of villages within the sub-district. Consequently, the program generated variation in competition

[1]Shared experiences can also affect attitudes towards people in poverty, gender or race (Rao, 2019; Dahl, Kotsadam and Rooth, 2021; Corno, La Ferrara and Burns, 2022).

through differences in the number of villages across sub-districts.

We characterize the number of villages in a sub-district – the pool of potential contestants in the contest – as our measure of competition. We identify the causal effect of inter-village competition on intra-village conflict using a triple-differences design comparing the relationship between conflict and number of villages in sub-districts in KDP against those not included in KDP before and after the KDP came into effect. This design helps reduce concerns of contamination (e.g., from the end of the Suharto regime) by relying on variation within treatment sub-districts based on differences in number of villages. Furthermore, we complement the triple-differences design with matching to improve the similarity of treatment and control groups. Finally, we control for pre-treatment characteristics correlated with the number of villages and we interact them with time and treatment status, to allow for a time-varying, heterogeneous effect on treatment and control sub-districts. Our results remain robust to these tests and allow us to interpret our results as causal.

We find that on average higher competition for public funds reduces the incidence of violent conflict within villages. The magnitude of the effect is notable: a sub-district with 11 villages in KDP will have 11% fewer conflicts than another KDP sub-district with 10 villages. However, the reduction in conflict from competition only holds at moderate levels of competition, likely due to discouragement effects at higher levels. We develop a simple model based on a Tullock (1980) contest showing the relationship between competition, participation and average "effort" to rationalize these findings. We show corresponding descriptive evidence that with increasing competition, a smaller share of villages submit proposals for the competition. Importantly, our results are not driven by eligibility for or receiving of funds from the program, but rather from participation in the program. We find near-identical effects on winners and losers who participate but no such effect amongst non-participants suggesting that the evidence is inconsistent with mechanisms directly associated with fiscal transfers (e.g., resource curse etc.) and consistent with participation in the competitive process irrespective of winning. The effect of competition is stronger in villages with a high degree of ethnic fractionalization. Moreover, we find that attendance at village meetings to discuss and submit KDP proposals mimics the trends in competition; we observe higher attendance rates in sub-districts with greater competition (up to a moderate level of competition) consistent with increased effort in response to out-group competition. Finally, we find no evidence to suggest an increase in across-village conflict.

Taken together, our results are consistent with the hypothesis that competition across villages incentivizes greater cooperation within villages and thereby reducing within-village conflict. This result comes with the important caveat that increasing competition delivers these conflict reducing effects only to the point where villages are not discouraged from participating in the process. Greater cooperation may manifest due to new opportunities for interaction amongst diverse communities within a village (Gibson and Woolcock, 2005; Barron, Diprose and Woolcock, 2006; Barron, Kaiser and Pradhan, 2009), the development of cooperative norms from civic participation, or the effect of shared experiences on group identity (Depetris-Chauvin, Durante and Campante, 2020; Mousa, 2020; Lowe, 2021). Although data limitations preclude us from distinguishing between these mechanisms, the key innovation of this paper is to highlight how development programs can reduce conflict within administrative units through external sub-national competition.

We contribute to several areas of inquiry in economics. First, we build on the literature on the effects of competition on in-group effort and behavior (Van Huyck, Battalio and Beil, 1990; Bornstein, Gneezy and Nagel, 2002). This literature has primarily focused on lab-based evidence or natural experiments on civil and external wars (Besley and Persson, 2008, 2010; Jha, 2014; Jennings and Sanchez-Pages, 2017; Eifert, Miguel and Posner, 2010; François, Fujiwara and Van Ypersele, 2018; Sambanis, Skaperdas and Wohlforth, 2015). However, the role of routine, non-violent competition amongst administrative units within a nation remains under-explored even though such mechanisms of fiscal distribution are increasingly commonplace. This is in part because exogenous variation in competition is rare outside a controlled lab environment. We build on this line of work by showing that competitive allocation of funds for public works can improve cohesion within administrative units by providing incentives for cooperation.[2] This is especially true for administrative units with a high degree of ethnic fractionalization or segregation. Moreover, we demonstrate that reductions in conflict within the unit are prevalent regardless of the outcome of the contest.

Second, we build on the literature on development aid and conflict. There is considerable heterogeneity in the effects of aid on conflict (Barron, Diprose and Woolcock, 2006; Nielsen et al., 2011; Berman, Shapiro and Felter, 2011; Nunn and Qian, 2014; Dube and Naidu, 2015; Christian and Barrett, 2017).[3] The mixed evidence suggests that the relationship between aid and conflict depends, at least in part, on *how* aid is distributed (Berman et al., 2013; Crost, Felter and Johnston, 2014). Although other aid programs have included competition as a feature of disbursement, previous work has not explicitly considered the role of competition between recipient villages on within-village conflict (Labonne and Chase, 2011; Crost, Felter and Johnston, 2014). In doing so, we also relate to a growing body of work on the effect of community driven development programs (Casey, 2018).[4]

[2]Previous work has examined how non-competitive fiscal allocations can reduce the quality of elected leaders (Brollo et al., 2013). A key distinction for our study is the use of competition in fiscal allocations.

[3]For example, Nunn and Qian (2014) detect a positive effect of US food aid on the incidence and duration of civil conflicts in recipient countries because armed factions and opposition groups have the incentive to appropriate humanitarian aid. Dube and Naidu (2015) find a that US military aid increased conflict in Colombia. On the contrary, Berman, Shapiro and Felter (2011) show that an increase in spending in reconstruction programs in Iraq led to a reduction in attacks by insurgents and Nielsen et al. (2011), using a panel of 139 countries, find that a decrease in foreign aid is associated with an increase in armed conflicts.

[4]Chavis (2010) shows that competition among potential beneficiaries increases the quality of the projects financed by the KDP. Our results suggest that competition in the allocation of KDP funds not only improves efficiency but can also have positive unintended benefits on the incidence of conflict, by promoting coordination within competing villages.

The paper proceeds as follows. Section 2 provides background for the relevant features of the KDP and on the Indonesian context during our study period. We describe the data in Section 3. In Section 4 we first characterize how the number of villages maps into competition, then describe the research design, and present our main results along with robustness checks. In Section 5 we offer an interpretation for the main results and evidence on mechanisms. Section 6 presents results for the overall impact of the KDP on conflict. Section 7 concludes.

2 The Kecamatan Development Program

The Kecamatan Development Program was a Government of Indonesia community driven development program that started in 1998. The program was launched in the immediate aftermath of the fall of the Suharto regime, which saw a period of political and economic turmoil. At its inception, it was the largest World Bank-financed community-driven development project (Rawski, 2004). We study the first phase of the KDP, from 1998 to 2002, that targeted the poorest sub-districts.[5] In the first phase, roughly 25% (986 of 4048) of all Indonesian sub-districts participated in the KDP, reaching nearly one out of every four Indonesian villages. The program continued in subsequent phases and other sub-districts rotated in and out of the program.[6] It is worth noting that the KDP was aimed at improving poverty, public goods and local governance in rural communities, and was not designed for conflict reduction and management (Ministry of Home Affairs, 2002; Barron, Diprose and Woolcock, 2006).

Every year, the KDP provided fixed block grants to sub-districts (kecamatan), and villages within a sub-district could submit proposals to apply for a portion of the block grant.[7] Importantly, funding for proposals was not guaranteed and the intent was that proposals within a sub-district would be

Importantly, we show how competition also affects villages that participated but lost, and distinguish between effects from different types of competition. For a broader review of the effects of CDD programs, see Casey (2018).

[5]Targeting was determined by the Ministry of Home Affairs (2002), according to poverty statistics as well as subjective assessments of poverty. As we explain in the section on empirical design, we use a combination of matching, difference-in-differences and triple-differences designs to address potential selection bias. In all cases, we demonstrate parallel pre-trends.

[6]We focus on the first phase, because all sub-districts participating in this phase received the entire block grant. In subsequent phases the block grant was often reduced with the participation of relatively better off sub-districts. While participation was non-random, the fact that all sub-districts received the maximum block grant ensures that the number of villages within a sub-district constitutes an important source of variation in competition and in the probability of a village receiving funding.

[7]There were two block grant sizes: seven hundred and fifty millions Rupiah ($93,750 1998 USD), and one billion Rupiah ($125,000 in 1998 USD). The assignment of the block grant size was based on the population of the sub-district. Sub-districts with a population below 25,000 received the smaller block grant, and sub-districts above this threshold received the larger block grant. In the more populous provinces of Java, the threshold to receive the higher grant was set to 50,000 people. For the sub-districts receiving the larger block grant, we scale the number of villages by 0.75, to account for the differential block grants. The number of villages is nearly constant at the threshold: a regression of the number of villages on population in a sub-district, in a window of 22,000 to 28,000 inhabitants, yields a small and statistically insignificant coefficient.

selected on merit. In general, each village could submit up to two proposals for small-scale infrastructure, social and economic activities with the caveat that if a village submitted two proposals, one had to come from women. Most of the village proposals in the first phase focused on infrastructure (76%), in particular roads and bridges, and to a lesser degree, on education and health (Ministry of Home Affairs, 2002). Each proposal needed to be matched by a contribution in labour and/or materials by the villagers. Village proposals were entirely voluntary and could range between a minimum of 35 millions Rupiah ($4,375 in 1998 USD) to a maximum of 150 millions Rupiah ($18,750 in 1998 USD). While the block grant is fixed across sub-districts, the number of villages varies and introduces variation into the degree of potential competition for funding. This feature of the KDP is central to our research design on the effects of competition on conflict.

The KDP had a well structured and monitored activities cycle (up to 14 months) that started with socialisation and information dissemination, proceeded with planning, proposal preparation and verification and ended with funding decision and actual implementation of the project. Village meetings were a crucial element of this process (see diagram in Figure A.1 of the Appendix). In particular, three village-level meetings (Musbangdes I, II an III) and one hamlet (group) level meeting (Musbangdus) were at the core of the program. The first village meeting was convened to publicize KDP and select village facilitators. This was followed by facilitated meetings at the hamlet level and of women's groups to develop proposal suggestions. In the second village meeting, a collective decision was taken on which proposals to submit and be discussed at the inter-villages meeting. Finally, at the third meeting, villagers would find out whether their proposal was successful and discuss how to move forward. Often, the participation in the planning and decision making forums was the first occasion in which villagers from different identity groups had ever congregated with the purpose of engaging in decision making and taking a collective action (Gibson and Woolcock, 2005).[8]

3 Data

We combine a number of different data sources for the analysis. The three main data sources include information on the implementation of the KDP program, data on conflict and data on other socio-economic variables.

Data on the program: There are two data sources for the program itself. First, we obtain data at the sub-district level for the first phase (1998-2002) including the name of the sub-district, population, the number of villages, KDP treatment status and size of the block grant from the Ministry of

[8]Whether people genuinely participate in the formulation of proposal ideas is a necessary condition for a project to pass the screening (verification) stage and be allowed to be put forward at the sub-district level for the final project selection.

Home Affairs (2002). We obtain the population and number of villages of the non-participant sub-districts using the 1999-2000 village census PODES.[9] On average, a sub-district that is both in KDP and covered by our conflict data has a population of 54,858 and contains 17.3 villages, so a typical village has a population of 3,171 (see Table A.1). Second, we obtain village level information from Chavis (2010). This includes information on the amount requested, amount allocated and number and type of projects in the village proposals. We also obtain information on village level attendance in KDP related meetings for the first two years of the program. The latter data are available for 716 out of the 986 sub-districts covered by the first phase of KDP.

Conflict Data: At the time of the program Indonesia was a country in the midst of an ongoing and uneven democratic transition, a process that has, at times, been accompanied by violence. In addition to outbreaks of large-scale and violent communal conflict in a number of locations, and secessionist conflict in two provinces, widespread and often violent local conflict has occurred across the country. We obtain data on the location, time, type and intensity of conflicts from the United Nations Support Facility for Indonesian Recovery (UNSFIR). The dataset covers 14 out of 28 provinces[10] and was compiled by a team of researchers. The advantage of the UNSFIR data is that it includes information on conflicts before the program. The main alternative data source for conflict in Indonesia is the National Violence Monitoring System (NVMS), which only started recording conflicts in 1998 (the year the KDP program was implemented), and only for 9 provinces (World Bank, 2016).[11] There are, however, more recorded conflicts in the NVMS data, and it has a slightly different spatial coverage, so we also use the NVMS data for robustness analysis in the Appendix in a difference-in-differences rather than triple-differences design.[12]

These data focus on collective violence and not individual violence or crime. They also do not include secessionist violence due to the inability to collect information in areas where a war of insurgency was in place (Varshney, Tadjoeddin and Panggabean, 2004). Of the 3,608 incidents recorded, 1,100 could not be attributed to a specific sub-district and were therefore excluded. For our main analysis, we also exclude districts that split during the decentralization process that followed the end of the Suharto administration (58 districts covering 617 sub-districts). Larger districts were more

[9]The number of villages by sub-district from the village census corresponds to the number of villages reported in the KDP documentation for participating sub-districts.

[10]These provinces are Banten, DKI Jakarta, Central Java, West Java, East Java, Central Kalimantan, West Kalimantan, Maluku, North Maluku, East Nusa Tenggara, West Nusa Tenggara, Riau, South Sulawesi (incl. today's West Sulawesi), and Central Sulawesi.

[11]One province is also covered in 1997, but does not overlap with the KDP program.

[12]The number of recorded conflicts between 1998 and 2002 in the NVMS data is around double the recorded conflicts in the UNSFIR data, but it also has a slightly different spatial coverage. In the provinces that are covered by both NVMS and UNSFIR data, NVMS has a 20% higher count of conflicts between 1998 and 2002. NVMS data includes the provinces of Aceh, West Kalimantan, Central Kalimantan, Maluku, North Maluku, East Nusa Tenggara, Papua, West Papua, Central Sulawesi.

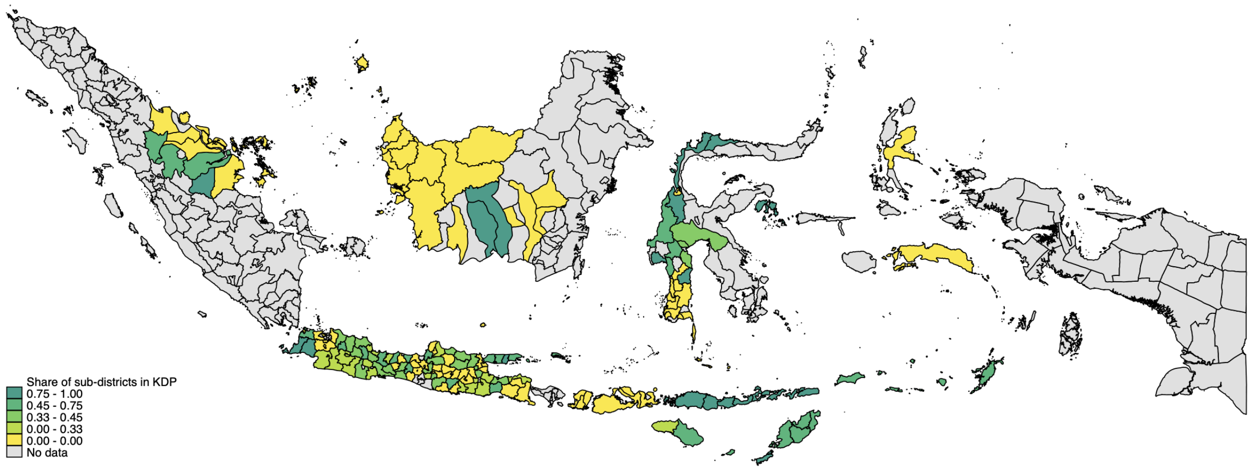


Figure 1: District map with share of KDP sub-districts with available conflict data

Notes: The map show the share of sub-districts in each district that are part of the KDP. Only districts in provinces are shown for which conflict data is available. Appendix map A.2 shows the same map for sub-districts that are within the two middle quartiles (Q2-Q3) of the distribution of number of villages.

likely to split, and these district splits have been associated with an increase in conflict (Alesina, Gennaioli and Lovo, 2019; Bazzi and Gudgeon, 2021). While we exclude these sub-districts from the main analysis, we also show results including all districts (while controlling for the splits) in the Appendix and recover qualitatively similar results. For our main analysis we have 1774 sub-districts, of which 424 are part of the KDP and 1350 are not part of the KDP (see Appendix Table A.1). The map in Figure 1 shows the spatial distribution of our data across districts in Indonesia indicating the share of treated in-KDP and control sub-districts across districts. Due to our focus on the two middle quartiles (Q2-Q3) of the distribution of the number of villages per sub-district, Figure A.2 shows a similar spatial distribution when focusing on these sub-districts only.

Table 1 shows a sharp increase in conflict starting the year preceding the end of the Suharto regime in 1998. While around 3% of the sub-districts in the sample experienced at least one conflict pre-1998, the incidence of conflict increased to almost 10% in the post-1998 period. This is true in both KDP and non-KDP sub-districts, although the latter are, on average, less affected by conflicts. Our results can therefore be interpreted as competition in the program reducing conflict in times of rising violence. Importantly, we describe in Section 4.3 how our research design addresses possible contamination from increases in conflicts after Suharto's fall.

The last two columns in Table 1 show the number of within-village and across-village conflicts. Conflicts are defined as "within-village" when a particular village is identified as the location of the conflict. Conflicts are categorized as "across villages" when more than one village is indicated as the location of the conflict, the specific cause of the violence is inter-village brawls, or when the name

Table 1: Number and shares of conflicts by year and participation in KDP

Year	% of sub-districts with conflict			Total number of conflicts				
	All	Out of KDP	In KDP	All	Out of KDP	In KDP	Within	Across
1990	0.55	0.44	0.89	11	6	5	9	2
1991	0.88	0.96	0.67	20	17	3	14	6
1992	1.6	1.77	1.11	37	32	5	25	12
1993	1.55	1.32	2.22	31	20	11	17	14
1994	1.88	2.13	1.11	36	31	5	14	22
1995	2.04	2.43	0.89	45	41	4	23	22
1996	3.15	3.68	1.55	64	56	8	38	26
1997	7.24	7.51	6.43	148	118	30	103	45
1998	10.5	10.74	9.76	251	183	68	190	61
1999	8.95	9.05	8.65	229	179	50	170	59
2000	12.43	12.29	12.86	321	255	66	212	109
2001	10.11	10.38	9.31	261	216	45	189	72
2002	9.17	9.64	7.76	225	188	37	176	49
Total	5.39	5.56	4.86	1679	1342	337	1180	499
Before	3.27	3.44	2.73	643	504	139	433	210
After	10.17	10.34	9.65	1036	838	198	747	289

Notes: Authors' calculations based on UNSFIR dataset.

of the village is not specified (but the sub-district is clearly identified). After the fall of Suharto, conflicts within the same village experience a much sharper increase than conflicts across different local jurisdictions.

Additional Data: We use additional data on local poverty statistics in 2000 from SMERU (2004), as well as further village and sub-district level information from the 2000 Census and the 1996, 1999-2000 and 2002-2003 versions of the census of villages (PODES). These, along with data from Bazzi et al. (2019), allow us to calculate the degree of ethnic fractionalization[13], polarization[14] and segregation[15] in villages and sub-districts. We carefully match these with the other datasets through fuzzy string matching and exact matching within districts, along with manual matching for unsuccessful automated matches. Descriptive statistics are reported in Appendix Table A.1.

[13]We calculate ethnic fractionalization at the village level using the standard formula based on the Herfindahl index (see e.g. Alesina et al. (2003) and Olken (2010)). This index measures the probability that two randomly chosen individuals in the population of reference belong to two different ethnic groups. Additionally, we use ethnic fractionalization calculated at the sub-district level, both directly and the village level measure aggregated up to the sub-district level with village population weights.

[14]We calculate ethnic polarization at the village level following Montalvo and Reynal-Querol (2005); Reynal-Querol (2002). For each village, ethnic polarization is calculated as $4\sum_i s_i(1-s_i)^2$ where s_i is the population share of ethnicity i in the particular village. The polarization index captures how close the distribution of ethnic groups is to a bi-modal distribution.

[15]Ethnic segregation measures how ethnic groups are distributed across different geographic areas. We construct ethnic segregation at the village level by measuring the extent to which the distribution of ethnic groups within census blocks resembles the distribution of ethnic groups within a village as a whole. At the sub-district level, we construct ethnic segregation as the extent to which the distribution of ethnic groups within villages resembles the distribution of ethnic groups within a sub-district as a whole. For example, the index is higher if the population of a sub-district is made of two equally sized ethnic groups and they live isolated in two villages instead of mixing across villages. We use the segregation index proposed by Reardon and Firebaugh (2002) implemented in La Ferrara and Mele (2006); Alesina and Zhuravskaya (2011); Bazzi et al. (2019).

4 The Effect of Competition on Conflict

In this section we explore the effect of competition on conflict. First, we describe our measure of competition and how it relates to the decision of villages to participate in the contest. Next, using this measure of competition, we describe our research design. Finally, we present results with insights into potential underlying mechanisms.

4.1 Characterizing Competition

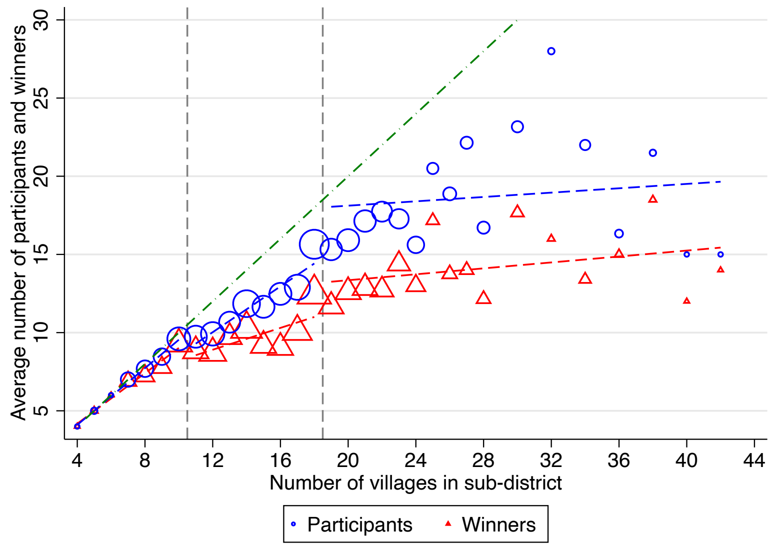
The allocation of grants under the KDP can be described as a tournament where villages are contestants and the grants are the prizes. The number of potential contestants is the number of villages in the sub-district. Importantly, the size of the block grant available to the sub-district did not vary by number of villages in the sub-district.[16] Moreover, there was a maximum amount that could be awarded to a village. Both program documentation and our data suggest that this cap was enforced. As such, we can think of the number of prizes (winners) in a sub-district as fixed. Therefore, the intensity of competition stems from the number of villages in the sub-district. However, not all villages will enter the contest as participation is voluntary. As such competition exists on the extensive margin (selection into submitting a proposal) and intensive margin (probability of winning conditional on submitting a proposal). We show that marginal differences in the number of villages in a sub-district correspond to marginal changes in competition at the intensive and extensive margins over different sub-samples.

Figure 2 shows the non-linear relationship between the number of villages in a sub-district and both the number of villages that chose to submit a proposal (blue circles) and the number of villages that receive a grant (red triangles). Initially, when considering sub-districts in the lowest quartile (Q1) in terms of number of villages, all villages in those sub-districts apply for and receive funding in a largely noncompetitive environment. Anecdotal evidence and program documentation suggest that this was common in sub-districts with few villages (Barron, Diprose and Woolcock, 2006). These villages would typically divide the funding amongst themselves, colloquially referred to as "*bagi bagi*". Table 2 shows that 96% of villages submitted a proposal, and conditional on submitting, 96% of villages won an award, equivalent to an unconditional 92% of villages that were awarded. There is only a small and statistically insignificant decline in the probability of winning for increases in the number of villages.

Next, when considering sub-districts with number of villages in the middle quartiles (Q2-Q3),

[16]There were two sizes of block grants available depending on whether the population in the sub-district was above or below 25,000 persons. In Java, this threshold was 50,000 persons. The number of villages in a sub-district does not discontinuously change at this threshold and the relationship between number of villages and population is small and statistically insignificant for generous bandwidths around the 25,000 persons discontinuity.

Figure 2: Numbers of participants and winners by overall number of villages in the sub-district



Notes: The graph plots the average number of participants (i.e. the villages submitting a proposal) and the average number of of winners (i.e. villages granted with the funding) against the number of villages within a sub-district. The size of the circles represents the relative number of underlying sub-districts with a particular number of villages. The linear fitted OLS lines are obtained for the bottom, the two middle, and the top quartiles of the distribution of the number of villages in sub-districts. For both graphs and as in the main analysis, only provinces that are covered by the UNSFIR data are included, and districts with sub-districts that split over the sample period are dropped.

most villages in these sub-districts still participate (81%) in the contest but the probability of winning a prize declines with each additional village in the sub-district. Table 2 shows that the unconditional probability of winning is 68%, and with each 10% increase in the number of villages (roughly one more village), the unconditional probability of winning reduces by 5 percentage points. This is the only sub-sample where marginal differences in number of villages in the sub-district corresponds to marginal differences in competition at the intensive margin, that is in the probability of winning conditional on participation. The last row in Table 2 shows that with each 10% increase in the number of villages, the probability of winning conditional on participation declines by 2.8 percentage points. We refer to the two middle quartiles as those where we can measure the effect of competition at the intensive margin.[17]

Finally, as we consider sub-districts in the top quartile (Q4) of number of villages, both the number of participants and the number of winners are largely invariant to differences in number of villages in the sub-district. Here marginal changes in number of villages corresponds to competition at

[17]We note that there is also some increase in competition at the extensive margin in the middle quartiles. For simplicity, we refer to the middle quartiles as those with intensive margin competition. To the extent that we capture some extensive margin competition in the middle quartiles, the true effect would be even larger than what we find, as our estimate would be biased towards the estimate of extensive margin competition in the top quartile which is closer to zero.

Table 2: Descriptive statistics on the nature of competition across villages in KDP sub-districts

	Q1	Q2-Q3	Q4
Number of sub-districts	65	180	206
Average number of villages	8.6	14.1	22.7
Average size of awarded grant (USD)	13,140	12,508	10,169
Percentage of winning villages	92%	68%	60%
Increase in percentage of winners from 10% increase in the number of villages	-1.2	-5.0***	-3.4***
Percentage of villages that submit a proposal (participate)	96%	81%	78%
Increase in percentage of participants from 10% increase in number of villages (*extensive margin competition*)	-0.7**	-2.4***	-3.5***
Percentage of winning villages conditional on participation	96%	86%	80%
Increase in percentage of winners conditional on participation from 10% increase in number of villages (*intensive margin competition*)	-0.5	-2.8**	-0.7

Notes: The table shows descriptive statistics on the KDP villages by quartiles of sub-districts in terms of number of villages. The quartiles are defined over the entire distribution including non-KDP sub-districts explaining the somewhat higher number in of sub-districts in Q4 in this Table (see Figure A.6. The rows titled "Increase in percentage.." report the increase in percentage points from a 10% increase in the number of villages, which is based on a regression of the percentage of winners (or participants, or conditional winners) on log number of villages within the given quartiles. Stars indicate the level of significance based on robust standard errors, with significance at * 0.1%, ** 0.05% and *** 0.01%. The estimated increases are significantly different from each other across columns, except for the last row, where Q1 and Q4 are not significantly different from each other.

the extensive margin – the likelihood that a village chooses to submit a proposal in the first place. In equilibrium, the share of villages that submit a proposal decreases and the probability of winning a proposal conditional on participation remains largely invariant to the number of villages in the sub-district, as shown in Table 2.

In our empirical analysis, we use marginal differences in the number of villages in a sub-district as a proxy for marginal changes in competition mainly at the intensive margin (sub-districts in the middle quartiles with 11-18 villages) and extensive margin (sub-districts in the top quartile with 19 or more villages).[18] Effects estimated in sub-districts in the bottom quartile (10 or fewer villages) serve as a placebo test. Importantly, our results are not overturned by reasonable changes in these thresholds.

[18]The relationship between the number of villages and intensive margin competition is similar in either of the two middle quartiles. We combine them together to bring the extent of variation in the number of villages closer to the variation in the bottom and top quartiles, as can be seen in the histogram in Figure A.6.

4.2 Rationalizing Competition and Effort with Contest Theory

We rationalize the observed patterns in competition and participation with a theory of contests, building on a canonical Tullock (1980) contest with probabilistic winners and heterogeneous contestants. Players i compete by spending effort $x_i \geq 0$ to win a prize with value V. In our case the contestants correspond to villages, and the prize is the KDP grant.[19] The probability of winning the competition is s_i and depends on own effort and the effort of all competitors:

$$s_i = \begin{cases} \frac{x_i}{\sum_j x_j}, & \text{if } x_i > 0\text{, for all } j \in P \\ 0, & \text{otherwise} \end{cases} \tag{1}$$

Contestants are heterogeneous in their "ability" a_i which represents cost of effort and is drawn from a standard uniform distribution and known before the contest begins.[20] The possibility of entry, the presence of heterogeneity, and noise through the probabilistic determination of winners are important differences to the all-pay contests studied in Fang, Noe and Strack (2020) where competition always decreases average effort, which need not be the case here.[21]

The expected profit of player i is therefore:

$$\Pi_i = s_i V - \frac{x_i}{a_i} \tag{2}$$

Importantly, there is entry into participation in the contest, corresponding to the village decision to submit a proposal. Contestants enter the contest if effort is positive ($x_i > 0$), and do not participate otherwise, with zero profit and effort ($x_i = 0$). The set of players eligible to participate is N with number of eligible players n. The set of participating players is P with number of participants p. The first order condition of profit with respect to x_i is:

$$V \left[\frac{\sum x_j - x_i}{(\sum x_j)^2} \right] = \frac{1}{a_i} \qquad \text{if } x_i > 0\text{, i.e. } i \in P \tag{3}$$

This provides an expression for individual effort of participants in equilibrium, where we define total effort as $X \equiv \sum x_j$, as well as an expression for total effort X by summing summing over $i \in P$

[19]For tractability, we have only a single prize in the model.

[20]The basic results also hold with several other distributions with positive support, e.g. a lognormal distribution.

[21]As in Moldovanu and Sela (2001), more competitive prize structures may increase effort in all-pay contests with heterogeneous ability depending on cost functions. See Schweinzer and Segev (2012) for the effect of prize structures on effort in symmetric Tullock contests, and Letina, Liu and Netzer (2023) for a discussion of optimal prize structures and competition across different type of contests. Nitzan (1991) extends a Tullock contest where groups compete and players within groups decide how much effort to contribute to the group and shows that this can reduce rent dissipation.

in Equation (3):

$$x_i = \begin{cases} X - \frac{X^2}{Va_i}, & \text{if } x_i > 0 \text{, i.e. } i \in P \\ 0, & \text{otherwise} \end{cases} \tag{4}$$

$$X = V(p-1)\frac{1}{\sum_{i \in P} \frac{1}{a_i}} \text{, where} \tag{5}$$

$$p = \sum i \in P, \text{ and } i \in P = \begin{cases} true, & \text{if } x_i > 0 \\ false, & \text{otherwise} \end{cases} \tag{6}$$

Own effort increases in own ability, but is quadratic with an inverse U-shape in total effort which in turn is a function of own and other participants' abilities. We solve the model numerically by drawing a_i, and iterate until the model converges to the Nash equilibrium conditions (Equations 4, 5 and 6). For each exogenously set number of eligible players n, we take 100,000 sets of draws, solve the model for each, and take the average equilibrium outcomes across these draws to approximate the expected values.

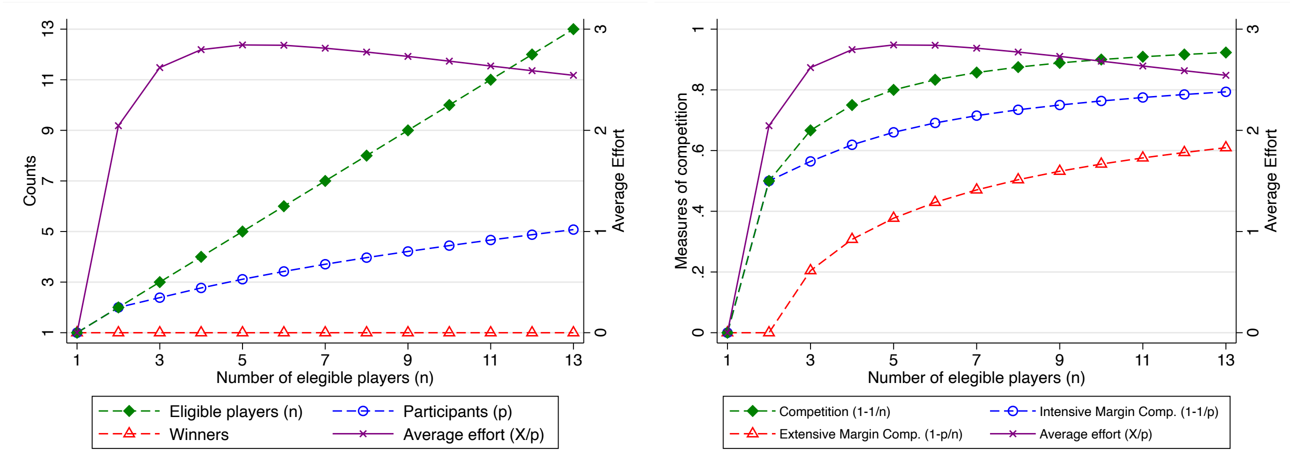
Figure 3a plots equilibrium outcomes, where the number of winners is flat at one, and the number of eligible players the 45 degree line. Note that the model-based horizontal axis does not correspond one-for-one with the horizontal axis in the KDP-based Figure 2, because the model only has one prize and winner for tractability. Therefore, the first portion Q1 in Figure 2 that corresponds to the case where every village wins corresponds to just one point in the model-based 3. The key insight is that the general pattern of endogenously determined participants closely mirrors the empirical pattern in Figure 2. The number of participants first tracks the number of eligible contestants for low n (corresponding to patterns in Q2-Q3), before it diverges for higher n (corresponding to Q4). This implies that for low n, and additional eligible player increases competition at the intensive margin more than at the extensive margin and vice versa for high n. Figure 3b shows this by plotting intensive margin competition as one minus the probability of winning conditional on participation ($1 - 1/p$), extensive margin competition as one minus the probability of participation ($1 - p/n$), and competition as one minus the unconditional probability of winning ($1 - 1/n$).[22] For low n, from 1 to up to around 4-5, intensive margin competition increases much more than extensive margin competition. For higher n extensive margin competition increases relatively more as probability of participation decreases.

An additional benefit of the model is that we can also plot average effort per participant in equilibrium (X/p). Figure 3 shows that average effort is inverse U-shaped in n, a pattern that we also

[22] Appendix Figure A.3d shows the same patterns for alternative measures of competition.

Figure 3: Model-based competition, participation and average effort in equilibrium

(a) Counts (b) Measures of competition



Notes: The figures plot equilibrium outcomes in the model. Note that horizontal axis does not correspond one-for-one to the horizontal axis in Figure 2, as there is only one prize and one winner in the model contrary to the KDP. Abilities a_i are drawn from a standard uniform distribution for all n eligible players with V fixed at 20. We average over 100,000 sets of simulations for each endogenously varied number of total players n. Average effort is plotted on the right vertical axis.

observe in our empirical analysis with conflict reduction. An additional player increases average effort at low number of players, corresponding to the portion where intensive margin competition increases relatively more, and competition decreases effort for higher n, in the portion where extensive margin competition increases relatively more. For intuition, we decompose average effort using equilibrium condition (5):

$$\log(\frac{X}{p}) = \log(V) + \log\frac{(p-1)}{p^2} - \log\frac{\sum_{i\in P}\frac{1}{a_i}}{p} \tag{7}$$

The first term is a constant, the second term decreases with n, especially at high n, and is dominated by the discouraging effect of overall competition similarly to the all-pay contests with homogeneous players (Fang, Noe and Strack, 2020).[23] The third term is the average inverse ability of participants which varies due to the heterogeneity of players and endogenous entry. Appendix Figure A.3b shows that this term is inverse proportional to average ability. As Figure A.3a shows, average ability increases with n as only higher ability players above an increasing threshold decide to enter the contest, and average ability increases faster for lower n when the lowest ability villages

[23]Note that this term can be further decomposed into $\log\frac{(p-1)}{p^2} = \log\frac{(p-1)}{p} + \log\frac{n}{p} + \log\frac{1}{n}$, where the first term is intensive margin competition, which increases with n, the second term is the inverse probability of participation, which also increases with n, and the last term is the unconditional probability of winning, which decreases and overcompensates the positive effects of the other two terms, as shown in Appendix Figure A.3c.

start to drop out.[24] Therefore, the third term pushes up average effort, and pushes effort up more the lower n is. Combined with the growing negative effect of the second term, average effort is inverse U-shaped in n.

4.3 Research Design: Triple Differences

An ideal research design would leverage random assignment in competition at the extensive and intensive margins. As participation in contests is voluntary, these measures are likely to be endogenous due to selection into participation. We overcome the selection problem by estimating the marginal effect of competition on conflict using the variation in number of villages across sub-districts. This exercise also allows to infer the role of competition at the extensive and intensive margin, by estimating the effect over different sub-samples of sub-districts where variation in the number of villages corresponds to variation in intensity of different types of competition.

Using number of villages in a sub-district as our key variable to measure competition has three advantages. First, unlike measures of competition at the intensive and extensive margin, number of villages in a sub-district can also be observed for sub-districts that did not receive the KDP (and therefore had no tournament) during our study period.[25]

Second, the measure is plausibly exogenous under a triple-differences design where we compare the differential effect of an extra village in a sub-district on conflict across sub-districts in and out of KDP, before and after the start of the program. The identification strategy relies on the assumption that trends in the relationship between number of villages in a sub-district and conflict would be parallel between KDP and non-KDP sub-districts in the absence of the program.[26] Therefore, our triple-differences design helps reduce concerns of contamination (e.g., from the end of the Suharto regime) by relying on variation within treatment sub-districts based on differences in number of villages.[27] The fact that we find no evidence for our Placebo test in Q1 in Section 4.5 also helps to rule out contamination from a Suharto effect.

[24]Gradstein (1995) provides a bounded number of participants in the limit for a Tullock contest. Furthermore, Gradstein (1995) examines possible deterrence actions of higher ability players. In our case, the more powerful "incumbent" villages could also discourage the less powerful villages from participating in the competition. An example of such deterrence behaviour could be investment into access to resources and information that increase the probability of winning, or being part of an established interest group which is better placed to win the contest. The theory predicts that entry deterrence behaviour of the more powerful villages is greater with a higher number of potential competitors relative to the prize, as it is the case with an increasing number of villages.

[25]It is worth noting that the absence of a tournament in sub-districts without the KDP also preclude the use of an instrumental variables strategy where we instrument for experienced competition with the number of villages in a sub-district.

[26]Note that this allows that conflict varies with the the number of villages at different rates between KDP and non-KDP sub-districts, as long as this discrepancy is parallel.

[27]A major change in the political economy of Indonesia at the end of the Suharto regime was the transition from appointed village heads to elected village heads (see Martinez-Bravo, Mukherjee and Stegmann (2017) for more details). We find that the competition effects are not different between villages with appointed and elected leaders, which also suggest that the end of the Suharto regime is not a major concern for our research design (see Footnote 37).

The third advantage of using the number of villages as an exogenous measure of competition is that the number of villages has remained mostly stable since 1980, after a significant increase during the 1970s, and as such were determined well before the advent of the KDP (Booth, 2011).[28] Furthermore, program features (e.g., size of block grant, maximum village-level award etc.) do not vary with number of villages in a sub-district allowing us to consider number of villages in a sub-district as an exogenous driver of competition for KDP funding in the triple-differences framework.

We estimate the following equation using either ordinary least squares (OLS) or a Poisson Pseudo Maximum Likelihood (PPML) estimator:

$$C_{st} = \delta_1(NV_s \times KDP_s \times Post_t) + \delta_2(NV_s \times Post_t) + \delta_3(KDP_s \times Post_t) + \boldsymbol{\gamma}_s + \boldsymbol{\eta}_t + \epsilon_{st} \quad (8)$$

where C_{st} is conflict in sub-district s in year t, $Post_t$ is a binary indicator that equals one for 1998 and subsequent years, KDP_s equals one for sub-districts in KDP, and NV_s is the number of villages in a sub-district. Finally, $\boldsymbol{\gamma}_s$ and $\boldsymbol{\eta}_t$ are sub-district and year fixed effects, and ϵ_{st} is the error term, which we allow to be clustered at the district level. The triple-differences coefficient of interest is δ_1. Compared to a difference-in-differences specification, identification of δ_1 in our triple-differences design relies on the weaker assumption of parallel trends in the *marginal effect of an extra village on conflict* between KDP and non-KDP sub-districts in absence the program. The parallel trends assumption cannot be directly tested, but we demonstrate parallel pre-trends using an event study design where we interact all variables in Equation (8) with a full set of year dummies.

It is possible, however, that number of villages in a sub-district also captures other sub-district characteristics that could be correlated with conflict. Indeed we find that the number of villages in a sub-district is correlated with other underlying sub-district characteristics (Appendix Table A.2). Sub-districts with a higher number of villages tend to be, for example, more populous, poorer, more ethnically segregated and less ethnically fractionalized, and have lower average village population. Our triple-differences design removes all confounding factors correlated with number of villages in a sub-district that are constant across KDP and non-KDP districts or before and after the start of the program. The remaining threat to interpreting δ_1 in Equation (8) as the effect of competition on conflict would be if treatment effect of KDP varied by sub-district characteristics correlated with number of villages in a sub-district.[29] One example could be that lower number of village sub-districts host more populous villages, and the KDP may increase conflict in larger villages. We allay these concerns by showing that our results are robust to controlling for these variables fully

[28] Although the number of districts in Indonesia increased dramatically over the period 2000-2003 and beyond, the number of villages in sub-districts was relatively stable.

[29] The unobserved factor correlated with number of villages would also have to apply only in the two middle quartiles where we find an effect, but not in the bottom or top quartile.

Table 3: The effect of competition in the KDP on conflict: triple-differences

	Total		Within		Across	
	OLS	PPML	OLS	PPML	OLS	PPML
	(1)	(2)	(3)	(4)	(5)	(6)
$Post \times KDP \times \log(NV)$	-0.0848	-1.136**	-0.0857**	-1.466**	0.000899	-0.315
	(0.053)	(0.548)	(0.043)	(0.646)	(0.017)	(0.694)
Observations	21288	9060	21288	7236	21288	3396
Sub-district FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
P-value Δ to Across	-	-	0.03	0.334	-	-
Mean outcome	0.0774	0.182	0.0543	0.160	0.0231	0.145
Sub-districts	1774	755	1774	603	1774	283
Sub-districts w/conflict	755	755	603	603	283	283
Share of sub-districts in KDP	0.239	0.228	0.239	0.232	0.239	0.216

Notes: The dependent variable is the total number of conflicts within a sub-districts, the number of within-village conflicts, or the number of across-village conflicts. Regressions include all lower order interaction terms. The number of villages are adjusted as outlined in Section 4.3. Districts with splitting sub-districts over the sample period are dropped. For regressions that use the unadjusted number of villages or include districts with splitting sub-districts, or are additionally combined with matching on propensity scores, see Appendix A.4. Standard errors in parentheses are clustered at the district level. The number of observations is lower in the PPML regressions because sub-districts with constant conflicts (zeros) over time are dropped. Significance at * 0.1%, ** 0.05% and *** 0.01%. P-value Δ indicates the p-value for the difference in the coefficients between Columns 3 and 5 and between Columns 4 and 6. This is the p-value associated with a quadruple interaction of our triple interaction term with a dummy for within-village conflicts in a stacked regression of within and across village conflicts with all variables (and fixed effects) interacted with a dummy for within-village conflicts.

interacted within our triple-differences design.[30]

We note one final econometric detail. In our baseline specifications, we adjust the number of villages to standardize it across two different block grant sizes. Sub-districts with population lower than 25,000 persons (50,000 for Java) received a 25% smaller block grant. Therefore, for the higher population sub-districts, we scale the number of villages down by 25%. Importantly, for our design, the number of villages in a sub-district does not shift with population at this threshold. The adjusted number of villages can be interpreted as the potential number of participants per block grant dollar, which is the relevant measure to capture the degree of competition.[31]

4.4 Competition reduces conflict

In this section, we show the overall effect of competition in KDP on conflict and estimate heterogeneity by type of conflict. Table 3 presents the results from estimating Equation (8). Columns 1 and 2 show the triple-differences estimates of the effect of an extra village on total conflict in a sub-district, with OLS and PPML estimators, respectively.[32] A one percent increase in the number of villages is associated with a 0.00085 decrease in the number of total conflicts, which corresponds to 0.5% of the average number of conflicts in a sub-district in a given year post 1998, or approximately 1% of the average number of conflicts in a sub-district in a given year over the entire study period. The PPML estimates can be interpreted directly as elasticities: a 1% increase in the number of villages reduces total conflicts by 1.1%. These estimates are economically important, implying that a sub-district with 11 villages in KDP will have 11% fewer conflicts than another KDP sub-district with 10 villages.

Of all reported conflicts, 70% are characterized as within-village conflicts while the remaining 30% as between-village conflicts. In the remaining columns of Table 3, we distinguish between conflicts that take place within villages (Columns 3 and 4), as opposed to conflicts that occurred between or across villages (Columns 5 and 6). We find that the effect of increased competition on conflict is explained by reductions in within-village conflict rather than conflicts between villages.[33] This result also implies that an increase in competition between villages does not increase conflict between those same villages. Importantly, the estimated coefficients for within-village conflict and across-village conflict are statistically different at the 5% level. We discuss the implications of this heterogeneity in more detail in the section on mechanisms.

Figure 4 presents the results of estimating Equation (8) in the form of an event study, separately for within- and between-village conflicts. The graph plots the coefficients of the triple interaction terms. The event study shows that we are unable to reject parallel pre-trends at a conventional level of significance. The post-KDP effects mirror the triple-differences results in Table 3, although the individual year-by-year estimates are less precise since we interact all independent variables with

[30] In Appendix Table A.7, we show that our results are robust to including additional control variables that are also interacted up to the triple-differences. In particular, we consider eight characteristics that could be potentially correlated with the number of villages: (i) sub-district population (ii) average village population, (iii) average number of hamlets (sub-villages), (iv) ethnic segregation, (v) sub-district ethnic fractionalization, (vi) average within-village ethnic fractionalization, (vii) poverty (SMERU, 2004), and (viii) a rural indicator.

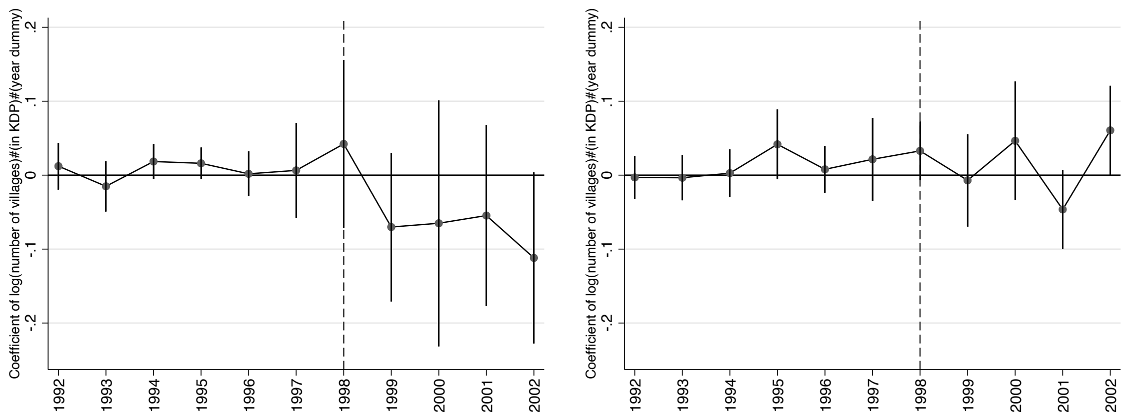
[31] We use quartiles Q1, Q2-Q3, and Q4 based on the adjusted number of villages in our main results. Therefore the quartile cutoffs are slightly different, such that Q2-Q3 (11-18 villages) corresponds to 9-15 *adjusted* villages. We also report the results for the main specifications using the unadjusted number of villages in the Appendix Table A.6 (Panel A).

[32] All sub-districts with no conflict over time are dropped for PPML estimations resulting in a decrease of sub-districts from 1774 to 755 and a decreases in number of observations from 21288 to 9060.

[33] The table also shows the p-value for the difference in the coefficients between Columns 3 and 5 and between Columns 4 and 6. This is the p-value associated with a quadruple interaction of our triple interaction term with a dummy for within-village conflicts in a stacked regression of within and across village conflicts with all variables (and fixed effects) interacted with a dummy for within-village conflicts.

Figure 4: Event study (triple-differences): the impact of competition in KDP on conflict

(a) within-village conflict (70%) (b) across-village conflict (30%)



Notes: The plots are created by a linear regression of the number of conflicts by sub-district on a full set of event time indicators interacted with a dummy indicating the participation in KDP and the log of the number of villages. The graph plots the coefficients of these triple interaction terms. We control for sub-district and year fixed effects. The dependent variable in the left plot is within-village conflicts, and the dependent variable on the right plot is across-village conflicts. The lines indicate 95% confidence interval, based on standard errors clustered at the district level. Results exclude districts were sub-districts split over the sample period.

indicator variables for each year.

4.5 Competition at the Intensive and Extensive Margins

Next, we examine the effects on conflict of competition at the intensive and extensive margins following delineations of sub-samples in Section 4.1. Recall that the effect of competition is entirely on within-village conflict with small, statistically insignificant coefficients on across-village conflict. Therefore, we focus on within-village conflicts in this section, which additionally allows us to perform our analysis at the village level (rather the sub-district level) to control for unobserved time-invariant village characteristics using village fixed effects and explore heterogeneous effects later.

We estimate the effect of the number of villages in a sub-district on within-village conflict analogously to Equation (8) but at the village level.[34] We present results in Table 4 using both OLS (Columns 1-4) and PPML estimators (Columns 5-8). Columns 1 and 5 present results pooling all villages resulting in 14053 observations. As in the regressions at sub-district level in Table 3, the average effect across these groups at the village level is negative (Column 1 and 5). The other columns in Table 4 report results separately by sub-samples over which changes in number of villages corre-

[34]We omit all villages with zero conflict over time in our observation count as our fixed effects absorb these observations, and the results are numerically equivalent to including them. This results in 14053 observations at the village level for 1081 villages across 13 years, compared to 7236 observations for 603 sub-districts in the sub-district level analysis in Column 4 of Table 3.

Table 4: The non-linear effects of competition in the KDP on conflict: triple-differences

	OLS				PPML			
	All Q	Q1	Q2-Q3	Q4	All Q	Q1	Q2-Q3	Q4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Post \times KDP$	-0.0688**	0.0498	-0.284**	-0.109	-0.719**	0.303	-2.839**	-1.233
$\times$ log(NV)	(0.034)	(0.193)	(0.116)	(0.089)	(0.349)	(2.335)	(1.170)	(1.039)
Observations	14053	3523	7215	3315	14053	3523	7215	3315
Village FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
P-value Δ to Q1/Q4	-	-	0.061	-	-	-	0.066	-
Mean outcome	0.0872	0.0894	0.0886	0.0821	0.0872	0.0894	0.0886	0.0821
Villages	1081	271	555	255	1081	271	555	255
Villages w/conflict	1081	271	555	255	1081	271	555	255
Share of villages in KDP	0.254	0.140	0.276	0.329	0.254	0.140	0.276	0.329

Notes: The regressions are at the village level and the dependent variable is the number of within-village conflicts. We only include villages with at least one conflict over time. The regressions are run for the whole sample (All Q), for the bottom quartile Q1 (≤ 10 villages), the two middle quartiles Q2-Q3 (11 to 18 villages), or the top quartile (≥ 19 villages). Regressions include all lower order interaction terms. The number of villages are adjusted as described in Section 4.3, and the quartiles are redefined accordingly. Districts with splitting sub-districts over the sample period are dropped. For regressions that use the unadjusted number of villages and include districts with splitting sub-districts, see Appendix A.5. Standard errors in parentheses are clustered at the district level. Significance at * 0.1%, ** 0.05% and *** 0.01%. P-value Δ to Q1/Q4 indicates the p-value for the difference in the coefficients between the Q2-Q3 Column and the Q1 and Q4 Column. This is the p-value associated with a quadruple interaction of our triple interaction term with a dummy for Q2-Q3 in a stacked regression of Q2-Q3 villages, Q1 and Q4 villages, with all variables (and fixed effects) interacted with a dummy for Q2-Q3 villages.

spond to no competition (Columns 2, 6), changes in competition at the intensive margin (Columns 3, 7) and changes in competition at the extensive margin (Columns 4, 8).

For villages in sub-districts with up to ten villages (Q1), we showed in Section 4 that differences in number of villages do not correspond to differences in competition at the extensive or intensive margins. This serves as a placebo test. Consistent with our hypothesis that competition at the intensive margin reduces conflict, we fail to detect any effect of changes in number of villages on conflict in this sub-sample (Column 2, 6).

For villages in sub-districts with eleven to eighteen villages (7215 observations in Q2-Q3), differences in number of villages correspond to differences in competition predominantly at the intensive margin. Here we find that differences in competition at the intensive margin due to the KDP reduced within-village conflict (Columns 3, 7). A one percent higher number of villages in this subsample corresponds to a 2.84% reduction in conflict (Column 7). These are economically meaningful effects – a village in a KDP-eligible sub-district with 11 villages relative to a village in a KDP-eligible sub-district with 10 villages would have almost 30% fewer conflicts.

For villages in sub-districts with more than 19 villages (Q4), differences in number of villages corresponds to differences in competition predominantly at the extensive margin rather than competition at the intensive margin. We are unable to detect a significant effect of differences in competition at the extensive margin on within-village conflict (Columns 4, 8). Although the coefficients are negative, the effect sizes are considerably smaller as well. A village in a KDP-eligible sub-district with 22 villages would have 12% fewer conflicts than a village in a KDP-eligible sub-district with 20 villages (Column 8).

An important implication of our results across Q2-Q3 and Q4 is that the main driver of conflict reduction is competition at the intensive, not at the extensive margin. That is, the conflict-reducing effect of competition appears to be driven by differences in conditions faced by villages that chose to participate in the KDP. When competition drives villages to opt out of participation (competition at the extensive margin), we observe no significant reductions in conflict. We test this further in section 5.3 and show that the effects of competition at the intensive margin are uniform across winners and losers but absent in non-participants. Note that these patterns also mirror equilibrium outcomes of our contest model in Section 4.2, as shown by regressions using average effort as dependent variable (Appendix Table A.3), which we further discuss in Section 5.1.

4.6 Additional Robustness Checks

We include several additional robustness checks in Appendix A.4 – in each case the results are qualitatively similar to those presented in this paper. While we lose precision in a small number of the robustness checks, the point estimates are reassuringly similar. In addition to the already described robustness checks, we show in Appendix Table A.6 that our results are robust to: (i) keeping sub-districts whose parent districts split over the sample period (Panel A), (ii) combining the triple-differences approach with propensity score matching, as discussed in Section 6 (Panel B), and (iii) restricting the control group to only include provinces where there is at least one treated sub-district (Panel C). We show robustness checks for the results on competition at the intensive and extensive margins in Tables A.8 and A.9 in Appendix A.5.

Sub-districts with fewer number of villages may possibly have larger villages, and the proposal selection process could more easily give rise to conflicts in those large villages. This would be consistent with less conflict with lower intensive margin competition. To address this, we control for average village size fully interacted with our difference-in-differences design in Table A.7, which shows, if anything, a slightly stronger effect of the number of villages.[35] We explore several other fully interacted potential confounders in Table A.7, as discussed in Section 4.3.

Finally, Table A.10 shows results using the alternative NVMS conflict data that only exists for the post-KDP period from 1998. We instead include province by year fixed effects and report the

[35] If village size was driving results, we would also expect an effect in Q1, which we do not find.

interaction between being part of the program and log number of villages. The reported estimate in Column 1 is of similar magnitude as our main result, and the remaining columns show robustness to our results on mechanisms (ethnicity and winners/losers) to which we turn next.

5 Interpretation and Mechanisms

Our results are consistent with the hypothesis that individuals in KDP villages work as a team to maximise the probability of winning a grant, and competition between administrative units increases coordination among individuals, favoring the development of norms of cooperation that in turn help to reduce conflict.

The effect of inter-group competition on within-group coordination and free-riding behavior by group members has been highlighted extensively in the experimental literature on group performance (Erev, Bornstein and Galili, 1993; Bornstein and Ben-Yossef, 1994; Nalbantian and Schotter, 1997; Bornstein, Gneezy and Nagel, 2002). This literature shows that competition between groups can significantly increase the productivity of competing units by: i) decreasing free-riding (in the absence of competition, each group member tends to put in less effort if rewards are group based), and ii) increasing coordination (which is typically very difficult and low for reasons such as lack of communication between members, limited time, or other logistic constraints). Our interpretation is also consistent with the experimental literature that corroborates theories of social psychology (Campbell, 1965; Coser, 1959), showing that inter-group competition can alter the motivation of group members by increasing group identification and intra-group cooperation. More specifically, Tajfel (1982) argues that the increase in group identification can lead group members to differentiate themselves from the out-groups by performing better.

In the KDP context, "coordination" can manifest in various activities such as the rate of participation in KDP meetings and the amount of time and energy spent to prepare proposals. Higher coordination and effort in any of these activities would increase the chance of winning for a given village. Importantly, there are several reasons why higher coordination and effort spent on these activities should also translate into lower incidence of conflict. First, participation in KDP meetings, where the planning and development of the proposals take place through inclusive forms of decision making, might favor the development of norms of cooperation, which in turn would be associated with a lower incidence of conflict. Second, by devoting more time and effort to the preparation of the proposals, villagers would have less time available to engage in conflict, a reasonable possibility given the fast turnaround times and tight deadlines characterising the KDP. In addition, villagers can also coordinate to keep the level of conflict and disputes at a minimum to produce better quality proposals and avoid undermining KDP procedures in order to increase the probability of winning.[36]

Another plausible interpretation of our results is that, by participating in the KDP contest, villagers from different ethnic groups might experience an increased sense of village identity. The increased sense of shared belonging would make villagers less likely to start a conflict with other ethnic groups in the same village. This mechanism has been detected, for example, in the context of football competitions in sub-Saharan Africa by Depetris-Chauvin, Durante and Campante (2020). They show that collective experiences, such as football matches of the national team, increase national identity as opposed to ethnic identity, and in turn lead to a decrease in ethnic conflicts. Crucially, the study finds that the effect holds only for competitive football matches and not friendly matches between nations.

The above mechanisms are generally supported by the fact that we see an effect of competition on within-village conflict, but not on across-village conflict (Table 3). If competition increases coordination and group identification within villages, it is reasonable to expect an improvement in the relations between ethnic groups or hamlets and therefore less tensions within villages, but not necessarily between villages. Next we propose three empirical tests that support our interpretation.[37] First, we look at the relationship between competition and attendance at KDP meetings as a measure of coordination. Second, we investigate how the relationship between competition and conflict interacts with existing ethnic diversity and segregation within villages. We would expect that competition-induced coordination and village identity would bring greater benefits to more ethnic diverse or segregated villages. Third, the benefits of coordination and identity should apply to villages regardless of whether they eventually won a grant, as long as they participated in the KDP.

5.1 Participation in village meetings

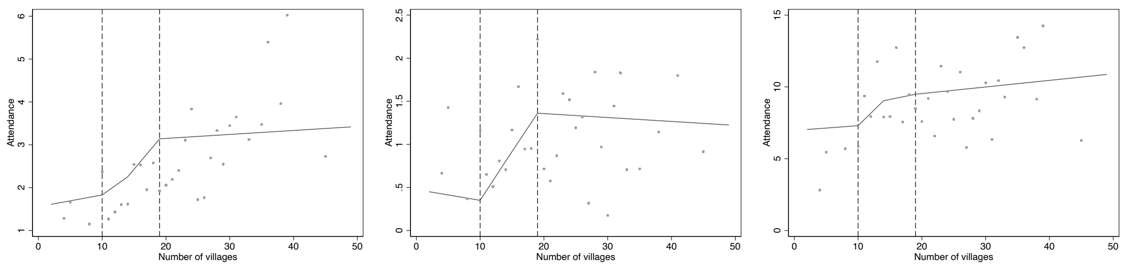
As part of KDP grant applications, villages were required to organize at least three meetings where villagers were invited to provide input and work on various aspects of the proposal. We obtain data on attendance at these meetings as a measure of villagers' effort in the KDP process. Meetings were a crucial element of the KDP (see Section 2) and participation was a necessary condition for a project to pass the screening stage (compliance) at the sub-district level and be allowed to compete

[36]Compliance with KDP rules also requires keeping conflicts to a minimum in order to prevent being excluded from the program by the monitoring institutions (i.e. World Bank and the Indonesian government). Almost all villages cleared the pure compliance threshold.

[37]Martinez-Bravo, Mukherjee and Stegmann (2017) show that Indonesian villages with elected village heads are less likely to be aligned with the party of the district head. One concern is that our measure of competition, number of villages in a sub-district, could be correlated with the share of elected vs. appointed village heads introducing omitted variable bias. In our sample, around 85 % of village heads are elected and roughly 70% of sub-districts have only elected heads. We run separate regressions for sub-districts with more or less than 90% of elected heads and find results that are statistically indistinguishable, which suggest that this is not a driving mechanism.

Figure 5: Correlation between number of villages and attendance at different types of KDP meetings

(a) Musbangdes I (b) Musbangdus I (Hamlets) (c) Musbangdes II



Notes: The figure plots the correlation by quartile between the number of villages in each sub-district and attendance rates at the three different types of meetings (in chronological order). Estimates are obtained implementing a piece-wise linear function that does not impose a global structure, such as polynomial functions, but still ensure continuity. It also plots the underlying data, i.e. average attendance rates by number of villages. Above 30 villages, data are grouped in bins given the smaller number of observations, hence above 30 the axis does not reflect the actual number of villages. Source: Data on KDP from Chavis (2010).

for funding.

Due to its competitive nature, the KDP created incentives for villagers to work together at meetings where proposals were prepared and discussed. Indeed, previous qualitative work describes how this form of collective decision-making process improved intra-group relations in participating villages (Gibson and Woolcock, 2005; Barron, Diprose and Woolcock, 2006). The KDP was meant to promote an inclusive decision-making environment with a particular emphasis on the empowerment of marginalized groups (e.g. women). While the KDP was not designed as a conflict reduction or management program *per se*, the implementation of the principles of participation and local choice in a competitive selection process helped villagers acquire civic skills and decision-making opportunities that were important for mediating conflicts (Barron, Diprose and Woolcock, 2006).

To explore whether greater competition led to more participation in local meetings, we use data on attendance in the KDP meetings. Since meetings are only taking place in KDP sub-districts and in the post-KDP period, we can only present suggestive associations between the number of villages in a sub-district and attendance at program meetings. Figure 5 presents the association between the number of villages and the percentage of villagers attending KDP meetings using a piece-wise linear function that captures non-linearity in the data without imposing an overall structure. The three panels show the relationship for the first and the second village level meeting (Musbangdes I and II) and the hamlet level meeting (Musbangdus), which takes place between the two village level meetings (see Section 2 and Figure A.1 for an overview of meeting timing). In all three meetings, competition at the intensive margin (Q2-Q3) is positively associated with attendance. By contrast we see very little association between competition at the extensive margin (Q4) and participation in any of the KDP meetings. As before, the placebo test over the sample where there is no competition (Q1) shows no meaningful association between number of villages in a sub-district and participation in KDP meetings.

This pattern can also be rationalized with the equilibrium outcomes in our contest model in Section 4.2. Appendix Table A.3 shows regressions using model-based average effort as outcome variable, for which village attendance could be interpreted as a proxy. Competition increases average effort, but this effect is driven entirely by the support of sub-districts with small numbers of villages, corresponding to a relatively larger increase in intensive margin competition (i.e. Q2-Q3 in our empirical application). Conversely, competition decreases average effort at a high number of competitors.[38]

Our results on the association between competition and attendance are consistent with the subset of the literature on community driven development programs that examines competition. For instance, Chavis (2010) finds that both competition and higher attendance in KDP village meetings are associated with more efficient projects being funded, although his paper does not examine the relationship between competition and attendance. Labonne and Chase (2011) examine the effect of a CDD program with competitive allocations in Philippines on social capital. While they are unable to isolate the effect of competition, they use a difference-in-differences approach similar to ours (Section 6) to evaluate the overall effects of the program and show that the program increased participation in village assemblies. Our evidence suggests that the degree of competition could be an explanatory factor for the varying levels of participation and subsequently conflict.

5.2 Heterogeneous Effects of Competition by Ethnic Diversity

A large literature has highlighted that ethnic diversity can be conducive to conflict, especially when society is heavily polarized (Montalvo and Reynal-Querol, 2005; Alesina and La Ferrara, 2005). In the context of Indonesia, one of the most diverse countries in the world, Bazzi and Gudgeon (2021) have recently shown that ethnic diversity increases local conflicts over the allocation of resources and provision of public goods.[39]

In this section we study how our main results vary by underlying ethnic diversity or segregation within villages focusing on our 7215 intensive margin competition observations (Q2-Q3).[40] In many cases the KDP offered an otherwise rare opportunity for groups from different ethnicities and re-

[38] We also show this pattern by including equilibrium intensive and extensive margin competition simultaneously in the regression.

[39] In the presence of weak institutions, ethnic diversity can be detrimental to several socioeconomic outcomes (Alesina, Gennaioli and Lovo, 2019; Fearon and Laitin, 2003; Horowitz, L and Horowitz, 1985; Esteban, Mayoral and Ray, 2012; Collier, 2000, 2001).

[40] The number of observations is slightly lower at 7020 due to some missing ethnic information.

ligions to come together and collectively discuss their needs and priorities (Gibson and Woolcock, 2005; Barron, Diprose and Woolcock, 2006). If competition reduces conflict by incentivizing greater coordination within villages, it might improve coordination and lower conflict relatively more in villages that are diverse or segregated and had lower between-group interactions prior to the program.

We divide our sample into either two groups of high and low ethnically diverse villages, or two groups of high and low ethnically segregated villages. For ethnic diversity, we compare the bottom half and top half of villages by within-village ethnic fractionalization (Alesina et al., 2003). For ethnic segregation, we instead compare the bottom quartile and the top quartile of villages by within-village ethnic segregation (Reardon and Firebaugh, 2002). Figure A.8 in Appendix A.6 shows that a median sample split generates two groups that are reasonably heterogeneous in terms of ethnic fractionalization, but a median sample split in terms of ethnic segregation produces two groups that have almost the same median. Therefore we compare the top and bottom quartile in terms of ethnic segregation. For all groups, we limit our sample to sub-districts in the middle two quartiles in terms of number of villages, where we observe an effect of competition on conflict, and estimate our main triple-differences specification. It is worth noting that our median sample split by ethnic fractionalization is equivalent to a median sample split by ethnic polarization.[41]

We show results for within-village conflicts by ethnic fractionalization and by ethnic segregation in Table 5. The effect size of an extra village is more than double for more ethnically fractionalized (or polarized) as well as for more ethnically segregated villages.[42] We treat this as suggestive evidence since the large standard errors from a significantly reduced sample size do not allow us to reject these coefficients at conventional levels. Nonetheless, these results weakly support our interpretation on the consequences of competition for group coordination and identity. First, competition might have induced higher coordination between different ethnic groups in the form of greater participation in KDP meetings. In turn, the opportunity of being involved in a collective decision making process might have significantly improved the relationships between ethnic groups, leading to less conflict. Second, higher competition might have spurred a higher coordinated effort by different ethnic groups to keep the level of conflict and disputes at a minimum. Third, higher competition might have increased village identity relative to ethnic identity, favoring an improvement

[41] Polarization captures how close the distribution of ethnic groups is to a bi-modal distribution. Esteban and Ray (1999) show in their behavioural model that heavily polarized ethnic groups maximize conflict potential. Figure A.7 in Appendix A.6 shows that the correlation between fractionalization and polarization depends on the level of ethnic fractionalization, similar as in Montalvo and Reynal-Querol (2005). Most of the mass of villages, however, is located at relatively low levels of ethnic fractionalization where fractionalization and polarization are perfectly correlated, such that the median sample split by fractionalization or polarization results in the same two groups. As such we can interpret the two groups as split by both, ethnic fractionalization and polarization at the same time.

[42] These effects are similar in event studies at the sub-district level using average village level fractionalization in the sub-district to split the sample, as shown in Figure A.9 in the Appendix. Table A.10 shows that the patterns are similar when using our alternative NVMS conflict data without a pre-period.

Table 5: The effects of competition by the degree of ethnic fractionalization or segregation

	Low/high ethnic fractionalization				Low/high ethnic segregation			
	OLS (Q2-Q3)		PPML (Q2-Q3)		OLS (Q2-Q3)		PPML (Q2-Q3)	
	Low	High	Low	High	Low	High	Low	High
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Post \times KDP$	-0.151	-0.419*	-1.943	-3.017	-0.154	-0.543*	-2.248	-6.005**
$\times \log(NV)$	(0.156)	(0.238)	(1.757)	(2.093)	(0.234)	(0.295)	(3.006)	(3.038)
Observations	3874	3146	3874	3146	1716	1456	1452	1344
Village FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
P-value Δ to Low Col.	-	0.322	-	0.687	-	0.323	-	0.388
Mean outcome	0.0808	0.0985	0.0808	0.0985	0.0798	0.106	0.0944	0.115
Villages	298	242	298	242	132	112	132	112
Villages w/conflict	298	242	298	242	132	112	132	112
Share of villages in KDP	0.305	0.223	0.305	0.223	0.303	0.152	0.303	0.152

Notes: The regressions are at the village level and the dependent variable is the number of within-village conflicts. We only include villages with at least one conflict over time. The regressions are run for the two middle quartiles Q2-Q3 of the number of villages (11 to 18 villages). The total number of observations is 7020, slightly lower than the 7215 in Column 3 and 7 of Table 4 due to missing information on ethnicity. Regressions include all lower order interaction terms. In Columns (1) to (4), the regressions are run separately for high (top half) and low (bottom half) ethnic fractionalization. In Columns (5) to (8) the regressions are run separately for high (top quarter) and low (bottom quarter) ethnic segregation. The number of villages are adjusted as described in Section 4.3, and the quartiles are redefined accordingly. Districts with splitting sub-districts over the sample period are dropped. Standard errors in parentheses are clustered at the district level. Significance at * 0.1%, ** 0.05% and *** 0.01%. P-value Δ indicates the p-value for the difference in the coefficients between the "High" Column and the "Low" Column. This is the p-value associated with a quadruple interaction of our triple interaction term with a dummy for "High" in a stacked regression of "Low" villages and "High" villages, with all variables (and fixed effects) interacted with a dummy for "High" villages.

of the relations between the different ethnic groups in the village and as a consequence decreased conflict.

5.3 Winners, Losers and Non-participants

This section serves two purposes by analyzing three groups of villages separately: winners, losers (but participants), and non-participants. First, if the main mechanism is that competition improved coordination in the *process* of the competition, all villages that took part in the competition should be affected regardless of the *outcome* of the competition. We can test whether the effect of competition on conflict applies equally to both groups of participants (winners and losers) irrespective of winning the grant, but not to non-participants (those who did not submit a proposal). Second, we can test competing hypotheses based on resource windfalls. It is possible that villages that win experienced an increase in corruption and conflict induced by the resource windfalls (e.g. Collier and Hoeffler, 1998; Rosser, 2006; Brollo et al., 2013). We have shown that sub-districts with a higher number of villages have a lower share of winners (see Figure 2). This in turn implies that there are fewer resource windfalls on average with more competition and potentially less conflict generated

Table 6: Competition and conflict: winners, losers and non-participants

	OLS (Q2-Q3)				PPML (Q2-Q3)			
	All	Winners	Losers	Non-par.	All	Winners	Losers	Non-par.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Post \times KDP$	-0.284**	-0.356***	-0.453**	0.195	-2.839**	-3.573***	-6.168**	2.745
$\times$ log(NV)	(0.116)	(0.124)	(0.204)	(0.201)	(1.170)	(1.382)	(2.815)	(2.446)
Observations	7215	6448	5616	5603	7215	6448	5602	5603
Village FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
P-value Δ to Losers	-	0.635	-	-	-	0.623	-	-
P-value Δ to Non.-par.	-	0.011	0.009	-	-	0.098	0.022	-
Mean outcome	0.0886	0.0892	0.0908	0.0903	0.0886	0.0892	0.0910	0.0903
Villages	555	496	432	431	555	496	432	431
Villages w/conflict	555	496	432	431	555	496	432	431
Share of villages in KDP	0.276	0.190	0.0694	0.0673	0.276	0.190	0.0671	0.0673

Notes: The regressions are at the village level and the dependent variable is the number of within-village conflicts. We only include villages with at least one conflict over time. The regressions are run for the the two middle quartiles Q2-Q3 (11 to 18 villages). Regressions include all lower order interaction terms. All regressions include the out of KDP control group. In addition, the winners columns include only the KDP villages that also won funding, the losers columns include only KDP villages that submitted a proposal but were not awarded funding, and the non-participants ("Non-par.") columns include only KDP villages that did not put forward a proposal. The "All" columns (1) and (5) replicate the results from Table 4 for convenience. The number of villages are adjusted as described in Section 4.3, and the quartiles are redefined accordingly. Districts with splitting sub-districts over the sample period are dropped. Standard errors in parentheses are clustered at the district level. Significance at * 0.1%, ** 0.05% and *** 0.01%. P-value Δ indicates the p-value for the difference in the coefficients between the "Winners" Column and the "Losers" or "Non-participating" Column, or the "Losers" and "Non-participating" Column. This is the p-value associated with a quadruple interaction of our triple interaction term with a dummy for "Winners" in a stacked regression of "Winners" villages and either "Losers" or "Non-participating" villages, and control non-KDP villages, with all variables (and fixed effects) interacted with a dummy for "Winners".

by the resource curse. We can test this hypothesis by comparing the impact on winning and losing villages without resource windfalls.

In Table 6, we show the impact of competition on the intensive margin (our 7215 Q2-Q3 observations) on conflict, for winning, losing and non-participating villages separately. Column 1 and 5 report the overall effect from Table 4. The other columns vary by the type of villages included in the treated group: only the winners, those who submitted a proposal but were not awarded funding (the losers), or those that decided to not submit a proposal (the non-participants). The results show that an additional village in the competition decreases conflict for both winners and losers. If anything, the effect for losers is slightly higher, even though the estimates are not statistically distinguishable.[43] There is, however, no attenuating effect of competition on conflict for the non-participants and the estimated effect is statistically different from that for winners and losers. On the contrary, the point estimate is positive (but imprecise) for these groups of villages, possibly due to entry deterrence or

[43] Note that there is a lower number of losers than winners as indicated in the row "Share in KDP", which indicates the share of villages in the treated group.

disappointment effects. Appendix Table A.10 shows that the patterns are similar when using our alternative NVMS conflict data without a pre-period.

These results show that it is participation in KDP that really matters, not the outcome of the competition. This is consistent with competition improving coordination and reducing conflicts within villages during the preparation process, regardless of whether the village is eventually being awarded funding or not. Furthermore, this evidence rules out a competing resource curse hypothesis to explain our main results.

6 Evidence on the Program-Level Effect of KDP on Conflict

After establishing the role of competition in shaping conflict outcomes in the KDP, we now briefly explore the overall effect of KDP on conflict, ignoring the differences in number of villages and competition. We employ a difference-in-differences design with matching, comparing sub-districts that received KDP with matched sub-districts not included in KDP, before and after the program was introduced. We find suggestive evidence that the program reduced conflict. We note an important caveat: even though we are able to demonstrate parallel trends in conflict across KDP and non-KDP sub-districts before the start of the program, we acknowledge the possibility that there may still be differential underlying trends in the post-program period, since the timing of program implementation was also a period of overall increase in conflict in Indonesia. Therefore we characterize these results as suggestive of the overall program effects.

6.1 Research Design: Difference-in-Differences with Matching

The KDP was rolled out non-randomly at the sub-district level. To account for this selection bias, we first match sub-districts in the KDP to sub-districts out of the KDP, using propensity score matching. Selection of sub-districts into the KDP was primarily based on a "poverty register using national statistics (PODES and SUSENAS criteria)" and to a lesser extent on subjective criteria (Ministry of Home Affairs, 2002). The SMERU (2004) disaggregated poverty data we used is based on the 1999-2000 PODES and 1999 SUSENAS surveys, the same that the government used for selection. Although this was not the sole criterion, these poverty statistics strongly predict selection into the program. We estimate propensity scores at the sub-district level using poverty statistics, pre-treatment conflict, and other variables to capture subjective criteria such as the share of villages that are rural, population, the number of villages, and the degree of ethnic fractionalization and segregation. We use a uniform kernel around the propensity score of all treated sub-districts to identify corresponding matches from the control group.[44]

We then adopt an event study or difference-in-differences approach where we weight the regression by the occurrences of sub-districts in the control group, after we impose a common support in the propensity score (Heckman, Ichimura and Todd, 1997, 1998).[45] The event study with treatment leads and lags is:

$$C_{st} = \sum_{\tau=-q}^{-1} \delta_\tau KDP_{s\tau} + \sum_{\tau=0}^{m} \theta_\tau KDP_{s\tau} + \boldsymbol{\gamma}_s + \boldsymbol{\eta}_t + \epsilon_{st}, \tag{9}$$

where KDP_s indicates participation in KDP. C_{st} is the number of conflicts in sub-district s and in year t, and $\boldsymbol{\gamma}_s$ and $\boldsymbol{\eta}_t$, are sub-district and year fixed effects. The difference-in-differences version collapses all treatment leads δ_τ and lags $\theta\tau$ into on estimate instead. The causal interpretation of our estimates requires the assumption that absent the program, the matched KDP and non-KDP districts would have experienced the same trends in conflicts. While this assumption is fundamentally untestable, our specification allows us to show parallel pre-trends.

6.2 Results

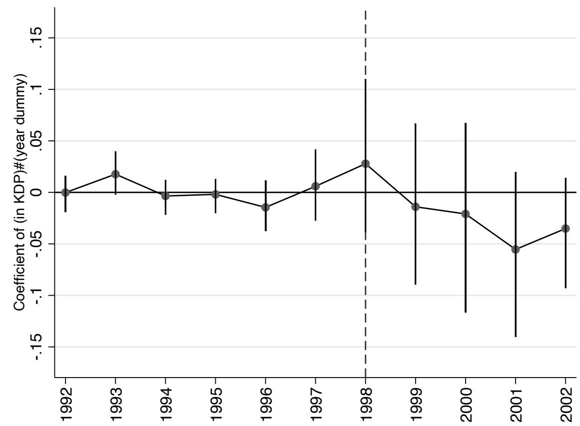
In this section we show the overall effect of KDP on conflict. Table A.4 reports the Logit regression results estimating the propensity of sub-districts to be selected for the KDP. As expected, the poverty index is a strong predictor (with the highest t-stat), as it is based on the exact same underlying data that were used for selection by the government (Ministry of Home Affairs, 2002). To capture subjective elements, we include further variables to estimate the propensity score, such as the share of villages that are rural, population, the number of villages, and the degree of ethnic diversity. Figure A.4 in the Appendix shows the distribution of the estimated propensity scores by treatment status.

In Figure 6 we show the event study, with each point representing the estimated difference in conflict between KDP and matched non-KDP sub-districts over time. Two important results follow from the event study. First, we are unable to reject parallel pre-trends at any conventional level of significance and the estimates are not meaningfully large. Following the introduction of the program there is an immediate decline in conflict in KDP relative to non-KDP sub-districts. For the

[44]Since the matches and regression weights are based on an estimated propensity score, we block bootstrap the entire procedure by district (to account for clusters), and by strata from within and outside of the KDP over the entire procedure, to estimate standard errors. Since we are using kernel matching, the bootstrap procedure does not suffer from the problems described in Abadie and Imbens (2008), as the number of matches increases asymptotically with the number of observations.

[45]The weights for the treated sub-districts are one, and the weights for the control sub-districts are the number it occurs as a match, divided by the average number of occurrences to normalise the weights to one. The bandwidth for the uniform kernel is 0.06 following Heckman, Ichimura and Todd (1997, 1998).

Figure 6: Event study: the impact of the KDP on conflict



Notes: These plots are based on a linear regression of the total number of conflicts by sub-district on a full set of event time indicators interacted with a dummy indicating the participation in KDP controlling for sub-district and year fixed effects. The results are based on a matching and difference-in-differences hybrid. The regressions are weighted with weights based on the estimated propensity scores as detailed in Section 6. The lines indicate 95% confidence intervals, based on standard errors clustered at the district level and block bootstrapped to account for the two-step matching and difference-in-difference procedure. Results exclude districts were sub-districts split over the sample period.

event study, we lack power for some of the individual annual effects, but these are close to the average effects of the matched difference-in-differences estimation in Table A.5 in Appendix A.3. The OLS estimate of the average effects (Column 1) correspond to a 24.7% reduction in conflicts in KDP sub-districts based on the average conflict incidence post-1998. We find similar effect sizes with a Poisson Pseudo-Maximum Likelihood (PPML) estimator (Column 2). The PPML estimate can be interpreted as a semi-elasticity, implying that the KDP reduced conflict count by 21.9%. In Figure A.5 in Appendix A.3 we present robustness checks including event study results without any matching, or including districts that split.

Our results indicate that the KDP attenuated the surge in conflict observed throughout Indonesia after the end of the Suharto administration. The literature on the effect of CDD programs on local institutions and conflicts, however, is generally mixed (Casey, 2018). An important distinguishing feature of the KDP was that the allocation of grants to villages, at least in most cases, was on a competitive basis. As shown throughout our analysis in the preceding sections, this element of competition was a key driver of the conflict reducing effect of the KDP, and our results predict that if the program featured moderate levels of competition throughout, the conflict reducing effects of the program would be even greater.

7 Conclusion

This paper shows that competition for funding, which was a key element in the KDP design, led to a significant, unintended reduction in local conflicts. We show that this effect manifests primarily through competition at the intensive margin where additional eligible villages participate by submitting a proposal and therefore face a lower probability of winning funding conditional on having submitted a proposal. By contrast, higher levels of competition on the extensive margin correspond to an increasing share of eligible villages dropping out from the competition, leaving the likelihood of winning for the participants unchanged.

We show three further key results. First, competition reduces *within*-village conflicts, with no effect on conflict between competing villages. Second, the effects are stronger in more ethnically fractionalized communities, which are generally more prone to conflicts. Third, our results do not differ between winners and losers in the competition for funding, indicating that our results arise from participation into the program and not from its funding outcome. We interpret this evidence as consistent with the hypothesis that competition between villages favors coordination within competing units, which in turn leads to a reduction in *within*-village conflict. This mechanism is well documented and rationalized by the experimental literature on inter-group competition and group performance. This interpretation is further corroborated by the fact that attendance rate in KDP meetings is higher in villages with greater competition at the intensive margin, suggesting that villages in more competitive sub-districts put more effort into the process. Our results also resonates with theories in social psychology (Tajfel, 1982) and with recent empirical evidence (Depetris-Chauvin, Durante and Campante, 2020; Mousa, 2020; Lowe, 2021) showing that inter-group competition can increase within-group identity. In the context of the KDP it is possible that people living in villages facing higher competition experience an increased sense of belonging to the village relative to ethnic or religious groups, making conflict outbreaks less likely between groups in the same village.

Our results are relevant for policymakers as they suggest that introducing moderate levels of competition in development programs can have important spillover effects and lead to a reduction in local conflict and violence. Are these effects persistent? While we cannot test this hypothesis due to data limitations, the increase in coordination favored by competition between villages might be conducive to general persistent improvements in intra-village relations and long-term reductions in conflict. We leave this question as an important avenue for future research.

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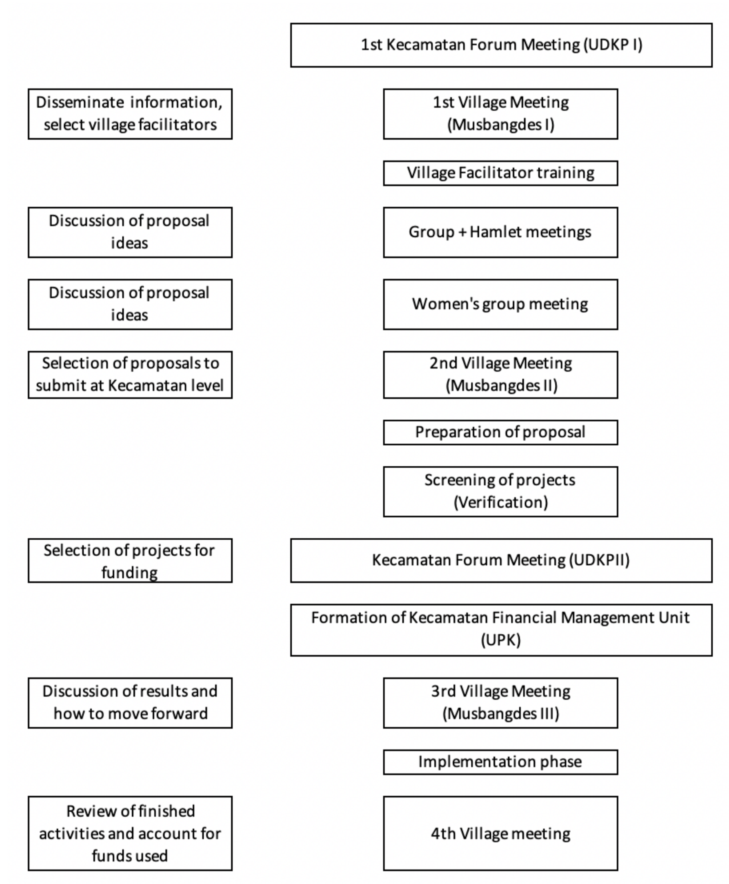
APPENDIX FOR ONLINE PUBLICATION

A.1 Descriptive statistics and additional information on the KDP

Figure A.1: KDP activity cycle



Notes: The figure is based on the official report by the Ministry of Home Affairs (2002). A kecamatan is a sub-district.

Table A.1: Descriptive statistics by sub-districts

	All		In KDP		Out of KDP		Difference
	Mean	SD	Mean	SD	Mean	SD	
Total conflict	0.0774	0.215	0.0619	0.114	0.0822	0.238	-0.020
Within-village conflict	0.0543	0.174	0.0438	0.082	0.0576	0.194	-0.014
Across-village conflict	0.0231	0.087	0.0181	0.068	0.0247	0.091	-0.007
Number of villages	14.574	6.335	17.330	6.311	13.708	6.092	3.622***
Population (sub-district)	58,284	35,336	54,858	24,426	59,360	38,068	-4,501
Population (village)	4,763	4,699	3,398	1,577	5,192	5,241	-1,793***
Segregation (sub-district)	4.044	2.214	4.139	2.261	4.014	2.198	0.125
Segregation (sub-district)	0.382	0.119	0.396	0.115	0.377	0.120	0.019
Ethnic fractionalization (sub-district)	0.137	0.211	0.103	0.153	0.148	0.226	-0.045
Ethnic fractionalization (village)	0.113	0.178	0.075	0.103	0.125	0.194	-0.050*
Poverty index	0.327	0.152	0.414	0.149	0.299	0.143	0.114***
Rural = 1	0.818	0.293	0.939	0.110	0.780	0.321	0.160***
Number of sub-districts	1774		424		1350		

Notes: Tests of differences in means are reported in the last column with significance * 0.1%, ** 0.05% and *** 0.01% .

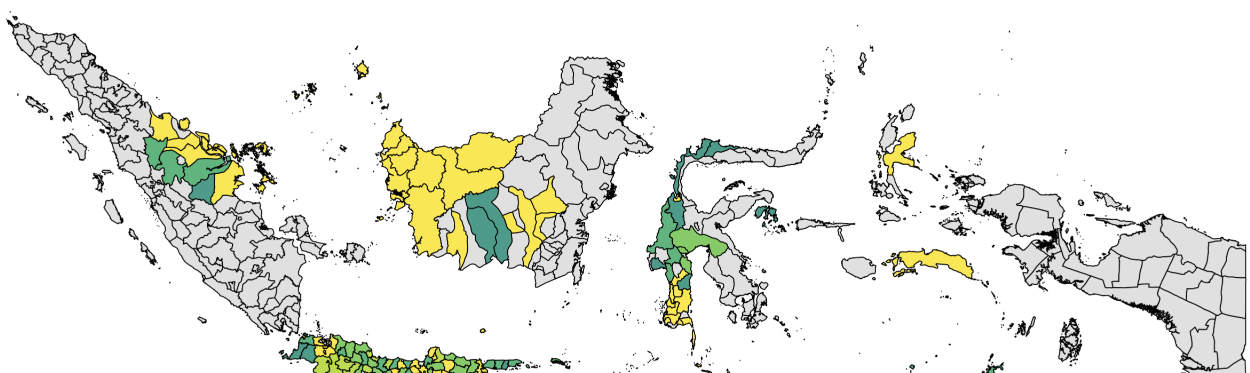


Figure A.2: District map with share of KDP sub-districts with available conflict data (Q2-Q3 sub-districts only

Notes: The map show the share of sub-districts in each district that are part of the KDP. Only districts in provinces are shown for which conflict data is available, and the map only shows sub-districts that are within the two middle quartiles (Q2-Q3) of the distribution of number of villages.

Table A.2: Correlation between number of villages and sub-distric characteristics

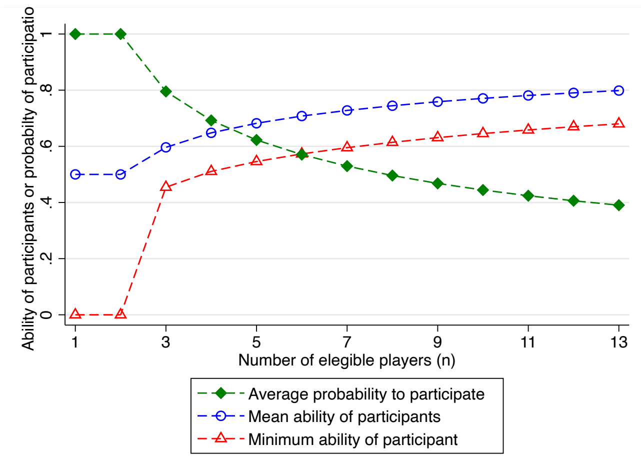
	(1) All	(2) Q1	(3) Q2-Q3	(4) Q4
Population (log)	3.370***	0.0942	0.925***	0.747
	(0.702)	(0.325)	(0.224)	(0.854)
Village population (log)	-4.805***	-0.744**	-1.028***	-4.170***
	(0.765)	(0.360)	(0.171)	(1.352)
Hamlets	-0.266*	0.0846	-0.0322	-0.343**
	(0.152)	(0.073)	(0.043)	(0.157)
Segregation (sub-district)	10.94***	2.081	1.379*	6.767*
	(3.169)	(1.419)	(0.718)	(3.462)
Ethnic fractionalization (sub-district)	-8.081***	-2.468***	-1.729***	0.536
	(1.534)	(0.459)	(0.448)	(1.984)
Ethnic fractionalization (village	-10.29***	-2.869***	-2.223***	-0.223
	(1.796)	(0.522)	(0.539)	(2.674)
Poverty	6.125**	2.702***	-0.470	3.627*
	(2.419)	(0.922)	(0.711)	(1.918)
Rural	5.142***	1.742***	0.662*	2.678**
	(1.014)	(0.398)	(0.338)	(1.023)
Observations	1774	513	845	416

Notes: Each cell is a separate regression. Column 2 considers only the middle two quartiles of the distribution of villages, 11 to 18 villages. Standard errors in parentheses are clustered at the district level. Significance at * 0.1%, ** 0.05% and *** 0.01%.

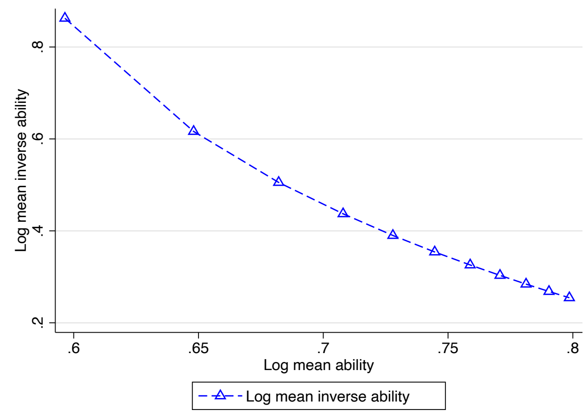
A.2 Additional equilibrium outcomes in the Tullock model

Figure A.3: Ability and alternative measures of competition

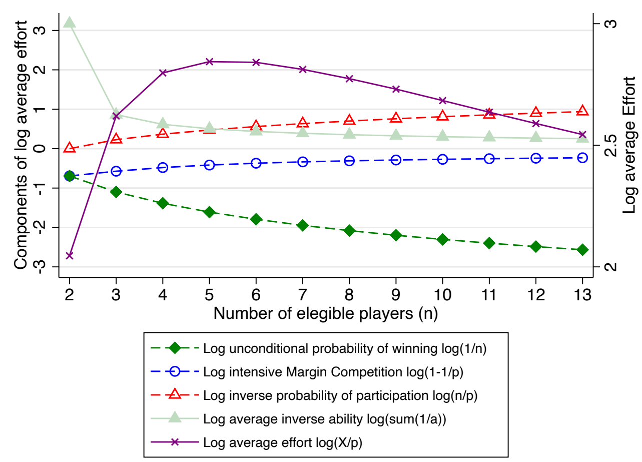
(a) Ability and probability of participation



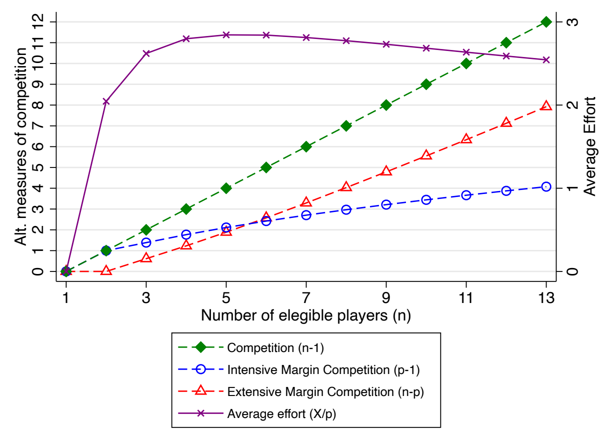
(b) Avg ability and average inverse ability



(c) Components of average effort



(d) Alternative measures of competition



Notes: The figures plot equilibrium outcomes in the model. Abilities a_i are drawn from a standard uniform distribution for all n eligible players with V fixed at 20. We average over 100,000 sets of simulations for each endogenously varied number of total players n. Average effort is plotted on the right vertical axis.

Table A.3: Regressions explaining equilibrium average effort

Panel (a): $n \in [1, 13]$

	(1)	(2)	(3)	(4)
Competition $(1 - 1/n)$	2.773***	0.912***	-1.790***	
	(0.412)	(0.170)	(0.167)	
Intensive Margin Competition $(1 - 1/p)$				4.821***
				(0.700)
Extensive Margin Competition $(1 - p/n)$				-1.747
				(0.982)
Observations	13	6	6	13

Panel (b): $n \in [1, 30]$

	(1)	(2)	(3)	(4)
Competition $(1 - 1/n)$	1.690**	2.606***	-14.78***	
	(0.746)	(0.462)	(0.506)	
Intensive Margin Competition $(1 - 1/p)$				5.759***
				(1.111)
Extensive Margin Competition $(1 - p/n)$				-3.757***
				(1.302)
Observations	30	15	15	30

Notes: The table shows OLS regressions where the dependent variable is equilibrium average effort (X/p) from our Tullock model in Section 4.2. Each observation corresponds to the model outcomes for a particular number of villages n. In Columns 1 and 4 we use the full sample, and in Columns 2 and 3 we split the sample at the median n to show that positive effects of competition are driven entirely by the initial part. Standard errors in parentheses are heteroskedasticity-robust. Significance at * 0.1%, ** 0.05% and *** 0.01%.

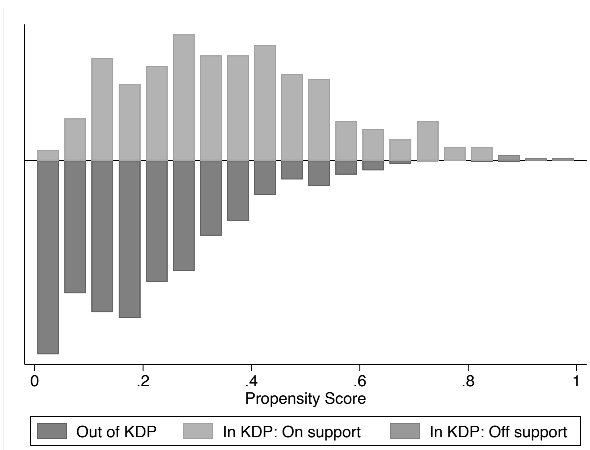
A.3 KDP and conflict: difference-in-differences robustness

Table A.4: Propensity of sub-districts to participate in the KDP

	(1)	(2)
Poverty index (SMERU)	4.312***	3.064***
	(0.835)	(0.747)
Share of rural villages	2.547***	2.867***
	(0.570)	(0.523)
Conflict pre-treatment	0.0467	0.0126
	(0.102)	(0.098)
Number of villages (log)	1.449***	1.476***
	(0.343)	(0.244)
Sub-district population (log)	0.429*	0.317*
	(0.223)	(0.178)
Ethnic fragmentation	0.961	0.405
	(1.059)	(0.647)
Observations	1774	2348

Notes: The dependent variable is a dummy of sub-district participation in the KDP. The logit regression serves to estimate the propensity score used for matching. In the first column, districts with splitting sub-districts over the sample period are dropped, while they are kept in the second column. Standard errors in parentheses are clustered at the district level. Significance at * 0.1%, ** 0.05% and *** 0.01%.

Figure A.4: Distribution of propensity scores



Notes: The graph plots the relative frequencies of the estimated propensity score for sub-districts in the KDP and outside the KDP. We also plot the four sub-district in the KDP that are off support at the far right tail.

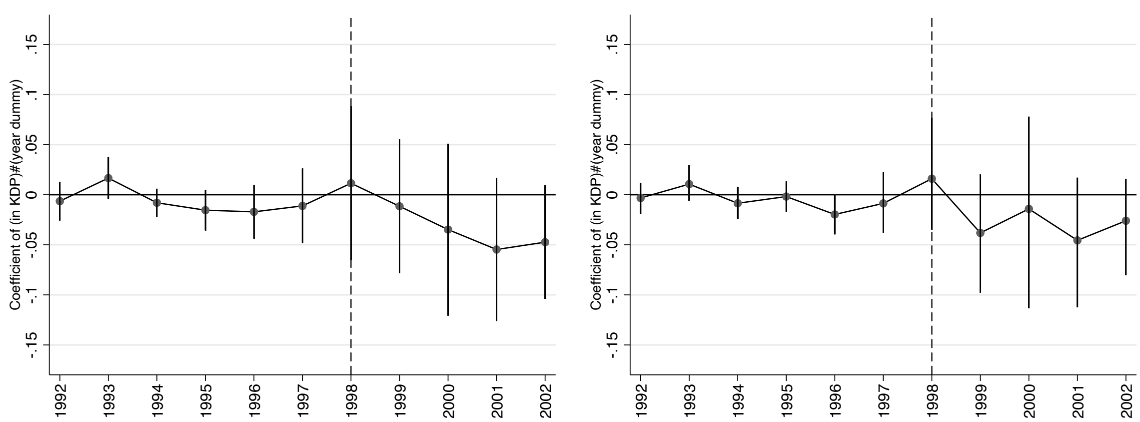
Table A.5: The Effect of KDP on Conflict: Matched Difference-in-Differences Estimates

	OLS (1)	PPML (2)
$Post \times KDP$	-0.0353 (0.028)	-0.219 (0.185)
Observations	21240	9024
Sub-district FE	Yes	Yes
Year FE	Yes	Yes
Mean outcome	0.0776	0.182
Sub-districts	1770	752
Sub-districts w/conflict	755	752
Share of sub-districts in KDP	0.237	0.226

Notes: The dependent variable is the total number of conflicts within a sub-districts. The results are based on a matching and difference-in-differences hybrid. The regressions are weighted with weights based on the estimated propensity scores as detailed in Section 6. Due to dropping sub-districts off the common support the number of sub-districts is 1770 compared to 1774 in Table A.1. Standard errors are block bootstrapped to account for the two-step matching and difference-in-difference procedure. Districts with splitting sub-districts over the sample period are dropped. The number of observations is lower in the PPML regression because sub-districts with constant conflicts over time are dropped.

Figure A.5: Event study: the impact of the KDP on conflict

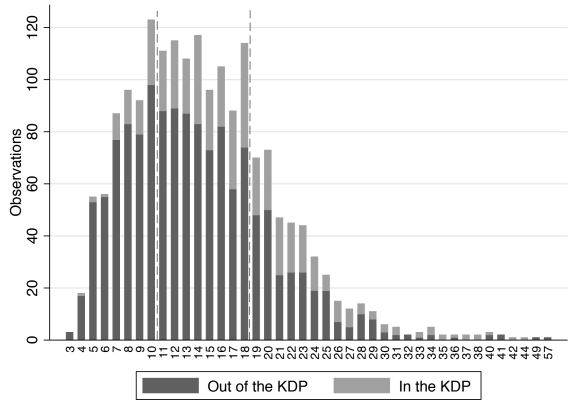
(a) Without matching (b) Including splits



Notes: These plots are based on a linear regression of the total number of conflicts by sub-district on a full set of event time indicators interacted with a dummy indicating the participation in KDP controlling for sub-district and year fixed effects. In the left panel, results are based on a difference-in-differences without matching. In the right panel results include districts were sub-districts split over the sample period, and are based on a matching and difference-in-differences estimator. The lines indicate 95% confidence interval, based on standard errors clustered at the district level, and in the right graph additionally block bootstrapped to account for the two step matching and difference-in-differences procedure.

A.4 Competition in the KDP and conflict: triple-differences robustness

Figure A.6: Distribution of the number of villages by quartiles



Notes: The graph shows the frequency of sub-districts by the number of villages within a sub-district. The dashed lines separates the bottom and the top quartiles from the two middle quartiles. The bottom quartile includes sub-districts with up to 10 villages, the middle quartiles include sub-districts with 11 to 18 villages and the top quartile includes sub-districts with 19 and more villages.

Table A.6: The effect of competition on conflict: triple-differences (robustness)

	Total		Within		Across	
	OLS	PPML	OLS	PPML	OLS	PPML
Panel A: Including splits and unadjusted NV						
	(1)	(2)	(3)	(4)	(5)	(6)
$Post \times KDP \times \log(NV)$	-0.0884*	-0.780**	-0.0834**	-1.005**	-0.00500	-0.355
	(0.050)	(0.365)	(0.039)	(0.441)	(0.018)	(0.501)
Observations	28176	12012	28176	9564	28176	5064
Sub-district FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean outcome	0.0801	0.188	0.0540	0.159	0.0261	0.145
Sub-districts	2348	1001	2348	797	2348	422
Sub-districts w/conflict	1001	1001	797	797	422	422
Share of sub-districts in KDP	0.247	0.228	0.247	0.232	0.247	0.209
Panel B: Matching hybrid						
	(1)	(2)	(3)	(4)	(5)	(6)
$Post \times KDP \times \log(NV)$	-0.0724	-0.884	-0.0670	-1.280*	-0.00541	-0.425
	(0.057)	(0.640)	(0.048)	(0.700)	(0.018)	(0.856)
Observations	21240	9024	21240	7212	21240	2952
Sub-district FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean outcome	0.0776	0.182	0.0544	0.160	0.0232	0.142
Sub-districts	1770	752	1770	601	1770	246
Sub-districts w/conflict	755	752	603	601	283	246
Share of sub-districts in KDP	0.237	0.226	0.237	0.231	0.237	0.232
Panel C: Restricted control group						
	(1)	(2)	(3)	(4)	(5)	(6)
$Post \times KDP \times \log(NV)$	-0.0896*	-1.154**	-0.0873**	-1.366**	-0.00239	-0.430
	(0.053)	(0.563)	(0.043)	(0.641)	(0.018)	(0.700)
Observations	19968	8496	19968	6840	19968	3180
Sub-district FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean outcome	0.0745	0.175	0.0514	0.150	0.0231	0.145
Sub-districts	1664	708	1664	570	1664	265
Sub-districts w/conflict	708	708	570	570	265	265
Share of sub-districts in KDP	0.255	0.243	0.255	0.246	0.255	0.230

Notes: The dependent variable is as indicated the total number of conflicts within a sub-districts, the number of within-village conflicts, or the number of across-village conflicts. Regressions include all lower order interaction terms. In Panel A, compared to the main Table (3), the number of villages are *not* adjusted as outlined in Section 4.3, and districts with splitting sub-districts over the sample period are included, and the number of splits is included as control variable. In Panel B, compared to the main Table (3), this is a matching and triple-differences hybrid, where results are based on weighted regressions, where weights are based on the estimated propensity score as detailed in Section 6, and standard errors in parentheses are block bootstrapped to account for the two-step matching and triple-differences estimation. In Panel C, compared to the main Table (3), we only include provinces that contain sub-districts in and out of the KDP. Standard errors in parentheses are clustered at the district level. The number of observations is lower in the PPML regressions because sub-districts with constant conflicts over time are dropped. Significance at * 0.1%, ** 0.05% and *** 0.01%.

Table A.7: The effect of competition on conflict: triple-differences (*further controls*)

Panel A: Total conflicts

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Post \times KDP$	-1.004*	-1.301*	-1.019*	-1.105**	-1.199**	-1.162*	-1.126**	-1.071*
$\times \log(NV)$	(0.552)	(0.668)	(0.565)	(0.554)	(0.604)	(0.626)	(0.563)	(0.599)
$Post \times KDP$	-0.457							
$\times \log(POP\_s)$	(0.375)							
$Post \times KDP$		-0.307						
$\times \log(POP\_v)$		(0.373)						
$Post \times KDP$			0.175*					
$\times HAM$			(0.090)					
$Post \times KDP$				-1.502				
$\times ESEG\_s$				(1.227)				
$Post \times KDP$					-0.383			
$\times ED\_s$					(1.577)			
$Post \times KDP$						0.237		
$\times ED\_v$						(2.367)		
$Post \times KDP$							1.372	
$\times POV$							(1.702)	
$Post \times KDP$								2.120**
$\times RUR$								(0.896)
Observations	9060	9060	9060	9060	9060	9060	9060	9060

Panel B: Within-village conflicts

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Post \times KDP$	-1.378**	-1.746**	-1.198*	-1.420**	-1.547**	-1.509**	-1.508**	-1.526**
$\times \log(NV)$	(0.644)	(0.834)	(0.648)	(0.650)	(0.681)	(0.710)	(0.669)	(0.722)
$Post \times KDP$	-0.387							
$\times \log(POP\_s)$	(0.467)							
$Post \times KDP$		-0.416						
$\times \log(POP\_v)$		(0.485)						
$Post \times KDP$			0.251***					
$\times HAM$			(0.094)					
$Post \times KDP$				-0.794				
$\times ESEG\_s$				(1.648)				
$Post \times KDP$					-0.872			
$\times ED\_s$					(1.736)			
$Post \times KDP$						-0.392		
$\times ED\_v$						(2.905)		
$Post \times KDP$							3.858*	
$\times POV$							(1.975)	
$Post \times KDP$								3.201***
$\times RUR$								(1.152)
Observations	7236	7236	7236	7236	7236	7236	7236	7236

Panel C: Across-village conflicts

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Post \times KDP$	-0.0192	-0.434	-0.213	-0.220	-0.136	-0.161	-0.320	-0.0486
$\times \log(NV)$	(0.713)	(0.746)	(0.649)	(0.697)	(0.789)	(0.782)	(0.707)	(0.662)
$Post \times KDP$	-0.785							
$\times \log(POP\_s)$	(0.558)							
$Post \times KDP$		-0.128						
$\times \log(POP\_v)$		(0.692)						
$Post \times KDP$			-0.00686					
$\times HAM$			(0.181)					
$Post \times KDP$				-2.309				
$\times ESEG\_s$				(1.839)				
$Post \times KDP$					1.099			
$\times ED\_s$					(1.837)			
$Post \times KDP$						1.706		
$\times ED\_v$						(2.404)		
$Post \times KDP$							-4.059*	
$\times POV$							(2.127)	
$Post \times KDP$								0.346
$\times RUR$								(1.278)
Observations	3396	3396	3396	3396	3396	3396	3396	3396

Notes: The dependent variable is indicated in each panel. Shown are estimates from PPML regressions including all lower order interaction terms. The number of villages NV are adjusted as described in Section 4.3. POP_s is sub-district population, POP_v average village population, HAM the average number of hamlets within villages, $ESEG_s$ ethnic segregation within sub-districts, ED_s ethnic fractionalization within sub-districts, ED_v average within-village ethnic fractionalization, POV is poverty (SMERU, 2004) and RUR is a rural indicator. All regressions include sub-district and year fixed effects and standard errors in parentheses are clustered at the district level. Significance at * 0.1%, ** 0.05% and *** 0.01%.

A.5 Nonlinear effects of competition in the KDP and conflict: triple-differences robustness

Table A.8: The non-linear effects of competition: triple-differences (*unadjusted* NV and *including splits*)

	OLS				PPML			
	All Q	Q1	Q2-Q3	Q4	All Q	Q1	Q2-Q3	Q4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Post \times KDP$	-0.0760***	0.0772	-0.272**	0.00246	-0.755***	0.646	-2.887**	0.0655
$\times \log(NV)$	(0.026)	(0.144)	(0.111)	(0.078)	(0.291)	(1.840)	(1.256)	(0.867)
Observations	18551	3913	8268	6370	18551	3913	8268	6370
Village FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
P-value Δ to Q1	-	-	0.057	-	-	-	0.114	-
P-value Δ to Q4	-	-	0.073	-	-	-	0.062	-
Mean outcome	0.0881	0.0917	0.0871	0.0873	0.0881	0.0917	0.0871	0.0873
Villages	1427	301	636	490	1427	301	636	490
Villages w/conflict	1427	301	636	490	1427	301	636	490
Share of villages in KDP	0.243	0.120	0.223	0.345	0.243	0.120	0.223	0.345

Notes: The regressions are at the village level and the dependent variable is the number of within-village conflicts. We only include villages with at least one conflict over time. The regressions are run for the whole sample (All Q), for the bottom quartile Q1 (≤ 10 villages), the two middle quartiles Q2-Q3 (11 to 18 villages), or the top quartile (≥ 19 villages). Regressions include all lower order interaction terms. Compared to the main Table (4), the number of villages are *not* adjusted as outlined in Section 4.3, and districts with splitting sub-districts over the sample period are included, and the number of splits is included as control variable. The number of villages are adjusted as described in Section 4.3, and the quartiles are redefined accordingly. Standard errors in parentheses are clustered at the district level. Significance at * 0.1%, ** 0.05% and *** 0.01%. P-value Δ indicates the p-value for the difference in the coefficients between the Q2-Q3 Column and the Q1 or Q4 Column. This is the p-value associated with a quadruple interaction of our triple interaction term with a dummy for Q2-Q3 in a stacked regression of Q2-Q3 villages and either Q1 or Q4 villages, with all variables (and fixed effects) interacted with a dummy for Q2-Q3 villages.

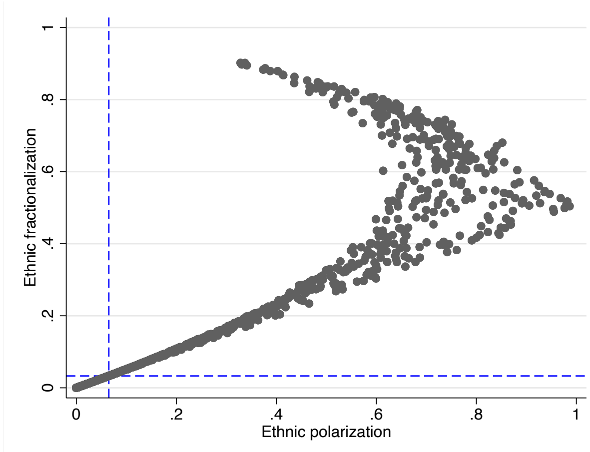
Table A.9: The non-linear effects of competition: triple-differences (*sub-district level*)

	Within				Across			
	All Q	Q1	Q2-Q3	Q4	All Q	Q1	Q2-Q3	Q4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Post \times KDP \times \log(NV)$	-1.466**	-5.856	-4.599***	4.054*	-0.315	7.611	-3.147*	-0.583
	(0.646)	(13.047)	(1.586)	(2.346)	(0.694)	(16.642)	(1.768)	(3.926)
Observations	7236	1536	3840	1860	3396	984	1644	704
Sub-district FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean outcome	0.160	0.146	0.183	0.123	0.145	0.153	0.153	0.128
Sub-districts	603	128	320	155	283	82	137	64
Sub-districts w/conflict	603	128	320	155	283	82	137	64
Share of sub-districts in KDP	0.232	0.0938	0.222	0.368	0.216	0.0854	0.226	0.359

Notes: These PPML regressions are at the sub-district level and the dependent variable is the number of within-village or across-village conflicts as indicated. The regressions are run for the whole sample (All Q), for the bottom quartile Q1 (≤ 10 villages), the two middle quartiles Q2-Q3 (11 to 18 villages), or the top quartile (≥ 19 villages). Regressions include all lower order interaction terms. The number of villages are adjusted as described in Section 4.3, and the quartiles are redefined accordingly. Districts with splitting sub-districts over the sample period are dropped. Standard errors in parentheses are clustered at the district level. Significance at * 0.1%, ** 0.05% and *** 0.01%.

A.6 Ethnic fractionalization, polarization and segregation

Figure A.7: The relationship between ethnic fractionalization and polarization

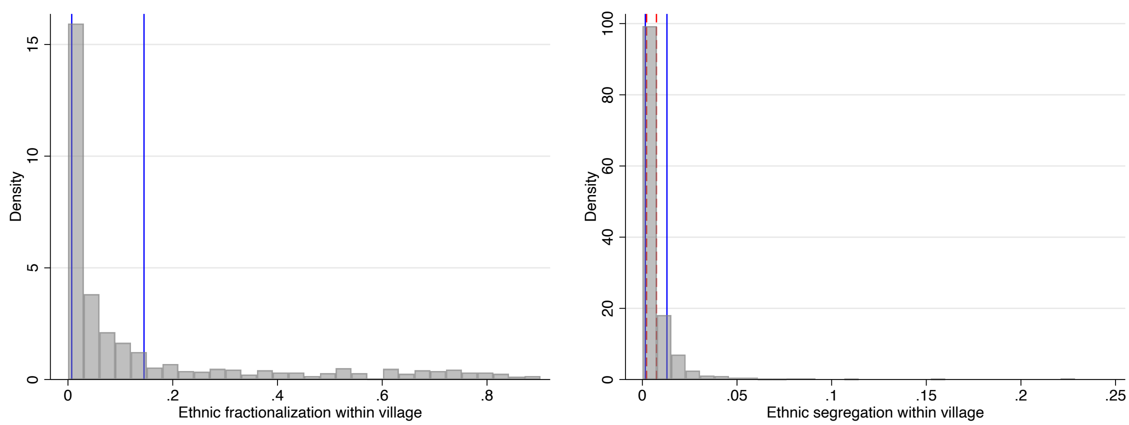


Notes: The graph plots within-village ethnic fractionalization and polarization in the sample used for estimation. The dashed lines indicate the median on each dimension.

Figure A.8: Distribution of within-village ethnic fractionalization and segregation

(a) Ethnic fractionalization within-village

(b) Ethnic segregation within-village

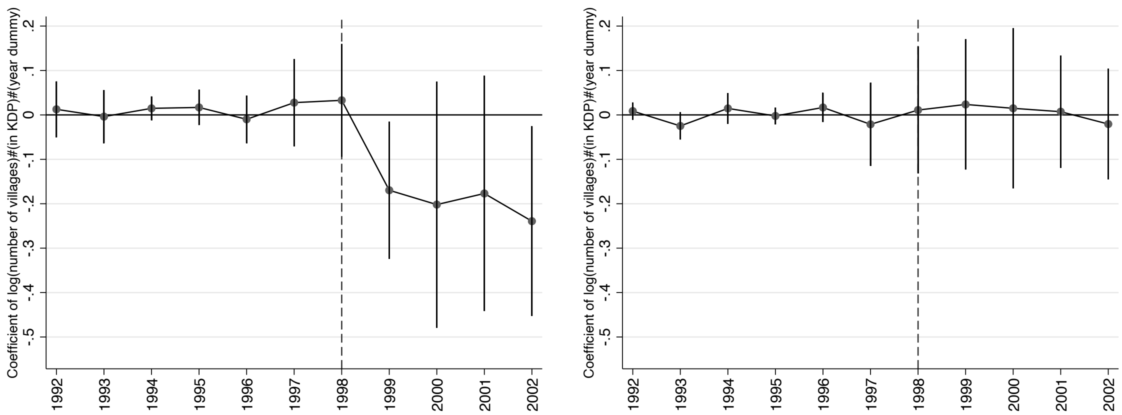


Notes: Panel (a) shows the histogram of within-village ethnic fractionalization for all villages in the sample used for estimation. The two blue vertical lines mark the median of the bottom half and the median of the top half villages. Panel (b) shows the histogram of within-village ethnic segregation for all villages in the sample used for estimation. The two blue vertical lines mark the median of the bottom quarter and the median of the top quarter of villages. The red dotted lines mark the median of the bottom half and the top half of villages. This shows that using a median sample split for fractionalization provides reasonable heterogeneity across groups, but for ethnic segregation a median sample split generates two groups where most of the villages are similar in terms of segregation. This is why we use the bottom and top quartile in therms of segregation for heterogeneity analysis.

Figure A.9: Event study (triple-differences): the impact of competition in KDP on conflict within villages by average village level ethnic fractionalization

(a) High ethnic fractionalization

(b) Low ethnic fractionalization



Notes: The plots are created by a linear regression of the number of conflicts by sub-district on a full set of event time indicators interacted with a dummy indicating the participation in KDP and the log of the number of villages. The graph plots the coefficients of these triple interaction terms. We control for sub-district and year fixed effects. High ethnic fractionalization is defined as sub-districts with an above median level of the (weighted) average of within-village fractionalization. The lines indicate 95% confidence interval, based on standard errors clustered at the district level. Results exclude districts were sub-districts split over the sample period.

A.7 Using alternative conflict data

Table A.10: Competition and conflict: Using NVMS data

	PPML (Q2-Q3)					
		Ethnic fract.		Winners/losers/non-participants		
	All	Low	High	Winners	Losers	Non-par.
	(1)	(2)	(3)	(4)	(5)	(6)
$KDP \times \log(NV)$	-1.713	0.201	-3.160	-2.723	-1.892	2.463
	(2.253)	(1.914)	(2.432)	(2.266)	(2.864)	(2.596)
Observations	15170	4358	7987	13685	12535	13130
Province X Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean outcome	0.0522	0.0289	0.0762	0.0553	0.0554	0.0544
Villages	3034	1129	1679	2737	2507	2626
Villages w/conflict	370	87	246	343	314	325
Share of villages in KDP	0.203	0.315	0.184	0.117	0.0355	0.0792

Notes: The regressions are at the village level and the dependent variable is the number of within-village conflicts from World Bank (2016). There is no pre-period in this data. We only include villages with at least one conflict over time. The regressions are run for the the two middle quartiles Q2-Q3 (11 to 18 villages). Regressions include all lower order terms. All regressions include the out of KDP control group and province by year fixed effects. In Columns (2) and (3), the regressions are run separately for high (top half) and low (bottom half) ethnic fractionalization. In Columns (4) to (6), regressions are run separately to include only the KDP villages that also won funding (4), the winners, to include only KDP villages that submitted a proposal but were not awarded funding (5), the losers, or to include only KDP villages that did not put forward a proposal (6), the non-participants ("Non-par.") as "treated" villages. The number of villages are adjusted as described in Section 4.3. Districts with splitting sub-districts over the sample period are dropped. Standard errors in parentheses are clustered at the district level. Significance at * 0.1%, ** 0.05% and *** 0.01%.