Kinship networks, wealth and economic behaviour in rural Ethiopia: does family come at a cost?

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Abstract

This thesis examines the effect of kinship networks on wealth and economic behaviour in rural Ethiopia. Data from Turufe Kecheme village is used to estimate different econometric models. Kinship networks are measured by concepts from social network analysis. Two common indices are used, namely degree centrality and closeness centrality. The effect of these indices is tested with instrumental variables regressions. Two models are developed; the first model has a wealth index as the dependent variable, the second model a variable measuring agricultural activity, called "effort". The network measures are instrumented with religion and ethnicity dummies. Especially religion seems to explain the network measures rather well. In both models, a negative effect of degree and closeness centrality is found. The kinship network seems to negatively affect both wealth and agricultural activity. It is argued that these results can be explained by the fact that kinship networks impose moral obligations about sharing and redistribution on their members. These sharing obligations distort economic incentives in a way similar to taxes. Relatively wealthy members of the network are discouraged to increase their income, due to the prospects of fierce demand for assistance from the network, whereas relatively poor members are not encouraged to improve upon their situation due to a comfortable safety net provided by their family.

Keywords: Kinship, social network analysis, compulsory sharing, forced redistribution

1. Introduction

Social capital is considered to be an important factor influencing households in everyday life. It is a core concept in the social sciences and popular among researchers of all areas. Just like other forms of capital (e.g. physical, human, and natural capital) recent research shows that it influences incomes (Narayan and Pritchett 1999), economic growth (Knack and Keefer 1997) and innovation (Miguel, Gertler et al. 2005). Narayan and Pritchett (1999) define social capital as "the quantity and quality of associational life and the related norms". Another definition is provided by Putnam (2000) in his famous work on social capital in the American community. Putnam defines social capital as a community characteristic and refers to a broad spectrum of its elements such as networks, groups, common rules and norms, trust and reciprocity, social interactions and their by-products. Elements of social capital, and of special interest in this research, are social networks. Narayan and Pritchett (1999) also describe the concept of a social network. According to them "…a society can be thought of as a series of nodes (e.g. individuals, households) and a set of connections between those nodes. The connections between the nodes can be any kind of relationship…". Examples of these relationships are family, ethnic, religious and voluntary associations. The focus in this research is on the effect of kinship networks on income and economic decision making.

In less developed economies, where there is market failure, where formal structures and institutions are absent and where costs of legality are high, social capital and social networks play an important role in the economic well-being of societies. Networks based on trust and informal enforcement mechanisms may provide the only avenue of access to credit and insurance (Carter and Castillo 2002). For example, informal insurance structures reduce exposure to risk and provide social security (Coate and Ravallion 1993; Fafchamps and Lund 2000). A focus in the social network literature is on risk sharing, since this is an important goal of social networks in developing societies. Risk sharing is a demeanour for individuals in a developing society to overcome dilemmas and adversities through collective action, cooperation and arrangements (e.g. based on reciprocity) with other individuals in their social networks (Narayan and Pritchett 1999). Also according to economic literature (Udry 1991) personal relations and trust are essential for these informal networks to overcome monitoring and enforcement problems. Furthermore, studies on risk sharing in the developing world (Fafchamps and Lund 2000) focus mostly on informal arrangements and social ties between households. Also this research will focus on informal social networks, in this case kinship networks, since these networks are most likely very relevant in a developing economy such as Ethiopia.

Kinship networks play a key role in risk sharing (Di Falco and Bulte 2009). Di Falco and Bulte describe a kinship network as "a collective institution, representing a primary principle of social organization, governing social relationships and marital customs and regulating access to resources and services". One of the essential features of kinship networks, next to the formation of strategic alliances between families, is the provision of economic and social security to its members via redistribution and sharing[1] (Di Falco and Bulte 2009).

Different types of networks come with different expectations, norms and sharing obligations. For example, friendship networks are typically voluntary and are based on reciprocity (Coate

[1] Sharing in this setting, not be mistaken with risk-sharing, refers to a (possibly voluntary) distribution of assets between family members.

and Ravallion 1993). However, the above described kinship networks may impose obligations to its members. Moral obligations, customs and norms about sharing and redistributions are the drivers of these sharing networks and enable the networks members to ask assistance when needed. For example (Hoff, Sen et al. 2005) refer to social contracts among members of a kinship network in their work, explicitly titled "The kin system as a poverty trap".

Barr, Dekker and Fafchamps (2008) also refer to the moral obligations kinship networks impose on there members in their research on risk sharing relations and enforcement mechanisms in Zimbabwe: "Blood ties….Marriage ties between in-laws are associated with many reciprocal obligations in Zimbabwe and may be highly valued as a result. However, they are not voluntary in the sense that, no matter how displeased a Zimbabwean is with his in-laws the reciprocal obligations remain and the repeated interaction is highly likely to continue". Research done by Baland et al. (2007) points out inefficiencies that occur in order to escape from forced redistribution. In their research, they find that individuals take on loans that are fully collateralized by their savings. This behaviour does not seem rational since interest payments on these loans are not negligible. However, according to Baland et al. (2007) the loans are taken on in order to signal the fact that one is too poor to have available savings. By doing so, individuals can successfully and convincingly oppose request for financial help from relatives and friends (Baland, Guirkinger et al. 2007). This research shows that evasive behaviour from forced redistribution might cause inefficiencies in societies.

Furthermore, while sharing norms may provide protection against adverse shocks and risks, they also may influence incentives and behaviour and both aspects have economic implications, which can be both positive and negative. One should therefore wonder how these kinship networks influence society. It is very likely that the sharing obligations described above influence the incentives of both relatively poor and wealthy members of the network. In this thesis, the factors that motivate choices are referred to as incentives. If a kinship network provides negative economic incentives to its members, it may hold back economic development in the network and thus may act as a poverty trap[2]. Unfortunately, incentives itself can not be directly measured, but the outcomes of decisions can. Therefore when examining the effect of kinship networks on economic incentives, one has to look at the outcome of such incentives, in this case economic behaviour.

In the literature there seems to be a lack of empirical work linking social capital from networks to economic incentives and behaviour. Most empirical work only explores the benefits of social networks, for example, informal insurance structures for risk sharing for coping with income shocks (Coate and Ravallion 1993; Fafchamps and Lund 2000). Although there is evidence for a positive influence of social networks on economic well being as described above, this thesis focuses on the possible negative effects of kinship networks. Empirical work, done by Di Falco and Bulte (2009), explores the dark side of social capital by looking at consumption patterns and savings in South Africa, and at climate change and risk mitigation in Ethiopia. In both cases, they find adverse effects of kinship networks.

For policy makers, it would be interesting to know whether and how these kinship networks form a "poverty trap" for societies in developing countries. To address this potential problem, it is essential to know more about the mechanisms linking kinship network to poverty. It is thus relevant to explore the 'dark side' of social capital, in order to explain differences in growth and well-being.

[2] The hypothesized mechanisms through which social networks influence wealth and economic behaviour are further described section 2.

The main objective of this thesis is to explore the relation between kinship networks, and wealth and economic behaviour undertaken by households. The main research question is whether kinship networks influence wealth and economic behaviour negatively, and if so, whether this effect can be explained by sharing obligations of kinship networks. The aim is also to provide insights and understanding on the mechanisms through which kinship networks influence wealth in a developing society.

In this thesis I find a negative effect of kinship networks on wealth. This effect is found in models with an instrumental variables estimator, where the instruments for kinship networks are ethnicity and religion. Mostly the density of a kinship network (i.e. how close a certain households is to all the other households in the network) seem to influence wealth, more so than the amount of direct ties of a household, although both characteristics are significant in the model. In order to explain the effect of kinship networks on wealth, another model is found, in which kinship networks influence the agricultural activity undertaken by a households negatively. This is again an instrumental variables regression, where kinship networks are instrumented by religion and ethnicity. The latter model shows that kinship networks reduce the incentive to work hard, which can be explained by the hypothesized 'family tax' effect.

This thesis proceeds as follows. In section 2 a theoretical framework is presented, where the possible mechanisms linking kinship networks to wealth are presented. This section also elaborates on the network measures used in the models, which are common conceptions from social network analysis. Section 3 describes the data and provides more background information about the particular village used for the analysis. This background is essential in order to link patterns found in the data to reality. In section 4 the econometric models are presented and section 5 provides the results from the estimations. Section 6 concludes.

2. Theoretical framework

2.1 Linking kinship networks to wealth

Social networks, as mentioned earlier, may influence economic incentives and decision making of households, due to the underlying sharing norms and social expectations. Since social networks are characterized by for example sharing obligations, norms and values, the effect of different networks may be varying according to these characteristics. Friendship networks for example differ from kinship networks due to the fact that these are mostly voluntarily formed. Hence the sharing norms in friendship networks are more likely to be based on altruism, and not so much on social pressure and reciprocity. Therefore, it is hypothesized that, since especially kinship networks have sharing obligations, they are likely to have the largest effect on economic behaviour. Therefore in this thesis, the focus is on kinship networks. In their paper, Di Falco and Bulte (2009) illustrate the idea that assisting your family is highly valued in the developing world by citing Gulliver (1971), who remarks that the statement 'you must help a man because he is your kinsman' has the same constraining quality as the statement 'you must cultivate because you need food to live'.

The mechanisms through which kinship networks influence behaviour are diverse but are linked to the moral hazard problem encountered in the provision of mutual insurance. In the moral hazard problem risk sharing arrangements might invite risk-taking behaviour due to the knowledge that losses in adverse situations will be compensated for (Hindriks and Myles 2006). Furthermore, a kinship network might minimize the incentives for members relatively

poor in the network to structurally improve their situation. When the necessity of a basic income is absent, there are no factors (incentives) driving the need for economic activities to gain such an income. Poor members can thus count on being provided their basic needs, which might be a level not so different from the majority of their family. This explains how a kinship network might act as a poverty trap for certain members of the network, as mentioned earlier in the previous sections.

Forced redistribution through the family network may directly impact the decisions on investment and spending. In their paper, Di Falco and Bulte (2009) examine the effect of kinship networks on spending decisions. They find that the size of a household's kinship network distorts spending decisions in the sense that spending on non-sharable goods is relatively higher, and savings are significantly lower, since these savings are likely to be divulged to kinsmen, since savings can be easily transferred. This is consistent with the findings of Baland et al. (2007). In their research they describe evasive behaviour in order not to be obliged to provide financial help to relatives, which was done by taking on unnecessary loans in order to signal a lack of savings, as described in the previous section. According to Di Falco and Bulte (2009) "compulsory contributions to the family pool, akin to a 'family tax', may discourage individuals to work hard and accumulate assets". Furthermore, they state that "if the adverse effects are sufficiently strong, social capital in the form of kinship obligations may induce an egalitarian poverty trap for its members". Thus also relatively rich members of the social network may be discouraged to further increase their wealth due to the fact that sharing norms will force them to redistribute their extra gained income, comparable to a progressive tax.

The effects of kinship networks can be variable due to different aspects. First, networks can have different sizes and 'depths'. Having a larger kinship network means having more family members to count in hard times, or having more family members to support. It is thus likely that the size of the network will also be relevant for the relation between kinship networks and economic behaviour.

Second, the different nodes in a social network may have different expectations when it comes to asking for support or supporting them. An example from the kinship network; direct family members, such as parents or siblings, may play larger part in providing or receiving support than less direct family members, such as cousins and uncles. It can thus be expected that the "closeness" of the relations between nodes may also play a part in the effect of kinship networks on wealth and economic behaviour.

Last, Di Falco and Bulte (2009) point out that the presence of formal credit markets plays a role on the effect of kinship networks on wealth. Formal credit and compulsory sharing are, according to Di Falco and Bulte (2009), "substitutes in terms of the insurance function they perform". Hence, when formal credit markets are absent, ignoring family obligations might be costly due to possible exclusion from the network, and thus exclusion from insurance arrangements. However, the presence of alternative formal insurance arrangements lower the cost of turning down requested aid from family. Unfortunately, in the data available, there is little information about access to formal financial services[3], therefore this effect will not be further examined in this thesis.

[3] There are some social organisations in the village that provide some relief during misfortunes and shocks, but the data shows that households are still struggling during shocks, despite the assistance these organisations provide. Assuming therefore these organisations do not provide full insurance, I do not consider them to be similar to formal insurance or formal credit.

2.2 Social network analysis

Measuring social networks and their corresponding sharing norms is not a straightforward job. One could simply use the amount of kinship ties to proxy the 'expected sharing pressure' on an actor in the network. The argument would be that having more connections in a social network will increase the involvement and thus the pressure to share coming from such a network. However, when it comes to kinship, this might not be true. Having many distant relatives may not be as restrictive as having only a few close siblings. Social network analysis provides sophisticated measures to proxy different aspects in a network. Social network analysis provides a clear map of the social influences in the network and can richly describe its social structure. The development and use of measures of actors' position in social networks are a formal part of the theory around social network mechanism (Friedkin 1991). In social network theory there a numerous centrality measures, indicated by simple numerical indices, that describe the actors' positions in terms of features of their network environments.

Measures to determine the relative position of a node in a network are called centrality measures. In this thesis, two methods from social network analysis are used for the estimations, namely degree centrality and closeness centrality. Although multiple network measures are available, these particular measures are chosen since they are likely to be most relevant for the "dark side of social capital" hypothesis.

In social network analysis, degree and closeness centrality are common measures. Although often used by sociologist, I have not yet encountered the use of these measures in econometric estimations on social networks. Since they are also relevant for economists working with social networks, it might be useful to further elaborate on the meaning of these measures and how they are calculated.

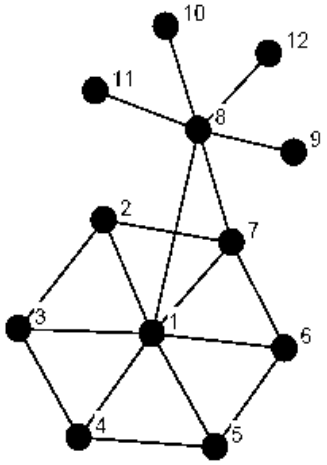


Figure 2.1. Image of a social network

In figure 2.1 a hypothetical social network is displayed.
Each point in the network is called a node, and in this case has a corresponding number. In words, the degree of a node is the number of lines incident with it, or equivalently, the number of other nodes adjacent to it (Wasserman and Faust 1994). The closeness centrality of a node is an index based on the distance with other nodes, and is defined as the mean geodesic distance between a node and all other nodes reachable from it, where the geodesic distance is the shortest path connecting two nodes in a network (Wasserman and Faust 1994). Furthermore, a node is said to be reachable from another node if there is a path linking the two nodes. In the following section a description of how these two measures are calculated is provided.

As described above, the degree of a node is the number of nodes adjacent to it, so the calculation of the degree is quite straightforward, and consists of basically counting the number of lines incident with it. Wasserman and Faust (1994) provide a definition of the degree centrality. The degree centrality for node *i* is described as follows;

$$C_D(n_i) = d(n_i) = \sum_j x_{ij} = \sum_j x_{ji} ,$$

where $d(n_i)$ denotes the degree for node n_i, and $x_{ij,}$ (equivalent to x_{ji}) denotes a direct link between node *i* and *j*. Thus according to the definition above, the degree is simply the sum of all nodes *j* adjacent to *i*. For example, in figure 2.1 node 8 has 6 direct links with other nodes, so its' degree equals 6.

The minimum value for the degree of a node is 0, if no nodes are adjacent to the given node. When the degree is equal to zero, a node is called an isolate (Wasserman and Faust 1994).
In case a social network consists of a total of *g* nodes, the maximum value the degree centrality can obtain is *g*-1. In the definition above degree thus depends on network size. In order to facilitate comparison between various networks, Wasserman and Faust present a standardized measure of degree;

$$C'_D(n_i) = \frac{d(n_i)}{g-1} ,$$

where the degree is divided by the maximum score attainable. Degree now measures the proportion of nodes that are adjacent to n_i, relative to the network size.

Closeness centrality is a measure of distance of other nodes in the network. It is a more sophisticated measure compared to degree, since it does not only depend on direct ties, but also depends on indirect ties. For calculating closeness centrality, let $d(n_i,n_j)$ now denote the geodesic distance (the shortest path) between node *i* and *j*. A centrality measure provided by Wasserman and Faust (1994) now looks as follows;

$$C_C(n_i) = \left[\sum_{j=1}^{g} d(n_i, n_j) \right]^{-1} , \forall j \neq i ,$$

where the total distance node *i* is from all actors, is the sum of all geodesic distances ($\sum_{j=1}^{g} d(n_i, n_j)$), taken over all $j \neq i$. As the distance increases, the centrality of the actor should decrease, therefore distances have to be weighted inversely, hence the inverse of the sum is taken in order to calculate the closeness centrality. Again, the closeness centrality as measured above depends on the size of the network, since at maximum value the index equals $(g\text{-}1)^{-1}$, i.e. when node *i* is adjacent to all other nodes in the network. Therefore Wasserman and Faust (1994) provide a standardized version of the index by multiplying by (*g*-1):

$$C'_C(n_i) = \frac{g-1}{\left[\sum_{j=1}^{g} d(n_i, n_j) \right]}$$

The index now measures the inverse average distance between node *i* and all the other nodes and the maximum value in this case equals unity (when all other nodes are adjacent).

However, the closeness centrality index has a major drawback. Problems arise when one or more nodes in the networks are not reachable, i.e. when there are isolates present. When a node is not reachable for another node, the geodesic distance between these nodes is defined as infinite. Now imagine the case where there is one isolate node present in a network, which has degree 0. The distance from all other nodes to this isolate node is defined as infinity. The distance sum is therefore also infinity for every node in the network, and the closeness centrality index, the inverse of the sum, is now zero for all nodes. The index is therefore only meaningful in a complete network; a fully connected network is thus needed to get 'proper values', and in reality this can be restrictive.

3. Description of the data

This chapter describes the data used for the empirical analysis. The analysis is based on data containing information on all households living in Turufe Kecheme village, in Oromiya Region, Ethiopia. Survey data (collected by questionnaires in May-August 2005) on an individual and household level is available. For the analysis all data will be aggregated to the household level. Turufe Kecheme is also part of two other long-term research projects. These are the Ethiopian Rural Household Survey (ERHS) and the Well-being in Development project[4] (WeD-Ethiopia), both providing relevant quantitative and qualitative information for this study. Especially the village studies done by Gezahegn et al. (2006) provide useful background information for better understanding the patterns in the data, and will be referred to in the remainder of the text.

3.1. Location

In 1985, Turufe Kecheme was formed during a villigisation programme, organizing the residents living scattered in the area to live in compact villages. This was done to facilitate service provision (Dekker 2008). Turufe Kecheme village is located in the Rift Valley Lake area, some 250 kilometres south of the Ethiopian capital Addis Abeba. It is located in the Shasheme *Woreda* in the Eastern Shewa zone of the Oromiya region (Gezahegn, Ayele et al. 2006). It is one of three villages in a *kebele* and is just over 10 kilometres north-east of Shashemene town (Dekker 2008). In figure 1 the location of Turfufe Kecheme is indicated with a dark square.

[4] The ERHS are a series of collaborative, interdisciplinary studies edited and produced jointly by the Department of Sociology, Addis Ababa University and the Centre for the Study of African Economies, Oxford University. The WeD-Ethiopia project was a collaboration of the institutes mentioned above with the University of Bath, and the International Food Policy Research Institute, Washington DC.

Figure 3.1. Map of Ethiopia

Source: http://www.lib.utexas.edu/maps/africa/ethiopia_pol99.jpg

It is situated at an altitude of approximately 2000m in a relatively plain area with fertile soil suitable for agriculture. Large forests, under protection of the government, and 3 rivers, one of them passing through the village can be found in the surrounding area (Gezahegn, Ayele et al. 2006). Turufe Kecheme is furthermore well connected to local markets with an all-weather road connection to the main road from Addis Abeba to the south and Kenya.

3.2 Social composition

Turufe Kecheme village has a complex social structure, including many different ethnicities and religions, due to its history of migration. The original inhabitants, the Oromos, are the main ethnic group and are dominant in the area (Gezahegn, Ayele et al. 2006). Table 3.1 shows that almost half of the households in the dataset are Oromo. Other relatively large ethnic groups are the Amhara, Wolayita and Tigrayan people, together accounting for about 37 percent of the households. Relatively small ethnic groups are the Kambata and Hadiya groups. The 'other' category in table 3.1 consists of people from Gamo, Gurage, Sidama and Silte ethnicity (Dekker 2008), accounting for only a very small fraction of the households in the sample.

Table 3.1. Ethnic composition in the Turufe Kecheme dataset

Ethnicity	Frequency	Percentage
Oromo	168	46.80
Amhara	46	12.81
Wolayita	46	12.81
Tigrayan	42	11.70
Kambata	25	6.96
Hadiya	21	5.85
Other	11	3.06
Total	**359**	**100**

Gezahegn et al. (2006) describe the relations between the different ethnic groups. Tension is present between the different ethnic groups, especially between Oromos and non-Oromos. During an ethnic conflict in 1991 all Kambatas were forced to leave the area by the local Oromos. During this ethnic violence, also other migrant ethnic groups, mainly Amharas and Tigrayans were victims. Currently, there is still some tension between these groups, since the Oromos consider the Amharas and Tigrayans as groups who "steal their resources". These present political conditions lead to the fact that the there is not much interaction between different ethnic groups. Gezahegn et al. (2006) state the following about the perceptions of the different ethnic groups: "Tigrayans feel superior to other ethnic groups, while the Oromos want the other groups to leave the area so they can own all the farmland. Wolayitas and Amharas consider themselves to be hardworking people and feel that it is only since they came to the area that the Oromos learned how to plough land and make themselves wealthy."

Also due to the history of migration, apart from ethnic differences, Turufe Kecheme village has a diverse religious composition. The households in the village either are Muslim, Orthodox, Kalehiwot (Protestant) or Catholic. However, there seems to be some religious freedom since in some cases members of households adhere different religions (Dekker 2008). Table 3.2 presents the distribution of households over the four different religions. The Islamic religion is the most dominant. This is due to the fact that religion is mainly determined by ethnic background. Most of the Oromos are Muslim, whereas Amharas and Tigrayans are mostly Orthodox, and the Wolayita and Kambata are mainly followers of Kalehiwot (Dekker 2008). Only a minority adheres to the Catholic Church. However, the religious composition is not completely determined by ethnic background since there are some ethnic groups present that have diverse religious memberships. For example, for both the Oromo and Wolayita ethnic group, memberships of all the other three religions are reported. There are few inter-marriages between the different ethnic groups. Inter-marriages mostly depend on religion, as well as on the custom of providing a cultural marriage gift.

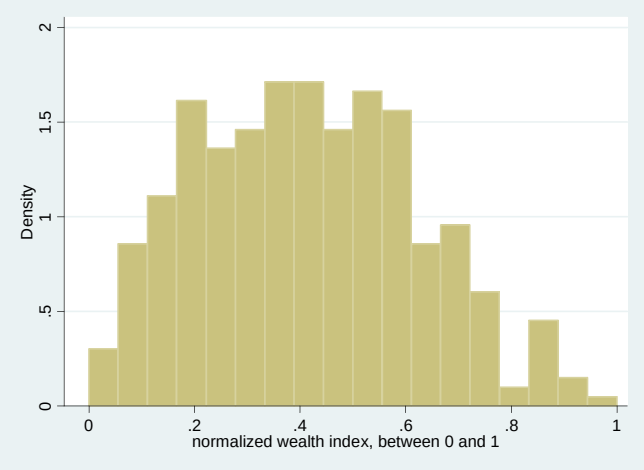
Table 3.2. Religious composition of the households in the Turufe Kecheme dataset

Religion	Frequency	Percentage
Muslim	153	42.98
Orthodox	116	32.58
Kalehiwot	77	21.63
Catholic	10	2.81
Total	**356**	**100**

3.3 Wealth

Wealth in the estimations is measured by an asset based wealth index. This index is based on ownership of assets and on housing characteristics[5]. Usually in economic studies, the economic status of households is measured by data on consumption or income (Dekker 2006). However, the asset-based index is an alternative measure when this type of data is absent. It is relatively simple to calculate. Figure 3.2 presents a histogram of wealth in Turufe Kecheme village. Wealth seems to be rather equally divided, with relatively little very rich residents. The majority of the residents have a wealth index between 0.2 and 0.6.

Figure 3.2. Histogram of wealth in Turufe Kecheme village



It also is interesting to see how wealth is divided over the different ethnic groups in the village. Table 3.3 is a cross tabulation showing the quintile scores on wealth by ethnicity. The quintile scores rank households from poor to rich based on their score on the asset based wealth index. The first quintile contains the poorest of the households, which are the bottom 20 percent of the distribution. The second quintile contains the next step of 20 percent in the distribution, which is the group from 21 to 40 percent, and the third quintile represents the 42-60 percent group. The last quintile, which is the fifth, contains the richest 20 percent of the wealth distribution in the village (Dekker 2008). The table shows both column percentages and frequencies, the latter being the lower number in parentheses in each cell. The column percentages make it relatively easy to compare wealth per ethnicity group. The bold numbers in the cells represent the highest column percentage per ethnicity. Interestingly, among the Oromos, the largest percentage of the people belongs to the lowest wealth quintile, whereas for the Amharas and Tigrayans, the highest percentage belongs to the highest wealth quintile. It seems that compared to the migrant groups, the Oromos seem to have relatively large numbers in the lowest wealth quintile groups.

[5] These assets include plough, sickle, spade, lamp, spray, cart, radio, bicycle, sewing machine, watch, clock, modern bed, blanket, mattress, sofa, table, wardrobe, leather mat and another house outside the village, and the housing characteristics are toilet facilities and iron roofing sheets.

Table 3.3. Cross tabulation of quintile scores of the wealth index of by ethnicity

Column percentage (Frequency)	Ethnicity							
Quintile scores on wealth index	Oromo	Amhara	Hadiya	Kambata	Tigrayan	Wolayita	Other	Total
1st	**26** (43)	13 (6)	**24** (5)	16 (4)	5 (2)	22 (10)	18 (2)	72
2nd	22 (37)	13 (6)	19 (4)	28 (7)	7 (3)	26 (12)	18 (2)	71
3rd	21 (35)	15 (7)	19 (4)	4 (1)	21 (9)	**30** (14)	18 (2)	72
4th	17 (29)	22 (11)	**24** (5)	**44** (11)	24 (10)	11 (5)	18 (2)	72
5th	13 (22)	**37** (17)	14 (3)	8 (2)	**43** (18)	11 (5)	**27** (3)	70
Total	100 (166)	100 (46)	100 (21)	100 (25)	100 (42)	100 (46)	100 (11)	357

The differences in wealth among the ethnicity groups are not unnoticed in the village. Gezahegn et al. (2006) present the stereotypes about the ethnicity groups to explain these differences. For instance, there is a stereotype that Tigrayans feel superior to other ethnic groups in economic status, which can also be found in table 3.3; they seem to relatively be the richest group. The villagers address this wealth to the fact that Tigrayans obtain land from local land owners through share cropping and land renting and seem to be very successful and hard working. Gezahegn et al. (2006) also describe the stereotype belonging to the non-migrant Oromos: "It is thought by some that the Oromos do not work hard. They are stereotyped as wanting to wander around the village, granting their farmland to share-croppers". Migrant groups such as Amharas and Tigrayans feel that by bringing technology and knowledge to the village, they have raised the overall wealth level in the village, increasing life standards for all other groups. However, this opinion is evidently not shared by all Oromos.

3.4 Land and agriculture

Turufe Kecheme village has an interesting history of equal land distribution, due to the fact that from 1977 to 1990, continuous land redistribution took place depending on the number of new households. Households were allotted equal pieces of land, based on their respective household size. In 1990, this practice was ended due to a change of economic policy (Gezahegn, Ayele et al. 2006).

From 1990 onwards, although no further land distribution took part, selling land remained illegal. Selling land, although being illegal, has been practiced but it is not a common practice. According to Gezahegn, Ayele et al. (2006) land is an essential part of life for and only when an individual decides to leave the area land is sold. Furthermore, the values and believes in the village are such that in general inhabitants disapprove of selling land. They are afraid of

returning to a feudal mode, where all land is owned by a few rich. Another worry is that some households may sell their land as a result of problems, and become landless and deprived of any source of income. The common believe is that land is the indispensable source of a households' income (Gezahegn, Ayele et al. 2006). Hence in order to remain a certain level of equality, selling land should remain an illegal practice according to the villagers. When looking at the current data, although some years have passed since the land distribution, a correlation coefficient (of 0.32) between amount of land owned and household size can still be found in the data. Furthermore, Gezahegn, Ayele et al. (2006) comment on the fact that the variation in land size across households is present due to the previous land allocation based on household size.

Although selling land is not very common, sharecropping and land renting are. There are land owners who let out land on a contractual basis, or for short periods when they for example face a shock and need cash in order to address the problem, but they in general prefer sharecropping. The households renting land on a contractual basis have to effectively produce crops in order to be profitable, taking into account the price for renting land (Gezahegn, Ayele et al. 2006).

3.5 Social capital

When talking about households in the village, one refers to a group of people living under one roof. According to Gazegn, Ayele et al (2006) members of a household are obliged to help and respect each other in every aspect of life. Also in general, sharing among kin is very common. Gazegn, Ayele et al (2006) state the following about sharing: "Those members of the *kebele,* who are better off in economic status, help their kin by lending money, and they can also help them materially (giving oxen for ploughing)". Furthermore, kinship ties involve economic and social obligations both the mothers' and fathers' kin. Kin groups are expected to help each other during marriage, mourning, and conflicts with other ethnic of kin groups. They are expected to adhere the same religion and to provide financial aid when fellow members are punished by a court or are unable to pay back a loan. Not only direct family members help each other, but also in-laws provide assistance in different ways; financially, through labour or materially.

Next to sharing and helping family, it is also common practice to assist friends when they are in need. Friendship contracts are formed, and are called *sarab*. According to Gazegn, Ayele et al (2006); "*Sarab* is a group of individuals who come together as friends on the basis of their closeness in character and work tendencies. Members of a *sarab* create an unwritten contract according to which they help each other with money, goods, and cattle or livestock during difficult situations such as marriage and mourning."

There are various forms of local voluntary organisations that provide some social support during important periods such as death and weddings. For example, there are funeral organisations that provide support when a family member dies. There are other organisations where the care for cattle is shared among members, etc. These organisations make it easier to cope with accidents or misfortunes, according to Gazegn, Ayele et al (2006). However, in the questionnaires, households are asked whether they experienced shortages (e.g. labour, cash) due to deaths or illnesses in the family and/or household. Most of the households responded that, when faced with a shock, they indeed suffered from some kind of shortage. This shows that these social organisations, although they might provide some relief, do not seem to be capable of providing full insurance to its members.

3.6 Summary statistics of the main variables

Table 3.4 below presents some summary statistics. The presented statistics are extracted from the available dataset of Turufe Kecheme village. In the appendix, summary statistics for the samples used in the regressions are presented, as well as an extensive explanation of the variables used in the regressions and presented below.

Table 3.4 Summary statistics of the dataset

Variable	Observations	Mean	Std. Dev.	Min	Max
Wealth	357	0.415	0.206	-3.6E-08	1
Effort	352	0.400	0.106	0	1
Degree	291	0.617	0.324	0	1.705
Closeness	285	0.407	0.154	0.155	0.510
Utilized land	352	2.685	2.158	0	12
Education	355	6.088	4.521	0	17
Age	357	37.486	13.396	9	75
Land ownership	357	0.832	0.374	0	1
Health shocks	357	0.899	0.302	0	1
Labour sharing	357	0.549	0.684	0	3
Household size	356	5.587	2.450	1	13
Memberships of organisations	357	7.120	4.781	0	26
Labour sharing	357	0.549	0.684	0	3
Labour shortage	357	0.826	0.379	0	1
Changed residence	340	0.462	0.499	0	1
Friends	357	4.213	2.579	0	14
Male household members	357	2.776	1.693	0	9
Oromo	357	0.591	0.492	0	1
Amhara	357	0.162	0.369	0	1
Hadiya	357	0.084	0.278	0	1
Kambata	357	0.092	0.290	0	1
Tigrayan	357	0.120	0.326	0	1
Wolayita	357	0.134	0.342	0	1
Other ethnicity	357	0.031	0.173	0	1
Muslim	357	0.431	0.496	0	1
Orthodox	357	0.328	0.470	0	1
Kalehiwot	357	0.216	0.412	0	1
Catholic	357	0.028	0.165	0	1

4. Econometric models

Consider the following econometric model;

$$y_i = const + x'_i \beta + \gamma KN_i + \varepsilon_i \quad (1A)$$

and with a corresponding first stage;

$$KN_i = const + x'_i \beta + \lambda R_i + \delta E_i + u_i \quad (1B)$$

where;

y_i is the score on the wealth index for household *i,*
x_i are different control variables for households *i,*
KN_i is the measure of the kinship network for household *i,* either degree or closeness,
R_i is the religion of the household *i*,
E_i the corresponding ethnicity,
const refers to a constant in the regression,
and,
ε_i and u_i are the idiosyncratic error terms for the corresponding regressions, assumed IID.

The variable of interest is the kinship network, KN_i, and its corresponding parameter γ which measures the effect of kinship networks on the asset based wealth index. The kinship network is either measured by degree or closeness of the network.

In the first stage, the kinship network is estimated by religion and ethnicity of the household. Religion and ethnicity are chosen as instruments, since they are likely to influence the kinship network, but not wealth directly, when controlled for the right aspects. Religion and ethnicity are determined upon birth, and one could therefore argue that they are an exogenous source of variation. Religion and ethnicity influence the effect of kinship networks since different ethnic and religious groups have different beliefs when it comes to for example birth control, family values and redistributive customs.

The control variables are variables likely to influence wealth directly. These are aspects of the household such as age, education level, household size, land owned and used, health shocks, labour sharing etc. The same set of control variables is used in both stages.

A second regression is used to examine the effect of kinship networks on economic behaviour, measured by agricultural activity. The econometric model for this estimation is very similar to the model presented above. It is presented as follows;

$$Effort_i = const + x'_i \beta + \gamma KN_i + \varepsilon_i \quad (2A)$$

again with the corresponding first stage;

$$KN_i = const + x'_i \beta + \lambda R_i + \delta E_i + u_i \quad (2B)$$

where

$Effort_i$ now replaces the previous wealth variable y_i
and,
the rest of the variables are similar to the ones in (1A) and (1B)

Again, the variable of interest is the kinship network KN_i of household i and its corresponding parameter γ, this time measuring the effect of kinship networks on a variable called 'effort'. Effort is measured as the amount of utilized land minus the amount of land owned. It basically measures the amount a household rents from other households. Assuming that the original land endowment amongst household is relatively equal, the left hand side variable measures the households' "effort" in agriculture and in obtaining their income. In reality, the practice of letting out land is considered as "not working hard" and "being lazy" whereas renting in land is a practice that requires hard work and is thus considered "more active".

Different in (2A) and (2B) are the control variables x_i. These are now variables that influence effort directly. These are variables controlling for a households' capacity of labour, such as age, number of male household members, labour sharing groups, but also the households' access to the land rent market. Important factors in this case are the social interactions of the household within the village, such as memberships of organisations, friends, etc. Furthermore, since renting out land is a way of dealing with shocks, for example a labour shortage, one must control for possible shocks influencing the demand for land.

In the following section, the empirical results of the models described above are presented.

4. Empirical results

4.1 Wealth and kin networks

In this section the empirical results are presented. In table 4.1 I start off with a normal regression of the network measures on wealth. Degree in all columns does not have a significant effect on wealth. However, closeness is significant in the column (1) and (2). The control variables have the expected sign. Remarkably, household size does not seem to influence wealth. Column (4) presents a full model with both ethnicity and religion dummies. Regarding the ethnicity and religion dummies, the default (zero) option is the Oromo ethnic group and the Muslim religion. These were the dummies that were left out of the regression. The dummies below should thus be interpreted as deviations from the "Oromo and Muslim" option. Column (4) shows that in general, neither ethnicity nor religion influences wealth directly. This can be explained by the fact that religion and ethnicity are likely to determine norms, customs and economic behaviour. Through these factors, religion and ethnicity might influence wealth indirectly, but not directly as column (4) shows. Hence, when the right control variables are included in the model, religion and ethnicity have basically no direct effect on wealth[6].

[6] Only the Kambata ethnic group is significant at a 10% level. Since this is a relatively very small group, I don't suspect this to be a problem when ethnicity and religion are used in the IV-regressions.

Table 4.1 Regression of Degree and Closeness on Wealth

	(1) b/se	(2) b/se	(3) b/se	(4) b/se
Dependent variable is wealth				
Degree	0.019	0.013	0.017	0.018
	(0.036)	(0.037)	(0.036)	(0.036)
Closeness	-0.177**	-0.164**	-0.089	-0.079
	(0.070)	(0.069)	(0.074)	(0.078)
Utilized land	0.051***	0.049***	0.046***	0.045***
	(0.005)	(0.006)	(0.006)	(0.006)
Education	0.007***	0.007***	0.007***	0.006***
	(0.002)	(0.002)	(0.002)	(0.002)
Age	-0.003***	-0.002***	-0.002***	-0.002***
	(0.001)	(0.001)	(0.001)	(0.001)
Household size	0.003	0.004	0.006	0.007
	(0.004)	(0.004)	(0.004)	(0.005)
Land ownership	0.015	0.017	0.041	0.041
	(0.026)	(0.026)	(0.028)	(0.028)
Health shocks		-0.088***	-0.087***	-0.090***
		(0.032)	(0.033)	(0.032)
Labour sharing		0.024*	0.016	0.014
		(0.013)	(0.014)	(0.014)
Amhara			0.068**	0.054
			(0.031)	(0.037)
Hadiya			0.060	0.054
			(0.043)	(0.042)
Kambata			0.064**	0.064*
			(0.032)	(0.035)
Tigrayan			0.076**	0.059
			(0.034)	(0.041)
Wolayita			0.034	0.024
			(0.026)	(0.033)
Other ethnicity			0.050	0.051
			(0.052)	(0.051)
Orthodox				0.031
				(0.040)
Kalehiwot				0.024
				(0.032)
Catholic				-0.062
				(0.061)
Constant	0.362***	0.403***	0.327***	0.320***
	(0.047)	(0.055)	(0.060)	(0.063)
Observations	279	279	279	279
R-squared	0.41	0.42	0.45	0.46
Adjusted R-squared	0.39	0.41	0.42	0.42
F test	22.09	18.46	12.20	10.95

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Robust standard errors

One could argue that the model presented below suffers from endogeneity. Possible endogeneity could create bias, either through omitted variables or problems of reversed causality. Cross-sectional regressions are notoriously affected by omitted variable bias, since it seems difficult to exclude all unobservable factors influencing the results. In this case, not only omitted variables bias could be a potential problem, also problems of reversed causality seem to be present. One could expect that networks influence wealth, but visa versa, it is also likely that a household's wealth influences its network. Wealthy households might have bigger networks, since they might attract relatively poorer members of the network who are

looking for sources of support. Or; wealthy households have more means and resources to be social, e.g. they need relatively less time for working and can spend more money on social 'gatherings'. However, the effect could also be negative; wealthy people are less dependent on their social support network and therefore are less 'social' and involved in the network.

In the case of amount of kinship ties, more wealth could possibly lead to having a bigger kinship network. For example; if in a household the parents are relatively wealthy, they are able to provide for more children, which is considered 'desirable' in Ethiopian rural areas since this implies having a bigger workforce. However, these children would inherit both their parents' wealth, as well as a large network of siblings. Wealth could also influence the kinship network through health status. Assuming that higher wealth leads to a better living standard and thus better health, this might increase life expectancy and thus decrease the amount of deaths in the family, leading to a bigger family network.

If there would be problems of either omitted variable bias or reversed causality, a regressor is said to be endogenous. If a regressor is endogenous, OLS produces a biased and inconsistent estimator for the parameter in the model. A solution to this problem is to use an alternative estimation method, such as the instrumental variable estimator (Verbeek 2005).

In the case of reversed causality, wealth would influence closeness two ways. One possibility would be that wealthier people rather reduce their dependence in the network, - nor would they need a large network for support and insurance - in able to "deflect" from expected redistribution of their wealth to poorer members of the network. One would thus expect a negative effect of wealth on closeness, enhancing the negative effect and thus creating an overestimation of the OLS estimates. Another possibility and maybe more likely, is that wealthier people are expected to have bigger and closer networks. Wealthy people might be more a 'social centre' because they have more resources to be social and facilitate social gatherings. Also poorer relatives in the network like to be close to the relatively wealthy people, since having these good connections would be an advantage in times of need. In this case, OLS would underestimate the bias, providing estimations closer to zero.

To address the problem of endogeneity, the IV-estimator is used to estimate the effect of degree and closeness of the network on wealth. As instruments, ethnicity and religion are used. Ethnicity and religion are likely to be an exogenous source of variation affecting the social network, and not wealth directly. Both religion and ethnicity are determined upon birth and there should be no reason to suspect a direct causal relation between wealth and these instruments, as was shown in table 4.2. However, I do expect religion and ethnicity to influence the social network. For example the view on usage of contraceptives differs across religion. For example Muslims who follow their religion seriously are prohibited from using any contraceptives. These views might influence household size across the different religions and thus indirectly the size of the kinship network[7]. Furthermore, changing religious adherence might also be of influence on the network, although it is not a common practice. Conversion rates to other religions are very low and mostly reflect young people converting within the Christian religion to Protestantism (Gezahegn, Ayele et al. 2006). However changing original religion leads to, according to Gezahegn et al (2006) "a deterioration of the relationships within the family". Last, ethnicity might influence the kinship network through social norms and values. Social norms and customs on redistribution are possibly different across the ethnic groups. For example ethnic groups have different customs when it comes to

[7] This is also an argument for controlling for household size in the following regressions, although it did not show up significant in the previous regression.

providing the marriage gift, which is a common redistribution mechanism for some, although others do not have this custom at all.

Table 4.2 presents results of an instrumental variable regression of degree on wealth, where degree is instrumented with religion and ethnicity. Controls similar to the previous (normal) regression are used[8]. Again, the controls have the expected sign. This time however, degree seems to influence wealth negatively. In comparison to the normal regression, the estimates on degree seem to be biased downwards in absolute value and biased towards zero (before 0.018 on average, now -0.247, averaged over the models). The estimated effect of degree shows, that if the degree index increases with 0.01, the score of the wealth index decreases with 0.015 (on a 0 to 1 scale). Both the over- and underidentification tests show that the instruments work rather well. The show that the first stage equations are identified and the instruments do not influence on wealth directly.

A remark must be made about the interpretation of the results in the following tables. The network measures degree and closeness for households can only be calculated given the fact that a household is part of a network. Furthermore, determining whether a household is part of a network or not is determined by unobservables (e.g. there might be an overlap between migration and network) I cannot control for. The selection into the two different groups, network or no network, cannot be explained. Therefore the isolates are excluded from the regressions. Hence the results must be interpreted as 'given a household is part of a network'. There might be a fundamental aspect of social life that determines the presence of a network, and this could even be correlated with wealth, but this aspect cannot be explained with the given data and models.

[8] Many different controls are tested, such as friendship relations, memberships of organisations, etc. I decided in order to save space, not to report these controls since they are not significant in the regressions.

Table 4.2 Instrumental variable regression of Degree on wealth, second stage results

	(1) b/se	(2) b/se	(3) b/se	(4) b/se	(5) b/se
Dependent variable is wealth					
Degree	-0.243**	-0.259**	-0.242**	-0.236**	-0.253***
	(0.111)	(0.103)	(0.102)	(0.096)	(0.097)
Utilized land	0.056***	0.056***	0.055***	0.054***	0.052***
	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
Education	0.009***	0.009***	0.009***	0.009***	0.009***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age	-0.003***	-0.003***	-0.002***	-0.002**	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Land ownership		-0.019	-0.015	-0.013	-0.018
		(0.027)	(0.027)	(0.027)	(0.027)
Health shocks			-0.075**	-0.085***	-0.090***
			(0.032)	(0.030)	(0.031)
Labour sharing				0.036**	0.036**
				(0.014)	(0.014)
Household size					0.005
					(0.004)
Constant	0.459***	0.479***	0.529***	0.499***	0.492***
	(0.080)	(0.081)	(0.085)	(0.080)	(0.081)
Observations	285	285	285	285	285
R^2	0.29	0.27	0.30	0.32	0.30
Adjusted R^2	0.28	0.26	0.28	0.30	0.28
F test	32.99	25.94	24.52	20.90	18.26
P-value F-test	0.00	0.00	0.00	0.00	0.00
Overidentification test (Hansen J)	10.00	9.02	9.67	8.72	9.52
P-value Hansen J	0.27	0.34	0.29	0.37	0.30
Underidentification test	27.59	31.25	30.58	31.40	30.63
P-value underid. test	0.00	0.00	0.00	0.00	0.00

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

In table 4.3 the first stage regression results are presented. Of the ethnicity dummies, two are significant in determining degree ("Wolayita" and "other ethnicity"). More interestingly, all of the religion dummies are negatively significant. This shows that having a different religion than the Muslim religion does influence degree negatively. As explained earlier, this maybe due to the difference in view on using contraceptives and/or different prevailing norms and values. The Shea partial R-square of the first stage regression can be considered sufficient (0.11). From this it can be concluded that the instruments indeed explain some of the variation in degree.

Table 4.3. First-stage regression results for IV-regression of Degree on wealth

	(1) b/se	(2) b/se	(3) b/se	(4) b/se	(5) b/se
Dependent variable is Degree					
Amhara	-0.059	-0.063	-0.063	-0.075	-0.075
	(0.067)	(0.068)	(0.068)	(0.067)	(0.067)
Hadiya	0.008	-0.022	-0.020	-0.018	-0.018
	(0.059)	(0.061)	(0.062)	(0.063)	(0.063)
Kambata	-0.038	-0.048	-0.048	-0.051	-0.051
	(0.057)	(0.056)	(0.056)	(0.056)	(0.056)
Tigrayan	0.001	-0.026	-0.026	-0.046	-0.046
	(0.077)	(0.079)	(0.079)	(0.079)	(0.079)
Wolayita	0.158***	0.144**	0.144**	0.130**	0.130**
	(0.060)	(0.060)	(0.060)	(0.060)	(0.060)
Other ethnicity	-0.146*	-0.178**	-0.178**	-0.200**	-0.200**
	(0.074)	(0.076)	(0.077)	(0.081)	(0.081)
Orthodox	-0.133**	-0.152**	-0.152**	-0.150**	-0.150**
	(0.064)	(0.063)	(0.063)	(0.061)	(0.061)
Kalehiwot	-0.202***	-0.212***	-0.214***	-0.219***	-0.220***
	(0.061)	(0.060)	(0.061)	(0.062)	(0.062)
Catholic	-0.316***	-0.341***	-0.345***	-0.331***	-0.331***
	(0.085)	(0.081)	(0.083)	(0.083)	(0.083)
Utilized land	0.008	0.013	0.013	0.011	0.011
	(0.009)	(0.009)	(0.009)	(0.010)	(0.011)
Education	0.008**	0.008**	0.008**	0.008**	0.008**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Age	-0.002	-0.000	-0.000	0.000	0.000
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Land ownership		-0.155***	-0.154***	-0.158***	-0.158***
		(0.051)	(0.051)	(0.051)	(0.051)
Health shocks			-0.018	-0.036	-0.035
			(0.071)	(0.072)	(0.073)
Labour sharing				0.057**	0.057**
				(0.027)	(0.027)
Household size					-0.001
					(0.008)
Constant	0.702***	0.786***	0.802***	0.769***	0.771***
	(0.063)	(0.068)	(0.085)	(0.085)	(0.088)
Observations	285	285	285	285	285
R^2	0.10	0.13	0.13	0.14	0.14
Adjusted R^2	0.06	0.09	0.08	0.09	0.09
F test	3.47	3.92	3.63	3.57	3.34
P-value F-test	0.00	0.00	0.00	0.00	0.00
Shea Partial R^2	0.09	0.11	0.11	0.12	0.11

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

An instrumental variables regression with closeness provides very similar results. The effect of closeness seems to be more negative than the effect of degree on wealth. This time a 0.1 increase in the closeness index creates a 0.04 decrease in the wealth index. This is not unexpected since closeness may be a better proxy for measuring the 'pressure' of a kinship network (it also takes into account indirect ties, unlike degree). It shows that "being close to relatives" has a bigger effect on wealth than "having many relatives", although both influence wealth negatively. The estimates for closeness are more negative than the OLS estimates. It shows that the OLS estimates are biased towards zero, underestimating the effect of closeness on wealth.

Table 4.4. Instrumental variable regression of Closeness on wealth, second stage results

	(1) b/se	(2) b/se	(3) b/se	(4) b/se	(5) b/se
Dependent variable is wealth					
Closeness	-0.395***	-0.421***	-0.408***	-0.390***	-0.419***
	(0.129)	(0.136)	(0.136)	(0.134)	(0.132)
Utilized land	0.052***	0.051***	0.051***	0.050***	0.048***
	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
Education	0.007***	0.007***	0.007***	0.007***	0.007***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age	-0.003***	-0.003***	-0.003***	-0.003***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Land ownership		0.034	0.036	0.035	0.034
		(0.028)	(0.028)	(0.027)	(0.028)
Health shocks			-0.072**	-0.079**	-0.084**
			(0.034)	(0.033)	(0.035)
Labour sharing				0.024*	0.023*
				(0.014)	(0.014)
Household size					0.005
					(0.004)
Constant	0.506***	0.503***	0.557***	0.531***	0.527***
	(0.073)	(0.072)	(0.080)	(0.080)	(0.082)
Observations	279	279	279	279	279
R^2	0.37	0.37	0.38	0.39	0.39
Adjusted R^2	0.36	0.36	0.37	0.38	0.37
F test	35.27	27.87	25.65	21.79	19.24
P-value F-test	0.00	0.00	0.00	0.00	0.00
Overidentification test (Hansen J)	8.28	9.79	9.50	8.69	9.27
P-value Hansen J	0.41	0.28	0.30	0.37	0.32
Underidentification test	56.75	52.31	52.41	50.85	51.61
P-value underid	0.00	0.00	0.00	0.00	0.00

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Looking at the first stage results, some minor differences can be noticed. First of all, a different ethnicity dummy is now significant, namely "Amhara". However, the same result for the religion dummies prevails. The Shea partial R-square is now 0.25, which is higher compared to IV-regression with degree, which was 0.11. It seems that the instruments better explain closeness than degree. One could say that they thus better explain the density of a network than the amount of direct ties for each node.

Table 4.5. First-stage regression results for IV-regression of Closeness on wealth

	(1) b/se	(2) b/se	(3) b/se	(4) b/se	(5) b/se
Dependent variable is Closeness					
Amhara	-0.100***	-0.099***	-0.099***	-0.100***	-0.101***
	(0.037)	(0.037)	(0.037)	(0.037)	(0.037)
Hadiya	-0.009	-0.003	-0.003	-0.003	-0.000
	(0.034)	(0.033)	(0.033)	(0.033)	(0.033)
Kambata	-0.027	-0.026	-0.026	-0.026	-0.025
	(0.034)	(0.034)	(0.034)	(0.034)	(0.033)
Tigrayan	-0.047	-0.042	-0.042	-0.044	-0.045
	(0.043)	(0.044)	(0.044)	(0.044)	(0.044)
Wolayita	0.100***	0.102***	0.102***	0.101***	0.100***
	(0.032)	(0.032)	(0.032)	(0.033)	(0.033)
Other ethnicity	-0.003	0.003	0.003	0.001	0.001
	(0.050)	(0.048)	(0.048)	(0.048)	(0.046)
Orthodox	-0.103***	-0.100***	-0.100***	-0.100***	-0.105***
	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)
Kalehiwot	-0.110***	-0.108***	-0.108***	-0.108***	-0.110***
	(0.031)	(0.031)	(0.031)	(0.031)	(0.031)
Catholic	-0.172***	-0.166***	-0.165***	-0.164***	-0.164***
	(0.047)	(0.048)	(0.048)	(0.049)	(0.048)
Utilized land	0.003	0.002	0.002	0.002	0.004
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Education	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age	-0.001**	-0.002**	-0.002**	-0.001**	-0.001**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Land ownership		0.028	0.028	0.028	0.029
		(0.024)	(0.025)	(0.025)	(0.025)
Health shocks			0.003	0.001	0.006
			(0.031)	(0.031)	(0.031)
Labour sharing				0.005	0.005
				(0.013)	(0.012)
Household size					-0.005
					(0.004)
Constant	0.525***	0.509***	0.507***	0.504***	0.521***
	(0.027)	(0.029)	(0.037)	(0.037)	(0.039)
Observations	279	279	279	279	279
R^2	0.29	0.30	0.30	0.30	0.30
Adjusted R^2	0.26	0.26	0.26	0.26	0.26
F test	9.67	8.98	8.33	7.72	7.29
P-value F-test	0.00	0.00	0.00	0.00	0.00
Shea Partial R^2	0.26	0.25	0.25	0.25	0.25

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

The previous IV-regressions showed that there is a net negative effect of degree and closeness on wealth. This is consistent with the hypothesis of a "dark side of social capital". However, it does not provide insides about how this relation actually is established, nor does it, although interesting as it is, prove the "dark side" hypothesis, because an alternative explanation linking degree and closeness to wealth can be easily provided. For example, by having a large network households are less active in building up capital as precautionary saving, since these households can count on their family network. Thus a high score on degree will give a lower value of the dependent variable wealth (measured with a capital based index) in the regression. In order to show the presence of a 'family tax', i.e. when networks influence economic incentives negatively, a different variable is needed.

4.2 Labour effort and kinship networks

In order to examine the effect of kinship networks on economic incentives, which eventually determine wealth, a variable is needed that proxies these economic incentives. According to "dark side of social capital" hypothesis, this variable must measure behaviour that improves the economic situation of a household, for example extra activities undertaken or extra labour provided by the household. According to the theory, kinship networks are expected to have a negative effect on such economic behaviour (see section 2).

The variable used to measure the economic behaviour described above, is a variable measuring utilized land minus owned land, as is called 'effort' throughout the thesis. As described earlier, land ownership was determined exogenously in the period between 1977 and 1990, when continuous land distribution took place based on household size. Although the current landownership situation likely has changed somewhat over time, it can be assumed that the initial endowment of land was likely to be fair and sufficient for each household, reflecting the households' demand for land. The data on current land distribution shows that there are households letting out land and households renting extra land in addition to their own land. Assuming that letting out land is not as profitable as using the land to grow crops, it is likely that people that rent extra land are more active in gathering extra income than those who do not, when controlled for the other aspects such as labour force, age etc. However, it is also important to control for shocks when using such a variable, since the demand for land changes when faced with a shock. Thus, the effort variable will be used to measure a households' economic behaviour.

In table 4.6 the results of an instrumental variables regression of degree on effort are presented and in table 4.7 the corresponding first stage results. The control variables are now different from the previous regressions since the dependent variable is in this case effort, not wealth. This means that controls for aspects such as male workforce, age, labour sharing (i.e. factors that influence the households' capacity for performing agricultural work) have to be used. Also the access to the land rent market has to be taken into account. Having many social contacts will increase the likelihood of forming a good land rent contract with another household. Variables such as friends, memberships of organisations, and changed residence control for these aspects. Last, one has to control for shocks, e.g. labour shortage due to health shocks, since shocks influence the demand for land.

The same instruments, religion and ethnicity, are used. Again, degree has a significant negative effect on effort, although the estimated effect is somewhat smaller in absolute value. Once again, the controls have the expected sign.

Another remark has to be made about the interpretation of the results. Due to the way the dependent variable is calculated, and due to the assumptions made above, households that do not own any land must be ignored in the regressions. Including these households would result in disproportionately high scores for the dependent variable 'effort'. Only interesting are therefore the households that actually do own land, assuming this land provides these households with a basic income. The results must therefore be interpreted as "given the household is a landowner".

Table 4.6. Instrumental variable regression of Degree on effort, second stage results

	(1) b/se	(2) b/se	(3) b/se	(4) b/se	(5) b/se
Dependent variable is effort					
Degree	-0.149**	-0.149**	-0.112*	-0.089	-0.096*
	(0.073)	(0.068)	(0.062)	(0.055)	(0.053)
Age	-0.002***	-0.001**	-0.001***	-0.002***	-0.002***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)
Male household members	0.008*	0.009*	0.008*	0.008**	0.009**
	(0.004)	(0.005)	(0.004)	(0.004)	(0.004)
Memberships of organisations	0.006***	0.005***	0.005***	0.005***	0.005***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Labour sharing		0.030**	0.030**	0.028**	0.028**
		(0.013)	(0.012)	(0.012)	(0.012)
Labour shortage due to health shock			-0.063***	-0.065***	-0.064***
			(0.024)	(0.023)	(0.023)
Changed residence				-0.029**	-0.029**
				(0.013)	(0.013)
Friends					-0.001
					(0.003)
Education					0.000
					(0.001)
Constant	0.477***	0.444***	0.481***	0.495***	0.501***
	(0.047)	(0.042)	(0.043)	(0.041)	(0.042)
Observations	238	238	238	231	230
R^2	-0.02	0.01	0.12	0.19	0.18
Adjusted R^2	-0.04	-0.01	0.10	0.16	0.14
F test	7.71	6.91	6.97	6.70	5.45
P-value F-test	0.00	0.00	0.00	0.00	0.00
Overidentification test (Hansen J)	13.29	11.86	14.18	13.13	13.02
P-value Hansen J	0.10	0.16	0.08	0.11	0.11
Underidentification test	21.78	22.58	21.81	25.30	26.46
P-value underid	0.01	0.01	0.01	0.00	0.00

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Table 4.7 presents the corresponding first stage results to the regression of degree on effort. The first stage results show that mostly the religion dummies are important in determining degree. The instruments seem to perform properly again, when looking at the different test values. Although the P-value of the Hansen J test is somewhat small, when it is above 0.10 the overidentification test is rejected on a 10% level, which is a reasonable result.

Table 4.7. First-stage regression results for IV-regression of Degree on effort

	(1) b/se	(2) b/se	(3) b/se	(4) b/se	(5) b/se
Dependent variable is degree					
Age	-0.000	0.001	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Male household members	0.003	0.004	0.004	0.009	0.009
	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)
Memberships of organisations	0.010*	0.008	0.008	0.008	0.007
	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)
Amhara	-0.073	-0.082	-0.083	-0.118	-0.113
	(0.078)	(0.077)	(0.077)	(0.080)	(0.081)
Hadiya	-0.005	-0.006	-0.005	-0.039	-0.039
	(0.073)	(0.075)	(0.075)	(0.082)	(0.080)
Kambata	-0.013	-0.016	-0.015	-0.065	-0.070
	(0.066)	(0.065)	(0.066)	(0.075)	(0.074)
Tigrayan	-0.010	-0.018	-0.018	-0.065	-0.063
	(0.090)	(0.090)	(0.091)	(0.095)	(0.096)
Wolayita	0.121*	0.112	0.112	0.099	0.106
	(0.069)	(0.069)	(0.070)	(0.068)	(0.069)
Other ethnicity	-0.094	-0.112	-0.113	-0.121	-0.147
	(0.094)	(0.093)	(0.093)	(0.107)	(0.111)
Orthodox	-0.132*	-0.132*	-0.133*	-0.134*	-0.149**
	(0.069)	(0.068)	(0.069)	(0.071)	(0.072)
Kalehiwot	-0.196***	-0.199***	-0.199***	-0.215***	-0.225***
	(0.063)	(0.065)	(0.065)	(0.065)	(0.066)
Catholic	-0.394***	-0.369***	-0.371***	-0.419***	-0.403***
	(0.105)	(0.104)	(0.105)	(0.104)	(0.104)
Labour sharing		0.050	0.050	0.052	0.050
		(0.032)	(0.032)	(0.033)	(0.033)
Labour shortage due to health shock			-0.007	-0.006	-0.000
			(0.065)	(0.065)	(0.064)
Changed residence				-0.148***	-0.142***
				(0.046)	(0.046)
Friends					0.003
					(0.009)
Education					0.007*
					(0.004)
Constant	0.610***	0.558***	0.564***	0.637***	0.599***
	(0.075)	(0.081)	(0.095)	(0.102)	(0.111)
Observations	238	238	238	231	230
R^2	0.10	0.11	0.11	0.15	0.16
Adjusted R^2	0.05	0.06	0.05	0.09	0.09
F test	2.40	2.35	2.17	2.80	2.62
P-value F-test	0.01	0.01	0.01	0.00	0.00
Shea Partial R^2	0.09	0.09	0.09	0.12	0.13

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

The following two tables, 4.8 and 4.9 present the results of the IV regression of Closeness on effort are presented and the corresponding first stage results. A similar pattern to the previous results can be discovered; Closeness has a negative effect on effort, the controls have the expected sign and the instruments work well. In this case, the instruments perform better than in the previous table. Two ethnicity dummies are now significant and the results of the different tests have better values (e.g. a higher Shea partial R-square and a higher P-value for

the overidentification test). Similar to the wealth regressions, the effect of closeness seems to be bigger than degree, indicating that the density of a kinship network has a larger negative effect on "agricultural effort" than the amount of direct kinship ties.

Table 4.8. Instrumental variable regression of Closeness on effort, second stage results

	(1) b/se	(2) b/se	(3) b/se	(4) b/se	(5) b/se
Dependent variable is effort					
Closeness	-0.248**	-0.232**	-0.192**	-0.158**	-0.158*
	(0.096)	(0.090)	(0.084)	(0.080)	(0.081)
Age	-0.002***	-0.002***	-0.002***	-0.002***	-0.002***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Male household members	0.006	0.007*	0.007*	0.007*	0.007*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Memberships of organisations	0.005***	0.004***	0.004***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Labour sharing		0.023**	0.025**	0.024**	0.024**
		(0.012)	(0.011)	(0.011)	(0.011)
Labour shortage due to health shock			-0.056**	-0.059**	-0.059**
			(0.024)	(0.024)	(0.024)
Changed residence				-0.022*	-0.022*
				(0.013)	(0.013)
Friends					-0.001
					(0.003)
Education					-0.001
					(0.001)
Constant	0.520***	0.486***	0.515***	0.518***	0.525***
	(0.053)	(0.050)	(0.052)	(0.051)	(0.055)
Observations	232	232	232	225	224
R^2	0.07	0.10	0.15	0.19	0.19
Adjusted R^2	0.05	0.08	0.13	0.16	0.15
F test	8.15	7.33	6.71	6.14	4.89
P-value F-test	0.00	0.00	0.00	0.00	0.00
Overidentification test (Hansen J)	10.12	10.17	11.62	11.02	11.08
P-value Hansen J	0.26	0.25	0.17	0.20	0.20
Underidentification test	44.54	43.00	41.60	45.89	43.91
P-value underid	0.00	0.00	0.00	0.00	0.00

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

Table 4.9. First-stage regression results for IV-regression of Closeness on effort

	(1) b/se	(2) b/se	(3) b/se	(4) b/se	(5) b/se
Dependent variable is closeness					
Age	-0.001*	-0.001*	-0.001*	-0.001*	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Male household members	-0.006	-0.006	-0.006	-0.004	-0.004
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
Memberships of organisations	0.002	0.002	0.002	0.003	0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Amhara	-0.107***	-0.107***	-0.107***	-0.114***	-0.116***
	(0.039)	(0.039)	(0.039)	(0.041)	(0.042)
Hadiya	0.022	0.022	0.022	0.017	0.018
	(0.032)	(0.032)	(0.033)	(0.035)	(0.036)
Kambata	-0.027	-0.027	-0.026	-0.035	-0.034
	(0.037)	(0.037)	(0.038)	(0.040)	(0.040)
Tigrayan	-0.032	-0.032	-0.032	-0.039	-0.041
	(0.049)	(0.049)	(0.049)	(0.051)	(0.051)
Wolayita	0.096**	0.096**	0.096**	0.104***	0.102**
	(0.037)	(0.037)	(0.038)	(0.039)	(0.039)
Other ethnicity	0.053	0.054	0.053	0.058	0.066
	(0.039)	(0.040)	(0.039)	(0.043)	(0.044)
Orthodox	-0.101***	-0.101***	-0.101***	-0.112***	-0.106***
	(0.034)	(0.034)	(0.035)	(0.036)	(0.037)
Kalehiwot	-0.101***	-0.101***	-0.102***	-0.118***	-0.114***
	(0.035)	(0.036)	(0.035)	(0.037)	(0.037)
Catholic	-0.196***	-0.197***	-0.199***	-0.228***	-0.234***
	(0.063)	(0.063)	(0.064)	(0.064)	(0.062)
Labour sharing		-0.002	-0.002	-0.001	-0.001
		(0.013)	(0.013)	(0.013)	(0.014)
Labour shortage due to health shock			-0.005	-0.003	-0.004
			(0.025)	(0.025)	(0.026)
Changed residence				-0.044***	-0.046***
				(0.017)	(0.017)
Friends					-0.002
					(0.004)
Education					-0.002
					(0.002)
Constant	0.526***	0.528***	0.533***	0.544***	0.559***
	(0.034)	(0.035)	(0.038)	(0.040)	(0.044)
Observations	232	232	232	225	224
R^2	0.30	0.30	0.30	0.33	0.33
Adjusted R^2	0.26	0.26	0.25	0.28	0.28
F test	8.48	8.11	7.47	8.63	7.92
P-value F-test	0.00	0.00	0.00	0.00	0.00
Shea Partial R^2	0.27	0.26	0.26	0.29	0.29

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors in parentheses.

The robustness of the results has been checked for several different specifications. First, the network measures have been transformed from individual levels to household levels. This was done by taking the maximum score on the network measures in each household. The argument for this is that the most dominant network will have the largest impact on the household. It was tested whether the result change when the network measures are transformed by either taking the sum, or the average of the individuals in the household. Doing so, the results of the regressions do not change significantly and the conclusion is the same. Since the results are very similar, they are not reported here.

In the tables above not all of the control variables that were tested are presented. Other controls, such as the different types of social organisations, other types of shocks, etc were also included. However, in order to save space, it is decided not to present many insignificant control variables in the tables. Only the most relevant and/or significant controls are therefore presented.

Furthermore, the regressions were run with different sub-samples. For example by dividing the sample based on their wealth, one can look at either the effect for relatively poor and wealthy households in the sample. However, the division drastically reduces the sample, making comparison practically impossible since the variables will suffer from selection bias. If the sample would be larger, this could be possibly interesting to further investigate.

Last, a sample including only the Oromo population was used in the regressions. However, this does not allow for an IV-regression since the instruments that are used previously cannot be used in this case. Although a significant effect of closeness on wealth was found in some cases, it did not seem to be very robust. However, since one can argue that such a model, without an instrumental variables approach, would suffer from endogeneity problem, this case was not further examined. Furthermore, also in this case, a serious reduction of the sample causes sample selection bias, making it difficult to compare such a model with the ones previously presented in this section.

5. Conclusion and discussion

The findings of this thesis are consistent with the "dark side hypothesis" presented in section 2. It is also consistent with other empirical work done on the "dark side of social capital" for example by Di Falco and Bulte. According to these regression results, the network measures degree and closeness have a negative effect on both wealth and "effort". The presence of a negative effect of kinship networks on wealth is interesting in itself (although not sufficient to prove the existence of a "family tax" effect). It shows that, although kinship networks are likely to have beneficial effects on wealth (e.g. the effects of risk sharing and informal insurance), on balance, the negative effects are dominant. Negative effects, as mentioned earlier, can be for example a discouraging effect of forced redistribution through family tax, or alternatively the fact that the presence of family insurance does not encourage to build up precautionary savings. Either way, kinship networks do not seem to stimulate the accumulation of capital of the households.

In order to distinguish between the different a 'family tax' effect of kinship networks on wealth, an additional factor is needed, that measures somehow economic incentives. However, it is quite difficult to directly measure economic incentives, i.e. the exact thoughts and reasons behind the decisions made. One would have to ask a farmer exactly why he

makes certain decisions, and probably the farmer himself is not even aware of all the factors that determine his decisions. However, the outcomes of incentives can be measured by the economic behaviour and choices they instigate.

An effort was made in this thesis to measure such economic behaviour by looking at the land that households rent, in addition to the land they own. The results show that again the network measures for kinship have a negative effect on this variable. This would imply that having either a large amount of direct kinship ties, or being part of a dense kinship network leads to putting less extra effort into renting land for gathering income. Does this prove the presence of a "family tax" effect? That seems to be dependent on what the "effort" variable actually measures. This variable is based upon certain assumptions, which seem reasonable on paper, but might be flawed in reality.

First of all, land redistribution took place some years ago. What happened in the period between last land distribution and collection of data could have altered and distorted the distribution of land in the village. For example, the ethnic conflict between Oromos and Kambatas has certainly changed the distribution, because the Oromos took land of the Kambatas by force (however it does not become clear how much land was taken over here). On the other hand, there are also forces that keep the equal distribution of land intact, such as the prevailing conceptions of equality in the village and the fact that selling land is an illegal practice. Thus a correlation coefficient (of 0.32) between household size and amount of land owned shows that there still exists a certain pattern that resembles an "equal" distribution of land. However, assuming the worst; that Oromos have a slightly higher land endowment than non-Oromos, this could be a potential problem in the 'effort regressions" since Oromos would have lower scores for that variable (and they have larger networks in general). However, this works in the opposite direction in the wealth regression; Oromos have higher endowments of land (and thus likely more wealth). In that case, despite the higher endowment of Oromos, I still find a significant negative effect of the kinship networks on wealth.

Furthermore, the assumption that the land owned by each household should provide for a sufficient basic income might seems a bit strange in a country such as Ethiopia where poverty still prevails. However, the common perception in the village is that those who let out their land are considered lazy and non-hard working. This is certainly consistent with what the effort variable tries to measure. Then if the effort variable indeed measures "extra effort" households put into the gathering of income, the results might be an indication of the presence of a "family tax".

A concern that comes to mind when looking at the regression results is whether there might exist an omitted variable driving the results. From the background studies of the village, it is known that the indigenous Oromo ethnic group is almost entirely Muslim, they have lower wealth, they have relatively more land and they let out their land more often than others. Now from the first stage regression, it shows that the Muslim groups have closer and bigger networks. Is it not a possibility that, in stead of the negative effect of kinship networks, the results are driven by an effect measuring "being a non-immigrant, Muslim and Oromo"? Is there maybe an omitted variable at work measuring the immigrant versus non-immigrant effect? There are reasons to believe this is not the case and that these immigrant groups are actually not so different from the Oromo group. Looking at the non-Oromo immigrant group, most of the immigrants came to the area a long time ago. During the redistribution period, these immigrants were allotted similar parts of land. They have faced similar economic environments for some time now. It is therefore likely that these immigrants are actually not

very different when it comes to original economic endowments[9]. What creates a difference between Oromo and non-Oromo groups (or Muslim and non-Muslim groups for that matter) is that they have different norms, customs, beliefs and values. For example when it comes to redistributive mechanisms, the wedding gift in the non-Muslim, non-Oromo group is much smaller. I argue that actually these differences in norms and values are driving the effect, (creating differences in work ethics) and not so much the fact itself that these groups are immigrants. In reality, the Oromos are described as being lazy, renting out their land, and not working hard, whereas the other ethnic groups are described as being much more active. The non-Oromo group, since they face different sharing obligations, have a more active approach to agricultural work, and thus they are more successful. However the Oromos, most of them having high pressure from the kinship network, have more negative incentives to work hard and thus are less successful and wealthy.

There remains a challenge to find a variable that better measures the economic incentives that drive the decisions of these households. It would possibly be interesting to create a model that can identify all the households' economic drives, to be able to exactly explain why some people rent land whereas others let out land. Maybe theory from labour economics could be helpful in identifying such a model.

An interesting approach of examining the dark side of kinship networks is to look at the evasive behaviour kinship networks can cause. Research done by Baland and Di Falco and Bulte (2009) show that this kind of behaviour can cause real inefficiencies, such as not building up savings, or taking on unnecessary loans. In a development setting, this kind of behaviour is likely to undermine economic development and progress, and should therefore give rise to real concerns. Policy makers should be therefore be aware of the possible "dark side of social capital" and try to reduce the negative effects of for example kinship networks.

However, the question remains how to reduce the negative effects of kinship networks on economic incentives and wealth. Di Falco and Bulte (2009) find that the negative effect of social capital can only be found in the absence of formal insurance structures. They claim that the "culturally-induced poverty trap can be escaped by the expansion of the financial system". Interestingly, this implies that the development of formal markets that can substitute some of the functions of a kinship network (e.g. insurance markets, credit markets etc) can possibly reduce the negative effect of these networks. Comparing the developed world with the developing world, where such markets are absent, this seems indeed a reasonable solution.

[9] Furthermore, the landless people and those without network are excluded from the regressions. The "new immigrants" are likely to be amongst this excluded group.

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Appendix

Table A. Description of the variables

Variable	Description	More information
Wealth	Measured by an asset based wealth index, based on ownership of assets (plough, sickle, spade, lamp, spray, cart, radio, bicycle, sewing machine, watch, clock, modern bed, blanket, mattress, sofa, table, wardrobe, leather mat and another house outside the village) and on housing characteristics (toilet facilities and iron roofing sheets). Normalized to lie between 0 and 1.	(Dekker 2006) and (Sahn and Stifel 2000)
Closeness	Measure of network centrality, index measuring the relative distance of all other nodes in the network, calculated by social network software called UCINET, normalized to lie between 0 and 1.	(Wasserman and Faust 1994) and (Borgatti, Everett et al. 1999)
Degree	Measure of network centrality, index measuring all direct ties of a node, calculated by UCINET	(Wasserman and Faust 1994) and (Borgatti, Everett et al. 1999)
Effort	Utilized land minus owned land, normalized between 0 and 1	
Household size	Number of members of the household	
Male household members	The amount of male household members	
Age	Average age of the adults living in the household	
Education	Average education of the adults living in the household	
Ethnicity dummy variables	Dichotomic variables indicating the ethnicity of a household, where the households' ethnicity is the ethnicity of the household head. The ethnicities are: Oromo, Amhara, Hadiya, Kambata, Tigrayan, Wolayita, Other ethnicity	
Religion dummy variables	Dichotomic variables indicating whether a household belongs to a religion, where the households' religion is the religion of the household head. The religions are: Muslim, Orthodox, Kalehiwot, Catholic	
Owned land	Amount of land owned	
Utilized land	Amount of land used for crop cultivation	
Land ownership	Dichotomic variable, indicating whether a household owns land (1) or not (0)	
Labour sharing	Number of memberships of labour sharing groups in the household	
Labour shortage	Dichotomic variable indicating whether the household experienced a labour shortage in the past year due to illness or death in the household or family.	
Health shocks	Number of health shocks (death or illness) the household has been affected by the past year	
Memberships of organizations	The amount of memberships of social organisations in the household.	
Friends	Amount of friends in the village reported	
Changed residence	Dichotomic variable indicating whether husband or wife of the household changed residence upon marriage	

Table B. Summary statistics for sample 1

Sample 1: IV-regression of degree and closeness on wealth

Variable	Observations	Mean	Std. Dev.	Min	Max
Wealth	285	0.421	0.206	-3.60E-08	1
Degree	285	0.620	0.324	0	1.705
Closeness	279	0.408	0.154	0.155	0.510
Utilized land	285	2.769	2.162	0	12
Education	285	6.282	4.593	0	17
Age	285	37.778	13.420	9	75
Land ownership	285	0.832	0.375	0	1
Health shocks	285	0.919	0.273	0	1
Labour sharing	285	0.572	0.702	0	3
Household size	285	5.667	2.462	1	13
Oromo	285	0.596	0.491	0	1
Amhara	285	0.147	0.355	0	1
Hadiya	285	0.084	0.278	0	1
Kambata	285	0.081	0.273	0	1
Tigrayan	285	0.137	0.344	0	1
Wolayita	285	0.140	0.348	0	1
Other ethnicity	285	0.032	0.175	0	1
Muslim	285	0.442	0.498	0	1
Orthodox	285	0.330	0.471	0	1
Kalehiwot	285	0.193	0.395	0	1
Catholic	285	0.032	0.175	0	1

Table C. Summary statistics for sample 2

Sample 2: IV-regression of degree and closeness on effort

Variable	Obs	Mean	Std. Dev.	Min	Max
Effort	286	0.405	0.111	0	1
Degree	289	0.618	0.325	0	1.705
Closeness	283	0.408	0.154	0.155	0.510
Age	289	37.589	13.433	9	75
Male households members	289	2.841	1.690	0	9
Memberships of organisations	289	7.488	4.915	0	26
Labour sharing	289	0.567	0.700	0	3
Labour shortage	289	0.858	0.350	0	1
Changed residence	280	0.464	0.500	0	1
Friends	289	4.336	2.605	0	14
Education	288	6.298	4.577	0	17
Oromo	289	0.599	0.491	0	1
Amhara	289	0.149	0.356	0	1
Hadiya	289	0.083	0.276	0	1
Kambata	289	0.083	0.276	0	1
Tigrayan	289	0.135	0.342	0	1
Wolayita	289	0.138	0.346	0	1
Other ethnicity	289	0.031	0.174	0	1
Muslim	289	0.443	0.498	0	1
Orthodox	289	0.332	0.472	0	1
Kalehiwot	289	0.190	0.393	0	1
Catholic	289	0.031	0.174	0	1