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Self-Help Groups and Income Generation in the Informal Settlements of Nairobi

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Abstract

The aim of this paper is to understand the functioning and the scope of self-help groups in the informal settlements of urban areas as a means of generating income for poor households. The paper uses a unique dataset collected by the author in 1999 surveying all individual group members from several informal settlements of Nairobi. It studies the individual determinants of earnings within groups and relates group composition to various indicators of group functioning. Sex, age and ethnic identity are among the most important determinants of individual reliance on group income and of access to group loans. Heterogeneity in earnings among members is shown to reduce their ability to borrow from the group as a whole but not from each other. The impact of ethnic and other forms of heterogeneity on the division of labor, choice of compensation schemes, sanctioning technology and recruitment criteria is also described.

Keywords: self-help groups, cooperative, participation, social capital

JEL codes: O12, P13, Z13

1   Introduction

Recent years have seen a growing interest on behalf of economists and other social scientists in the role played by *groups* in the process of economic development. Drawing upon the conceptual framework of Putnam (1993), some studies have looked at civic engagement in a variety of associations, including recreational and socio-political ones, to argue that the mere participation in such groups can have an economic impact by providing opportunities for members to share information, enforce informal transactions, and coordinate on cooperative outcomes.[1]   Other studies have focused on the role of groups in the informal credit market and have analyzed their incentive schemes and economic performance.[2] For some of the poorest individuals in developing countries, however, groups are more than socio-political associations or saving devices: they are 'employers'. People who do not have access to the formal labor market and whose options in the informal market are relatively unattractive can often benefit from pooling resources and working in groups. To what extent can informal groups constitute a reliable source of income for the poor? What factors affect group performance, and in particular, how does the 'social' composition of the group affect the organization of production and the allocation of resources to members?

This paper attempts to address the above questions by employing a unique dataset on 'self-help' groups with income generating activities collected by the author in the informal settlements of Nairobi in 1999. Information has been collected on *each and every member* of the surveyed groups, which allows to construct exact measures of the composition of the group in terms of income, education, age and ethnicity. This is particularly important when investigating the impact of heterogeneity on group performance. The advantage of this methodology compared to the studies that infer within-group heterogeneity from the heterogeneity of the population at large is that it accounts for the possibility that people sort into groups that are more or less heterogeneous than the whole population. By having a 'census' of the entire group, the matching between group composition and individual outcomes can

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[1] In the context of developing countries, see for example the work of Narayan and Pritchett (1999), Grootaert (1999), and Isham (2001).

[2] See the surveys by Besley (1995) on ROSCAs and other nonmarket institutions, and by Ghatak and Guinnane (1999) on group lending.

thus be estimated more precisely.

The main findings of the empirical analysis can be summarized as follows. First, within each group individual earnings increase with age and decrease with the number of years the individual has been living in the current place. The time spent in the group, as a proxy for experience, has a positive but insignificant impact on earnings, suggesting that the notion of 'seniority' rewarded by these groups is strictly related to age. Second, women and young people are relatively more dependent on group activities for their living, while adult males often have an alternative source of income. 'Dependency' is also negatively correlated to the income that the individual was earning before joining the group, suggesting that group production serves a particularly crucial function for members with low 'outside options'. Third, among the most valuable functions of these groups is that of giving access to loans to otherwise credit constrained individuals. About 64 percent of the respondents say that in case of need they borrow from the group as a whole or from individual members. The most important factor to gain access to such loans seems to be speaking the same language of the chairperson: ceteris paribus, members of the same ethnic group as the chairperson are 20 to 25 percentage points more likely to borrow from the group or from other members. Fourth, while ethnic fragmentation and wealth inequality do not affect the likelihood of borrowing, inequality in group earnings has a negative and significant effect. The effect is particularly strong in groups that experienced financial losses, suggesting that when the available capital to lend is particularly scarce and members are not remunerated 'uniformly' it may be difficult to reach consensus on who should get a loan. This hypothesis is corroborated by the fact that when loans from the group as a whole are distinguished from loans from individual members, earnings inequality negatively affects the former but not the latter. Finally, apart from affecting the allocation of loans, heterogeneity seems to influence the organization of production. In more ethnically heterogeneous groups it is less common for members to specialize in different task and more likely that everyone does the same job. Also, ethnic fragmentation seems to be associated with remuneration schemes in which every worker gets the same fixed amount, rather than being paid on the basis of the number of hours worked or the number of items produced. Again, this may be due to the relative difficulty of reaching consensus in heterogenous groups. The ability to sanction free riding behavior on contributions to the group

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is also negatively related to ethnic fragmentation, while that of sanctioning absenteeism and other irregular behavior is not. Finally, no pattern emerges between group composition and the criteria for recruiting new members.

The remainder of the paper is organized as follows. Section 2 briefly reviews the related literature. Section 3 describes the setting, starting with a description of the informal sector and of self-help groups in Kenya and then moving to the specific data used in this paper. Section 4 contains econometric results on income generation, access to credit, and the organization of production. Section 5 concludes.

2   Background literature

The issue of heterogeneity and group participation has received increasing attention in recent years. Alesina and La Ferrara (2000) analyze the impact of racial, ethnic, and income heterogeneity on individual propensity to join socio-political associations in the US and find that it has a negative effect. La Ferrara (2001) models the role of wealth inequality in villages where people have the choice of joining groups that provide different net benefits to the rich and the poor, and shows that when access is unrestricted, higher village inequality translates into lower participation because the relatively rich opt out of the groups. Both papers differ from the present work in two respects. First of all, they address the question of how groups form (what determines the likelihood that an individual will join), and not how they function. Secondly, they relate group formation to "society wide" heterogeneity as opposed to within-group heterogeneity. In fact, the link tested by those papers is from inequality (or racial fragmentation) in the "pool" from which members are drawn, to individual choices regarding group participation. While this paper employs exact indexes of within group heterogeneity, it has the limitation of taking membership as exogenous, without accounting for the motivations that may induce people to join homogeneous versus heterogeneous groups. Developing a comprehensive framework (and suitable data) to account for both group formation and internal group composition and functioning seems an important task for future work.

A strand of the literature which is closer to the current paper is the one on heterogeneity and group performance. This has been explored in the context of project maintenance by Khwaja (2000),

who uses project level data on 132 community-maintained infrastructure projects in the Himalayas. The author finds that, ceteris paribus, socially heterogeneous communities have poorly maintained projects, and that the relationship between maintenance and inequality in projects returns is U-shaped. Miguel (2000) and Gugerty and Miguel (2001) analyze the effect of ethnic diversity on school funding and school organization in Kenyan villages. Both studies find that ethnic fragmentation is associated with worse outcomes, and suggest mechanisms though which this effect may be generated. In particular, Gugerty and Miguel find that the more racially heterogeneous the pupils' population, the lower are parental participation in school activities, school committee attendance, and teacher attendance and motivation. The authors suggest that these results may be due to the fact that social sanctions apply within ethnic groups, hence fragmented communities have lower scope for sanctioning noncooperative behavior. In a recent study, Karlan (2001) examines the impact of members' composition on savings and repayment performance in group lending programs offered by a Peruvian organization. The author focuses on geographic and 'cultural' dispersion (Western versus indigenous) and finds that both types of heterogeneity increase the probability of defaulting on group loans. As for savings, which can be viewed as a form of 'collective' good to the extent that capital is lent back to the members, geographic distance among the members significantly reduces saving rates, while cultural dissimilarity has a negligible effect. Finally, Wydick (1999) estimates the determinants of repayment performance and of intra-group insurance in a sample of 137 borrowing groups from Guatemala, and finds that 'social ties' (as measured by the number of years members have known each other and by the degree of friendship and social interaction before and after joining the group) have a negligible impact on group performance. What seems to matter most is the availability of sanctioning mechanisms and the possibility of monitoring (as proxied by geographical distance and knowledge of each other's business).

The present study builds upon the above literature with a few significant modifications. First, it considers groups that provide the main source of income for most of the members. In other words, individuals' stake in these groups is particularly high in this case as compared to project maintenance groups or school committees, and possibly even to borrowing groups, in that members mostly depend on production activities organized within these groups for their daily living. As such,

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it is important to investigate what determines individual earnings and the 'dependency rate' on group income, as well as group performance. And even when the attention is on the latter, we may expect the effects of characteristics such as heterogeneity to be amplified –and possibly different– in this context. Secondly, as will be described in the next section, the setting in which these groups operate is as precarious and socially disrupted as one may conceive, due to the virtual absence of property rights in the squatter communities and to the high degree of in and out-migration. This can also be expected to have an impact on group functioning. Finally, compared to some of the above studies in which the degree of heterogeneity and other group characteristics were estimated based on the leaders' evaluation, a key ingredient of the survey methodology in this study was to interview *all* members of each group and to compare their 'subjective' assessments with 'objective' measures of group composition. This reveals some interesting differences, for example, in the case of wealth and income inequality.

Before turning to the description of the setting in which the data was collected, it is useful to compare this study to the earlier work by Abraham, Baland and Platteau (1998). The authors surveyed 510 households from one of the most populated informal settlements of Nairobi, Kibera, collecting data on participation in different types of groups and on the socio-economic background of the respondents. The groups are then divided into several categories, such as rotating savings and credit associations, burial societies, health groups, etc. and their main characteristics in terms of organizational structure, contributions, and composition are examined. While similar for the context, the present paper differs from the work of Abraham et al. in three respects. First, their approach is purely descriptive, while this paper employs multivariate analysis. Second, among their respondents some are members of a group and some are not, so they could estimate participation rates but not know who else is in the same group of a respondent. In this paper no participation regression can be run, because every respondent is by definition member of some group, but the identity and characteristics of all other group members are known. Finally, the data of Abraham et al. has a broader coverage, including groups with and without investment or production activities, while in this paper the focus is on groups with income generating activities.

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3 The setting

3.1 Informal settlements and self-help groups in Nairobi

It is estimated that in 1993 more than 55 percent of the population of Nairobi lived in 'informal settlements', i.e. squatter communities where inhabitants have no legal right or at most a quasi-legal right, in the form of temporary occupation right from the Local Authority or a letter from the Chief.[3] These informal settlements in turn cover less than 6 percent of Nairobi's residential area, which leads to an average density of 250 dwellings and 750 persons per hectare as compared to about 10 to 30 dwellings and 50 to 180 persons per hectare in upper and middle income areas (Alder et al. (1993)). Until the late 1970s the government policy was to demolish informal settlements throughout the country, while since the early 1980s they gradually became tacitly accepted, with occasional episodes of demolition and resettlement of the population to other areas (for example, in Nairobi Muoroto and Kibagare in 1990, Mitumba in 1993). Uncertainty over basic property rights adds to that over land tenure to generate a pattern of extreme insecurity where almost no investment is made in infrastructure and local public goods. Dwellings are entirely made of temporary materials such as mud, wattle and timber offcut, and waste disposal is done on the street and in the rivers. Most sites have virtually no sewerage systems and hygienic conditions are extremely poor.

The inhabitants of squatter communities usually work in the informal sector. Most of them are involved in hawking, are occasionally employed for the day, or operate small businesses without licenses. A non-negligible fraction is also involved in illegal activities. Particular relevance have small businesses known as "jua kali", which encompass manufacturing activities, repair and services, and employ a large number of mechanics, carpenters and construction workers that serve other areas of Nairobi as well.[4] The attitude of the City Council has historically been that of discouraging this type of employment, but in recent years the official stand on this issue has shifted, possibly in recognition that the lack of employment opportunities in the formal sector for many slum dwellers called for

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[3]Technically, when some form of legal rights exists these may not be viewed as "squatter communities", but in this paper that terms will be used interchangeably with "informal settlements" and "slum".

[4]The term "jua kali" was originally created to indicate people who work "under the sun" with no permanent structure, but has extended to represent the whole informal small business sector.

alternative forms of employment. Public opinion and policy makers have thus started to view the jua kali sector as a valuable opportunity for unemployed youth to enter the (informal) labor market and contribute to domestic product generation (Otieno Okumu (1999)).

Jua kali workers may have formal education, but they often receive informal training on the job, for which they may have to pay their employer (Ng'ethe and Ndua (1985)). In addition to training costs, people who want to start their own business need start up capital which, though limited compared to licensed businesses, may be far beyond the possibilities of a typical slum dweller. For this reason it is becoming increasingly common among the urban poor to join resources and form the so called "self-help" groups, which operate in the informal sector with income generating activities similar to those of individual jua kali workers, but are organized approximately as a production cooperative. The degree of formalization of these groups, as well as their stability and the scope of their activities, vary a lot. It seems therefore valuable to undertake a first step towards a quantitative assessment of the economic potential of these groups and of the determinants of their economic performance.

3.2   The data

The data used in the empirical analysis below was collected by the author in the months of July and August 1999 in five among the most populated informal settlements of Nairobi: Dandora, Gikomba, Kayole, Korogocho, and Mathare Valley. In consultation with local community workers, a list of the self-help groups active in these areas was prepared and twenty groups were selected to be interviewed, based on their location, type of activity, size, age and sex of the members.[5] A key requirement was that the group had some type of income generating activity (though not necessarily the *only* activity of the group). Income generating activities in the sample span as different fields as crafts-making (wood carving, basket weaving, etc.), tailoring, garbage recycling, education and health services, informal lending, etc. Preliminary meetings were set up with the chairperson and secretary of each group, and a list of all active members was obtained. Based on this list, individual

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[5]The criterion was to have some degree of diversification among the groups in terms of size, productive activities and location, as well as age and gender of their members.

interviews were scheduled with each member for the survey modules on demographics, income, and personal assessment of group functioning. An additional module was administered separately to the chairperson, the treasurer, and the secretary of each group to gather information on the history, organizational structure, and costs and revenues of the group. Given that the methodology of this study required a complete survey of *all* participants in the group, only groups for which at least 90 percent of the members were successfully interviewed were retained in the sample. This leaves us with 18 groups for a total of 303 individual members. While the sample is certainly not representative of all groups in the informal settlements of Nairobi, it can provide a reasonable representation of small and medium-sized groups with a focus on income generation and a low degree of formalization.

[Insert table 1]

As can be seen from table 1, the groups in the sample differ substantially in terms of size and of the number of years they have been in place. The smallest group has 6 members and the largest has 30, with an average of 14 members per group. The average group has been in place for almost 5 years, with a minimum of 9 months and a maximum of 16 years. Groups are mostly mixed in terms of gender, with 33 percent of them being all-women and 11 percent being all men. These figures are not surprising, given the prominent role of women groups in the informal sector of most developing countries. The average group member is 31 years old, but this figure hides substantial differences in the sample: the 'youngest' group has a mean age of its members equal to 19, and the 'oldest' group of 60. Approximately 10 percent of the respondents has no formal schooling, 48.4 percent has Class 1-8, and the rest has higher education. This is an important piece of evidence because it shows that in the reality of urban informal settlements with strong barriers to entry in the formal labor market, self-help groups cater not only to unskilled workers. Finally, members' wealth was assessed on the basis of ownership of a basket of durable consumption goods such as radio, TV, camera, bike, car, stove, electric or gas cooker, stove, clock, sofa, bed and mattress, weighted by an estimate of their prices in the informal market.[6] Based on this index, the average respondent owned durables for 7,379

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[6]The average prices for these items on the second hand market at the time of the interview were as follows (in Ksh). Byke: 4000, car: 180000, electric cooker: 4800, gas cooker: 4500, stove: 400, charcoal burner: 200, sofa: 4500, bed: 2000, mattress: 1100, mat: 350, radio: 700, tv: 4000, camera: 2000, wall clock: 900.

Kenyan Shillings (Ksh), which amounted to 99.6 US dollars in August 1999 prices. Groups differed substantially in wealth, though, with the average member of the 'poorest' group having 2,450 Ksh, and that of the richest having ten times as much.

In what follows we turn to multivariate analysis to investigate how individual and aggregate characteristics affect the economic performance of these groups.

4   Empirical results

4.1   Income generation

The first aspect to be considered is the potential for income generation provided by these groups. One can estimate the following earnings function:

$$y_{ij} = X_{ij}\beta + D_j\gamma + \varepsilon_{ij} \tag{1}$$

where y_{ij} is the log of hourly earnings of individual i in group j, X_{ij} is a vector of individual characteristics, D_j if a set of group dummies, and ε_{ij} is an error term. Individual characteristics, which should capture labor productivity, include sex, marital status, age, education, and experience (proxied by the number of years the respondent has been in the group), as well as language dummies. A non-linear specification is chosen for age, education and experience, to allow for nonlinearities in the returns to human capital. Group fixed effects are introduced to control for differences in remuneration schemes across activities.

[Insert table 2]

Table 2 reports coefficient estimates for (1), with White-robust standard errors in parenthesis. Group dummies are omitted from the table, but a standard F test in all cases rejects the null that their coefficients are jointly equal to zero. When a small set of demographic controls is included (column1), the only significant determinant of hourly earnings is age: within each group there are positive but decreasing returns to age. Surprisingly education is not significant (the omitted category is people with no formal education), nor are sex and marital status. Column 2 introduces two more

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regressors: the number of years the respondent has been working in the group (and its square), and the number of years he or she has been living in the current place of residence. The coefficients on the former variable are positive but not statistically significant: in these groups there seem to be returns to 'seniority' in the sense of age, but not in the sense of experience. As for the latter variable, residential stability has a negative and significant effect on individual earnings. This is not surprising if we consider that the areas of study are probably the poorest and most degraded of urban Nairobi, so having resided somewhere else probably means higher 'unobserved ability'. This interpretation may also help explain while the experience variable is not significant. On the one hand, spending more years in the group increases job-specific skills; on the other hand, to the extent that high ability workers may be the first ones to quit for formal jobs, length of work within the group may end up capturing low ability. In an attempt to control for this, column 3 introduces among the regressors individual earnings before joining the group (in log). The previous results remain virtually unchanged and past earnings are insignificant, indicating that this variable is a poor proxy for unobserved ability.[7]

In column 4 a set of language dummies is introduced to control for whether the respondent is Kikuyu, Luo, or Kamba (the omitted category is Luhya and other ethnicities). Furthermore, the dummy 'Dominant language' takes value 1 if the individual speaks the same language as the majority of other group members, and zero otherwise. This is aimed at capturing possible ethnic favoritism, as found for example by Collier and Garg (1999) in the Ghanaian labor market. As can be seen from the table, the coefficient on this variable is not statistically different from zero. A possible explanation is that when the decision process is not democratic, what counts is not belonging to the majority, but being the same ethnicity as the leaders. The last column introduces a dummy for whether the respondent speaks the same language as the chairperson of the group when decisions are reported to be made by leaders as opposed to democratically, but the conclusion remains the same.

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[7]This is not too surprising, given the heterogeneity of the sample in terms of age: for young respondents low pre-group earnings may simply reflect an out-of-the-labor-force status during school years, while for older ones the same is not true.

The coefficient on this variable is positive but not statistically significant.[8]

A second aspect to consider in order to assess the role of these groups for income generation is to what extent they offer better earning opportunities compared to individual jobs in the informal sector. When asked what was the most important reason for joining the group, 39% of the respondents said that they did not have another job, 25% said that they had a job but the job the group was better, 19% indicated the access to side benefits such as health or training opportunities, and the rest gave other reasons. At first sight, then, the answer to the above question is not obvious. A possible way to rephrase the question is to ask to what extent people are dependent on these groups as their main source of income, and estimate the determinants of this 'dependency ratio' through multivariate analysis.

[Insert table 3]

The dependent variable in table 3 is the ratio of individual income earned in the group over total individual income, expressed in percentage. The sample average for this variable is 75%, indicating a fairly high dependence on group earnings. The controls in columns 1 to 3 are the same as those introduced in table 2. The single most important correlate of group dependency is gender: other things equal, the share of women's income coming from the group is about 11 percentage points higher than that of men. Though not statistically significant at conventional levels, the coefficients on the age variables show that group dependency declines as members become older, suggesting that these groups may serve a particularly valuable function for young people who do not have access to alternative jobs. Column 4 attempts to control for alternative employment opportunities by introducing among the regressors the income that the individual was earning *before* joining the group. Interestingly, this variable is negative and highly significant: people who were earning more in the past are less dependent on the group to earn a living. Notice also that from column 4 dependency decreases with education up to Form 4 level, as one should expect.[9]

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[8] The variable 'Chair's language' is an interaction between a dummy equal to 1 if the language of the respondent is the same as that of the chariperson, and a dummy equal to 1 if the respondent declares that 'leaders decide' in the group. Using only the former dummy also yielded an insignificant result.

[9] The cofficient on Advanced education cannot be estimated precisely due to the small incidence in the sample (only 2.6%) of respondents with a technical or college degree.

4.2 Access to credit

Aside from the cash flow provided by the group in the form of earnings, responses to the survey suggest that many members value the possibility of resorting to the group for help in case of need. This section will examine to what extent this occurs with respect to credit, i.e. what factors affect members' access to group loans.

[Insert table 4]

Table 4 estimates the probability of borrowing from the group or from individual members in case of need as a function of the respondents' characteristics plus group fixed effects. The dependent variable takes value 1 if, when asked "If you need a loan, who do you borrow from?", the respondent answers "Group as a whole" or "Individual group member". It takes value 0 if the answer is "Bank", "Relative", "Friends *not* in the group", or "Nobody". The regressors are meant to control both for demand and for supply factors, as will be clear from the discussion. Column 1 reports marginal probit coefficients on demographic variables only. It is surprising that only the language dummies are statistically significant. An interesting regressor is the dummy identifying respondents that speak the same language as the chairperson when decisions are taken by the leaders. Ceteris paribus, speaking the language of the chairperson increases the probability of borrowing from the group or from members by 20 percentage points, which is a very sizeable effect. Column 2 adds two measures of individual wealth, to control for the need to borrow. The first is a dummy equal to one if the respondent or a relative owns a house, which for the reasons explained in section 3.1 is rather uncommon in the informal settlements under investigation. The second is the index of durable goods described in section 3.2. Neither index turns out to be significant in column 2. While home ownership can be considered exogenous given the small size of group loans, one could argue that ownership of durable assets is an endogenous variable or that it is measured with error. Column 4 of table 4 reports two stage least squares estimates of a linear probability model when wealth is instrumented with three variables: income before joining the group (in logarithm), the number of groups to which the respondent belongs (excluding the current group), and a dummy equal to one if group work is the main source of income for the individual. Column 3 reports the uninstrumented linear

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probability model for comparison. When wealth is instrumented, its coefficient becomes negative but is still insignificant. The Hausman test fails to reject the joint null of weak exogeneity and no measurement error in wealth (p-value is .24), and according to the Sargan overidentification test our instruments are valid (p-value of .36). This seems to suggest that the concerns about reverse causation and measurement error are not warranted empirically. Notice that the "Chair's language" variable remains significant in all cases and its coefficient is even bigger in the 2SLS regression.

[Insert table 5]

Apart from including group fixed effects, the analysis so far has not attempted to relate ability to borrow to any specific group characteristic. Table 5 addresses this point by adding to the individual controls listed in column 2 of table 4 (not displayed) a number of group level controls. The first two are measures of resources available in the group: group profits per capita (which may serve as capital to advance loans) and average wealth of group members (in case members draw upon their own personal capital to lend to others). Neither variable has a significant impact on access to credit. The remaining variables are indexes of heterogeneity within the group.

Fragmentation indexes measure the likelihood that two randomly drawn member belong to different 'categories' and are computed as follows:

$$Fragment_j = 1 - \sum_k s_{kj}^2 \qquad (2)$$

where j represents a group, k a category, and each term s_{kj} is the share of category k in the total membership of group j. For ethnic fragmentation, for example, the categories are Kikuyu, Luhya, Luo, Kalenjin, Kamba, Kisii, Meru, Mijikenda, Masai, Somali, Nubian and Other. In this case, s_{kj} is the fraction of group members speaking each of the above languages. The other fragmentation indexes are computed in a way analogous to (2) but instead of using ethnicity we use the fraction of individuals in a group with the same education level (No formal education, Class 1-8, Form 1-4, Technical or College), and residential location.[10] All indexes are constructed in a way that increasing values correspond to more heterogeneity.

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[10]The different 'categories' in the residential fragmentation index were the sub-areas where members resided within each slum. For example, Korogocho was divided into Grogon, Gitadhuru, Highridge, Nyayo, Kisumu Ndogo, Ngomougo, and so on for the other settlements.

From the studies reviewed in section 2, both ethnic and geographic fragmentation can be expected to play a significant role to the extent that they capture possibilities for information flows, monitoring and enforcement. Education fragmentation instead is usually not employed in the literature, but becomes relevant in the present study because different education levels may represent complementary production skills. As can be seen from the table, of the fragmentation indexes only that related to education is significant: members of groups in which widespread education levels are represented are more likely to borrow, possibly because of complementarities among members themselves.

The last two regressors in column 1 are Gini coefficients of inequality either in wealth (durable assets ownership) or in earnings from the group. It is noticeable that the latter has a negative and highly significant coefficient, indicating that when members earn very different amounts from group activities it is less likely that loans are advanced either by the group as a whole or by individual members. Column 2 expands on this result by allowing the coefficient on group income inequality to differ depending on whether the group has positive or negative profits. Interestingly, the negative effect of inequality on credit is found in groups that have financial difficulties but not in those that make positive profits. In other words, having members who earn very different amounts does not harm their ability to borrow if the pie is large enough for a number of them, while it does undermine lending by the group or among individuals when members have to struggle over resources.

[Insert table 6]

Borrowing from the group as a whole or borrowing from individual members could make a difference, especially in the light of the above result. Table 6 reports the estimated coefficients from two multinomial logit regressions in which the explanatory variables are the same as in table 5, but the dependent variable is a categorical variable taking value 1 if in case of need the individual borrows from the group as an 'institution', 2 if he or she borrows from a single member, and 0 if the lender is outside the group. The latter is the omitted category in the table. Inequality in group earnings decreases the likelihood of both types of loans, but is statistically significant only for 'group' loans. This suggests that allowing for differences in remuneration of the members does not significantly

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undermine their willingness and ability to lend to each other, but it does undermine the ability to use the group as a source of credit, especially when the group runs in financial difficulties (see column 2). This may be due to the difficulty of agreeing on how to allocate the common funds when these are very limited. The next section will look more closely at the various forms of heterogeneity among group members and at the relationship between heterogeneity and group organization.

4.3 Heterogeneity and group organization

One of the clear patterns that emerged from the previous analysis was that certain types of heterogeneity had a stronger impact than others. In particular, inequality in individual earnings from the group significantly reduced the ability to borrow from the group as a whole, while inequality in "wealth", as measured by the index of durable goods, did not. It is useful to investigate why this is the case.

In addition to asking about 'objective' wealth, the questionnaire asked each respondent the following question: "Leaving aside the income from this group, do the members have the same wealth?"; and prompted the following responses: "Mostly the same", "Some differences", "Very different". Figure 1 relates this 'subjective' notion of inequality to the objective ones used in the regressions.

[Insert figure 1]

The vertical axis in each panel measures the fraction of members of each group saying that members' wealth is "very different". The horizontal axis reports for each group the Gini coefficient for individual wealth (top panel), the Gini for earnings from the group (middle panel), and the ethnic fragmentation index (bottom panel). For example, a point such as (.23, .54) in the top panel represents a group in which the Gini coefficient for wealth is .23 yet 54 percent of the members think that differences in wealth among them are substantial. The size of the circles in the figure is proportional to group membership: points identified by larger circles correspond to larger groups.

It is quite striking how in the top panel no relationship at all emerges between the actual level of wealth inequality and that *perceived* by the members. On the contrary, the middle panel

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shows that subjective inequality is positively correlated with the extent of inequality in income received by different members from the group (the correlation between the two is .64). This result can be rationalized by presuming that people have limited information about each other's personal belongings, but that they have fairly accurate information about how much each member is paid, which matches the environmental conditions of the informal settlements and the groups surveyed pretty closely. If subjective beliefs are formed this way, then, it is not surprising that inequality in earnings affects group functioning more than wealth inequality: members' ability to agree on collective outcomes may depend more on their beliefs than on their objective conditions.

The bottom panel in figure 1 plots the fraction of people who think that members differ a lot in wealth against the likelihood that two randomly drawn members of the group belong to different ethnicities. The link between ethnicity and wealth is not obvious in this context, but it may be that simply by considering a member as an "outsider" leads an individual to label him or her as very different in terms of wealth. The figure suggests a weak positive association between the two dimensions (the correlation coefficient is .10). Finally, in no case the heterogeneity indexes considered vary systematically with size, which means that higher heterogeneity does not simply capture a larger group of participants (which may be considered a source of collective action problems).

[Insert table 7]

In the light of the above discussion it is useful to examine the impact of various dimensions of heterogeneity on the organization of production within the group. The first column of table 7 reports summary statistics on the percentage of groups that fall into different forms of organization: this provides a broad idea of the way these groups function. The same statistics are then computed splitting the groups into 'High' and 'Low' heterogeneity depending on whether their degree of heterogeneity is above the median or not (where the median is the index of heterogeneity of the median group). The dimensions of heterogeneity considered are ethnic, in wealth, and in education. Inequality in earnings from the group is omitted because it is endogenous to the organization of production chosen. Comparing the incidence of the various organizational forms in high and low heterogeneity groups can be a first step towards understanding how heterogeneity affects group functioning, though such

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interpretations will have to be taken with caution, given the small number of observations on which table 7 is based (there are only 18 different groups in the sample).

Starting from the division of labor, on average 33% of the groups assign the same task to everybody, 45% allow for specialization, and 22% have different tasks in which the members alternate, so that no one is systematically assigned to a given task. When we split the sample according to their ethnic fragmentation (columns 2 and 3) the pattern is different. Highly fragmented groups tend to be ones in which everyone does the same job, while in relatively homogeneous groups it is more common to observe specialization in tasks. A possible explanation, which will be further advanced below, is that when members are heterogeneous it is more difficult to reach consensus on something that would generate disparities in economic treatment or in responsibilities, hence a "flat" rule becomes more attractive. Notice that this does not hold for heterogeneity in wealth, which, as argued above, is likely not to be common knowledge among the members. As for education levels (columns 6-7), more heterogeneous groups display more specialization, while in homogeneous ones everyone tends to do the same thing. This seems reasonable, given that people with different education are 'naturally' suited to different tasks.

Turning to remuneration schemes, groups tend to fall into two broad categories: those that pay a fixed amount equal for everyone (55.6%) and those that pay in proportion to the number of items produced (33.2%). Occasionally, they pay according to the number of hours worked (5.6%) or to the contributions made by the members when the group started (5.6%). When the sample is split according to ethnic fragmentation, more heterogeneous groups tend to pay a 'flat rate', while more homogeneous ones pay in proportion to output. As above, this can be interpreted as resulting from problems in reaching agreements that involve differential treatment of heterogeneous members. Results for wealth inequality go along the same lines, while those for education heterogeneity again follow the expected allocation of 'competence'.

Previous studies (e.g., Gugerty and Miguel (2001)) indicate the sanctioning technology as the key mechanisms through which ethnic fragmentation affects group functioning. The third panel of table 7 reports data on the fraction of groups that employ a penalty (monetary fine or suspension) in case of missed contributions and in the case of absenteeism and other irregular behavior. The

average number of times in which the given punishment was applied in the past year is also reported. In the full sample, the percentage of groups imposing a penalty for missed contributions is 38%, and that for irregular behavior is 47%. When these statistics are computed separately for 'high' and 'low' heterogeneity groups, we find that only 14% of the ethnically heterogeneous groups penalize missed contributions, while 67% of the homogeneous ones do. Wealth inequality works in the same direction, though the discrepancy is somewhat smaller. As for education heterogeneity, the pattern is reversed but we have already seen that this index seems to capture skill complementarities more than 'conflict'. From the number of times in which the penalty is applied, it seems that when ethnically fragmented groups do envisage a penalty, they apply it more often than others (though this may be due to higher *need* for punishment due to increased tension, as opposed to greater effectiveness).[11] Sanctions for absenteeism and irregular behavior seem more or less equally likely and uniformly applied between high and low heterogeneity groups, suggesting that the effect of fragmentation may be closely related to control over economic resources.

Finally, the last panel of table 7 explores whether there is a relationship between the criteria for recruitment and the composition of the group. For example, if new members are chosen on the basis of their ability we may expect groups to be more heterogenous than if they are chosen because they are 'friends' of other members. In the aggregate, group leaders say that the single most important criterion to select new members is 'commitment' (50% of the groups), indicating the degree of uncertainty faced in their everyday work. The remaining criteria are ability (22%), need of the member (22%), and only in rare cases friendship (5.6%). Interestingly, no clear relationship emerges between the recruitment criterion and the heterogeneity of the group, which may be due to the limited importance of the 'friendship' factor in determining who joins. When individual members were interviewed about the main reason for joining the group, only 6% said that they had friends in the group. All this is comforting because it is consistent with the interpretation that the causal link goes from heterogeneity to decision making and group performance, and not the opposite. In fact,

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[11]The apparent inconsistency between the presence of a penalty for missed contributions and the number of times in which it is applied may be due to measurement error, but it may also indicate that, even when in place, sanctions in heterogeneous groups do not deter deviations, while in homogenous ones they serve a pre-emptive role.

if group composition were the result of a 'biased' decision making processes, we should expect the method of recruitment to be correlated with the degree of heterogeneity, which from table 7 is not.

5   Conclusions

Overall, the empirical evidence in this paper suggests that self-help groups are an important source of income for certain categories of people, e.g. women. Individual earnings within the group seem to increase with age more than with job experience (as proxied by the number of years spent in the group), and are negatively correlated with the time spent in the current place of residence. This probably reflects the precarious living conditions of the slums, which induce most skilled people to leave if they have the opportunity to do so. Production groups also serve an insurance function by giving access to informal credit: 64 percent of the respondents borrow from the group from individual members in case of need. An important channel to gain access to such loans seems to be the ability to speak the same language as the chairperson,leading to a probability increase of 20 to 25 percentage points at the mean. Group composition affects both the extent to which borrowing can be carried out within the group, and the organization of production in terms of division of labor, compensation schemes, and sanctioning technology. The data at hand do not allow to estimate these effects precisely, nor do they give insights into how groups get to be more or less heterogeneous. However, they seem to suggest that fragmented groups may be limited in their choices by the need to curb the higher potential for conflict within the group. To the extent that the resulting choices (lower access to group loans, simpler production and compensation schemes, lower ability to sanction) are suboptimal from an efficiency point of view, the case for understanding the roots of social cohesion and 'social capital' within these groups is strengthened.

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Appendix

A.1 Summary statistics

Variable	No.obs.	Mean	Std. Dev.
Age	303	31.09	11.66
Age squared	303	1101.98	939.98
Avg wealth of group members (Ksh)	303	7367.46	5675.09
Borrow	302	.64	.48
Chair's language	302	.06	.22
Dominant language	302	.74	.44
Educ1-8	302	.48	.50
Educ Form1-4	302	.39	.49
Educ Advanced	302	.03	.16
Educ fragmentation	303	.63	.11
Ethnic fragmentation	303	.35	.27
Female	303	.50	.50
Gini income from group	303	.22	.15
Gini wealth	303	.38	.13
Group profits per capita (Ksh)	280	3271.96	7367.66
Hourly earnings from group (Ksh), ln	302	2.50	1.06
Income before group (Ksh), ln	300	4.32	3.86
Kamba	302	.36	.48
Kikuyu	302	.38	.48
Luo	302	.14	.35
Married	303	.43	.50
Own house	303	.26	.44
Wealth (Ksh)	302	7379.14	19221.42
# years in group	303	3.14	3.37
# years in group, squared	303	21.19	45.65
# years resident	303	11.64	7.69
% of total income coming from group	300	76.43	37.55

Table 1: Basic group characteristics

		Mean	*Min*	*Max*
Size (regular members)		14.22	6	30
Duration (yrs)		4.92	.08	16
% Female members		50%	0	100%
Only men	11.1%			
Only women	33.3%			
Mixed, mostly men	33.3%			
Mixed, mostly women	22.2%			
Members' age		31.09	15	73
Group avg. median		28.68		
Group avg. min		19.53		
Group avg. max		60.22		
Members' education				
Class 1-4	7.3%			
Class 5-8	41.1%			
Form I-II	12.9%			
Form III-IV	25.8%			
Form V-VI	0.0%			
Educational college	2.0%			
Technical institute	0.7%			
Basic adult educ.	2.3%			
No schooling	7.9%			
Members' wealth (Ksh)		7379.1	350	197300
Group avg. median (Ksh)		5134.4		
Group avg. min (Ksh)		2450		
Group avg. max (Ksh)		24192.3		

Table 2: Earnings functions

Dependent variable: hourly earnings from group (ln)

	[1]	[2]	[3]	[4]	[5]
Female	-.134	-.130	-.123	-.136	-.135
	(.116)	(.119)	(.121)	(.119)	(.119)
Married	-.094	-.087	-.085	-.092	-.086
	(.070)	(.069)	(.070)	(.073)	(.073)
Age	.056**	.059**	.054**	.059**	.060**
	(.019)	(.019)	(.023)	(.019)	(.019)
Age squared[a]	-.065**	-.069**	-.063**	-.069**	-.070**
	(.023)	(.022)	(.026)	(.023)	(.023)
Educ1-8	.001	-.001	.018	.014	.021
	(.173)	(.169)	(.184)	(.180)	(.179)
Educ Form1-4	-.223	-.228	-.204	-.221	-.204
	(.179)	(.175)	(.196)	(.183)	(.183)
Educ Advanced	-.097	-.093	-.063	-.091	-.071
	(.195)	(.192)	(.203)	(.198)	(.199)
# years in group		.018	.004	.012	.022
		(.052)	(.053)	(.053)	(.054)
(# years in group)^2[a]		-.008	.064	.024	-.034
		(.318)	(.321)	(.322)	(.327)
# years resident		-.009**	-.008**	-.009**	-.008*
		(.004)	(.004)	(.004)	(.004)
ln Income before group			.011		
			(.012)		
Kikuyu				.081	-.066
				(.135)	(.141)
Luo				-.054	-.115
				(.146)	(.170)
Kamba				-.113	-.089
				(.160)	(.157)
Dominant language				-.158	
				(.130)	
Chair's language					.128
					(.125)
Constant	1.665**	1.652**	1.691**	1.795**	1.686**
	(.407)	(.440)	(.454)	(.419)	(.428)
No. obs.	301	301	298	301	301
Adj. R^2	.72	.72	.73	.72	.72

Notes: Table reports estimated OLS coefficients. Robust standard errors in parenthesis.
 * denotes significance at the 10 percent level, ** at the 5 percent level.
 All regressions include GROUP fixed effects.
 (a) Coefficients and standard errors multiplied by 100.

Table 3: Dependence on group for income

Dependent variable: % of total income coming from group

	[1]	[2]	[3]	[4]
Female	11.44**	11.06**	12.35**	11.14**
	(4.84)	(4.84)	(5.05)	(5.06)
Married	-1.58	-1.39	-1.39	-.80
	(2.97)	(2.92)	(3.00)	(3.08)
Age	-1.05	-1.05	-.94	-.34
	(.73)	(.73)	(.54)	(.74)
Age squared	.011	.012	.011	.005
	(.008)	(.008)	(.008)	(.009)
Educ1-8	-3.88	-4.05	-5.21	-6.84
	(4.52)	(4.54)	(4.81)	(4.94)
Educ Form1-4	-4.72	-5.14	-6.70	-9.45*
	(5.11)	(5.19)	(5.39)	(5.50)
Educ Advanced	-7.84	-8.02	-9.51	-12.34
	(10.55)	(10.37)	(10.50)	(9.71)
# years in group		-.53	-.48	-.60
		(2.14)	(2.17)	(2.17)
(# years in group)^2		-.07	-.07	-.06
		(.16)	(.16)	(.16)
# years resident		.266	.24	.19
		(.191)	(.20)	(.21)
Kikuyu			2.70	1.68
			(7.62)	(7.47)
Luo			8.09	7.43
			(6.05)	(6.02)
Kamba			5.62	5.86
			(6.35)	(6.35)
Dominant language			-3.06	-1.75
			(6.87)	(6.81)
ln Income before group				-1.26**
				(.46)
Constant	96.06**	94.90**	91.29**	87.69**
	(14.77)	(15.05)	(15.39)	(15.44)
No. obs.	299	299	299	296
Adj. R^2	.60	.60	.60	.61

Notes: Table reports estimated OLS coefficients. Robust standard errors in parenthesis.
* denotes significance at the 10 percent level, ** at the 5 percent level.
All regressions include GROUP fixed effects.

Table 4: Ability to borrow, individual determinants

Dependent variable = 1 if borrow from whole group or group member

	Probit		OLS	2SLS[c]
	[1]	[2]	[3]	[4]
Female	-.097	-.097	-.063	-.043
	(.105)	(.105)	(.085)	(.087)
Married	.002	-.003	.004	-.027
	(.069)	(.069)	(.068)	(.069)
Age	-.021	-.021	-.015	-.024
	(.018)	(.018)	(.016)	(.017)
Age squared[a]	.016	.016	.010	.018
	(.020)	(.020)	(.020)	(.021)
Educ1-8	-.007	-.013	-.016	-.035
	(.124)	(.124)	(.128)	(.137)
Educ Form1-4	-.135	-.142	-.114	-.025
	(.141)	(.141)	(.140)	(.155)
Educ Advanced	-.151	-.171	-.138	-.045
	(.253)	(.249)	(.197)	(.211)
# years in group	-.003	-.008	.001	-.019
	(.045)	(.045)	(.037)	(.045)
# years in group, squared[a]	.003	.033	-.014	-.001
	(.265)	(.272)	(.246)	(.003)
# years resident	-.003	-.002	-.002	-.001
	(.005)	(.004)	(.004)	(.004)
Kikuyu	-.206	-.197	-.142	-.240*
	(.135)	(.138)	(.100)	(.132)
Luo	-.346**	-.342**	-.227*	-.329**
	(.165)	(.167)	(.124)	(.158)
Kamba	-.241	-.230	-.170	-.293*
	(.161)	(.162)	(.130)	(.168)
Chair's language	.201*	.196*	.215*	.251**
	(.085)	(.086)	(.126)	(.133)
Own house		-.061	-.049	.152
		(.102)	(.084)	(.180)
Wealth[b]		.253	.059	-1.81
		(.424)	(.073)	(1.59)
Constant			1.251**	1.457**
			(.312)	(.356)
No. obs.	278	278	278	275
Adj. R²	.21	.21	.14	.14
Predicted P	.69	.69	.64	.64
Observed P	.64	.64	.64	.64

Notes: Cols. 1-2 report marginal probit coefficients calculated at the means; col. 3 reports

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OLS coefficients; and col. 4 reports two stage least squares.

Robust standard errors in parenthesis.

* denotes significance at the 10 percent level, ** at the 5 percent level.

All regressions include GROUP fixed effects.

(a) Coefficients and standard errors multiplied by 100.

(b) Coefficients and standard errors multiplied by 10,000

(c) Instruments for wealth are: income earned before joining the group (in logs), number of other groups to which respondent belongs, dummy=1 if group is main source of income.

Table 5: Ability to borrow, group determinants

Dependent variable = 1 if borrow from whole group or group member

	[1]	[2]
Group profits per capita[a]	-.769	-.853
	(1.30)	(1.27)
Avg wealth of group members[a]	2.41	3.09
	(2.72)	(2.99)
Ethnic fragmentation	-.172	.019
	(.336)	(.321)
Educ. fragmentation	.654*	.792**
	(.382)	(.357)
Residence fragmentation	-.102	-.087
	(.236)	(.228)
Gini wealth	.497	-.103
	(1.02)	(1.20)
Gini income from group	-.735**	
	(.375)	
Gini income from grp| grp profits>0		-.266
		(.423)
Gini income from grp| grp profits⩽0		-1.04**
		(.453)
No. obs.	278	278
R^2	.20	.21
Predicted P	.67	.67
Observed P	.62	.62

Notes:* denotes significance at the 10 percent level, ** at the 5 percent level.

  Marginal probit coefficients calculated at the means. Standard error in parenthesis are

  corrected for heteroskedasticity and clustering of the residuals at the group level.

  (a) Coefficients and standard errors multiplied by 10,000.

  Controls include all those listed in column 2 of table 4.

Table 6: Borrowing from group vs. members

	[1]	[2]
Source = whole group		
Group profits per capita[a]	-.160**	-.168**
	(.076)	(.068)
Avg wealth of group members[a]	.079	.136
	(.142)	(.180)
Ethnic fragmentation	.108	1.35
	(1.79)	(1.75)
Educ. fragmentation	2.78	2.74
	(3.00)	(2.94)
Residence fragmentation	-1.24	-1.21
	(1.22)	(1.15)
Gini wealth	3.45	-1.56
	(6.04)	(8.89)
Gini income from group	-4.01**	
	(1.92)	
Gini income from grp| grp profits>0		-.811
		(2.30)
Gini income from grp| grp profits$\leqslant$0		-5.94**
		(2.61)
Source = indiv. group member		
Group profits per capita[a]	.219**	.154
	(.091)	(.095)
Avg wealth of group members[a]	.108	.207
	(.151)	(.176)
Ethnic fragmentation	-4.09	-2.74
	(3.80)	(3.70)
Educ. fragmentation	-4.07	-2.59
	(5.46)	(5.18)
Residence fragmentation	-1.87	-.390
	(1.95)	(2.02)
Gini wealth	-3.56	-10.30
	(6.28)	(8.27)
Gini income from group	-3.14	
	(2.93)	
Gini income from grp| grp profits>0		1.42
		(3.97)
Gini income from grp| grp profits$\leqslant$0		-11.01
		(7.01)
No. obs.	247	247
Pseudo R^2	.36	.37

Notes: Table reports estimated multinomial logit coefficients. Omitted category is
"Source = other". Standard error in parenthesis are
corrected for clustering of the residuals at the group level.
* denotes significance at the 10 percent level, ** at the 5 percent level.
(a) Coefficients and standard errors multiplied by 1000.

Table 7: Organization of production and heterogeneity

| % of groups with:	FULL SAMPLE [1]	ETHNIC HETEROG High [2]	ETHNIC HETEROG Low [3]	WEALTH HETEROG High [4]	WEALTH HETEROG Low [5]	EDUCATION HETEROG High [6]	EDUCATION HETEROG Low [7]
Division of jobs							
Everyone same	33.3	45.4	14.3	22.2	44.5	22.2	44.5
Specialization	44.5	36.4	57.1	44.5	44.4	66.7	22.2
Alternate	22.2	18.2	28.6	33.3	11.1	11.1	33.3
How members paid							
# items produced	33.2	22.2	33.3	22.2	33.3	44.5	11.1
# hours worked	5.6	11.1	11.1	0	11.1	11.1	11.1
Fixed amount, same for all	55.6	66.7	44.5	66.7	44.5	44.4	66.7
Their contributions	5.6	0	11.1	11.1	11.1	0	11.1
Penalty for missed contributions	.38	.14	.67	.20	.50	.60	.25
# times applied	3.7	9	0.6	8.3	1	1.2	6.2
Penalty for irregular behavior	.47	.55	.37	.37	.55	.44	.50
# times applied	3.2	2.9	3.5	2.6	3.7	3.3	3.1
How members recruited							
Ability	22.2	22.2	22.2	22.2	22.2	22.2	22.2
Need	22.2	22.2	22.2	11.1	33.3	22.2	22.2
Commitment	50.0	55.6	44.5	55.6	44.5	55.6	44.5
Friendship	5.6	0	11.1	11.1	0	0	11.1
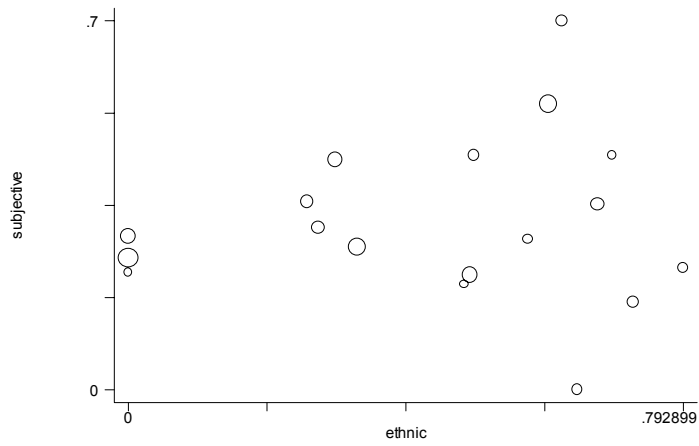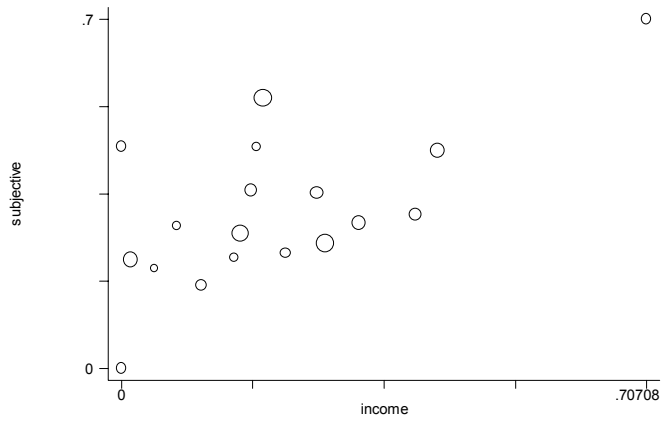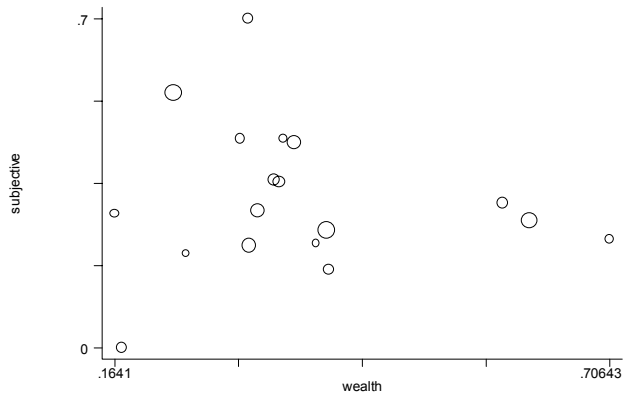
Figure 1: Subjective versus objective heterogeneity