Decentralizing Development:
Allocating Public Goods via Competition [*]

Larry Chavis
Economic Analysis and Policy
Stanford Graduate School of Business
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Abstract: Decentralizing the allocation of public goods by giving funds directly to communities takes advantage of local information concerning needs, but decreases the accountability over how funds are used; leaving funds open to misuse or capture by local elites. In Indonesia, the World Bank attempts to overcome this downside of decentralized allocation by having communities compete locally for block grants. Competition weeds out less efficient projects. Doubling the number of villages bidding leads to an 18% decline in road construction costs. Microcredit gives a measure of the diversion of funds, since in the initial phase of this program microcredit involved little monitoring and low repayment rates. Competition reduces the funds allocated to microcredit. Hence competition between localities for development funds has a significant impact on efficiency.

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How should local public goods be allocated? There are drawbacks to both central and decentralized allocation. Making the decision centrally risks supplying the wrong mix of public goods, given the center's lack of information about local needs. Decentralizing decision-making by transferring funds to local decision-makers and letting them choose the mix of public goods runs the risk of some funds being lost to misuse. Projects may be undertaken that benefit only a select few in the community rather than the whole; in the extreme, funds may be lost to corruption. This downside of decentralization is especially prevalent in developing countries, where local leaders are often subject to little accountability. This paper investigates a mechanism for the decentralized allocation of local public goods that is designed to prevent the misuse of funds by having localities compete against one another for funding.

In Indonesia, the World Bank has tried to solve the agency problem in its Kecamatan (Subdistrict) Development Project (KDP) by having local villages compete against one another for funding. The idea is to encourage villages to use their local information to weed out less efficient projects. The goal of this research is to assess how well this competition-driven local monitoring increases efficiency. The effect of competition on efficiency is important not only because it raises interesting economic questions, but also because of the magnitude of funding devoted to community driven development (CDD) programs. KDP has funneled almost one billion dollars down to more than 20,000 villages in less than a decade, and currently accounts for almost half of the World Bank's lending to Indonesia. This is part of a larger trend in which the World Bank doubled its lending for CDD between 1996 and 2003 to $7 billion; almost 40% of its total lending in 2003 (see Mansuri & Rao, 2004).

There are two methodological challenges to identifying the causal effects of competition on efficiency: identifying a source of exogenous variation in the degree of competition and

constructing a measure of efficiency. Exogenous variation in competition is embedded in the structure of KDP, with villages competing for funding from block grants at the subdistrict level.[1] There is little variation in the size of the block grants, but considerable variation in the number of villages in a subdistrict. There are instances of 3 villages competing to divide $125,000, and 72 villages competing for $125,000. While these are the extremes, the level of competition almost doubles over the inner quartile range of the data. I will demonstrate that such changes in the level of competition affect participants' behavior. This variation in the number of villages in a subdistrict also provides for clean identification of the level of competition for development resources.

A key source of inefficiency in KDP is elite capture. This capture can take place through the outright theft of funds, the over-invoicing of goods or services, the allocation of microcredit funds to friends and family, or a variety of other illicit schemes. The secretive nature of elite capture makes measurement difficult. I propose two novel strategies for measuring the amount of elite capture in KDP. I use the per unit costs of road projects and the amount of funding allocated to microcredit at the subdistrict level to measure changes in efficiency. The decline of the cost per square meter of road projects as competition increases is one indication of behavior being changed by competition. Doubling the amount of competition (e.g. from 8 to 16 villages in a subdistrict) reduces the per unit cost of roads by 18%. At the very least, the reduction in costs restricts the amount of funds available to be captured by local elites. The amount of subdistrict funds allocated to microcredit projects is also used as an indication of the level of elite capture. Microcredit projects are identified by many KDP observers as, on average, the least desirable types of projects carried out in the initial phase of KDP because of a lack of sound

[1] The levels of Indonesian government are province (*propinsi*), district (*kabupaten*), subdistrict (*kecamatan*) and village (*desa*).

lending principles and very low repayment rates. Microcredit produced high levels of elite capture with money often being divided between village heads and their friends and families (Holloh, 2001). Because of the inefficiency with which the microcredit funds where used I employ them as proxies for inefficiency and elite capture. I interpret the decline in the percentage of subdistrict funding allocated to microcredit as competition increases as a key sign of the ability of competition to reduce elite capture.

A number of empirical studies have looked at how well community-level development projects meet the needs of local communities. Alderman (2002) finds that local communities in Albania use their informational advantage to better target funds to poor households. Using time series data from India, Foster and Rosenzweig (2004) show that democratically elected officials can make local governments more responsive to the needs of the poor. However, these local effects may be outweighed by biases in the allocation of money by the center to local communities (see Bardhan & Mookherjee, 2005). Yet, the center is not to blame for all missteps as income inequality and ethnic heterogeneity have been found to decrease accountability and increase the amount of elite capture in local communities (see Galasso & Ravallion, 2005; Olken, forthcoming).

The empirical analysis in this study is closely related to a theoretical model of elite capture constructed by Bardhan and Mookherjee (2003). They show that when grants are given directly to local communities, any amount provided above the threshold necessary to complete a main infrastructure project is likely to be captured by local elites. I observe similar behavior in KDP. Bardhan and Mookherjee do not deal with how competition might affect the use of such extra funds. Olken (2005) also examines elite capture in road projects in KDP. In an experimental setting of 600 villages, Olken finds that increased auditing decreases the amount of

theft in road projects. I contend that competition has a similar effect to auditing, although instead of adjusting their behavior in anticipation of the auditor, village leaders adjust their behavior in response to one another.

This research also finds that community participation can have an impact on elite capture, although the impact is much more substantial in the case of roads than in the case of microcredit. This lends some credence to the idea that decreases in the elite capture variables are caused by the increased scrutiny and focus on quality that competition provides. Overall this research is not only about the effects of competition, or even participation, on elite capture; it is a lesson in how behavior is sensitive to the incentives embedded in organizational design. KDP provides a clear example of changes in institutional parameters altering the choices of its participants.

The outline of the paper is as follows: Section 2 outlines the practical and theoretical aspects of competition, including a framing of the mechanism through which competition affects elite capture. Sections 3 and 4 provide an overview of KDP and the data used in this research. Section 5 shows that the incentives for increasing efficiency and reducing elite capture are greater when there is increased competition between villages. Sections 6 and 7 discuss the reduction of elite capture through increased competition. Section 8 concludes.

Section 2: Competition in KDP

Competition can affect elite capture in KDP at two levels: the subdistrict level and the village level. At the subdistrict level, competition affects how the inter-village councils allocate funding and the quality of the projects that receive funding. When there are only a few villages in a subdistrict, the villages tend to simply divide the funds among themselves with little

emphasis on the characteristics of proposed projects or the needs of the individual villages. As the number of villages in a subdistrict increases, ceteris paribus, there are fewer resources available per village. Thus the process of allocating resources to villages becomes more difficult as the number of villages increases, in part because minimum project sizes imposed by the KDP guidelines prevent funds from simply being divided when there many villages in a subdistrict.

When there is increased competition, and thus equal division of funds becomes more difficult, the inter-village councils must decide upon allocation rules. This is illustrated in the most basic of summary statistics. In the lowest quartile of competition (9 or fewer villages in a subdistrict), 83 % of the proposals are approved; in the highest quartile of competition (17 or more villages in a subdistrict), only 50% of the proposals are approved. Similarly in the lowest quartile, 96% of villages receive some funding, while only 68% do in the highest quartile. Increasing competition forces inter-villages councils to decide which villages and projects will not receive funding.

As I will show below empirically, when competition is high, inter-village councils are more likely to follow the guidelines put forth by the World Bank in allocating funding. The increased focus on these guidelines can be viewed as an attempt by the inter-village council to better screen the projects. Yet an increased focus on quality would not necessarily be the expected outcome of competition. Increased competition could bring about collusion or harm certain villages, such as religious or ethnic minority villages, that are less powerful in the subdistrict. Surprisingly, given the recent unrest in Indonesia, this research finds no negative effects on these disadvantaged groups in terms of the amount of funding awarded to them by inter-village councils.

The increased emphasis on project quality at the subdistrict level brought about by competition also affects the quality of the projects proposed by the villages. For competition to have an effect on the decisions made by village leaders, project characteristics must matter under high competition. If project characteristic are not important then there is no incentive for village leaders to improve the quality of their projects (Evers, 2001). Under conditions of high competition, village leaders must make the trade-off between the probability of getting the project approved and the direct benefit of the project to themselves. Thus at low levels of competition, when the probability of a given project being approved is high, we would expect to see lower quality projects approved with more elite capture. Such a trade-off is seen in the comment of one World Bank reviewer of KDP who writes that elite capture will be lower in KDP "when the subdistrict facilitator has done a good job in convincing all project participants that the KDP process is indeed competitive and that only good-quality, cost-effective proposals will be funded"(Woodhouse, 2002p. 49).

Without empirical evidence it is not evident that a village leader would choose higher quality when there is more competition. Competition increases the importance of project quality, but it also decreases the expected payout to any given village. If the cost of increasing project quality is higher than the increase in expected funding, then village leaders will choose not to improve the quality of their projects. This is similar to the effect of product market competition on a manager's behavior as outlined theoretically by Schmidt (1997). On the one hand, increasing competition can push the manager to reduce costs, since reducing costs reduces the probability the firm has to be liquidated, a probability that was increased by rising competition. On the other hand, increased competition reduces profits which may affect the value of a cost reduction. A manager only undertakes the effort to reduce costs if the benefits outweigh the cost

of effort. That the data show decreases in elite capture, and therefore increases in quality, may be a result of the low costs of increasing quality. This empirical effect of competition on elite capture will be examined further after discussing the design of KDP and the data used in this research.

Section 3: Overview of KDP

The first phase of KDP began in 1998 and had completed five yearlong cycles by early 2005. The program began small but by 2001 had fully scaled up to cover 15,481 villages in 984 subdistricts. Today KDP covers almost 28,000 villages with a beneficiary population of over 35 million. Subdistricts participate in KDP for three consecutive years before rotating out. The goal of the World Bank is to include all of Indonesia's nearly 70,000 villages in KDP or similar projects at some point. KDP planning and loans to the government of Indonesia are carried out in phases. KDP is currently in its third phase of funding with fine-tuning of the KDP process occurring from phase to phase. The first two phases were three years each and the third is scheduled to be two years. For consistency and because of the limitations of the data, the bulk of the statistics and facts given in this paper deal with year 3 of phase one, the first year of KDP at full scale. If other phases or years are referred to it will be noted.

Block grants are award to subdistricts according to their populations based on the criteria in table 1 from Wong (2003). Almost 60% of the subdistricts receive the $125,000, while most of the remaining subdistricts received a grant of $93,750. Only 10 of the nearly 1,000 subdistricts qualified for the $43,750 level of funding. Thus there were essentially only two levels of grant funding to the subdistricts. This coarseness was smoothed out slightly in phase two when an additional funding level of $62,500 was added. There is considerably more

variation in the number of villages in a subdistrict than in the amount of the block grants, as is seen in figure 1. As stated above, the level of competition nearly doubles over the inner quartile range while conversely the expected allocation per village drops by half. Changes in the level of competition are even larger in the outer quartiles.

The planning of village projects begins in the village neighborhoods or hamlets. Villages are a formal government structure that often consists of multiple hamlets, nearly 4 on average in the KDP villages. Hamlets can be several kilometers apart and there can be significant variance in standards of living between hamlets (Evers, 2000). In each village there are KDP-trained facilitators responsible for informing villages about KDP projects and organizing meetings to plan village projects. A village-wide meeting is held to decide which projects should be presented to the subdistrict's inter-village council. This process is overseen and guided by KDP social and technical staff at the subdistrict and higher levels of administration.

Villages select a group of projects to present to the inter-village council. Project choice is based on an "open menu," with only a small list of prohibited projects like "paying officials salaries, purchasing weapons, planting tobacco, buying pesticides, etc" (Guggenheim, 2003p. 4). The vast majority of the projects are related to roads, bridges, irrigation and microcredit. Each project proposal contains the nature of the project, a request for an amount of KDP funding, a rupiah amount for the village's own contribution of money, labor or supplies to the project, and estimates of how many men, women, and poor will benefit from the project. Projects (which can be of various types) are then bundled together into a proposal and compete with the proposals from other villages. Proposals range from a minimum of $4,375 to a maximum of $18,750 (Wong, 2003). Villages are allowed to submit 2 proposals; however, the second proposal must be suggested by a group of women from the village.

Once villages have submitted their proposals, a team of community leaders and technical staff examine the technical and economic feasibility of the projects. This "verification team" can only make recommendations for project improvement but can not reject projects. The verification teams focus on the following set of questions:

> Are the projects economically feasible?
>
> Do proposals benefit large numbers of people, especially the poor?
>
> Do proposals meet project requirements, including, for example, maintenance plans for infrastructure or repayment plans for economic projects?
>
> Did people genuinely participate in formulation of proposal ideas?
>
> Do people contribute labor, materials or money?
>
> (National Management Consultants, 1999 Appendix p. 5)

The recommendations of the verification team are reviewed by a district level engineer. This review process is intended to be a basis for the discussions of how the subdistrict funds will be allocated.

The village head, an additional village officer and three other village representatives from each village in a subdistrict meet to decide which projects will receive funding. The phase 2 KDP (and this appears to hold for phase 1) operations manual suggests that the meeting attendees break into groups with a representative from each village in the group.[2] Each of the groups ranks each of the proposals. The rankings are then summed across the groups and used as a final ranking for the proposals. Funding is awarded based on this final ranking. Borda rules of this sort generally suffer from a lack of independence of irrelevant alternatives and thus are

[2] It seems that there was some experimentation with how to facilitate project selection in phase one with this method finally being settled on.

subject to gaming. However this does not seem to be crucial in this case since the initial ranking by small groups is reached after debate by representatives from all the villages.

A significant aspect of this process is promoting transparency through community participation. There are avenues to anonymously report cases of corruption in the villages and by making information about projects public it is hoped that local officials can be held accountable. Thus despite my current focus on the issue of elite capture in KDP and Olken's finding of significant graft in KDP road construction, the effort to reduce corruption in KDP has been somewhat successful. In phase one, out of the "nearly 1,400 cases of financial abuse" reported "most or all of the money was recovered" in almost half of the cases (Guggenheim, 2003 p. 31). While this is a small fraction of the total number of projects, this is nevertheless significant in the Indonesian context. Woodhouse (2002) sees the most significant sign of corruption being lower than the norm in Indonesia is that the costs of KDP projects are lower than non-KDP projects. KDP makes a concerted effort to give money directly to the villages to minimize the "grabbing hands" involved in the distribution of funds. Also the money is released to the villages in phases and each release requires multiple signatures of village and KDP officials. Below I will show that competition between villages is another KDP innovation that reduces elite capture.

While the focus of this research is on the more tangible output of KDP, infrastructure and microcredit projects, the World Bank has more far reaching goals for the programs. The core idea of KDP is not only to make elite capture more difficult but to change the cultural and political environments that make elite capture possible. By having citizens participate in the planning of local projects, the World Bank hopes that all villagers, especially women and the poor, will learn to participate in other vital aspects of village decision-making. Scott

Guggenheim, a key member of the team responsible for conceiving of and implementing KDP, writes, "KDP's underlying premise has been that villagers learn about democracy by practicing it" (2003 p. 37). That I find elite capture decreasing as the level of participation increases gives some indication that some impact is being made in this area.

Section 4: Data

The primary source of data for this research is a set of records supplied by the World Bank that cover the first 5 year-long cycles of KDP. These are basically the same records that the Bank uses for its macro-level internal monitoring of the program. As such they provide significant insight into KDP. The main part of the data used for this research is data on projects that villages proposed. The data contains project type (broken into over 70 categories), amount of funding requested, number of men, women and poor that will receive benefits from the project, the village's voluntary contribution, type of village group than proposed the project (men, women, or mixed), the amount of funding the project received, village location, and the amount of the block grant to the subdistrict. These records are available for more than 12,000 villages and 40,000 projects in each of the two years that are the focus on this research. For more on the size of the data set, see table 2 and the appendix. The data also has information on the meetings that occur throughout the year-long KDP cycle such as the attendance at the inter-village meetings and comments by subdistrict facilitators on their impressions of the meetings.

To facilitate an analysis of what projects were carried out, I aggregated the 72 different types of projects into 8 categories. An overview of the funding distribution across these categories is given in table 3. The largest projects, roads, tend to be more than twice the size of the smallest project, microcredit schemes. Also, almost half the funding is allocated to roads,

with roads receiving an even larger percentage of funding than is requested. Thus roads tend to fair better in the inter-village meeting than microcredit. Microcredit represents 22.6% of the funding requested, but only 17.9 of the funding allocated, a twenty percent decrease. It should also be noted that projects proposed by groups of women tend to be different than those proposed by the entire communities or men's groups. Women have traditionally been the recipients of microcredit and that is reflected here. Also women's projects tend to be more concentrated in public toilets, schools and water than those from male or mixed groups.

In order to aid in the analysis of elite capture these World Bank records were supplemented with two village censuses (PODES 2000 and 2003) carried out by Indonesia's Central Bureau of Statistics. These censuses cover all of Indonesia's *desas* (rural village) and *kelurahans* (urban administrative equivalent of a village). They cover a wide range of topics such as topographical characteristics, population, housing, education, health, social institutions, transportation, land usage and village economy.

Table 4 gives an overview of some the of key village demographic characteristics used in this research. Overall the villages are more similar within subdistricts than between them. However for People's Credit Banks, junior high schools and doctor's offices, all of which could serve multiple villages, there is more than twice as much variation within than between subdistricts. Thus we might expect these to be useful proxies for which villages within a subdistrict are more influential. An indicator variable for village heads having a high school education or higher also yields higher within correlation than between correlation. The village head's level of education could provide a strong sign of both a village's ability to plan projects but also the village head's ability to lobby for funding relative to other villages within in a subdistrict. The presence of *arisans* and village cooperatives give some idea of the level of

social capital in a village. An *arisan* is a rotating savings and credit group in which its members contribute a fixed amount during each meeting and draw lots to see who wins that week's pool. During a cycle all members will win once. *Arisans* are important in maintaining social ties as well as providing access to credit. The existence of such social institutions could be utilized in a village to help prepare proposals for KDP, especially microcredit projects.

The key independent variable in this analysis is the number of villages in a subdistrict. As such, its exogeneity is a prime concern. That subdistricts are Indonesian administrative units largely created 30 years ago or more erases much of this concern. Indonesian administrative boundaries appear to have been drawn largely based on geographical and population considerations (see Fitrani, Hofman, & Kaiser, 2005; Kato, 1998). Such considerations will be controlled for in the regression analysis. Another concern along these lines is that since 1999 there has been a sharp increase in the number of local administrative units due to new decentralization laws in Indonesia. The number of subdistricts across Indonesia increased by 20% between 1999 and 2002. However the impact of this on KDP seems to have been minimal. The average number of villages per subdistrict in KDP remained practically constant during this period (see table 11).

This analysis also rests on the number of villages per subdistrict being uncorrelated with any unobservable village or subdistrict characteristics. Table 5 offers some support for this assumption. Table 5 compares a few key village characteristics for villages above and below the median number (13) of villages per subdistrict. A key difference between these two sets of villages is that when there are fewer villages in a subdistrict they tend to be about 30% larger on average. The means of all other variables are within 10% of one another. Thus since the two groups of villages have similar observable characteristics, then it is more plausible that they also

have similar unobservable characteristics. Another stylized fact that supports the claim of exogeneity is that for each of the demographic variables the amount of variation within the level of competition (the number villages in a subdistrict) is greater than the variation between levels of competition. Levels of competition tend to host a variety of overlapping types of villages.

Section 5: Inter-village resource allocation

Competition increases the emphasis on project characteristics

For competition to impact project quality, project characteristics must affect the probability of receiving funding. Project characteristics need to matter in order to provide incentives for village leaders to improve the quality of their proposed projects. If funding were distributed solely on the basis of fixed village or village head characteristics, then there would be no incentive for village heads to improve the quality of their projects.

To determine if project characteristics matter in the allocation of funding, I model a village's funding allocation as based on project, village and subdistrict characteristics.[3] In addition, a fixed effects model is used to capture the allocation of funding at the subdistrict level. The form of the model is as follows:

$$\text{Village Allocation}_{ij} = \beta_1 \bullet \text{Project Characteristics}_{ij} + \beta_2 \bullet \text{Village Characteristics}_{ij} + \beta_3 \bullet \text{Subdistrict Characteristics}_j + \text{Subdistrict Fixed Effect}_j + u_{ij}$$

[3] Total village allocation is used as the dependant variable rather than project level allocations because in the data projects and proposals are not well defined. Under World Bank guidelines villages can bundle various projects (roads, irrigation, microcredit, etc.) together as proposals, with each village making up to two proposals at the inter-village meetings. Proposals are supposed to be evaluated and allocated funding as a whole. However in 42% of the subdistricts the allocations are made at the project level with some projects being accepted and rejected within the same proposal. This makes it more appropriate to use the village rather than the project or proposals as the proper level of observation.

The main project characteristics that I observe in the data are the total funding requested by the village, the percentage of funding contributed by the village to the proposed projects, and the average number of poor people that purportedly benefit from each of the projects. There are also indicator variables for each of the types of projects proposed. If project characteristics are considered in a manner suggested by KDP guidelines, one would expect village allocation to be increasing the amount of the voluntary contribution and the number of poor people aided. Again since the focus is on the distribution of funds at the inter-village meetings, these effects are measured relative to the other villages in a subdistrict in the fixed effects model.

In addition to these project characteristics there are many other factors that could play a role in the distribution of funds in the inter-village meetings. Poorer villages might be expected to receive more funding if the goal is to target poverty, while from an efficiency point of view funds might be channeled to the more productive villages. The electrification variable serves as a proxy for productivity as discussed in the appendix. However from a socio-political point of view these more developed villages may be able to use their relative power to steer funding toward themselves. The location of junior high schools and doctor's offices in a subdistrict is a proxy for the relative bargaining power of the villages. On the one hand, the location within a subdistrict of these institutions could, to some extent, reflect the local power dynamics and also the relative health and education of the local residents. On the other hand, the presence of *arisans* (revolving credit groups) and village cooperatives give some indication of social capital and the ability of a village to plan and implement projects. The geographic nature of the subdistrict could also affect the relative influence of the villages. Villages that are farther away from the subdistrict offices may be at disadvantage if they receive less information about the KDP process or less attention from KDP officials.

While there could be efficiency reasons for the ways in which some of these village characteristics affect the distribution of funding, there are two village characteristics that are examined that are more difficult to support on efficiency grounds. If religious or ethnic minority villages were, ceteris paribus, to receive less funding it would seem more obvious that this is because of a bias on the part of the majority group. It is conceivable that villages might collude along ethnic or religious lines. Building a coalition according to ethnic or religious background could be easier than trying to lobby for the support of other villages with less formal ties.

The characteristics of village leaders could also significant impact the allocation of funding. More able leaders may be able to better plan and garner support for their projects. A leader's traits may also affect the outcome of the bargaining that is inevitably part of the inter-village meetings where village leaders with more influence could steer money toward their own villages. Here I use data on the age, sex and education of a village's leader. One would expect the leaders' influence to increase with age as there is a significant amount of social deference based on age in Indonesia. There could also be a fear that the few female village heads (less than 3% overall) may be discriminated against. More educated leaders may be able to plan better projects and/or may be more skilled at lobbying for money in the inter-village meetings.

In examining the effects of various project, village, and leader characteristics on village allocation it is necessary to use tobit fixed effect models. There is concern over biased coefficients and standard errors in these types of models. Greene (2004) discusses the property of this estimator based on the results of Monte Carlo regressions. He finds that when the size of groups is large, greater than 5, that the bias in the estimated marginal effects is small and tend to be well estimated. However there can be significant underestimation in the size of the standard errors and, although this persists as the size of the groups rise, it also decreases with group size.

The group size is the number villages in a subdistrict and in these specifications average number of villages in a subdistrict is 24. Thus estimates of the marginal effects should be relatively unbiased and the standard errors only slightly optimistic (possibly in the range of 10 – 15%). The main conclusion from this table would hold even with a moderate amount of bias in the standard errors. The marginal effect coefficients reported on the variables relating to a village's voluntary contribution and the number of poor people aided would still be significant at a confidence level of 1% even with significant inflation of the estimated standard errors.

To examine the importance of project characteristics to funding decisions I compare the regression results for the model laid out above in two specifications: one for high competition areas (*1*) and one for low competition areas (*2*). The high (low) competition specification is composed of subdistricts with 17 or more (9 or fewer) villages, the upper (lower) quartile of competition. I find that the impact of a village's voluntary contribution and the number of poor people helped by its projects are significantly larger in high competition subdistricts than in low competition subdistricts.

Under high competition the elasticity of village allocation with respect to its total voluntary contribution is 0.51, while the elasticity with respect to the average number of poor people helped is 1.2. Thus a 10% increase in the average number of poor people reportedly helped by a village's projects is associated with a 12% increase in funding allocation. In the low competition subdistricts the elasticities are much smaller. The elasticity of village allocation with respect to its total voluntary contribution is 0.035 and is not statistically different than zero. The elasticity with respect to the average number of poor people helped is 0.27, which is less than one-fourth the size of the elasticity in the high competition case.

The point estimates for the impact of these project characteristics are not only much larger under increased competition, but the statistical significance is also greater. The P-values on the two variable of interest are greater than or equal to 7 in the high competition specification and under 2 in the low competition specification. In addition to the project characteristics there are two village-level variables that also impact funding allocation under high competition. Villages with *arisans* are estimated to receive 205% higher allocations than those villages without *arisans*. This estimate seems to overstate the effect as the raw summary statistics only suggest a 10-20% increase for those villages with these rotating credit groups. Villages with more highly educated leaders tend to receive allocations 88% higher than villages with leaders who did not finish high school. While both of these variables seem to overstate the effect, they could be a sign of the strong impact of social capital in the allocation process.

Given the large advantage of these more socially sophisticated villages, there is also cause for concern that this competitive allocation process may be biased against certain types of villages. This would especially be the case with poorer villages and ethnic and religious minorities. Fortunately these fears have no empirical support. In specifications *(1)* and *(2)*, the coefficient on the percentage of poor families is positive and statistically insignificant. In specifications *(3)* and *(4)*, indicator variables for villages whose main ethnic or religious group differs from the majority of the other villages in the subdistrict are included. In both the high and low competition specifications I find no negative and statistically significant impact of being in the religious or ethnic minority.

Overall competition appears to reward those villages with higher quality projects. At the inter-village council level, this increased emphasis on project quality would lead one to expect inefficiency and elite capture to decline with competition. At the village level, the increased

emphasis on project characteristics in the allocation process is necessary for competition to cause project quality to increase but it is not sufficient. The increase in quality depends on the cost to village leaders to increase the efficiency of their projects. In the case of elite capture, the main costs to village leaders would be the direct decrease in the amount of capture. If the increased probability of winning outweighs such costs then project quality should increase with competition. Before focusing on the impact of competition on the quality of funded projects in the next section, I will first discuss another avenue by which competition focuses the attention of inter-village councils on project characteristics.

Competition makes simply sharing block grants less likely

One reason for the discrepancy between the role of project characteristics in high and low competition subdistricts is the tendency for funds to simply be divided relatively equally among villages when there is little competition. This, in part, stems from the traditional belief of villagers that it is "better to have an equal division of funds and no complaints than open debate and possible conflict" (National Management Consultants, 1999 p. 34). While equal allocation of funds appeals to some basic notions of fairness, it ignores the fact that different villages have different needs. A more efficient allocation process would take such needs into account.

Competition is associated with more uneven distribution of funding between villages as is seen in Figure 2 which graphs the coefficient of variation[4] of village allocations against the number of villages in a subdistrict. The graph displays a clear upward trend in the variation of village funding as the number of villages in a subdistrict increases. This effect is stronger when

[4] The coefficient of variation is the standard deviation of the village funding allocations within a subdistrict divided by the mean village allocation in the same subdistrict. A value of 0 indicates there is no variance and that the money is divided evening, with higher values indicating more variation in the allocation. This allows the variance of the funding allocations in different subdistricts to be compared on the same scale.

the subdistrict budget constraint is tighter, as the increase in the coefficient of variation is steeper for the subdistricts receiving a block grant of $93,705 versus those receiving $125,000. The change in the tendency to share the funds appears more related to competition than to varying cultural beliefs as it varies more across levels of competitions than across Indonesian provinces. With a mean of .53 there is more variation within provinces (.38) than across them (.19), while there is more variation between levels of competition (.48) than within them (.34). This variation in the way funding is allocated across levels of competition gives another indication that competition promotes changes in behavior. The way in which change promotes increases in efficiency and decreases in elite capture will be examined in the next section.

Section 6: Reducing road costs through competition

Overview of road construction

Road projects are an important part of KDP as they account for nearly half of the project funding in a given year. Increasing the efficiency of these projects could lead to enormous savings given the size of KDP, making it possible to construct more projects with the same amount of funds. This section looks at the effect that competition has on the per unit costs of road projects. Olken (2005) has shown that there is a significant amount of over-invoicing of labor and materials in the stated costs of KDP road projects. This suggests that there is substantial room to reduce the costs of roads without reducing quality. Such reductions in costs are very straightforward for village leaders to undertake. At the village level, the main condition for such reductions in cost-padding is when the increased probability of being awarded a project outweighs the loss in expected benefits to a village leader that over-invoicing affords. At the subdistrict level increased competition may provide what Shleifer (1985) terms “yardstick

competition." With more villages competing there will be more road proposals and the inter-village council will have more information about the costs of building roads locally. This information can aid in the selection of more efficient projects.

For year 5 of KDP the records contain the length and width of road projects as well as the amount of funding they were awarded. This is used to compute a cost per square meter of road construction. I focus on three main type of road projects: new roads, road hardening projects and road paving projects. These three types of projects account for 80% of the spending on roads in the data for year 5. To get a graphical overview of the relationship between costs and competition I first focus only on road hardening projects (i.e. upgrading a dirt road to a stone road). The cost per square meter for road hardening projects in US dollars is averaged for each level of competition (number of villages in a subdistrict) and graphed against the number of villages in a subdistrict in figures 3a and 3b. Each graph also contains a trendline weighted by the number of subdistricts with a given number of villages in them. Thus the mean per unit cost from the 200 road hardening projects in subdistricts with 14 villages in them are given more weight than the 2 projects form subdistricts with 3 villages in them. Figure 3a only illustrates the mean cost at each level of competition, while the circles in figure 3b are weighted by the number of road projects for a given level of competition.

The graphs illustrate a negative relationship between the cost per square meter and the number of villages in a subdistrict. The estimated cost per square meter declines by approximately 30% over a range of competition. This is a relatively mild effect as the number of villages in a subdistrict range from 3 to 50. As we will see below, as more variables that may affect the costs of road are taken into account, the relationship becomes more pronounced. In order to estimate the effect of competition on the per unit cost of roads, the natural log of the cost

is regressed on a set of variables likely to impact the cost of building a road. These include elevation, hilly terrain, an indicator variable for if the current widest road in the village is paved, and indicator variables for the type of road project (new road, road hardening, and road paving). Variables are also used to control for many of the village characteristics that were discussed in the previous section, as well as variables that control for the size of the block grant and the number of villages in the subdistrict.

Results of road costs regressions

The results in table 7 (*1*) shows a sizeable decline in costs with an increase in the number of villages in a subdistrict. The coefficient of -.18 on the natural log of the number of villages in a subdistrict represents an 18% decrease in the per unit costs of roads with the doubling of the number of villages in a subdistrict. The coefficients on the size of the block grant are statistically insignificant, indicating that the reduction in costs is associated more with the increase of additional competitors rather than change in the amount of funding available per village ex ante. Such an effect could reflect that the reduction in the cost of the roads comes in the planning of the projects rather than funding being reduced in the inter-village meetings, where the amount of funding available would be a more immediate issue.

As one might expect, larger villages have reduced road construction costs. However, two other statistically significant variable seem somewhat counter-intuitive. Costs decrease in both the elevation and distance from the subdistrict office. There could be road characteristics that are unique to higher elevations or more remote villages that make their per unit costs less. However the size of the coefficient on the log of elevation only represents a 2.7% decrease in costs with the doubling of elevation. This could be a specification problem since this treats a change in

elevation from 5 to 10 meters the same as a change from 1500 to 3000 meters. When the elevation rather the log of elevation is used the variable is still negative but statistically insignificant.

The effect of the level of participation of villagers in the planning process on elite capture can also be addressed with this data. In the selection and planning of KDP projects, there are a series of public meetings intended to encourage broad participation. The involvement of women and the poor is especially encouraged by the World Bank. The result of this attempt to increase local involvement in decision making has been uneven with Guggenheim (2003)noting that "women's participation in KDP varies from mutely sitting against the back wall of village meetings halls, to equal participation in all parts of the process" (p. 30). The question of the impact of increased participation on elite capture was addressed by Olken's (2005) experimental study of KDP roads projects. By distributing 300 or 500 invitations to village meetings he found an average increase in attendance of 13.4 people or 35%. Olken estimated that this increase lead did not lead to a significant decrease in overall corruption, but it did effect how village leaders chose to hide corruption.

For 2,196 of the 3,131 villages involved in specification (*1*), data is available on the attendance at the meetings (average 4 per village) from the previous year of KDP. The average attendance at these meetings is used as a proxy for the level of village participation in the planning of KDP projects. Specification (2) adds averages for total, women and poor attendances to the previous regression. The coefficients on women and poor are not statistically significant, and this aligns with most of the reviews of KDP that argue that more must be done to integrate these groups into the process. However, overall attendance does seem to have a large

and significant impact on the per unit cost of roads. This coefficient suggests that doubling the level of participation would lead to a reduction in costs of 10.1%.

On the face of it, these results are at odds with the findings of Olken (2005) that increased attendance does not have an impact on corruption. However, my research addresses a different aspect of attendance, suggesting that villages with higher rates of attendance have lower road costs. Here village attendance may be a proxy for having a tradition of local participation in decision making. Such traditions may not come through in an experimental setting.

These results show a strong negative correlation between per unit road costs and the number villages in a subdistrict. Doubling the level of competition is estimated to decrease per unit costs by almost a fifth. The result holds when controlling for the level of local participation, and participation moves costs in the same direction. Similar results will be seen in the case of microcredit in the next section.

Section 7: Microcredit and Elite Capture

In this section, I use quite a different measure from the one above to show that elite capture decreases with increased competition. In most development settings microcredit schemes have been thought of as highly beneficial to credit-constrained poor borrowers. However, in the first phase of KDP the microcredit program was found to have "serious design and system flaws"(Wong, 2003 p. 24). What served KDP well in the design and construction of infrastructure projects did not work as well in the allocation and collection of loan funds (Holloh, 2001). After initial complaints and low repayment rates a series of studies of the microcredit projects in KDP were commissioned. One analyst pointed out that KPD's "participative forums and local government institutions are governed by logics other than those required for good

credit governance" (ibid, p. v). In the best cases credit decisions were based on community needs, but these decisions did not reflect best practices in microfinance; in the worst case the funds were simply commandeered by local elites.

Repayment rates reflect much of the problem with the microcredit projects. There seems to be uniform agreement that the repayment rates were low in the first phase of KDP, however there is wide variation in the precise estimates. Holloh (2001) reports overall estimates where 40 – 60% of the year 1 and 2 amounts due had been paid. However he cites one source in which 97% of the loans were overdue (p. 31-32). There were several problems that led to such low repayment rates. Many villagers claim that they perceived the loans as grants -- as had been the case with previous government "loans"; however, this claim is often disputed by analysts (see Evers, 2001; Holloh, 2001). It was also the case that many communities did not follow KDP guidelines in obtaining the loans. In order to propose a loan project a village group was supposed to have been in existence for more than one year prior to making the proposal. This was to insure some internal cohesion in the group so as to assist in monitoring of repayment and proper use of the funds. However one study of 15 subdistricts across three provinces revealed that 77% percent of the groups did not exist before requesting KDP funds and 3% never existed at all (Day 2001 in Holloh, 2001 p. 35). Sixty-two percent of borrowers surveyed reported "their groups were not helpful in any way" (ibid).

Low repayment rates and fake credit groups can largely be traced back to the way in which some village leaders monopolized the making of loans, shuttling funds to close friends and family (Holloh, 2001 p. 34). This practice led to the concentration of "credit to the powerful rather than the poor" (ibid, p. 36). Although one of the key stated aims of KDP is poverty alleviation, in some areas, as one villager noted, "poor families were discouraged from

borrowing because it was known that they would have a hard time making the repayments" (Agung & Hull, 2002 p. 8). This goes against the conventional wisdom of microfinance that "the poor are usually more eager to repay loans as they highly depend on sustained credit access" (Holloh, 2001 p. 37). Agung and Hull capture this targeting of KDP loans toward the more affluent in a survey of 2,000 households in KDP and non-KDP areas. In KDP areas, a household in the middle quintile of income was more than twice as likely to receive a loan as the lowest quintile with the highest quintile being almost 4 times as likely. In non-KDP areas there was no statistical difference in the likelihood of receiving a loan between any of the income quartiles (Agung & Hull, 2002).

Even if village leaders did not target friends and family, initially there were also instances of leaders misusing the loan installments paid by villages. These funds were supposed to be loaned out again locally but they were often stolen by village leaders (Holloh, 2001). Such misuse is often a reason cited by villagers for a lack of repayment. They were also able to see the indiscretions in the microcredit scheme. One local subdistrict facilitator reported that at a pre-allocation inter-village meeting that the residents were "enthusiastic although there was a feeling of pessimism about the economic and savings and loan projects" (World Bank, 2002 author's translation). Evers (2001) describes a subdistrict where the villages that recently received loans blamed their lack of repayment on crop failures, pigs dying and falling prices. However the fraction of villages not receiving loans that year begged to differ. They claimed "that parts of the loans were used to buy clothes and food, that crops did not fail, that pigs didn't die but were sold. In short, they claim that the debtors are perfectly capable of paying" (p. 14).

Given the state of the microcredit scheme in the initial phase of KDP it would seem desirable to have the competition between villages sort out some of the more objectionable

microcredit projects. Woodhouse (2002) concludes that there were few disincentives for villagers not to form false groups to apply for KDP funds, "unless it is made clear to villagers that the process is competitive and that any group that seems likely to be false is unlikely to receive project funds" (p. 53). Evers (2001) concludes in his review of KDP that many of the problems of the microcredit schemes could be avoided with increased competition. He writes, "Projects that suffer most from the lack of true 'verification' and true competition are the economic activities, the village groups submitting requests for loans" (p. 26) Evers claims that competition can improve the quality of KDP loans because of the ease with which some basic requirements of the loans can be verified. He lists these attributes as:

> Is it a group, do the members know each other, do they understand the conditions of the loan, are they experienced in the activity, do they have technical back-up, do they have someone who can keep books and administration…..etc. Yet some inter-village meetings approve economic groups that fulfill none of these conditions. (p. 27)

The capture and misuse of microcredit funds made these projects very inefficient on average. One analyst suggested that microcredit provided a negative rate of return (Edstrom, 2002), while infrastructure projects were seen as providing returns of 30% or more.
On average, moving funds away from microcredit to infrastructure projects both reduces elite capture and increases economic efficiency. In this section I analyze whether or not competition pushed funds towards more efficient uses. Competition could affect microcredit projects at the subdistrict level in the verification process, in inter-village meetings where less worthy loan proposals are rejected or at the village level where leaders decide it is not worth the effort to organize the "fake" groups for the sole purpose of capturing the loan funds. These are the same kinds of subdistrict and village level considerations that were described more generally above.

This change in levels of elite capture and loan quality can be analyzed by examining the percentage of funds each subdistrict in year 3 allocated to microcredit schemes. If the share of funding going to microcredit declines with the level of competition, this is taken as a sign that the worst of the microcredit projects are being weeded out. Certainly not all microcredit projects are corrupt, and some areas have high repayment rates and use the funds productively; however as chronicled above there were ample instances of the misuse of the funds. Thus I seek to test if the share of microcredit at the subdistrict level declines with the number of villages in a subdistrict. Such a decline would be interpreted as a sign that competition decreases elite capture and increases efficiency.

I approach this analysis first with a few descriptive statistics on microcredit funding. Overall 17.9% of the funds in year 3 went to microcredit, while microcredit represented 22.6% of the funding requested. At the subdistrict level the average subdistrict allocates 18% of its funds to microcredit though that rises to 23% if I condition on allocating a positive amount of funding to microcredit. Of the 966 subdistricts, 212 do not allocate any funding to microcredit. In 114 of these cases no microcredit was requested. On the other extreme 6 subdistricts allocate all of their money to microcredit and 69 allocate more than half. There is a significant amount of variation in the percentage of funding going to microcredit at the province level which can be seen in table 8.

What is striking about this distribution across provinces is that the three provinces that dedicate the largest percentage of funds to microcredit are the three that would seem to be among the needier provinces in terms of infrastructure improvements (Holloh, 2001). Irian Jaya, Central Kalimantan and East Nusa Tenggara provide 39% or more of their funding to microcredit. This is a trend that has continued through the first few years of KDP as Holloh

(2001) notes for years 1 and 2. Two of these three provinces were reported to have among the lowest repayment rates at 10-20% (World Bank, 2003). On the other end of the spectrum are provinces on the islands of Sumatra and Sulawesi who have undertaken very little microcredit. In these cases, the fear of recurring communal violence and thus the need to be prepared to flee their homes means that these communities do not want to leave have large sums of money in their homes (Ministry of Home Affairs, 2002). Given this variation in levels of microcredit funding we will pay close attention to province level effects later in the analysis.

Table 9 gives an overview of the distribution of the funding allocated to the various project types across the upper (17 or more villages per subdistrict) and lower (9 or fewer villages per subdistrict) quartiles of competition. In the lower quartile microcredit projects do very well in the inter-village meetings, actually representing a higher fraction of allocated funding than of requested funding. The situation is reversed in the upper quartile. Microcredit is also the only one of the eight categories that decreases in the percentage of funds allocated from the lower to higher level of competition. In the shift from low to high competition, all the other project types benefit at the expense of microcredit. The decrease in the percentage of funds allocated to microcredit across levels of competition is also seen graphically in figures 4a and 4b. Here the average percentage of subdistrict funds allocated to microcredit are graphed against the number of villages in a subdistrict. The trendline is weighted by the number of subdistricts at a given level of competition. The same weights are used for the markers in graph 4b. The decrease in microcredit funding by level of competition appears to hold not just between the upper and lower quartiles as in table 9 but across the range of competition.

There are a number of factors that might impact the need for microcredit projects such as access to credit and the need for infrastructure. If there happened to be a greater need for credit

in subdistricts with fewer villages because they are more remote then the negative correlation between level of competition and funding allocated to microcredit seen above would be of a spurious nature. Thus it is important to investigate the nature of the relationship using a more complete model of the allocation of microcredit at the subdistrict level. Indonesia has one of the most "differentiated rural finance sectors of any developing country…some 50% of rural households are reported to remain without access to formal and semiformal finance"(Seibel, 2005 (forthcoming) p. 1). Thus we would anticipate that the need for credit could be an important factor in how much funding is allocated towards microcredit projects.

Two independent variables are introduced in table 10 that proxy for the need for credit. They are percentage of villages in a subdistrict with at least one bank and the percentage with at least one People's Credit Bank (PCB). PCB specializes in serving community markets and is responsible for "80% of microsavings balances and 54% of microloans outstanding" in Indonesia (ibid). Despite the reach of these institutions 43% percent of the subdistricts have neither a regular bank nor a PCB. For each of the variables the median subdistrict does not have either a bank or a PCB. For subdistricts with at least one PCB 19% of the villages on average have a branch, though the range is large from less than 2% of villages to 100% of villages in a given subdistrict. As mentioned above *arisans* (informal rotating credit groups) also play a significant role in supplying access to informal credit in Indonesia and thus are used in the following specifications.

I use a mix of independent variables similar to those used in the previous regressions relating to the allocation of funding at the village level and per unit road costs. Now the unit of analysis is the subdistrict and thus village-level variables have been averaged (evenly weighted) up to the subdistrict level. Of particular note is that indicator variables at the village level

become the percentage of villages in a subdistrict with a certain characteristic. Another key independent variable to consider is the percentage of villages in a subdistrict that are on a hill or in a valley. One government official in Central Sulawesi suggested that economic projects did better than infrastructure projects there in part because "the hilly geography of the province is not conducive for projects such as roads, bridges, and culverts" (Wong, 2002 p. 12). Thus it is important to control for such terrain features.

Tobit regressions are used to model the percentage of funds allocated to microcredit at the subdistrict level since many subdistricts chose not to allocate money to microcredit despite proposals from the villages. Those subdistricts in which there were no requests for microcredit are excluded from these specifications since it seems likely their reasons for excluding microcredit are unrelated to competition. This is especially true of those areas where microcredit was not used because of the security situation. In these tobit regressions indicators variables are used to control for unobserved province level effects. As discussed above, there are problems associated with tobit fixed effect regressions. However given the large number of observations per province (38 on average in the main specification) the cause for concern over biased marginal effects and underestimated standard errors is minimal.

Microcredit regression results

Table 10 gives the results of regressing percentage of subdistrict funding to microcredit on various subdistrict characteristics. In (*1*) the coefficient on the number of villages in a subdistrict is significant at a 95% level of significance and suggests that doubling the level of competition would results in a 2.8 percentage point decrease in the percentage of subdistrict funding going to microcredit. At the mean value of the dependant variable this represents a 13%

decrease in the amount of funding. This significant given that the number of villages in a subdistrict more than triples across the range of the data. Of the three variables relating to credit access only the percentage of banks in a subdistrict is statistically significant, although it is jointly significant with percentage of People's Credit Banks at the 95% level of significance and the three are jointly significant at a 90% level of significance. Despite the statistical significance, their impact overall is limited. A one standard deviation increase in the percentage of villages in a subdistrict with a bank only increases the percentage of funding allocated to microcredit by about 1%. However, in all five of the specifications in table 10 the coefficients on these variables are positive except for on the percentage of *arisans* in one specification. Thus it is the availability of credit, not the lack of credit, that is associated, at least weakly, with increases in the funding going to microcredit projects.

In (*2*) I control for the percentage of funding requested for microcredit projects. This is not included in the other specifications because I want the coefficient of the number of villages in a subdistrict to reflect the decrease in microcredit that happens during the project planning stages in the villages and at the inter-village meeting through rejection of microcredit projects. Comparing the coefficients on the level of competition in specifications (*1*) and (*2*) allows me to identify the mechanism through which competition reduces the amount of microcredit. According to the coefficient estimates 75% of the decline in the allocation to microcredit happens in the inter-village meetings. The remaining 25% is due the anticipation of increased competition at the village level (i.e. not forming as many fake credit groups).

Specifications (*3*) and (*4*) constrict the geographic focus on the model. Three (*3*) focuses on Java, the most populous island in the Indonesian archipelago with nearly half of Indonesia's population and thus nearly half of the subdistricts in KDP. Here the coefficient on competition is

slightly higher and the average percentage of funding allocated to microcredit is slightly larger than off Java. Overall this increases the effect of doubling competition on the mean percentage of microcredit funding by almost half over specification (*1*). It is important to find this effect in Java because it is relatively homogeneous compared to the rest of Indonesia and because of its size. Four (*4*) looks specifically at those three provinces (Central Kalimantan, East Nusa Tenggara, and Irian Jaya) that target 39% or more of their funds to microcredit. Here doubling of the number of villages in a subdistrict decreases the allocation to microcredit by 12 percentage points. That represents 29% of the mean percentage of allocation to microcredit. Thus competition is quite effective in these "problem" areas.

Lastly I considered the role participation in the inter-village meetings plays in the allocation of funding to microcredit. Specification (*5*) contains the variables in log form for the total number of attendees, number of women attendees and number of poor attendees at the inter-village forum that decides the which village proposals will be funded. The size of the effect of competition in this model is similar to the original specification. The statistical significance of the coefficient has diminished somewhat but that is mostly due to collinearity with the total attendance variable as they are jointly significant at a 98% level of significance. The total attendance at the inter-village meeting does seem to have a strong effect on the percentage of funds allocated to microcredit; however this effect can almost entirely be offset by the role of women in the meetings. Since many women's groups propose microcredit, these types of projects tend to draw more women to the meetings and are supported by women. Thus if total attendance and the number of women at the meeting are doubled, the allocation to microcredit will only fall by a little more than 1 percentage point. It is possible that this effect does not quite

capture the effect of increased community participation but instead suggests that when there are more men at the meeting, the group is less likely to approve microcredit projects.

These regressions show a strong correlation between increases in competition and decreases in the percentage of subdistrict funds that are allocated to microcredit. This effect is strongest precisely where the misuse of microcredit is the most problematic. These results also give insight into the mechanism through which competition operates as the reduction is largely driven by rejection at the inter-village meetings.

The decrease in funding allocated to microcredit as competition increases is clear from this analysis. I argue that this is due at least in part to the effect competition has on elite capture and efficiency. One competing hypothesis is that communities simply prefer infrastructure projects to microcredit projects for reasons unrelated to elite capture. When competition forces money to be allocated more carefully, infrastructure projects are given a higher priority and microcredit projects are only funded if there is money left over. This would cause microcredit to fall with competition given that there is less and less money left over. Here the relationship between competition and elite capture could be spurious. There is merit to this argument, yet it does not seem to apply as broadly as the focus on elite capture. It certainly does not seem to apply to the three provinces where microcredit is allocated the almost a majority of the funding. In those provinces microcredit is not accorded only the leftovers. It accounts for more than half the funding in more than a third of the subdistricts in those provinces. Despite being a primary project in these areas the percentage of funding allocated to microcredit still falls as competition increases.

Section 8: Conclusion

The responses of road costs and funding allocated to microcredit suggest that competition between localities can have a significant impact on the efficiency with which development funds are used. Competition dampens the decrease in accountability associated with a decentralized allocation of public goods. It also enhances the informational advantages of decentralized allocation by using local information to weed out inefficient projects.

Competition between villages for CDD funds provides an avenue for decreasing elite capture. Doubling the level of competition can reduce elite capture by 10%-20% or more. Over phase 2 of KDP $300 million was granted to local communities over 3 cycles of KDP. Reducing elite capture by 15% could have saved $45 million over this period resulting in over 10,000 additional community projects. With the internal rates of return on infrastructure projects estimated at over 30%, such saving could have a significant impact on KDP communities (Guggenheim, Wiranto, Prasta & Wong, 2001, p11). The increase in competition necessary for such savings could come though devolving the level of competition to the hamlet or sub-village level in some subdistricts. Planning meetings are already being carried out in hamlets, therefore allowing hamlets to propose their own projects need not incur significant additional expenses. Such increases in the level of competition for funding could also be accompanied by finer targeting of the amount of block grants given to subdistricts.

As the largest World Bank anti-poverty program in Asia, KDP has provided a model for other projects both inside and outside of Indonesia. Other local Indonesian governments and even private firms have embraced the KDP format for distributing development funds (see National Management Consultants 2000, p. 72). Projects based on KDP principles are also being carried out in Afghanistan, the Philippines and East Timor. Outside of Indonesia CDD

plays a similarly large role. This makes it imperative to solve the agency problem that lies at the core of CDD. Making local leaders accountable can provide significant increases in efficiency and increase the impact of CDD on local communities.

Overall this research speaks to the importance of organizational design, giving clear evidence of localities changing their behavior in response to the varying level of competition. Villages allocate funding differently when there is competition, paying more attention to project characteristics. Competition also provides the necessary incentives for village leaders to propose better projects. A similar effect is seen when there is broader local participation in the KDP process. Transparency, like competition, can lead to better outcomes.

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Appendix

This data was collected from the World Bank as the records for the second three year phase were still being compiled, I have the complete records for phase 1 and partial records for phase 2. During phase 1, the records became more detailed over the course of the three years. Thus year 3 (2001 - 2002) of phase 1 contains the most complete set of records. The most complete set of records for phase 2 is year 5 (2004-05). Table 2 gives an overview of the data available for years 3 and 5, which are the focus of this research. Data coverage is much better in year 3 than in year 5, with fewer missing observations.

Because of the timing of data collection, missing observations are a concern for year 5. Some of this concern is dispelled in table 11 which compares key demographic characteristics across year 3 and year 5. There are no statistically significant differences between the characteristics across the two. There is some variation in these village characteristics but this is to be expected since the population of villages changes from year to year in KDP and the demographic data for these two years are from different village censuses (2000 and 2003). The key is that the missing data in year 5 does not make year 5 wildly dissimilar from year 3.

As stated in the text, the 72 different types of local projects are aggregated into eight categories which can be seen in table 3. A brief explanation of these categories is given here. The categories of "bridge," "road" and "irrigation" are straightforward. "Public toilet" refers to public toilets and laundry facilities. "Microcredit" covers microfinance projects that are for saving and loans groups whose members are involved in various small scale enterprises and loans given for specific economic undertaking like raising chickens or handicraft production. "School" refers to both school building construction and the funding of scholarships. "Water"

refers to wells and pumps for obtaining clean water for household consumption and use. "Other" captures the remainder of projects that range from electric generators to village market places.

Village demographic data is from the 2000 and 2003 Indonesian village censuses (PODES). In general the 2000 census is used with year 3 KDP records and the 2003 census with year 5 records. Ninety-six percent of the year 3 KDP village where matched with 2000 census data and 76% of the year 5 records were matched with 2003 census data. The lower match rate for year 5 data reflects the increasing impact of decentralization in Indonesia as villages and subdistrict break apart to form new entities and the incompleteness of the phase 2 records.

A key demographic variable that is used to measure the level of development of a village is the percentage of homes with electricity. One criterion for a village to be included in a recent World Bank electrification project was a "powerful potential for socioeconomic development" (JBIC 2003, p.4). Thus this measures the potential as well as the current level of development. The percentage of poor in a village used in this research is the percentage of households that fall into the category of pre-welfare (KP, *keluarga prasejahtera*) and welfare I families (KS I, *keluarga sejahtera I*). KS I families meet but do not exceeding the following set of household standards: 1) Able to eat two or more time per day; 2) Possessing changes of clothing for different needs (i.e. home and work); 3) Floor of house is not earthen; and 4) Ability to bring sick children to health facility. KP families do not meet one or more of these requirements (BPS Statistics Indonesia, 2000 author's translation). This measure is less useful as a measure of absolute levels of poverty than as a measure of regional differences in poverty (Barron, Kaiser, & Pradhan, 2003).

Table 1: Grant size eligibility thresholds for subdistrict

(Exchange rate: $1=8,000)[5]

Subdistrict in Java:	Subdistrict outside Java:	Maximum Grant to Subdistrict
> 50,000 persons	> 25,000 persons	Rps 1 billion/year ($125,000/year)
25,000 – 50,000 persons	15,000 – 25,000 persons	Rps 750 million/year ($93,750/year)
	< 15,000 persons*	Rps 350 million/year ($43,750/year)

*Only exists in East Nusa Tenggara

Table 2: Overview of KDP records

	Year 3	Year 5
Actual		
Provinces	22	30
Subdistricts	986	2,000
Villages	15,481	28,000
Observed		
Provinces	22	30
Subdistricts	968	1,214
Villages	13,268	16,716
Projects	46,471	40,181

[5] I use this exchange rate throughout the paper to be consistent with the exchange rate during the period when most of the data of this paper was collected. Currently (August 2005) the Indonesian currency was trading at around 10,000 rupiah to 1 US dollar.

Table 3: Distribution of funding by project category

	Mean Project Size		% of Total		Women
	Requested	Allocated	Requested	Allocated	Allocated
BRIDGE	$ 4,184	$ 3,970	5.9%	6.7%	3.8%
IRRIGATION	$ 3,460	$ 3,139	11.1%	11.5%	7.4%
PUBLIC TOILETS	$ 3,196	$ 2,467	3.1%	2.1%	4.4%
MICROCREDIT	$ 2,532	$ 2,041	22.6%	17.9%	41.3%
ROAD	$ 6,028	$ 5,461	42.4%	47.3%	23.3%
SCHOOL	$ 3,575	$ 3,387	2.1%	2.1%	4.1%
WATER	$ 5,385	$ 4,947	8.8%	8.3%	11.1%
OTHER	$ 4,865	$ 4,495	4.1%	4.0%	4.5%
Total	$ 4,067	$ 3,723			

Table 4: Overview of demographic data

Village Characteristic	Mean	Standard Deviation Overall	Between	Within
Population	2,520	2,319	1,830	1,607
Percentage HH w/ electricity	48%	34%	27%	20%
Percentage Poor	60%	27%	22%	17%
Number of public junior high schools per thousand residents	0.07	0.21	0.08	0.20
Number of doctors per thousand residents	0.04	0.15	0.05	0.14
Distance to subdistrict office (km)	11.7	21.1	15.4	13.9
Hilly terrain	34%	47%	36%	32%
Arisan present	77%	42%	33%	27%
Village cooperative (all types)	35%	48%	29%	39%
People's credit bank	8%	27%	16%	21%
Village head high school+	46%	50%	24%	44%
Village head's age	44.4	9.1	4.3	8.1
Village head female	2%	14%	5%	13%
Village is in religious minority in subdistrict*	3%	18%	13%	14%
Village is in ethnic minority in subdistrict*	7%	26%	15%	22%

*All data is from PODES 2000 expect these which are from PODES 2003.

Table 5: Village characteristics by level of competition

	Village level means		Overall standard deviation by number of villages in a subdistrict	
	Villages per subdistrict			
	13 or fewer	14 or more	Between	Within
Villages per subdistrict	9.9	21.0	n/a	n/a
Village population	3,114	2,180	1,155	2,225
Percentage of villages in Java	48%	43%	0.30	0.47
Percentage poor hhlds by village	57%	62%	0.15	0.26
Percentage hhlds with electricity by village	48%	48%	0.16	0.33
Percentage of villages with arisans	0.79	0.76	0.17	0.41
Kilometers from village to subdistrict office	11.2	12.0	7.6	21.1

Based on 12,736 observations in year 3 of KDP.

Table 6: Allocation of funding to villages by project and village characteristics
Dependant variable: Ln of village funding allocation

	(1)	*(2)*	*(3)*	*(4)*	*(5)*
Ln total funding requested	0.123	0.877*	0.269	0.673	
	[0.39]	[1.94]	[0.82]	[1.42]	
Ln total volutary contribution	0.514***	0.035	0.49***	0.04	
	[9.99]	[0.54]	[9.23]	[0.60]	
Ln average number of poor helped	1.185***	0.272*	1.227***	0.333**	
	[7.00]	[1.74]	[7.10]	[2.16]	
Ln Population	-0.052	0.032	0.009	0.068	1.110***
	[0.17]	[0.15]	[0.03]	[0.32]	[10.92]
Percentage HH w/ electricity	-0.693	0.408	-0.395	0.469	1.620***
	[1.07]	[0.84]	[0.60]	[0.99]	[6.17]
Percentage poor families	0.942	0.607	1.25	0.629	-1.463***
	[1.20]	[1.08]	[1.54]	[1.16]	[4.99]
Village is in ethnic minority in subdistrict			2.271*	-0.12	-0.953**
			[1.73]	[0.25]	[1.83]
Village is in religious minority in subdistrict			-0.113	-0.056	-0.926***
			[0.18]	[0.14]	[2.80]
Public junior high schools	0.323	-0.166	0.353	-0.075	-0.46
(per thousand residents)	[0.90]	[0.79]	[0.97]	[0.37]	[1.18]
Doctors	0.188	0.086	0.133	0.067	-1.373***
(per thousand residents)	[0.51]	[0.52]	[0.36]	[0.43]	[2.37]
Ln distance to subdistrict office (km)	0.310*	-0.035	0.319	0.086	0.182*
	[1.59]	[0.25]	[1.57]	[0.59]	[1.85]
At least one *arisan*	1.114**	0.07	1.134**	0.257	-0.378*
	[2.29]	[0.17]	[2.27]	[0.66]	[1.80]
Village cooperative (all types)	-0.264	0.017	-0.316	0.022	-0.082
	[0.75]	[0.07]	[0.89]	[0.10]	[0.48]
Ln village head's age	0.378	-0.001	0.319	-0.215	0.356
	[0.53]	[0.00]	[0.44]	[0.48]	[0.91]
Village head female	-0.893	0.318	-0.603	0.653*	0.437
	[0.96]	[0.71]	[0.63]	[1.90]	[0.87]

Village head high school+	0.631**	-0.16	0.64**	-0.15	0.351**
	[2.07]	[0.76]	[2.06]	[0.76]	[2.07]
Constant	7.777	-1.499	-74.192***	1.842	3.327*
	[1.25]	[0.17]	[9.24]	[0.20]	[1.88]
Subdistrict Fixed Effects	Yes	Yes	Yes	Yes	No
Observations	4,880	1,584	4,592	1,481	11,912
Uncensored Observations	3,299	1,522	3,140	1,428	9.558
Wald X2	1,519		1,489		290
Prob > X2	0.000		0.000		0.000
R-squared		0.30		0.31	

Absolute value of robust z statistics in brackets.
* significant at 10%; ** significant at 5%; *** significant at 1%

(*1*) (*3)*& (*5)*Tobit regressions with unconditional marginal effects at the mean of the dependant variables. (*3*) & (5) OLS regressions as censoring is not a prevalent.
(*1*) & (*3*) High competition subdistricts with 17 or more villages. (*2*) & (4) Low competition subdistricts with 9 or fewer villages. (*5*) All villages.

Table 7: Per unit cost of road projects

Dependant variable: Ln of cost per square meter

	(*1*)	(*2*)
Ln of Villages per Subdistrict	-0.181***	-0.176**
	[2.96]	[2.22]
Ln mean village meeting attendance		-0.101*
		[1.64]
Ln mean num. of poor at village meetings		0.002
		[0.07]
Ln mean num. of women at village meetings		0.012
		[0.28]
Ln of village popluation	-0.107***	-0.087**
	[3.71]	[2.76]
Ln of village elevation	-0.027***	-0.019
	[2.77]	[1.62]
Widest village road is paved	0.055*	0.033
	[1.96]	[0.98]
Hilly terain	0.024	0.028
	[0.77]	[0.80]
Percentage HH w/ electricity	-0.012	-0.044
	[0.22]	[0.71]
Percentage poor families	-0.019	-0.120*
	[0.32]	[1.64]
At least one *arisan*	-0.068	-0.070
	[1.36]	[1.05]
Ln distance to subdistrict office (km)	-0.078***	-0.056**
	[3.97]	[2.21]
Village head female	0.053	-0.036
	[0.92]	[0.59]
Village head high school+	0.013	-0.016
	[0.56]	[0.57]
Asphalt road project	-0.181***	-0.161***
	[3.97]	[2.87]
Road hardening project	-0.077**	-0.031
	[2.13]	[0.75]
Ln of voluntary contribution	-0.009***	-0.011***
	[2.85]	[2.46]
Ln total users of project	0.003	0.005
	[0.27]	[0.30]
$93,750 block grant	-0.074	-0.016
	[0.85]	[0.18]
$125,000 block grant	0.034	0.055
	[0.38]	[0.62]
Constant	3.431***	3.75***
	[10.84]	[9.34]
Observations	3,235	2,252
R-squared	0.10	0.12

OLS regression. Robust t statistics in parentheses, clustered by subdistrict. Includes province level fixed effects. Outliers removed. * significant at 10%; ** significant at 5%; *** significant at 1%

Table 8: Microcredit funding distribution by province

	Requested	Allocated
Irian Jaya	49%	53%
Central Kalimantan	42%	40%
East Nusa Tenggara	43%	39%
Gorontalo	28%	28%
Yogyakarta	33%	27%
West Java	28%	26%
West Sumatera	29%	22%
South Kalimantan	26%	19%
Central Java	23%	19%
Riau	22%	18%
Central Sulawesi	25%	17%
Banten	26%	16%
Lampung	22%	16%
Southeast Sulawesi	21%	15%
North Maluku	14%	14%
Maluku	19%	13%
East Java	17%	11%
South Sulawesi	12%	8%
North Sulawesi	12%	6%
North Sumatera	8%	3%
South Sumatera	2%	0.8%
Aceh	6%	0.5%

Table 9: Project type distribution by upper and lower quartiles of competition

	Less than 10 villages per subdistrict		More than 16 villages per subdistrict	
	Requested	Approved	Requested	Approved
Bridge	5.5%	6.6%	5.5%	6.8%
Irrigation	8.8%	10.1%	12.6%	11.1%
Microcredit	20.0%	21.4%	18.6%	16.4%
Public Toilet	1.0%	1.9%	1.8%	2.6%
Road	45.1%	46.7%	42.8%	47.4%
School	2.6%	1.9%	1.6%	2.5%
Water	11.2%	7.4%	13.0%	9.0%
Other	5.6%	4.1%	4.0%	4.2%

Table 10: Percentage subdistrict funds allocated for microcredit declines with competition

	(1)	*(2)*	*(3)*	*(4)*	*(5)*
Ln of Villages per Subdistrict	-0.028**	-0.021**	-0.031**	-0.115**	-0.023*
	[2.48]	[2.65]	[2.23]	[2.21]	[1.66]
Microcredit as a % of total funding requested		0.822***			
		[39.40]			
Ln intervillage council meeting attendence					-0.044**
					[2.01]
Ln intervillage council meeting female attendence					0.032*
					[1.65]
Ln intervillage council meeting poor attendence					0.003
					[1.11]
% of villages with at least one bank	0.130**	0.018	0.169***	-0.181	0.160**
	[1.91]	[0.43]	[1.88]	[0.73]	[2.23]
% of villages with at least one People's Credit Bank	0.02	0.046**	0.008	2.35***	0.018
	[0.69]	[2.97]	[0.25]	[3.49]	[0.63]
% of villages with at least one *arisan*	0.018	0.007	0.03	-0.140**	0.049***
	[0.96]	[0.50]	[1.27]	[2.49]	[2.64]
Ln of average village population	0.026**	0.020**	0.017	-0.008	0.014
	[1.85]	[2.33]	[0.99]	[0.14]	[1.01]
Ln of average % of village hhld's with electricity	0.023	0.023**	0.02	0.126*	0.022
	[1.55]	[2.06]	[1.04]	[2.14]	[1.43]
Ln of average % of village hhld's classified as poor	-0.031	-0.024	-0.03	-0.167	-0.02
	[1.19]	[1.27]	[1.03]	[0.81]	[0.76]
% of villages on a hill or in a valley	0.027**	0.012	0.023	0.126*	0.013
	[2.18]	[1.27]	[1.44]	[1.81]	[1.03]
Public junior high schools	-0.123*	-0.023	-0.117	-0.566*	-0.108
(per thousand residents) avg by village	[2.04]	[0.51]	[0.66]	[2.20]	[1.75]
Average village distance to subdistrict office	-0.001**	0.000	-0.002	-0.002	-0.001
	[1.88]	[0.53]	[1.83]	[1.75]	[1.54]
% of village heads that are female	-0.03	0.081	-0.105	0.538	-0.072

	[0.36]	[1.46]	[1.06]	[1.46]	[0.88]
Median education level of village heads	0.007	-0.001	-0.004	0.041	-0.004
	[1.03]	[0.16]	[0.43]	[1.53]	[0.54]
$43,750 block grant	0.126***	0.060**		0.054	-0.059
	[1.83]	[1.67]		[0.52]	[0.71]
$93,750 block grant	0.005	0.006	0.003	0.016	0.001
	[0.46]	[0.75]	[0.24]	[0.26]	[0.09]
Constant	-0.109	-0.116	0.101	0.62	0.161
	[0.84]	[1.37]	[0.62]	[1.17]	[0.95]
Mean value of Y	0.208	0.208	0.166	0.394	0.211
Percentage Y reduced by doubling of competition	-13%	-10%	-19%	-29%	-11%
Observations	839	839	435	116	679
Uncensored Observations	746	746	407	111	608
Province Level Fixed Effects	yes	yes	yes	yes	yes
Wald X^2	402.31	1395.87	137.92	100.78	278.88
Prob > X^2	0.000	0.000	0.000	0.000	0.000

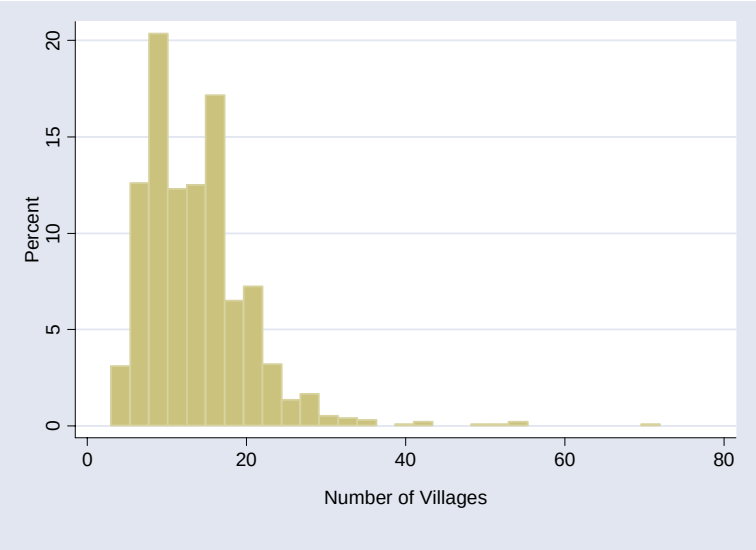
Absolute value of robust z statistics in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%

All specifications are tobit regressions with conditional marginal effects reported. Each specification controls for unobserved province effects. Only subdistricts with positive amount of microcredit requested are included. (3) Includes only the island of Java. (4) Uses provinces with three highest percentages of funding going to microcredit: Irian Jaya, Central Kalimantan, East Nusa Tenggara.

Table 11: Mean demographic characteristics across years of KDP records

	Year 3	Year 5
Villages per kecamatan	13.7	13.8
Village popuation	2,570	2,742
Percentage of villages in Java	42%	45%
Percentage poor households by village	60%	55%
Percentage households with electricity by village	48%	55%
Percentage of villages with arisans	0.77	0.83
Kilometers from village to kecamatan office	11.7	10.2

Figure 1: Distribution of number of villages per subdistrict



Mean	13.7
Std Dev	6.7
Minimum	3
Lower Quartile	9
Median	13
Upper Quartile	17
Maximum	72

Figure 2: Coefficient of variation of village allocations by subdistrict (*kecamatan*)

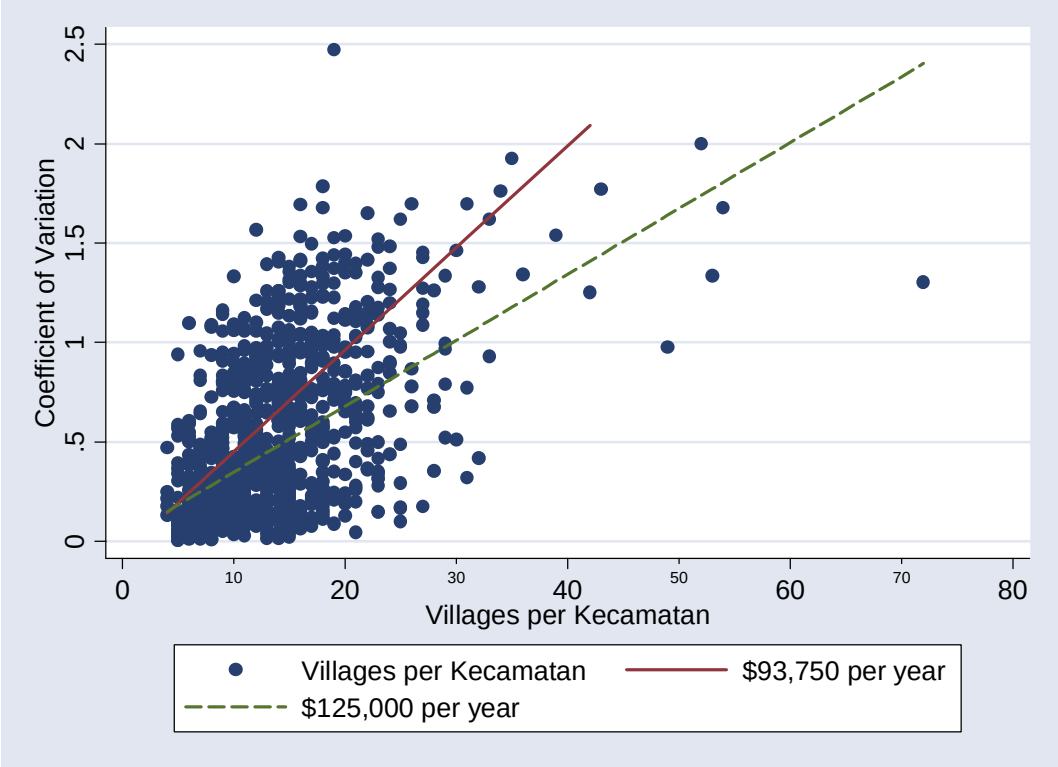


Figure 3a: Mean cost per square meter for road hardening projects by level of competition (number of villages in a subdistrict (*kecamatan*))

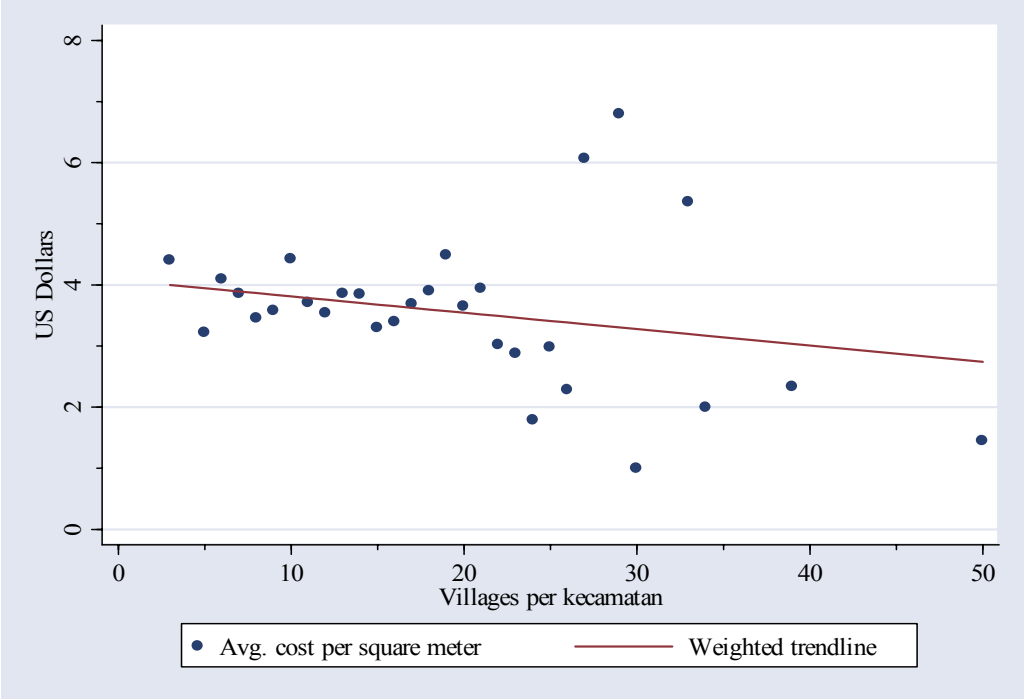


Figure 3b: Markers proportional to the number of projects

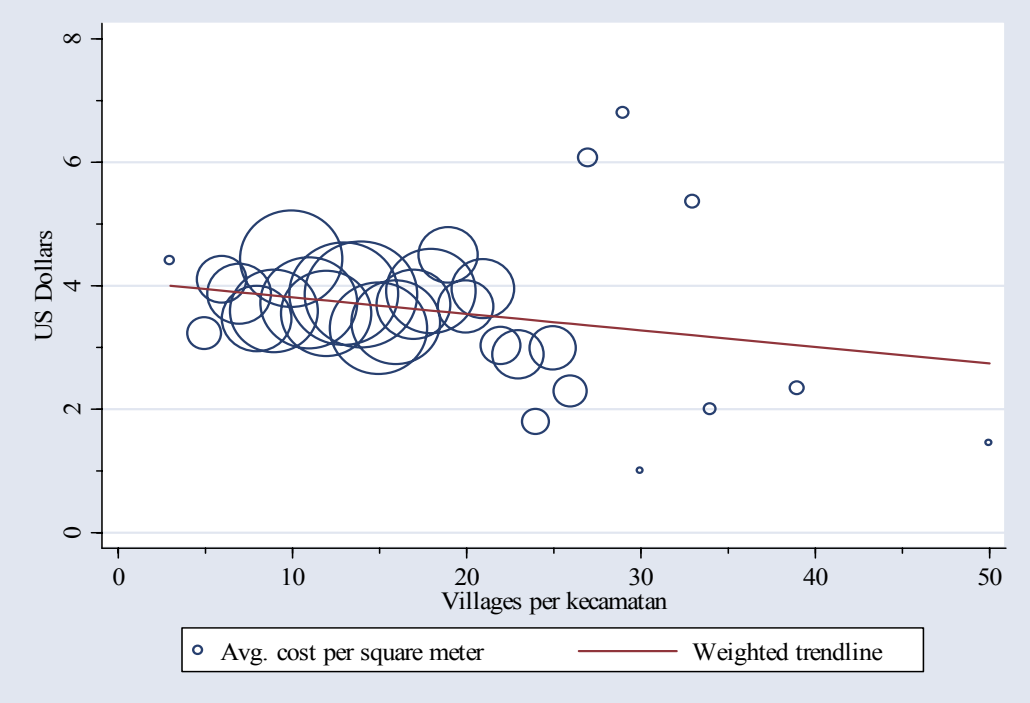


Figure 4a: Mean percentage of subdistrict funds allocated to microcredit by level of competition (number of villages in a subdistrict (*kecamatan*))

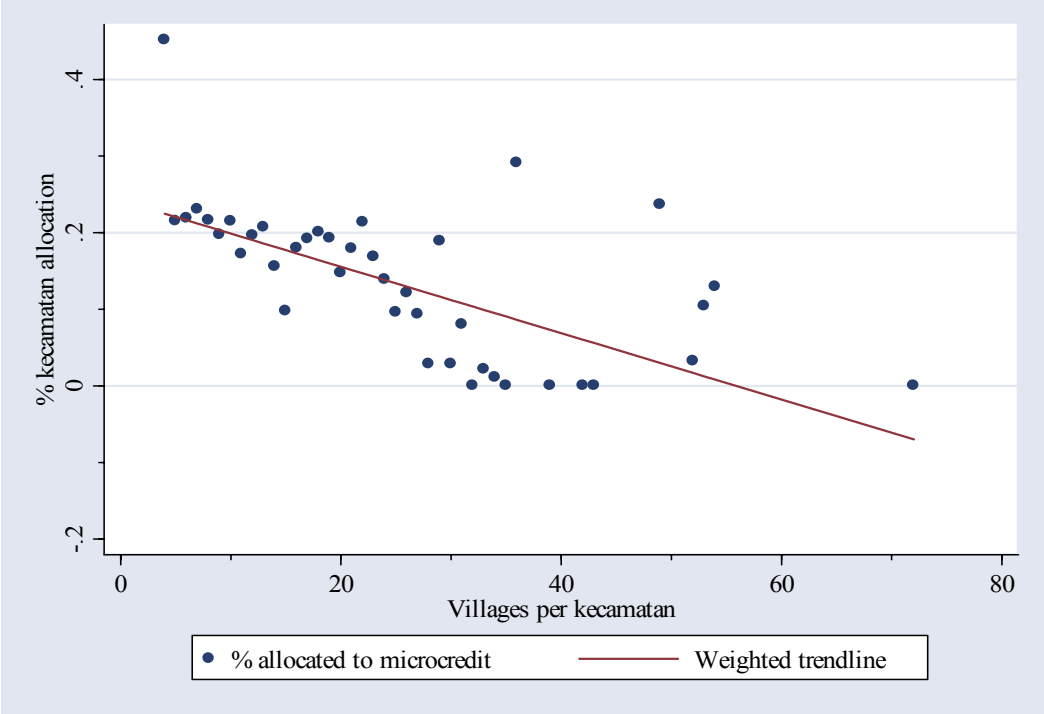


Figure 4b: Markers proportional to the number of subdistricts