

Networks and Informal Mutual Support in 15 Ethiopian Villages

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1. Introduction

Households in developing countries face a variety of shocks that can adversely affect their well-being. It is also well understood that households use a variety of mechanisms for addressing these shocks. In rural areas, for example, households may decide to grow a mix of crops that embody differing levels of susceptibility to climatic shocks and returns. Crops may be grown in different locations, may be temporally diverse or may be intercropped. Similarly, the household might diversify into off-farm activities or casual wage labor.¹ The existence of interlinked transactions, such as sharecropping, where access to land, labor, and possibly capital and marketing are tied together, is another example of how the presence of shocks causes households to adopt strategies that protect consumption even at the cost of lowered incomes (Bell 1988). Households may also draw down savings, borrow money, obtain remittances or engage in gift exchange.

The large body of literature on collective action in developing countries has run in parallel to a different literature that focuses on another means by which households cope with shocks – the use of networks and other forms of collective action. While much of this initially focused on villages in their entirety as the means by which the adverse impacts of shocks were smoothed away (see Townsend, 1995), such approaches were clearly a simplification. There is now considerable interest in role sub-village local networks play in protecting members from fluctuations in their incomes.

Why might such networks matter? All societies rely on a mix of informal network-based institutions and more formal market-based exchanges. The role of

¹ Alderman and Paxson (1992), Dercon (2004), and Morduch (1995, 1999) discuss these mechanisms further.

informal networks in Africa has been extensively documented by sociologists and anthropologists but we have little understanding of the inter-linkages between them and more formal government and market activities. Informal networks are where much of rural insurance and credit activity is located. Networks, however, by their nature are personalized and exclusive and we have little understanding of why and under what circumstances some people might be excluded from social networks. Here, clearly, the role of networks might not be benign.

Furthermore, as Dasgupta (2003) points out, transactions in informal networks have effects that spill over to other areas of economic activity. Some spillovers reflect synergies between the operations of networks and markets for instance; but where markets and networks are substitutes, they will be antagonistic. Where market or other formal interventions displace networks, there might be people who suffer, but equally, this observation has a converse. Some kinds of networks might prevent markets from functioning well or even from coming into existence. These issues therefore call for careful design of economic interventions.

In short, understanding networks is important, particularly for the development of effective social protection policy. A misunderstanding of the roles of these networks can lead to policy changes that have unintended consequences on the functioning of these networks, with potentially damaging effects on the capacity of the poor to mitigate, and cope with, the effects of shocks. At the same time, a better understanding of such networks can lead to the identification of policies that complement existing networks that already serve the poor well, and to policies that can substitute for networks that simply are not reaching the poor.

This paper provides a descriptive assessment of the role played by collective action through informal social networks that helps rural Ethiopians manage their exposure to risks and cope with shocks to their livelihoods. It describes the extent and correlates of these networks and the role played by credit in redressing the pernicious effects of shocks. Following the work by Dercon et al, (2004), it also describes the extent of *iddir*, insurance institutions indigenous to Ethiopia that are used to cope with the high cost of funerals.

2. Data

Ethiopia is divided into 11 regions. Each region is subdivided into zones and zones into *woredas* that are roughly equivalent to a U.S. or U.K. county. *Woredas*, in turn, are divided into Peasant Associations (PA) or *Kebeles*, an administrative unit consisting of a number of villages. Our data are taken from the Ethiopia Rural Household Survey (ERHS), a unique longitudinal household data set. Data collection started in 1989, when a survey team visited 6 Peasant Associations in Central and Southern Ethiopia. The survey was expanded in 1994 to encompass 15 Peasant Associations across four regions, yielding a sample of 1,477 households. An additional round was conducted in late 1994, with further rounds in 1995, 1997, 1999, and 2004.

As part of the survey re-design and extension that took place in 1994, the sample was re-randomized by including an exact proportion of newly formed or arrived households in the sample, as well as by replacing households lost to follow-up by those that were considered by village elders and officials as broadly similar in demographic and wealth terms. The nine additional PAs were selected to better account for the diversity in

the farming systems found in Ethiopia. The sampling in the PAs newly included in 1994 was based on a list of all households constructed with the help of the local Peasant Association officials. The sample was stratified within each village to ensure a representative number of landless households to be included. Similarly, an exact proportion of female-headed households were included via stratification.

Table 1 gives the details of the sampling frame and the actual proportions in the total sample. It shows that population shares within the sample are broadly consistent with the population shares in the three main sedentary farming systems — the plough-based cereals farming systems of the Northern and Central Highlands, mixed plough/hoe cereals farming systems, and farming systems based around *enset* (a root crop) that is grown in southern parts of the country. In this way, the sampling frame was stratified by the main agroecological zones with one to three villages selected per strata. Further, sample sizes in each village were chosen so as to approximate a self-weighting sample, when considered in terms of farming system: each person (approximately) represents the same number of persons found in the main farming systems as of 1994. However, results should not be taken as being nationally representative. The sample does not include pastoral households or urban areas. Also, the practical aspects associated with running a longitudinal household survey when the sampled localities are as much as 1,000 kilometers apart constrained sampling to only 15 communities in a country of thousands of villages. So while these data can be considered broadly representative of households in non-pastoralist farming systems as of 1994, extrapolation from these results should be done with care.

3. Networks: Basic Descriptive Statistics

In ERHS 2004, households were asked to provide details “... about the five most important people you can rely on in time of need for support, both within the village and elsewhere.” In addition, they were asked whether there were other people, beyond these five, who could be relied on for help in time of need. The links between each household and its friends describe a network, where each person is a node and the position they occupy vis-a-vis each other captures the shape of the network.² Here we provide descriptive statistics on three dimensions of these networks: correlations between network size and observable household characteristics; characteristics of individuals within a household’s network; and the extent to which networks are consistent of like or dissimilar households.

Virtually all households—91 percent—report that there is at least one person they can rely on for assistance. Figure 1 plots a density function for the size of networks reported by these households. The median number of people in a households’ network is 5 with about a quarter of households reporting that they have two or fewer people in their network and a smaller percentage (16 percent) reporting 10 or more people in their network. There is some evidence that households do indeed call on these networks. Respondents indicate that they received help from 86 percent of the individuals they list as part of their network. Further, there is some evidence of reciprocity in these relationships: in 75 percent of the individuals listed as being in a household’s network, households had both received *and* provided assistance in the past. In fewer than 10

² Krishnan and Sciubba (2004, 2005) examine the role of both connections and structure of networks on outcomes, arguing that the number of connections alone cannot capture the impact of networks. Krishnan and Sciubba (2005) explore the formation of informal insurance networks, arguing that the architecture and size of such networks is driven by both the level and distribution of individual endowments.

percent of individuals listed as part of a network had assistance neither been given nor received.

Does access to networks vary by observable household characteristics? While it is possible to construct descriptive tables, their interpretation is difficult. For example, female-headed households have smaller networks, a mean size of 5.8 compared to a mean size of 7.3 for male-headed households. However, larger households tend to have larger networks and female-headed households have, on average, fewer members than male-headed households so that it is unclear whether the smaller network size of female-headed households is due to them being female-headed or being smaller. For this reason, we use regression analysis to assess the associations between household characteristics and the likelihood that a household has a network as well as the size of that network.

Results are presented in Table 2. The first column reports the results of estimating a probit where the dependent variable equals one if the household has at least one person in its network, zero otherwise. To make the coefficients readily interpretable, we report the marginal effects of the regressors in column (1). In columns (2) and (3), we report the determinants of the size of the household's network. Because our estimates need to take account of the fact that the dependent variable is censored at zero, we use a tobit estimator and this is reported in column (2). However, estimates derived from a tobit are suspect if the underlying disturbance terms are non-normally distributed and so we also report the results of estimating Powell's (1984) censored least absolute deviations model.

Few household characteristics are associated with an increased or decreased likelihood that a household has at least one person in its network. The only statistically significant characteristics are whether the household's landholdings lie within the fourth

(second highest) quintile within the village and whether the father of the household head belonged to an *iddir* that marginally increases (by 4.7 percent) the likelihood that the household has at least one person in its network. Second, being wealthier, as defined in terms of landholdings, is associated with bigger networks. Using the parameter estimates reported in column (3), households in the fourth and top land quintiles have 1 to 2 more people in their network compared to the households in the bottom quintile of landholdings. Third, larger households have larger networks. Fourth, family background plays some role in influencing network size. Having a parent who was an important person in social life of the village, a relative who holds an official position within the village, and having a father who belonged to an *iddir* all increase the mean number of persons in a household's network. Households belonging to ethnic or religious minorities do not appear to have smaller networks.

Table 3 provides descriptive statistics on some of the characteristics of individuals found in these networks. Most individuals in these networks are neighbors (60 percent) or, while not neighbors, live in the same village (27 percent). Just over a quarter have at least one plot of land adjacent to a plot held by the household. Only 13 percent of individuals in households' network reside outside the village. The most common relationship is either being a relative or being a member of the same *iddir*; indeed only 12 percent of network members are neither relatives nor members of the same *iddir*. Network members are often (49 percent) individuals whom previously the household had borrowed from or lent to. They are unlikely to be individuals with whom the household sharecrops, hires in, or hires out labor or buys or sells crops.

Table 4 and Figure 2 provide additional descriptive statistics. Here the focus is on the extent to which other network members are similar or dissimilar to our respondents. We consider comparative measures of wealth and age. Just over 40 percent of other network members have more land than the respondent household, about a quarter have the same amount, and a third have less. The top panel in Table 4 cross-tabulates land-ownership (by quintile) against the amount of land held by the household in the network. Poorer households tend to have relatively better-off households in their network while richer households tend to have relatively poorer households in their network. The bottom panel compares household ownership of oxen to that of individuals in the household's network. Unlike land, here there appears to be some sorting by asset ownership: households with no oxen or only one animal tend to have as network partners similar households. Households with two or more oxen typically have as network partners other households with two or more oxen.

Figure 2 graphs the distribution of the difference in age between the household head and other individuals in the network who are either relatives or members of the same *iddir*. The modal age difference for both is close to zero. However, while the distribution for age differences among *iddir* members is more peaked than for relatives, both are characterized by a considerable spread around this mode.

To summarize, nearly all households in the ERHS report that they have a network of individuals whom they can call on for help. These networks consist largely of other households in the same village, which suggests that the scope for addressing covariate risks is likely to be limited. Individuals within these networks would appear to engage in reciprocal assistance. Further, they typically have other ties; in particular, they are

relatives, members of the same *iddir*, or members of the same labor sharing group.³

Better-off households tend to have larger networks as do households whose relations (parents or other relatives) had either status or connections within the village. Network heterogeneity is mixed: network members tend to be varied when measured by age or land-ownership but not in terms of ownership of oxen.⁴

4. Informal Credit

Credit as insurance can be a means by which households can use networks to smooth out the adverse affects of shocks that might otherwise lead to reductions in consumption, asset depletion, or both.⁵ More than half the households in the ERHS report borrowing at least 20 birr (equivalent to payment for 2-3 days of unskilled agricultural labor) in the previous 12 months from either formal or informal sources. Among households that borrowed, about three-quarters obtained one loan, another 19 percent borrowed twice, and the remaining 7 percent had three or more loans.

The most common reason for borrowing money was to purchase inputs such as seeds, fertilizers, and pesticides. Here we focus on loans that were largely used for consumption purposes: to buy food or other goods for the household or to pay for travel, health, education or wedding or funeral expenses. Descriptive data are provided in Table 5 and Figure 3. The dominant use of these consumption loans is to either buy food or

³ Krishnan and Sciubba (2004) examine the formation of labour-sharing networks and find that heterogeneity in endowments is associated with asymmetric network architecture (as predicted), while homogeneity is associated with symmetric structures where network partners have similar number of links. Furthermore, they find that the impact of wealth on connections varies by network architecture and that correcting for endogeneity raises the impact of network membership on outcomes. In contrast to the current literature we emphasise the critical role of both number of links and architecture in determining the impact of social networks on outcomes.

⁴ De Weerd (2005) obtains similar results in Tanzania.

⁵ Another form of mutual insurance, informal transfers and gifts appears to be relatively unimportant in this sample.

other goods or to pay for health-related expenses. Median loan size for the former is 100 birr and 80 birr for the latter, although as Figure 3 shows, a small number of loans are taken out for larger amounts. Loan sizes are given for fixed amounts; this can be seen in the peaks in the distribution of loan sizes around 100, 200, 300 birr, and so on. Virtually all these loans were from informal sources. Just over a third (37 percent) came from relatives; 28 per cent came from friends or relatives; 15 percent came from *iddir*; 11 percent from moneylenders; and 9 percent from other sources.

Among the 46 percent of households who did not borrow, half stated that they did not need to borrow, 32 percent did not borrow because they were concerned that they could not pay back a loan or they were afraid that they would lose their collateral, 9 percent indicated that there was no one from whom they could borrow, 2 percent either expected to be rejected so that they did not try to borrow or believed they had no collateral necessary for a loan, and the remaining 8 percent gave a variety of other reasons. A question that arises is whether households who wished to borrow, but did not, also experienced shocks that caused them to lose income, reduce consumption, or sell assets. Table 6 provides some details on this.

Table 6 indicates that between 16 and 20 percent of households reported being adversely affected by insufficient rainfall, pests that attacked crops or livestock, death, or illness. Between 50 and 60 percent of households who were affected by these shocks borrowed money. However, a significant percentage of households—40 to 63 percent, depending on the shock—who did not borrow indicated that they wished to borrow funds but either did not (largely out of fear that they could not pay these loans back) or could not. These credit constraints were most severe among poorer households. Forty-one

percent of households with no oxen who were affected by one of these shocks and who did not borrow indicated that they wished to do so but did not or could not, compared to 15 percent of households with two or more oxen.

5. Membership in *Iddir*

A widespread institution in Ethiopia is *iddir*, a funeral association that pays out to the family of the deceased, in cash or in kind, when a member or relations of a member dies. These payouts are funded by contributions made to the *iddir* by its members. A striking feature of these organizations is their degree of formality; often there are written rules and records of contributions and payouts (Dercon et al, 2004).⁶

Outside of Tigray, *iddir* membership is widespread, with nearly 90 percent of households reporting that they belong to at least one *iddir*. Among households who report belonging to *iddir* (and again excluding Tigray, where *iddir* do not exist), just under 60 percent report belonging to one *iddir*, 21 percent belong to two, and another 20 percent belong to three or more. Of the 132 households (11 percent of the sample) indicating that they did not belong to an *iddir*, 49 households (37 percent) stated that they had no need for *iddir* membership, and 51 households (39 percent) claimed that they could not afford to join. Virtually all *iddir* (93 percent) are situated within the PA. Two-thirds of *iddir* appear to have no restrictions on membership beyond paying the necessary dues and fees, 14 percent were restricted to members of the same church or mosque, 6 percent were restricted to women and 14 percent had some other restriction. All villages had at least one *iddir* that was open to anyone.

⁶ Also see the descriptions found in Dejene (1993) and Pankhurst (2003).

Table 7 uses probits and ordered probits to examine the correlates of membership in *iddir*. Wealthier households are more likely to join *iddir*, and to join more *iddir*. However, the magnitude of these effects is not large; a household in the fourth land-owning quintile within a village is only 3 percent more likely to belong to an *iddir* than a household in the omitted category, households in the poorest land-owning quintile. Larger households and households where the father of the head had been an *iddir* member are more likely to join *iddir*. Being a female-headed household or belonging to either an ethnic or religious minority appears to have no statistically significant impact on the likelihood or extent of *iddir* membership.

Iddir provide cash in the event of a funeral. The median amount that is paid out by the *iddir* that our households belong to is 100 birr. However, a third of the *iddir* these households belong to also provide cash payouts to their members when they have experienced other types of adverse shocks and a quarter offer loans. As Table 8 shows, the most common form of assistance apart from funerals is cash payouts in cases of fires. Ten percent of *iddirs* provide cash in case of illness and 15 percent provide loans. A smaller percentage of *iddir* provide cash transfers or loans in cases where the member has lost oxen or other livestock, lost their house, or are paying for a wedding or some other event.

6. Summary

Many Ethiopian households belong to some type of network that provides assistance in time of need. These networks are composed primarily of other individuals who live within the same geographical location. Oftentimes, members of these networks

share characteristics such as kinship or membership of other organizations such as *iddir* or labor-sharing groups. As such, these networks are well suited for providing mutual insurance against idiosyncratic shocks (the overlap with other interactions provides opportunities to monitor behavior and thus address concerns over moral hazard) with the possible exception of shocks affecting crops (relatively few network members share adjoining fields so monitoring of crops and harvests is less easy) but not against covariate shocks, given that few network members reside outside the village. Some households do use these networks as a means of obtaining credit for food or health expenses. However, a number of households, especially poorer ones, do not borrow even when they experience a shock, out of fear that they cannot pay the loan back.

One form of mutual insurance is *iddir*, a funeral association that pays out to the family of the deceased, in cash or in kind, when a member or relations of a member dies. *Iddir* membership is widespread outside of Tigray. However, better-off households have larger networks and belong to more *iddir*. Some *iddir* provide assistance in the event of shocks apart from death, such as fire and illness.

Table 1: The distribution of households in the Ethiopian Rural Household Survey, by agroecological zone

	Population share in 1994	Sample share in 1994	Number of villages
	(percent)	(percent)	
Grain plough complex: Northern Highlands	21.2%	20.2%	3
Grain plough complex: Central Highlands	27.7	29.0	4
Grain plough: Arsi/Bale	9.3	14.3	2
Sorghum plough/hoe: Hararghe	9.9	6.6	1
<i>Enset</i> (with or without coffee/cereals)	31.9	29.9	5
Total	100	100	15

Source: Dercon and Hoddinott (2004).

Note: Percentages of population share relate to the rural sedentary population; they exclude pastoralists who account for about 10 percent of total rural population.

Table 2: Correlates of the presence of networks and their size

	(1)	(2)	(3)
	Probit (Dependent variable: Household has at least one person in network)	Tobit (Dependent variable: Number of people in household's network)	Censored least absolute deviations (Dependent variable: Number of people in household's network)
Household is in second land owning quintile†	0.037 (1.11)	0.039 (0.04)	0.607 (1.21)
Household is in third land owning quintile†	0.038 (1.40)	0.527 (0.60)	0.685 (1.32)
Household is in fourth land owning quintile†	0.052 (1.97)**	1.904 (2.18)**	1.856 (3.97)**
Household is in highest land owning quintile†	0.028 (1.18)	3.037 (3.07)**	1.726 (2.52)**
Log of age of head	-0.039 (1.34)	0.357 (0.34)	-0.114 (0.17)
Female headed household†	-0.004 (0.31)	-0.938 (1.29)	-0.212 (0.51)
Head has schooling†	0.022 (1.16)	2.081 (2.57)**	0.951 (1.78)*
Log household size	-0.009 (0.70)	1.302 (2.15)**	0.443 (1.27)
Household head born in this village†	0.0002 (0.02)	-1.164 (1.59)	-0.682 (1.57)
Mother or father was important person in social life of village†	-0.008 (0.53)	0.814 (1.24)	0.977 (2.52)**
Relative holds official position	0.021 (1.42)	1.378 (2.22)**	1.111 (2.72)**
Father belonged to an iddir†	0.047 (2.12)**	2.395 (3.38)**	0.878 (2.13)**
Household belongs to an ethnic minority in PA†	-0.012 (0.51)	-0.582 (0.60)	0.309 (0.52)
Household belongs to religious minority in PA†	-0.004 (0.30)	0.988 (1.22)	0.100 (0.20)

Notes:

1. Results of probit are presented in terms of the marginal effects of the regressors; dummy variables measure marginal impact of switching from zero to one.
2. Covariates marked with a † are dummy variables.
3. In column (1), absolute value of Z statistics are in parentheses; in columns (2) and (3), absolute values of t statistics are in parentheses. Standard errors in column (1) are robust to locality cluster effects. Standard errors calculated in column (3) use a bootstrap with 1,000 replications.
4. * Significant at the 10 percent level; ** significant at the 5 percent level.
5. PA dummies are included but not reported. .Sample size is 1,227.

Table 3: Characteristics of individuals in a household's network

Percentage of individuals who are	Percent
Neighbors	60
Not neighbors, but in same village	27
Not neighbors, live outside village	13
Have plot(s) of land next to plots belonging to this household	28
Members of the same <i>mehabir</i> (social group)	21
Relative	66
Belong to same <i>iddir</i> (burial society)	57
Neither relative nor member of same <i>iddir</i>	12
Members of the same labor-sharing group	43
Partners in sharecropping or land renting arrangement	6
Partners in oxen sharing arrangement	23
Members of the same <i>iqqub</i>	7
Borrow or lend money	49
Do wage work	7
Buy or sell crops	4

Notes:

1. 1,368 households reported information on 4,951 individuals who form part of their network.

Table 4: Wealth characteristics of other individuals in networks: Landownership and oxen

Quintiles of landownership of respondent household	Other household in network has		
	More land	About the same	Less land
		(percent)	
Poorest quintile	53	21	26
Second quintile	43	22	35
Third quintile	40	24	36
Fourth quintile	36	25	39
Richest quintile	31	25	44

Respondent household owns	Other household in network owns			Row totals
	No oxen	One ox	Two or more oxen	
			(percent)	
No oxen	49	21	30	100
One ox	26	34	40	100
Two or more oxen	18	17	65	100

Table 5: Characteristics of consumption loans

Loan purpose	Mean loan size	Median loan size	Percentage of consumption loans used for this purpose	Percentage of all loans used for this purpose
	(birr)	(birr)	(percent)	(percent)
Buy food or goods for the household	172	100	48	18
Pay travel expenses	146	100	3	1
Pay health expenses	117	80	27	10
Pay education expenses	335	120	7	3
For wedding	393	230	6	2
For funeral	139	80	9	4

Notes:

1. There are 375 loans taken out for consumption purposes by the 1,368 households in the sample.
2. Loan size calculations exclude the 5 percent of loans taken out in-kind.

Table 6: Shocks and credit constraints

Shock	Percentage households reporting this shock in last 12 months	Percentage of households reporting shock who borrowed for any purpose	Percentage of non-borrowing households reporting shock who would have liked to borrow but did not
		(percent)	
Insufficient rain	20	60	63
Crop or livestock pests	17	58	47
Death	16	55	40
Illness	19	54	49

Notes:

1. There are 1,368 households in the sample.

Table 7: Correlates of membership in *iddir*

	(1) Probit (Dependent variable: Household has at least one person in an <i>iddir</i>)	(2) Ordered Probit (Dependent variable: Number of <i>iddir</i> household belongs to)
Household is in second land-owning quintile†	0.014 (0.23)	0.248 (2.02)**
Household is in third land-owning quintile†	0.028 (1.93)*	0.269 (2.22)**
Household is in fourth land-owning quintile†	0.030 (3.58)**	0.348 (2.53)**
Household is in highest land-owning quintile†	0.018 (1.66)*	0.190 (1.47)
Log of age of head	0.011 (0.55)	0.105 (0.53)
Female-headed household†	-0.008 (0.61)	-0.018 (0.15)
Head has schooling†	0.030 (1.77)*	0.213 (2.23)**
Log household size	0.069 (5.31)**	0.576 (6.12)**
Household head born in this village†	-0.007 (0.57)	-0.166 (1.69)*
Mother or father was important person in social life of village†	-0.0005 (0.04)	0.036 (0.42)
Relative holds official position	0.015 (1.35)	0.177 (2.39)**
Father belonged to an <i>iddir</i> †	0.055 (2.91)**	0.210 (2.24)**
Household belongs to an ethnic minority in PA†	-0.017 (1.35)	0.102 (0.53)
Household belongs to religious minority in PA†	0.014 (0.66)	0.141 (0.70)

Notes:

1. Results of probit are presented in terms of the marginal effects of the regressors; dummy variables measure marginal impact of switching from zero to one.
2. Covariates marked with a † are dummy variables.
3. In ordered probit, number of *iddir* above three are set equal to three.
4. Absolute value of Z statistics are in parentheses. Standard errors are robust to locality cluster effects.
5. * Significant at the 10 percent level; ** significant at the 5 percent level.
6. PA dummies are included but not reported.
7. Sample size is 1,132.

Table 8: Events for which *iddir* make payouts or offer loans

Event	<i>Iddir</i> will give a cash transfer	<i>Iddir</i> will give a loan
	(percent)	(percent)
Funeral	100	9
Fire	20	9
Loss of oxen or other livestock	7	3
Destruction of house	6	4
Wedding	5	5
Illness	10	15
Harvest loss	3	2
Other event	6	1
Any event	34	25

Notes:

1. Households report membership in 1967 *iddir*.

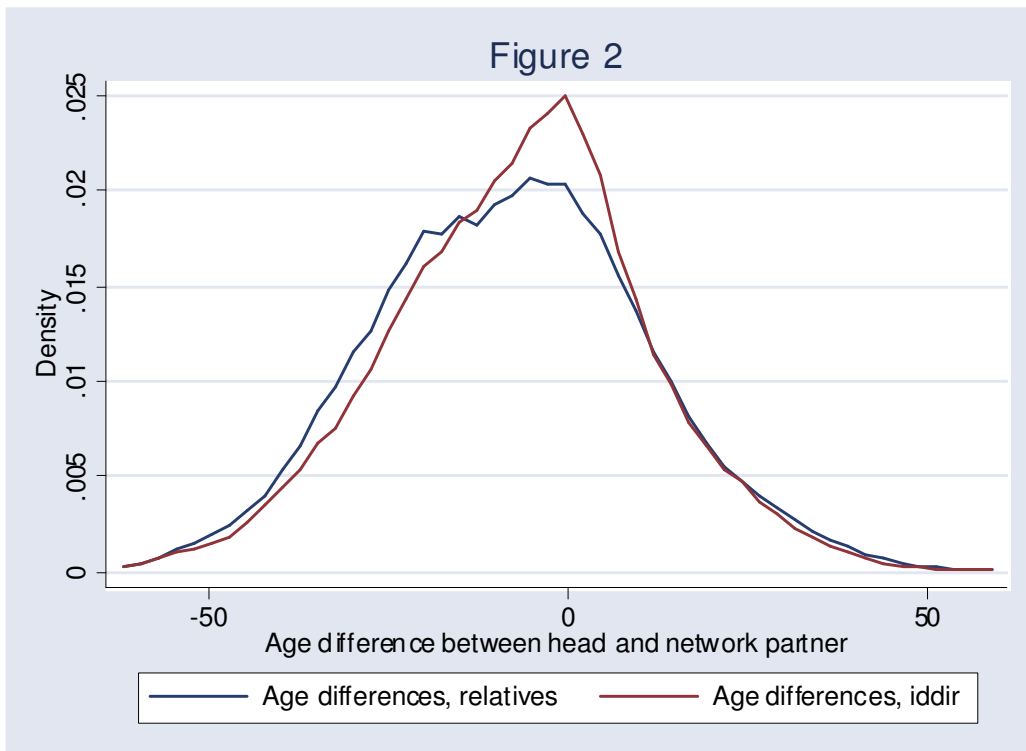
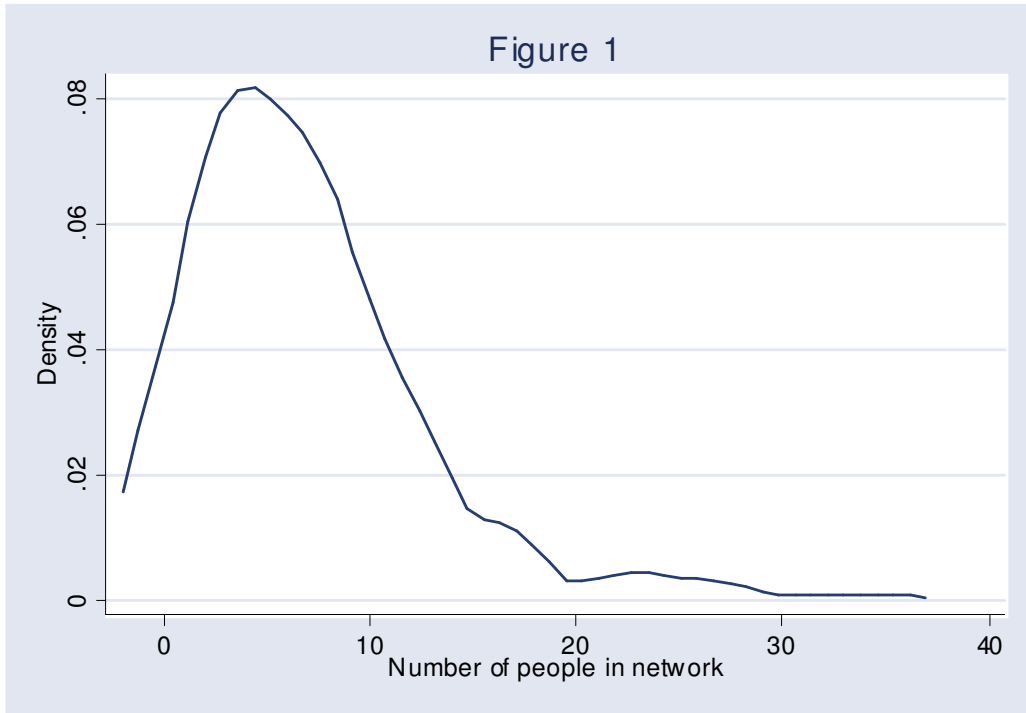
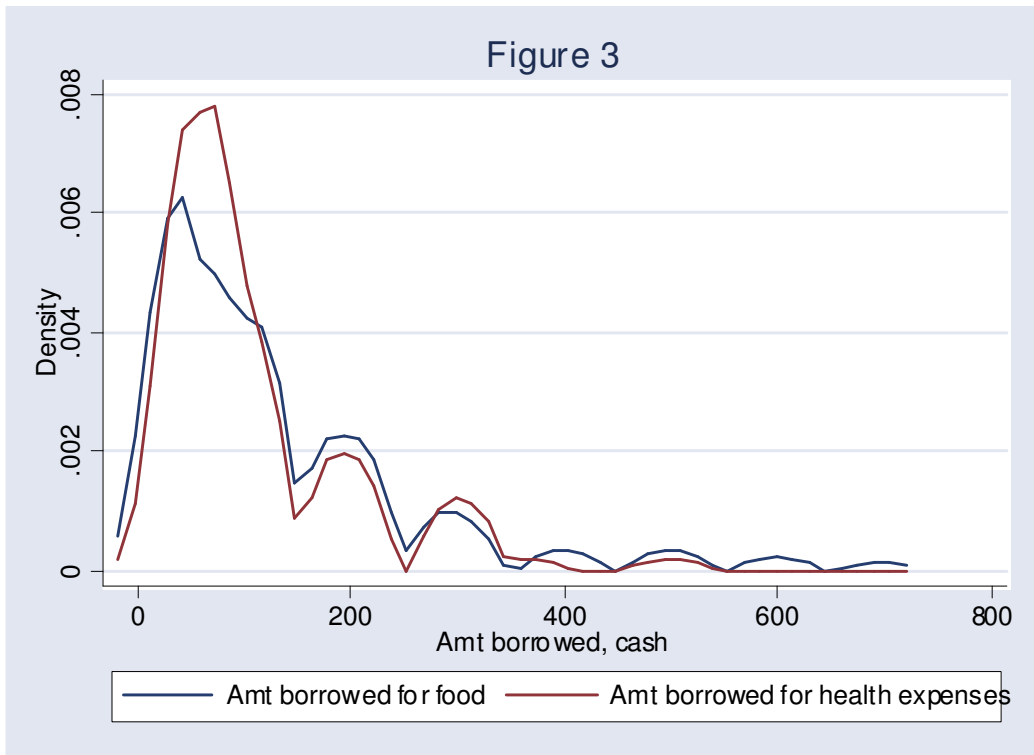


Figure 3



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