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Abstract:

How have rural populations in India mobilized their social networks in times of forced "social distancing"? Focusing on a rural region in Tamil Nadu, mixing Social Network Analysis, descriptive statistics and qualitative interviews conducted before the lockdown, during the lockdown and its aftermath, this paper shows that kinship ties and caste-based relationships are still used as inescapable economic resources, especially when it comes to surviving in this unprecedented worldwide economic and social crisis. The region under study has undergone profound changes in recent decades, combining the disappearance of agrarian forms of dependency and the strengthening of intra-caste interdependence among the lower-caste group (measured here in terms of homophily and homogeneity) with a focus on access to credit and self-help to access employment. The crisis is putting these social networks to the test. Subsidized food, the main pro-poor measure of the Indian government, prevented famine, even if it did not prevent severe malnutrition. Although kin and caste solidarity played a key role in helping households survive, they did not prevent the resurgence of old forms of patronage.

JEL Codes: D85, J15, Q12

Keywords: social networks, homophily, name generators, India, lockdown, caste, employment, debt, kinship.

1. Introduction

How have rural populations in India mobilized their social networks in times of forced “social distancing”? This paper aims to analyze the effects of the first Indian lockdown from March 2020 until November 2020 with regard to the use of interpersonal social networks in rural areas of Tamil Nadu, with a focus on caste.

The COVID-19 pandemic was expected to trigger a range of dramatic sanitary and socio-economic consequences in India and its population of 1.3 billion. Catastrophic forecasts were published right after the beginning of the lockdown in March 2020.¹ A claim was made that India had successfully achieved the fight against COVID-19 at the end of the first lockdown (Financial Express 2021). The outbreak of the second wave from April 2021 has contradicted the successful management of the COVID-19 crisis by the government, with huge pressure on the Indian health system and an exponential rise in cases.

The first Indian lockdown (March 2020) was extended through three other phases from April 15 until May 31, 2020. The lockdown involved closing inter-state borders, shutting down public intra-state transportation, halting economic activities, markets and schools with some exemptions for essential services and commodities. People were forced to stay home and told to respect social distancing. Nonetheless, this command could hardly be applied in a context where the majority of Indian citizens depend on spatial mobility and informal social interactions for their survival (Guérin, Michiels, Natal, Nordman, and Venkatasubramanian, 2022).

Starting June 1, 2020, the central government carried out a progressive “unlockdown” until the end of November 2020. Earlier constraints were progressively lifted with the resumption of economic activities, the reopening of shops and markets, and the re-authorization of large gatherings. However, in spite of these India-wide measures enacted by the central government, Indian states had the possibility of reinforcing the degree of implementation of preventative measures against the coronavirus. States have thus chosen to extend or to interpret the lockdown in their own way, often with strikingly different results (Arnold 2020). In Tamil Nadu particularly, stricter measures have been implemented, as it is one of the most severely affected states of India along with Maharashtra, Andhra Pradesh and Karnataka.

In a context where the bulk of the workforce has no social benefits and about 100 million workers are circular migrants (Nagaraj and Srivastava 2020), the severity and brutality of

¹ For an overview, see for instance Al Dahdah et al. (2020).

containment and the paucity of pro-poor measures have been severely criticized. Researchers and activists have rightly denounced both the lack of compassion of the Indian government (Aiyar 2020; Harriss 2020), its attempts to “destroy” the informal economy of the poor (Harriss-White 2020), a “deliberate cruelty” (Hensman 2020), the possible resurgence of old forms of bondage and slavery (Nagaraj and Srivastava 2020) and a “political strategy of cumulative inequality” (Breman 2020). Using first hand and original survey data and with a focus on a rural region of Tamil Nadu, this article explores how rural families have coped with the lockdown by focusing on the use of caste-based social networks.

It is a known fact that informal economies, lacking an effective legislative framework and providing no social benefits for their workers, rely extensively on social networks. Whether it is to find a job, to borrow, to get help in times of urgent need, to marry children, men and women make extensive use of their interpersonal—including family—networks (Nordman 2016). Social networks are important not only for their direct uses, but because they express one’s standing in society. We submit the hypothesis that interpersonal relationships stemming from the labor and credit markets are relevant to analyze socioeconomic positions and may be used as a proxy for the evolution of the macro-social structure (Lin 1999). Both labor and credit shape livelihoods in the villages and are directly linked to the production or the circulation of economic capital. Lin (1999) defines the macro-social structure as a pyramidal structure consisting of positions ranked according to certain normatively valued resources, such as wealth, status and power according to his theory of social resources. Individuals at the top of the pyramid benefit from more advantages. For individuals further from the top, the best strategy in order to move forward in the social structure would be to be in contact with individuals higher up in the social hierarchy.

In India, social networks are organized around social institutions such as caste, kinship, religion, gender and location (Harriss-White 2003). Although caste is a fluid concept, perpetually evolving according to the context and political concerns, it does still have a clear meaning. Caste is a significant marker of poverty and social discrimination all over India. Low castes remain at the bottom of Indian society (Shah et al. 2018). Agrarian forms of caste dependency are on the decline, but have been replaced by new forms of dependency, in the form of neo-bondage, urban and circular migration organized by recruiters of the same caste but for dominant caste employers (Breman 1996). This is typically the case in the region studied here, in north-eastern Tamil Nadu. Caste-based agrarian interdependence has declined sharply in recent decades, although it coexists with new forms of relationships in the credit and labor markets (Guérin 2013; Hilger and

Nordman 2020). In the same vein, kinship alliances have been radically transformed (Kapadia 2016), while continuing to shape individuals' life trajectory and to play a key role in protection and security (De Neve 2016).

The specific questions we ask are then: to what extent have intra-caste, inter-caste and kinship relationships been used during the COVID-19 lockdown? What have been the effects of the sanitary crisis and the lockdown on the structure of interpersonal networks in these rural areas of Tamil Nadu? This paper will explore these questions using data on interpersonal relationships collected in relation to labor and credit markets and an innovative methodology based on Social Network Analysis (SNA). The data on interpersonal networks stem from panel surveys conducted in 2016–17 (NEEMSSIS-1) and 2020–21 (NEEMSSIS-2) in about twenty localities of Tamil Nadu (NEEMSSIS-1). Documentation on the effects of the pandemic on rural life in this region is achieved through the NEEMSSIS-2 survey, launched in November 2020. Quantitative data are combined with qualitative surveys conducted on the same populations during the first lockdown and its successive phases.

Our results can be summarized as follows. The analysis of pre-crisis and post-crisis networks shows the reinforcement of intra-caste relationships.² Agrarian-type interdependence, implying a unilateral dependence of the lower-caste group on the upper-caste group, no longer exists. People, including low castes, now juggle multiple loans, multiple occupations and multiple employers. Intra-caste interdependency, measured here in terms of homophily (i.e. the tendency to associate with others like one's self; Lin et al. [2017]) and homogeneity (i.e. the tendency to be associated exclusively with others like one's self) exists among the lower-caste group, whose members now represent a significant share of lenders and employers. Nevertheless, the segmentation and hierarchy of credit and labor markets persists. Low castes lend to and hire predominantly low castes. One rarely borrows from and rarely works for someone "lower" than oneself, in terms of the prevailing caste hierarchy. Intra-caste relationships may also reveal another form of power structure, in which low castes are trapped in the lower positions without the possibility of accessing social groups that are higher up in the social hierarchy.

How have these networks been mobilized to cope with the shock of the lockdown? Our analyses lead to four major findings. The first result is the key role of the family, especially during the early stages of the lockdown. While the shock has been a major source of uncertainty and translated

² As a nod to the title, 81% of Alters declared as friends are also from the same caste group as their Ego.

into a “collapse of trust”, the family has been a decisive space of refuge and material and emotional support. The second result is the reduction in consumption and the key safety net role of subsidized food. This prevented famine, even if it did not prevent severe malnutrition. The third result is the equally key role of intra-caste networks, which were intensively mobilized when exchanges and economic life began to resume. However, although kin and caste interdependencies played a key role, they did not prevent the resurgence of old forms of patronage, and this is our fourth result.

The paper is organized as follows. Section 2 describes the study area and the data. Section 3 compares pre-covid and post-covid data to analyze the structure of social networks and its evolution. Section 4 draws on qualitative and quantitative data to analyze the responses to the crisis and the role of social networks. Section 5 concludes.

2. Study area and data

2.1 Context of the study area

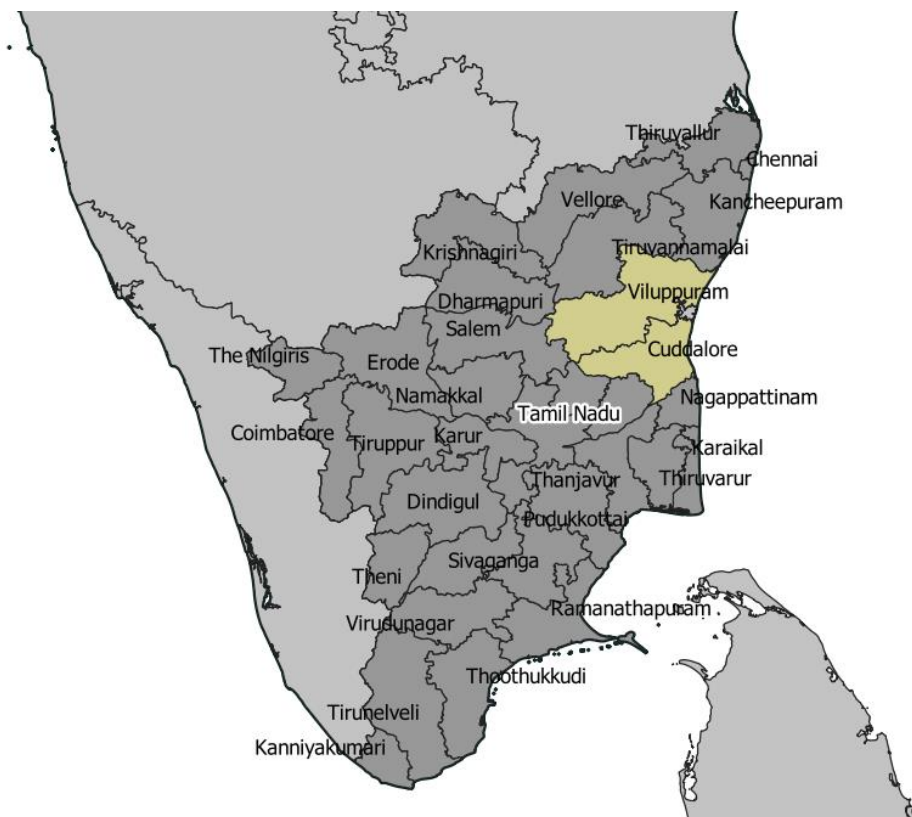


Figure 1: Map of Tamil Nadu with the districts of Villupuram and Cuddalore
(*source:* Global Administrative Areas data; designed by Arnaud Natal)

The study area is economically dynamic, featuring a large proportion of irrigated agriculture, two industrial towns (Neyveli and Cuddalore) and a regional business center (Panruti). Vanniyars and Paraiyars are the two major local jati groups across the region. Vanniyars can be qualified as middlecaste. They are a farming caste with a low ritual rank but, in the villages we studied, as in many places in northeast Tamil Nadu, they control much of the land and are politically dominant. Paraiyars are one of the major Dalit communities in Tamil Nadu. The upper castes of the local hierarchy are the Mudaliyars, Chettiyars, Naidus, Reddiyars, Settus and Yathavars, who account for only a small proportion of the village population.³

The region has seen many changes over the last three decades. Upper castes have mostly moved away from the villages to nearby towns, adopting urban jobs and lifestyles, and selling an important part of their land to Vanniyars. Overall, upper castes still have a hold on village life but are not as powerful as they used to be (Harriss 2013). Land transfers to Vanniyars explain in great part why they are now dominant (Harriss and Jeyaranjan 2016), although their dominance is permanently contested, including by Dalits (Pandian 2000). As for Dalits, although their situation has been improving thanks to the combination of short term migration to nearby towns and industrial centers, and governmental schemes (Guérin, Venkatasubramanian, and Michiels 2014), inequalities persist, whether in terms of education, income or assets. Like elsewhere in India, non-farm income is now largely dominant across all social categories and its share continues to grow. Households also tend to diversify and multiply the type and number of occupations as a familial strategy to cope with risks.

Faced with low and irregular incomes, indebtedness represents a chronic and growing coping strategy (Guérin et al. 2022). All households are indebted, on average up to the amount of their annual income. The financial landscape has diversified greatly over the last few decades. Supplying credit is no longer the privilege of specialized castes. The unilateral indebtedness of Dalits to the landowner is a thing of the past. All castes frequently juggle several sources of debt. Although formal loans have developed greatly over the last two decades through microcredit and financial companies, they still represent only one fifth of households' debt (18%) and this whatever the caste. Most debts rely on interpersonal networks which include relatives, neighbors, friends, employers, labor recruiters, local elites and so forth. As we shall see later, debt is still strongly segmented along caste lines.

³ Christians and Muslims are a minority in the area.

As for the labor market, it is characterized by important changes in a post-liberalization era. Agriculture as a source of income keeps on declining, due to unoccupied land (for farmers) and mechanization (for agriculture laborers). Non-farm incomes are now predominant, largely through the development of jobs into the region's informal economy. For Dalit males, most often landless, the main opportunities outside the village involve a permanent trade-off between regular but seasonal jobs, based on a wage advance system and involving terrible working conditions (sugar cane harvesting and brick molding), and casual jobs (manual labor in construction, transport and markets). The middle-caste group is over-represented as farmers (one third), and the upper-caste group as entrepreneurs (42%, NEEMSI-1, 2016–17). The dependency of Dalits upon non-Dalits through relations of production has declined over the last decade, but persists. Most Dalits are casual wage laborers (71%). Half of their employers are private companies or institutional employers.⁴ The middle- and upper-caste groups are however predominant among personal employers (69%).

The role of caste in contemporary India remains highly controversial: has the market economy erased caste and been replaced by class? Some scholars see modernity and the reinforcement of a market economy since the 1990s as a caste-erasing process.⁵ Tamil Nadu, which is one of the most industrialized states of India, and well-known for the quality of its development indicators (Dhas 2012), might be a good case to examine this hypothesis. Do we observe the persistence of caste in the structure of markets, and labor markets in particular? According to Mosse (2020), the caste into which a person is born remains among the most important determinants of life opportunities. Caste is not only a major socio-political institution, but also has to be taken into account in relation to economic processes. Caste is used as a resource in the modern market economy, sometimes in the form of networks, maintaining a structure of advantage for upper castes and a structure of discrimination for the lower-caste group. A social network made-up of lower-caste people may reinforce inequalities. When social groups differ in their access to resources (such as wealth, status or information), and when members of privileged groups mainly interact with one another, social network resources are unequally distributed (Lin 2004). By contrast, a diversified social network may multiply economic opportunities. Better connected people enjoy higher returns (Lin, Cook, and Burt 2017). Moreover, some authors put forward the concept of “conjugated oppression” to describe how identity-based social oppression is inseparable from class relations (Shah et al. 2018).

⁴ Employers employ employees. We make a distinction among employers between a personal employer (i.e. an individual) and others employers (i.e. companies, institutions, the government and associations).

⁵ For a review, see Mosse (2020).

The correlation of both NEEMIS-1 (2016–17) and NEEMIS-2 (2020–21) data on interpersonal networks through SNA (Social Network Analysis) highlights the weight of caste-based interpersonal relationships over the last four years. Collected from November 2020, right after the end of the first lockdown in Tamil Nadu but before the second one in May 2021, NEEMIS-2 data provide partial insight into the COVID-19 effects on the structure of social networks, especially in terms of caste.

2.2 The surveys

This paper relies on both qualitative and quantitative survey data. The qualitative material was collected first through phone interviews during the COVID-19 lockdown and then, from December 2020, through face-to-face interviews. Quantitative data stem from a longitudinal household survey collected at three points in time: in 2010 with the RUME survey, in 2016–17 with the NEEMIS-1 survey (Nordman et al. 2017) and in 2020–21 with the NEEMIS-2 survey (Nordman et al., 2021 ; <https://neemis.hypotheses.org/>).⁶

RUME mainly focused on the financial practices and labor of a sample of households in ten villages. Using the same population, NEEMIS-1 enlarged the original sample, and introduced extended questions at the individual level for the so-called Egos (i.e. the household head and another member randomly selected), providing interpersonal networks data.⁷ NEEMIS-1 was carried out among 492 households and 2,696 individuals. The NEEMIS-2 questionnaire (2020–21) follows the same structure as that of NEEMIS-1 with some improvements, and additional questions. Since NEEMIS-2 ended around mid-October 2021, the current sample is made-up of 495 households and 2,912 individuals from 10 villages.⁸

The majority of households from NEEMIS-2 were surveyed before the second wave of COVID-19 hit Tamil Nadu in May 2021. The lockdown we are referring to in this paper is therefore the first lockdown implemented in India from March until November 2020 and we do not account for the situation in Tamil Nadu during the second COVID-19 peak that began in May 2021.

⁶ See **Appendix 2** for information on the sampling method. More details can be found in Nordman et al. (2017) and Nordman et al. (2021).

⁷ For a full set of statistics in NEEMIS 1, see the statistical report Nordman et al. (2019).

⁸ See **Appendix 3** for more information on the content of each questionnaire.

2.3 The social network data

NEEMIS-1 and NEEMIS-2 include questions about the size and the characteristics of interpersonal relationships. Data on interpersonal relationships were collected through “name generators” in different contexts (e.g. labor market, credit market, everyday interactions). They consist of several questions to invite the respondent (i.e. the household head, Ego 1, or Ego 2) to elicit people (“Alters”) with whom she or he maintains certain types of direct relationships.⁹ For one and the same question, different Alters could be mentioned.¹⁰

The objective is to delineate the core members of the respondent’s interpersonal network (Marsden 2005). The structure of these interpersonal data allows us to use the Social Network Analysis (SNA) approach, which is rarely used in developing countries to approach employment and financial practices. For this paper, we focus on labor-based and debt-based interpersonal relationships collected through six different questions. **Appendix 2** provides a detailed description of the social network sampling.

3. The structure of social networks

3.1. Methodological approach to Social Network Analysis (SNA)

Social relations encompass multiple ranges of interpersonal networks that people might use in different contexts in order to gain access to different resources. Interpersonal networks are a way for individuals to find additional resources. They are sets of relationships between a set of actors (Forsé 2008). More generally, and in our case study, actors are individuals, but they may also be companies or households. A structural approach is interested in the structure of interpersonal networks as a whole; instead of being focused on the specific connections a person might have at the individual level. The SNA’s tools include statistical indicators to define and to characterize the network along with sociograms (i.e. graphs of social networks). The structure might be defined in terms of density (i.e. the overall level of connectedness in network [Scott 2017]), centrality (i.e. how well connected an Ego is within his/her local environment [Scott 2017]), betweenness (i.e. the extent to which an Ego is a bridge between the other Egos in the network [Freeman 1979]), homophily (i.e. the tendency to associate with others like one’s self [Lin

⁹ We use the terms social networks, interpersonal relationships, interpersonal networks, social relations in an undifferentiated manner to describe the set of relationships that individuals develop and use in specific contexts.

¹⁰ See **Appendix 1** for more detailed information.

et al. 2017]) and homogeneity (i.e. the tendency to be associated exclusively with others like one's self).

Interpersonal networks are a set of egonets, connected to or independent from each other. An egonet comprises all the relations that a focal agent, Ego, has with others, Alters (Scott 2017). It is then possible to analyze the scope of the personal network and its composition, as the “social surface” of Ego. A number of other indicators for the overall network structure might also be made on these egonets (Bidart, Degenne, and Grossetti 2018). **Figure 2** shows the graph for an egonet¹¹.

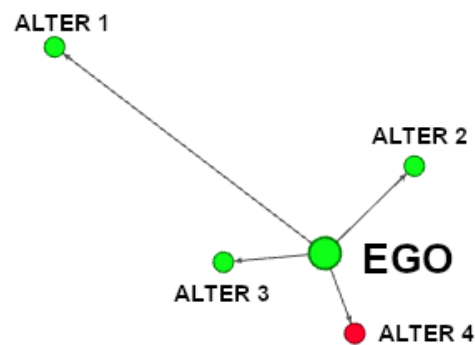


Figure 2: Representation of an egonet

¹¹ It is a theoretical example; the colors have no meaning.

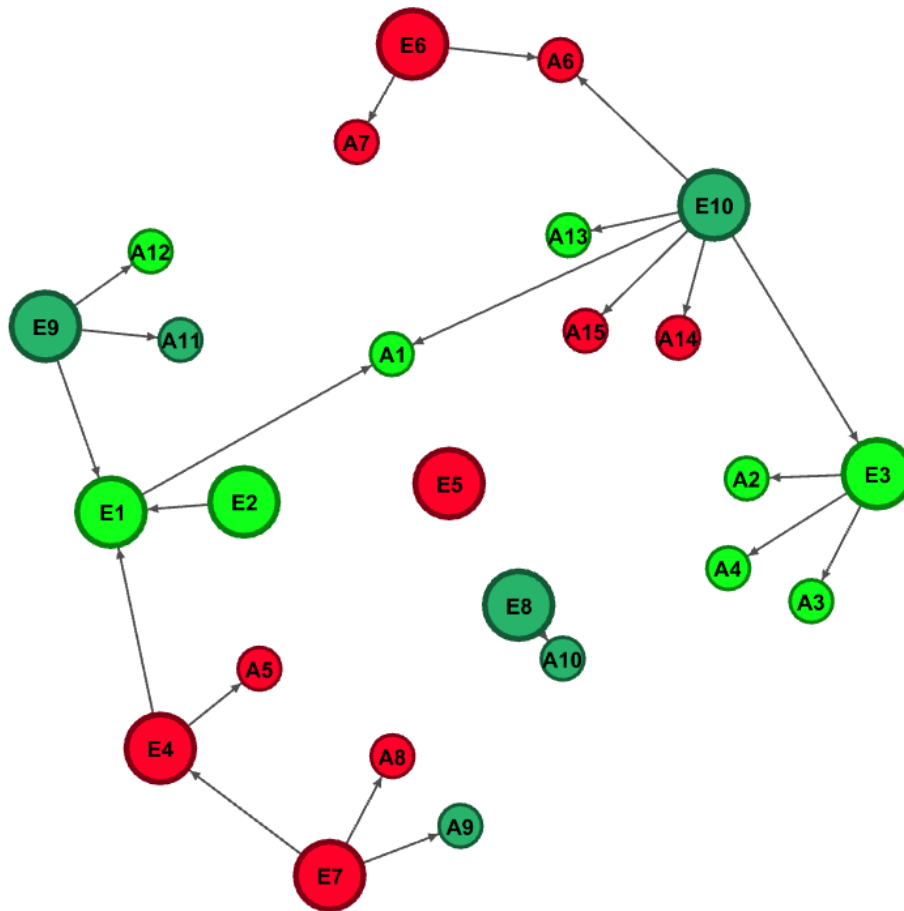


Figure 3: Representation of a whole network made-up of egonets

Figure 2 shows a single egonet made-up of Ego with his/her Alters. This Ego mentioned four Alters, who are not connected to each other; they do not know each other. **Figure 3** is an illustration of a whole network. It indicates that Ego 1 (E1) is connected to one Alter, and is also in connection with Ego 9 (E9), E2 and E4, themselves being connected to three Alters. Ego 5 is an isolated Ego, without any connections.

There is a distinction between two types of networks within SNA: whole and egocentric networks. In a whole network, Egos can be connected to any other person in the network. Whole networks provide information on relationships built between two Alters mentioned by two different Egos, or between Egos. We were able to identify bridges, i.e. people creating connections between groups of people, or opinion leaders, i.e. the best-connected individuals. In an egocentric network, Egos can only be connected to Alters. Egocentric networks are more limited than whole networks in terms of indicators and analysis of power relationships. NEEMIS data on interpersonal relationships are egocentric networks. As a consequence, we are limited to the measurement of homophily and homogeneity indicators.

3.2 Caste dependency before and after COVID-19

The tools from SNA are powerful for studying the importance of intra- and inter-caste relationships for financial practices and employment through graphical representations of social network indicators. The structure of the NEEMSIS database allows us to draw out information on each Ego's personal network scope with regard to labor and credit markets and the composition of each Ego's personal network. The objective is to evaluate the social surface of each Ego (Bidart et al. 2018) using the size of interpersonal networks and the diversity of the Alters to which a person has access. To this intent, we use descriptive statistics, homophily and homogeneity indicators along with graphs.

Descriptive statistics on Egos and Alters

What are the characteristics of the Alters and Egos? Who are the most connected Egos, and to whom? The average size of the egonet is 2.38 Alters for NEEMSIS-1 and 2.97 Alters for NEEMSIS-2. An individual will name on average 3 Alters for both waves. However, the number of Alters mentioned in 2020–21 is slightly higher.

For NEEMSIS-1 (see **Table 1**), the average Ego¹² is an uneducated male from the lower-caste group in the 46–55 age bracket, working as a wage worker. The average Alter is a male from the middle-caste group in the 36–45 age bracket, working as a wage worker. For NEEMSIS-2 (see **Table 2**), the average Ego is poorly educated (primary school) from the lower-caste group in the 46–55 age bracket, working as a wage worker. The average Alter is a male with a higher level of education (upper primary) from the middle-caste group, working as a wage worker.

For both waves, the majority of Alters come from the middle-caste group¹³ although their Egos come from the lower-caste group. In addition, we observe that Alters are slightly better educated than Egos. Furthermore, the share of wage workers is always less important for Alters than for Egos; Alters are more likely to be farmers or self-employed than Egos. These figures are consistent with the theory of social resources developed by Lin (Lin 1999). To get information about job opportunities and to contract a loan, Egos are likely to make use of Alters who are higher up in the social hierarchy, which is expressed here in terms of educational background, caste groups and status of employment. Notwithstanding, this trend must be nuanced in view of extremely homophilous interpersonal relationships as we shall see now.

¹² Two Egos were surveyed per household; the household head and another randomly selected member.

¹³ However, for further analyses, considering the availability of information at the *jati* level, it might be more accurate to rely on *jatis* to have a more adequate picture of the importance of caste-based relationships in villages.

Egos - Alters sample - NEEMSI 1 (2016-2017)

Individual variables for Egos (N: 557 Obs.)	%
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Gender (N: 557 Obs.)	
Men	70.56
Women	29.44

Age (N: 557 Obs.)	
15-25	7.18
26-35	15.26
36-45	27.47
46-55	27.83
56-65	18.31
More than 65	3.95

Level of education (N: 557 Obs.)	
Primary education or below	26.75
Upper primary	16.88
High school/ITI	18.31
Senior secondary	7.00
Bachelor and above	3.23
No education	27.83

Caste groups (N: 557 Obs.)	
Low caste	51.53
Middle caste	38.42
Upper caste	10.05

Status of employment (N: 557 Obs.)	
Employed	3.59
Unemployed	96.41

Type of main occupations (N: 537 Obs.)	
Farmer	15.46
Self-employed	15.08
Salaried job	69.46

Individual variables for their Alters (N: 1 471 Obs.)	%
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Gender (N: 1 144 Obs.)	
Men	82.95
Women	17.05

Age (N: 357 Obs.)	
15-25	6.16
26-35	18.49
36-45	41.74
46-55	28.01
56-65	4.76
More than 65	0.84

Level of education (N: 318 Obs.)	
Primary education or below	26.42
Upper primary	26.10
High school/ITI	12.58
Senior secondary	10.38
Bachelor and above	5.03
No education	19.50

Caste groups (N: 1 471 Obs.)	
Low caste	40.45
Middle caste	46.09
Upper caste	13.46

Status of employment (N: 1 166 Obs.)	
Employed	2.14
Unemployed	97.86

Type of main occupations (N: 1 135 Obs.)	
Farmer	25.90
Self-employed	25.11
Salaried job	48.99

Table 1: Descriptive statistics of the sample in 2016–17 (*source:* NEEMSI-1, **authors' calculations**).

similar to themselves in a socially significant way. Homophily measures highlight similarities and dissimilarities among Egos and Alters. **Fig. 4** shows homophily measures for employment (e.g. whether a person is engaged in paid labor or not), caste group (i.e. the upper-, middle-, and lower-caste groups), gender, economic status (i.e. same economic condition according to Ego), occupation (i.e. farmers, self-employed or wage workers), age (i.e. 15–25, 26–35, 36–45, 46–55, 56–65, above 65 years old) and level of education (i.e. no education, primary school, upper primary, high school, senior secondary, bachelor and above).¹⁴ Questions on Alter's age and education were asked to Egos only for labor-based interpersonal relationships or for their

¹⁴ See Appendix 1 for detailed information accounting for the differences in the number of observations.

business lenders in 2016–17. In order to be rigorous, we restricted our sample in 2020–21 accordingly.

Descriptive statistics of our sample

Egos - Alters sample - NEEMSI 2 (2020-2021)			
Individual variables for Egos (N: 562 Obs.)		Individual variables for Alters (N: 2 016 Obs.)	
Gender (N: 562 Obs.)		Gender (N: 2 016 Obs.)	
Men	60.32	Men	62.40
Women	39.68	Women	37.60
Age (N: 562 Obs.)		Age (N: 2 016 Obs.)	
15-25	2.31	15-25	1.39
26-35	11.92	26-35	18.85
36-45	26.51	36-45	46.03
46-55	29.36	46-55	21.38
56-65	21.17	56-65	11.76
More than 65	8.72	More than 65	0.60
Level of education (N: 562 Obs.)		Level of education (N: 2 016 Obs.)	
Primary education or below	28.29	Primary education or below	20.01
Upper primary	16.90	Upper primary	34.20
High school/ITI	17.26	High school/ITI	21.04
Senior secondary	7.83	Senior secondary	4.68
Bachelor and above	3.20	Bachelor and above	3.32
No education	26.51	No education	16.75
Caste groups (N: 562 Obs.)		Caste groups (N: 2 016 Obs.)	
Low caste	48.04	Low caste	38.64
Middle caste	43.06	Middle caste	53.13
Upper caste	8.90	Upper caste	8.23
Status of employment (N: 562 Obs.)		Status of employment (N: 2 016 Obs.)	
Employed	4.98	Employed	3.87
Unemployed	95.02	Unemployed	96.13
Type of main occupations (N: 533 Obs.)		Type of main occupations (N: 1 936 Obs.)	
Farmer	13.51	Farmer	22.21
Self-employed	10.51	Self-employed	16.89
Salaried job	75.98	Salaried job	60.90

Table 2: Descriptive statistics of the sample in 2020-21 (*source:* NEEMSI-2, **authors' calculations**). employment as their Ego, 98% live in the same village, 19% are from the same caste group and 86% have the same gender. In 2020–21, 92% of Alters have the same status of employment as their Ego, 86% live in the same village, 82% are from the same caste group and 74% have the same gender. The large discrepancy on the homophily indicator regarding place of residence between 2016–17 and 2020–21 is noteworthy.

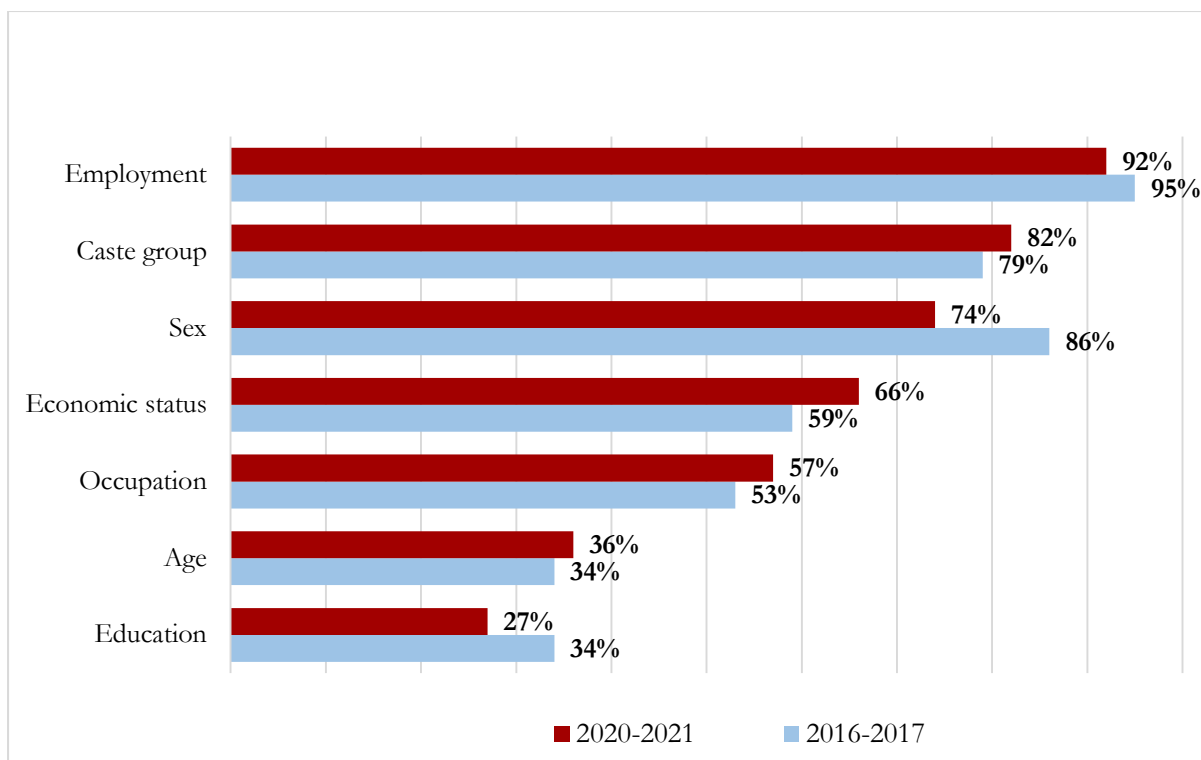


Figure 4: Evolution of homophily indicators for each trait across all the name generators
(source: NEEMSIS-1, 2016–17 and NEEMSIS-2, 2020–21; authors' calculations)

The status of employment refers to whether or not the person is engaged in paid work. On the one hand, interpersonal relationships being used to access a job opportunity or a loan, we might naturally expect Egos to refer to Alters employed in the labor market with enough economic capital to support their request. On the other hand, the high degree of homophily for status of employment could be explained by a relatively high employment rate in our survey area. The employment rate in the villages remains quite high for both 2016–17 and 2020–21: respectively 72% and 71% using a one-year reference period for the calculation. For both years, the ego-alter sample is specific and consists mainly of people engaged in paid work (90% of Egos and Alters). Caste group homophily has slightly increased between 2016–17 and 2020–21. Respectively, 79% and 82% of the Alters come from the same caste group as that of their Ego. The evolution of caste homophily illustrates a general trend observed in the villages since 2010 with the RUME survey: the reinforcement of intra-caste interdependency regarding first loan-based relationships and then labor-based relationships.

We also notice a high degree of homophily for gender; 86% in 2016–17 and 74% in 2020–21. Males tend to name males in their interpersonal relationships, while females tend to mention females. This homophily indicator confirms that gender remains an important determinant on

both labor and financial markets in rural Tamil Nadu. Using NEEMSI-1 data, women do not have access to the same jobs or financial opportunities, and this also varies according to caste (and marital status) (Reboul, Guérin and Nordman 2021; Guérin, Michiels, Nordman, Reboul and Venkatasubramanian 2020).

We have also calculated homophily indicators for the Alter's place of residence. The place of residence depends on whether an Alter lives in the same neighborhood as his/her Ego. However, we were not able to compare our results between both waves, since we asked the questions differently. Looking at the figures for 2020–21, which are more precise in terms of location, we obtain interesting results. 86% of Alters live in the same village as their Ego. Among those 86%, 25% live in the same neighborhood. More broadly, 94% of Alters were from the same district. These figures confirm the importance of village relationships for building interpersonal relationships (Hilger and Nordman 2020). Potentially, the geographic importance of interpersonal relationships may reinforce existing socioeconomic fragmentations: households with geographically extended and diversified social networks may be advantaged in terms of social mobility.

A strong caste homophily expresses difficulty for lower-caste Egos to move the social structure upwards. This lack of access to contacts who are higher in the social hierarchy is a form of “negative social capital” (Pinçont and Pinçont-Charlot 2007). People from the lower-caste group only interact with people from the same caste group, cumulating inequalities and discriminations (Mosse 2020).

In a nutshell, Alters tend to share the same status of employment, the same caste group and the same gender as their Ego. These results confirm a strong segmentation and fragmentation of the labor and financial markets around social institutions, particularly across caste and gender. People face either restrictions or differential treatment based on caste or gender (Guérin et al. 2022). These social identities still affect the tasks most people do (Harris-White 2003).

Homogeneity among egonets

Homogeneity is another SNA statistical indicator. It is defined as the proportion of Alters sharing the same attribute among all Alters elicited by Ego. Homogeneity indicators are calculated at the egonet level, while homophily indicators are based on ego-to-alter ties. Homogeneity is equal to 1 if all Ego's Alters share the same attribute, and 0 otherwise. For

egonet made-up of Ego and a single Alter, homogeneity is equal to 1 if Alter and Ego share the same attribute.

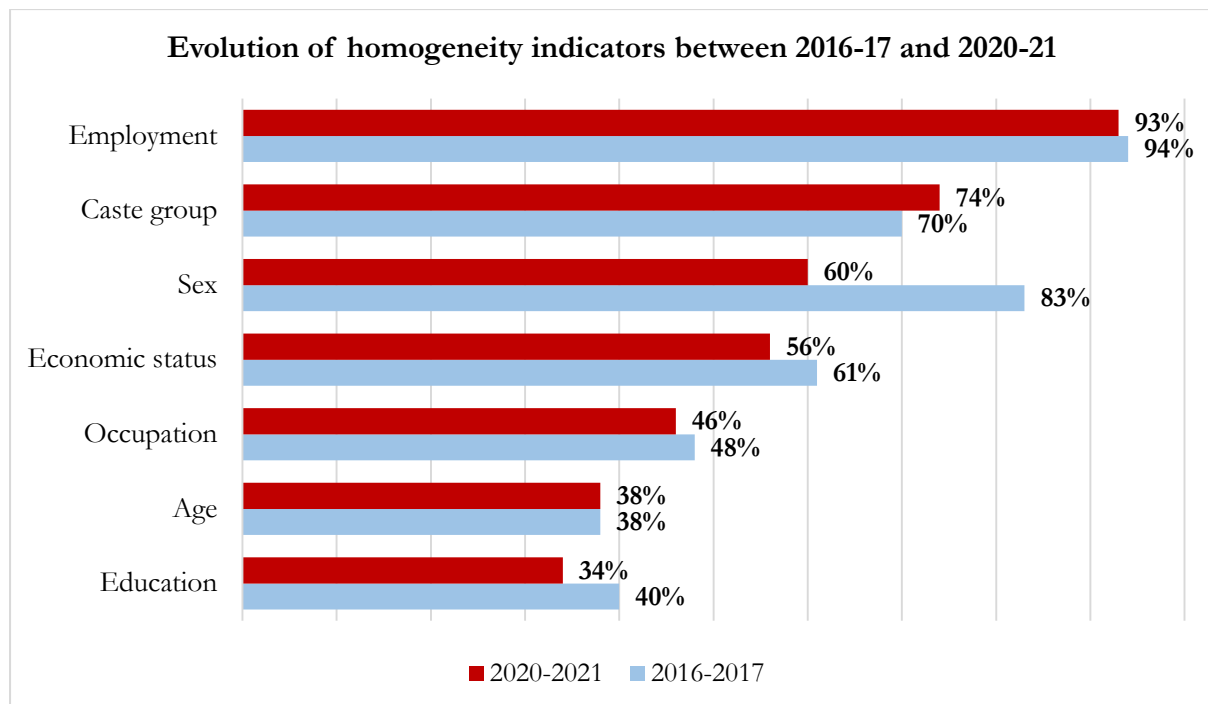


Figure 5: Evolution of homogeneity indicators for each trait across all the name generators
(source: NEEMIS-1, 2016–17 and NEEMIS-2, 2020–21; authors’ calculations)

Calculating homogeneity is a way to determine whether homophilous relationships are common across Egos, or are overestimated for a specific group of Egos. Both homophily and homogeneity provide information on the similarities and dissimilarities between Alters and Egos. Homophily measures diversity at the network level, while homogeneity measures diversity at the individual level of Egos. In addition to being homophilous, our sample could also be homogeneous or heterogeneous. An Ego has a homogeneous egonet if he/she is in relationships with similar Alters only, in terms of caste group, or other socio-economic attributes. By contrast, an Ego has a heterogeneous egonet if he/she is associated with Alters from different socio-economic backgrounds. The degree of homogeneity at the network level is thus defined as the proportion of homogeneous egonets, i.e. the proportion of Egos in relationships with Alters sharing the same socio-economic attribute strictly.

Fig. 5 shows the homogeneity indicators calculated for each trait across the 6 name generators. As for homophily indicators, the more homogeneous attributes are the status of employment, the caste group and gender. Interestingly, caste group is the only attribute to exhibit a higher degree of homogeneity across waves, i.e. in a 4-year interval. While Egos generally have more

socio-economically diversified profiles among their Alters (*e.g.* gender, age, education), the proportion of Egos with Alters from different caste groups has decreased overtime.

The important degree of homogeneity for the status of employment is the direct result of a strong homophily on the status of employment for Egos and Alters. With respectively 95% and 92% of Alters sharing the same status of employment in 2016–17 and 2020–21, a high degree of homogeneity is expected. Accordingly, 93% of Egos only mention Alters sharing the same status of employment in 2020–21, and 94% in 2016–17.

Looking at gender homogeneity, only 19% of Egos maintained interpersonal relationships with both male and female Alters in 2016–17. This proportion increases to 40% of Egos in 2020–21. Noteworthy, Egos are more likely to be in contact with a gender-diversified set of Alters in 2020–21. This evolution does not minimize the segmentation of interpersonal relationships around gender. At the egonet level, interpersonal relationships are getting more diversified. People still tend to spend time with people from the same gender. However, the proportion of Egos spending time with both female and male Alters is on the rise.

Regarding caste group, 74% and 70% of Egos have an egonet made-up of Alters sharing the same caste group in 2016–17 and 2020–21, respectively. Homogeneity indicators are higher in 2020–21. Intra-caste relationships are on the rise at the whole network level as well as at the Ego level. In 2020–21, Egos are less likely to have people from different caste groups among their Alters.

Descriptive statistics and both homophily and homogeneity indicators highlight similarities among Egos and Alters in terms of status of employment, caste group and gender. Analyzing specifically the weight of caste-based interpersonal relationships, we observe a rise of intra-caste relationships. However, low-caste Egos may be hampered by the lack of Alters that are found higher in the social hierarchy among their personal network, thereby reproducing power relations between caste groups. The next section presents an in-depth analysis of the intra- and inter-caste relationships at the caste group level for both debt and labor.

3.3 Caste dependency on labor and financial markets

Focus on debt and interpersonal networks

Information on debt through interpersonal networks draws on 477 Egos, who belong to 420 households, and who elicited 1,114 Alters in 2016–17, and on 529 Egos, who belong to 415 households, and who elicited 1,921 Alters in 2020–21. Two questions constitute our sample (i) information about the lender for business loans, and (ii) information about the lender for all types of loans. For the rest of the analysis, we are not interested in institutional lenders which represent 14% and 29% of the lenders in 2016–17 and 2020–21 respectively.

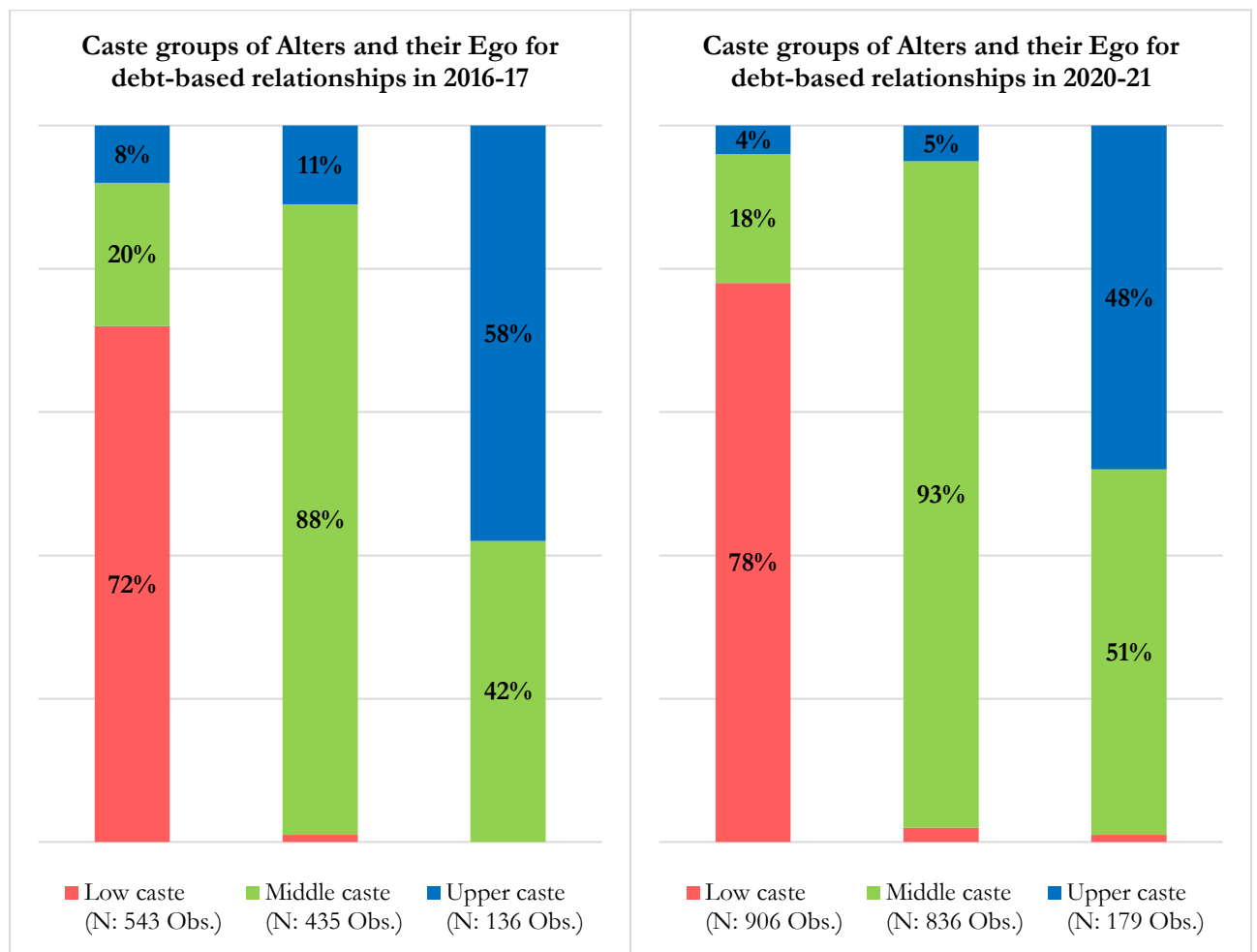


Figure 6: Which Ego mentions which Alter on the financial market?

(source: NEEMIS-1, 2016–17; NEEMIS-2, 2020–21)

Egos depend to a large extent on intra-caste lenders among all the villages of our sample. 82% of Alters have the same caste group as their Ego in 2020–21, and 76% in 2016–17. Homophily on caste group is particularly important; people tend to borrow from lenders of the same caste group.

Fig. 6 shows the caste group affiliation of Alters across the caste groups of Egos between 2016–17 and 2020–21. This structure of loan interpersonal network among villages unveils a strong caste group homophily, which increases between both waves. This high level of homophily on caste group is especially important for middle-caste Egos: from 88% of intra-caste loans in 2016–17, the statistic reaches 93% in 2020–21. Low-caste Egos also tend to borrow money through lenders from their caste group; respectively 72% and 78% of their Alters were from low castes in 2016–17 and 2020–21. Upper-caste Egos have the most diversified money lenders. Between 2016–17 and 2020–21, 58% then 48% of their money lender were from upper castes. This is the only caste group for whom caste group homophily has decreased between both waves. However, this diversification might be constrained by the departure of most of the upper-caste communities from the villages, who looked for more interesting opportunities in the surrounding towns or bigger cities of Tamil Nadu.

Fig. 7 shows graphical representations of the network of middle-caste Egos used for interpersonal loans. Each circle represents a node, either Ego or an Alter.¹⁵ The egonets with the smaller number of alters are in the center of the graph. The further egonets are from the center, the bigger is the number of Alters per egonet, i.e. the bigger is the number of money lenders. The ego-to-alter tie represents the loan Ego has taken out from a lender.

The graph of the whole network in **Fig. 7** emphasizes the high degree of group caste homophily among middle-caste borrowers. The graph is almost entirely made-up of green nodes representing either Egos or Alters from the middle-caste group. Visually, this confirms the importance of intra-caste personal relationships (**Fig. 7a** to **Fig. 7d**).

If we restrict the ties to heterogeneous egonets (**Fig. 7c** and **Fig. 7d**), the majority of nodes disappears. As a reminder, an egonet is supposed to be homogeneous if all the Alters making up the egonet are from the same caste group. A homogeneous egonet means Ego only mentions Alters from the same caste group. We might consider that the more one's network is homogeneous across caste, the more caste is a discriminating criterion to constitute this network.

As for homophily, caste homogeneity also increases between 2016–17 and 2020–21. A middle-caste Ego is likely to contract loans through lenders exclusively from the same caste group: 79% of Egos only mention Alters from the same caste in 2016–17, and 88% of Egos in 2020–21.

¹⁵ The graph was made on GEPHI, using the “Force Atlas” algorithm.

These data show the increasing importance of intra-caste loans, specifically for caste groups that are placed higher in the social hierarchy. Looking at the hierarchization of the credit market, low castes tend to borrow more and more from low-caste money lenders. However, the middle- and upper-caste groups do not borrow from low castes. Simply put, one rarely borrows for anyone lower than oneself. No matter the degree of intra-caste or inter-caste dependency, the caste system keeps segmenting the credit market.¹⁶

¹⁶ See the rest of the sociograms of debt relationships for all caste groups in Appendix 6 and Appendix 7.

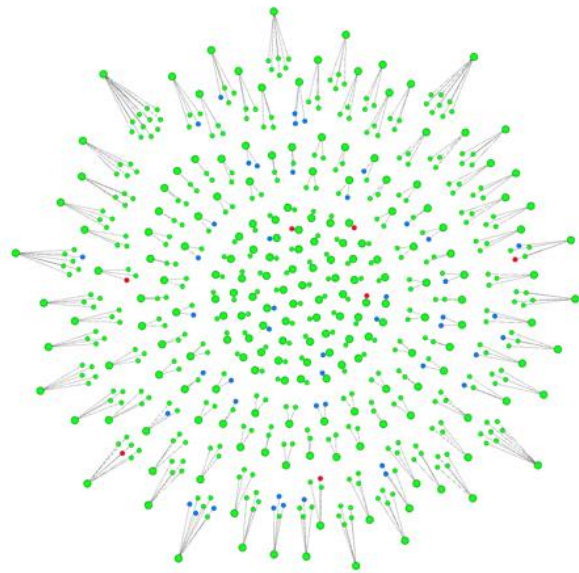


Figure 7a: Graph of the whole debt network for middle caste egonets in 2016-17.

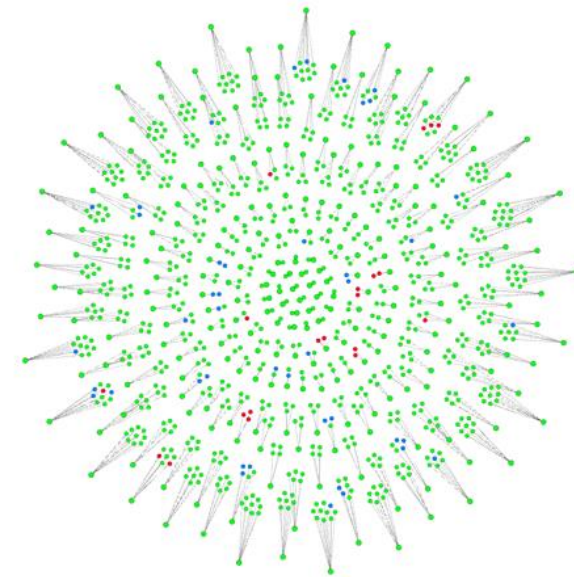


Figure 7b: Graph of the whole debt network for middle caste egonets in 2020-21.

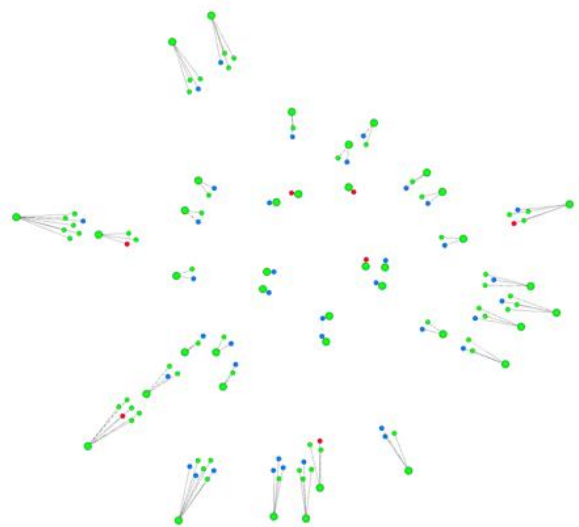


Figure 7c: Graph of the debt network for heterogeneous and middle caste egonets in 2016-17

● Upper caste
● Lower caste
● Middle caste

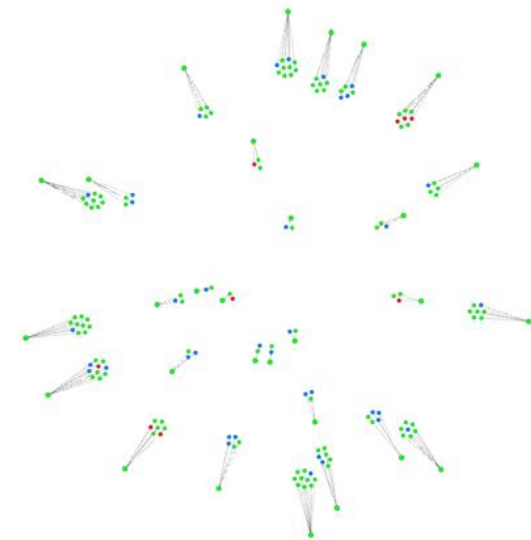


Figure 7d: Graph of the debt network for heterogeneous and middle caste egonets in 2020-21.

Figure 7: Graphical representations of debt-based interpersonal relationships for middle-caste Egos in 2016-17 and 2020-21
 (source: NEEMIS-1, 2016-17, NEEMIS-2, 2020-21)

Focus on labor market and interpersonal networks

The NEEMIS questionnaires include a range of name generators associated with questions related to labor. The reduced sample consisting of the labor-based network is the following: 357 Alters elicited by 249 Egos part of 195 households in 2016–17; 225 Alters elicited by 171 Egos part of 129 households in 2020–21. This labor-specific social network relies on four questions, gathering information on: (1) the person to whom Ego would ask help to recruit a worker (2) the person Ego will contact to find a new job (3) the person Ego contacted in the last 12 months (4) the person who got hired thanks to a recommendation. Egos mention Alters for these questions if they need help from a worker (1) *job, is there someone you are directly in contact with you would need/Nobody*). 15% and 18% of self-employers asked at least one worker (1), 24% and 15% of Egos are eager to contact a worker (1), 5% and 4% of Egos have recommended at least one Alter (2), 4% and 3% of Egos are in contact with at least one Alter (3) recommendation (4) in 2016–17 and in 2020–21 respectively.

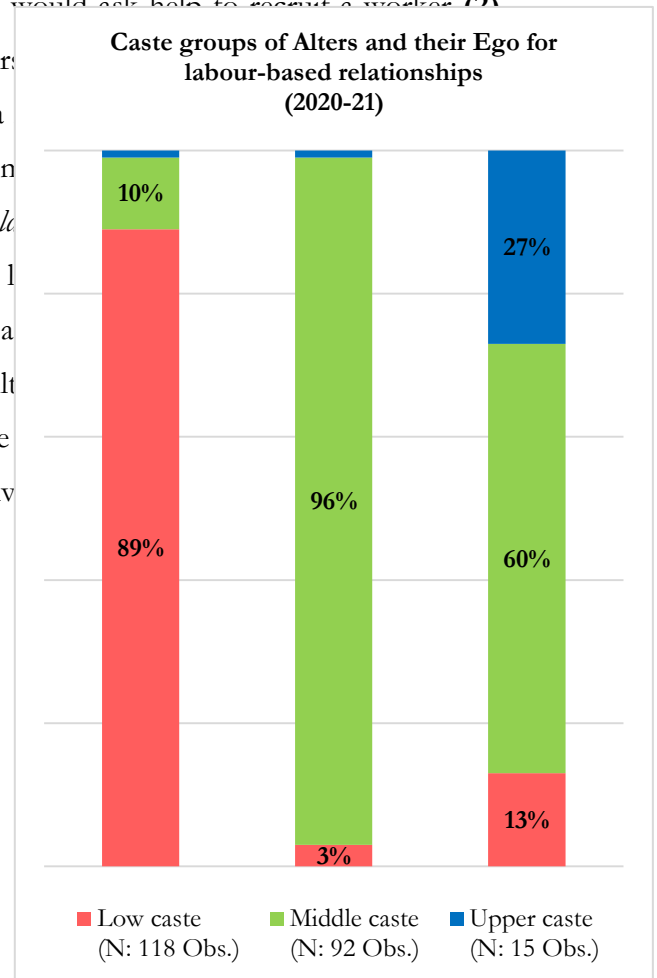
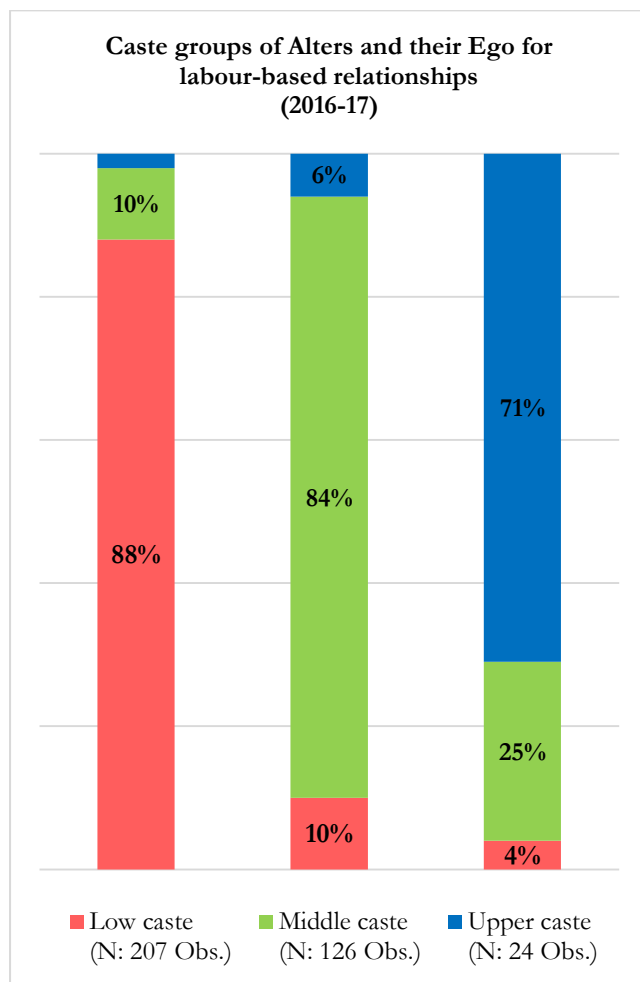


Figure 8: Which Ego mentions which Alter on the labor market?

(*source*: NEEMIS-1, 2016–17; NEEMIS-2, 2020–21)

Fig. 8 outlines the evolution of caste group homophily within caste groups between 2016–17 and 2020–21. We note that the proportion of Alters from other caste groups is stable for low-caste Egos, and the overwhelming majority of their Alters are from low castes.

For middle-caste Egos, the trend is in favor of more intra-caste relationships. In 2020–21, 96% of Alters are from the middle-caste group while it was 84% in 2016–17. Noteworthy, in the case of non-homophilic relationships, middle-caste Egos do not seem to mention Alters from a higher-caste group systematically, i.e. upper-caste Alters. The share of low- and upper-caste Alters is quite balanced for middle-caste Egos.

The most outstanding result comes from upper-caste Egos, and may be explained by a very low number of observations. We observe a strong decline of upper-caste Alters in favor of a rise of middle-caste Alters. Furthermore, they hardly mention Alters from low castes. As a direct consequence, upper-caste Egos have the more diversified labor-based network, while the majority of middle- and low-caste Egos have homogeneous labor-based networks.

Fig. 9 shows the sociogram of the labor-based network for low-caste Egos in 2016–17 and 2020–21. The graphs again visually illustrate a strong homophily among low-caste Egos, reinforcing the hypothesis of the importance of intra-caste interpersonal relationships. By restricting the sample to heterogeneous egonets, the majority of Egos disappears too. Homogeneity is especially high for labor networks, higher than for debt networks (see **Fig. 9**). In 2020–21, 12% of low-caste Egos mention Alters from different caste groups among their own labor network, while 39% of low-caste Egos mention Alters from different caste groups among their own debt network.¹⁷

The overwhelming majority of intra-caste relationships highlight the persistence of caste as a major determinant of labor market participation. Individuals rely on people from the same caste group to access jobs. Such analysis does not take into account power relationships between caste groups, and to what extent intra-caste cooperation tends to reinforce a structure of advantage or a structure of discrimination (Mosse 2020).

¹⁷ See the rest of the sociograms of labor relationships for all caste groups in Appendix 4 and Appendix 5.

An analysis of the relationships between employers and employees provides insight into the power structure in relation to the evolution of the caste system.

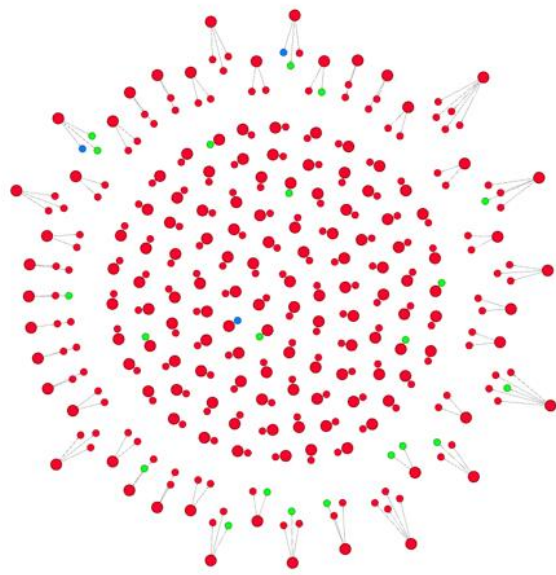


Figure 9a: Graph of the whole labour network for low caste egonets in 2016-17.

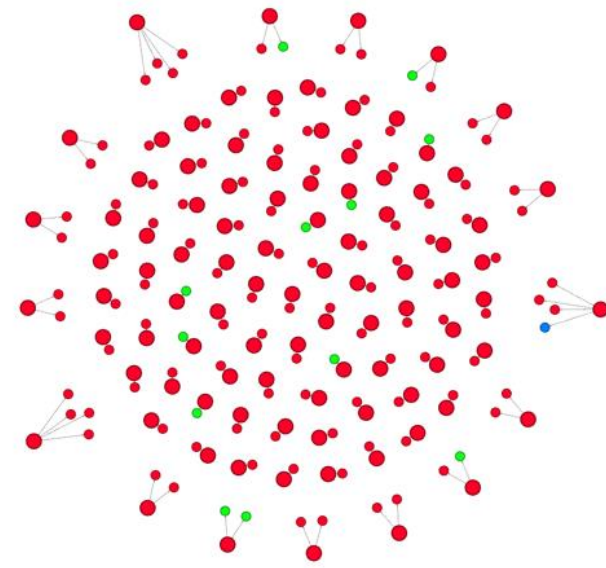


Figure 9b: Graph of the whole labour network for low caste egonets in 2020-21.

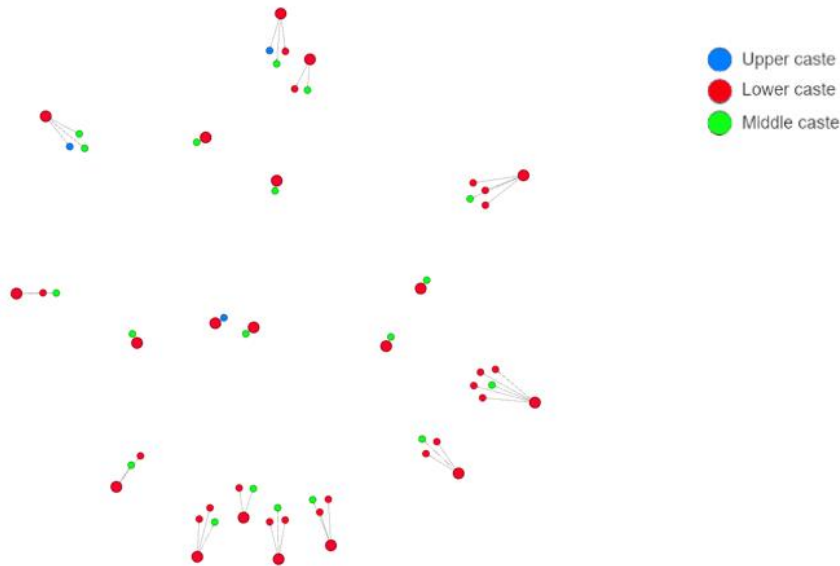


Figure 9c: Graph of the labour network for heterogeneous and low caste egonets in 2016-17

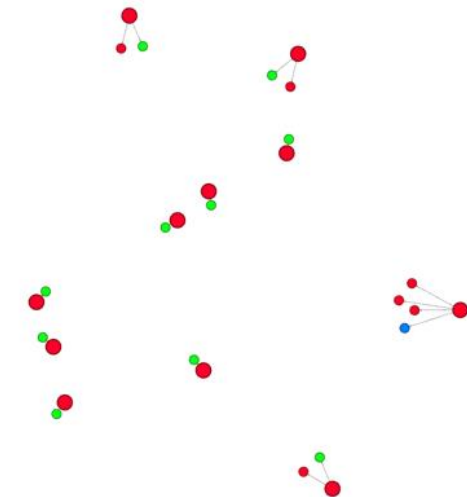


Figure 9d: Graph of the labour network for heterogeneous and low caste egonets in 2020-21.

Figure 9: Graphical representations of labour-based interpersonal relationships for low-caste Egos in 2016-17 and 2020-21
(*source:* NEEMSI-1, 2016-17, NEEMSI-2, 2020-21)

The NEEMSSIS questionnaires also include questions on the relationships between salaried workers and their employers. To study the caste distribution among employer-employee ties, institutional employees and private companies have been removed from the sample. They represent 35% and 32% of the employers in 2016–17 and 2020–21 respectively. Aligned with the segmentation of labor market on caste, low castes are over-represented among salaried workers; for both 2016–17 and 2020–21, low-caste workers account for 55% of wage workers. **Tab. 3** reports a matrix of inter-caste dependency through employer-employee ties in both years.

		Employers					
		<i>Low caste</i>		<i>Middle caste</i>		<i>Upper caste</i>	
		2016–17	2020–21	2016–17	2020–21	2016–17	2020–21
Employees	<i>Low caste</i>	30%	43%	45%	49%	25%	8%
	<i>Middle caste</i>	5%	4%	71%	84%	24%	12%
	<i>Upper caste</i>	0%	2%	30%	40%	70%	58%

Table 3: Evolution of caste groups for employers and their employees
(*source:* NEEMSSIS-1, 2016–17; NEEMSSIS-2, 2020–21).

In 2016–17, 30% of lower-caste wage workers’ employers were from the lower-caste group, 45% from the middle-caste group and 25% from the upper-caste group. In 2020–21, 43% of lower-caste wage workers’ employers were from the lower-caste group, 49% from the middle-caste group and 8% from the upper-caste group. Lower-caste wage workers depend on a majority of middle-caste employers: in 2016–17 and 2020–21 respectively, 46% and 49% of employers for low-caste wage workers belong to the middle-caste group. The percentage of middle-caste employers increases between both waves, while the share of upper-caste employers tumbles from 25% to 8% in 2020–21. It is also worth noting an increase of low-caste employers between both waves, from 30% to 43%. The employer-to-employee network has an important degree of homophily among the middle- and upper-caste groups. Almost two thirds of both middle- (71%) and upper-caste (70%) employers have employees with the same caste group as their employer in 2016–17. Four years later, the percentage of upper-caste employers for employees from the upper-caste group has decreased (58%), which is counterbalanced by a rise of middle-caste employers (40% in 2020–21 against 30% in 2016–17).

This figures on employer-employees ties put the emphasis on the overrepresentation of low-caste Egos as wage workers, while middle- and upper-caste people are more likely to be employers. Moreover, middle- and upper-caste workers are rarely hired by a low-caste employer. However, as for the credit market or other labor-based interpersonal relationships, intra-caste employer-employee ties have increased. The predominance of middle- and upper-caste employers has to be nuanced by the rise of low-caste employers: 27% of employers come from the lower-caste group in 2020–21, while 21% of employers came from the lower-caste group in 2016–17.

Finally, the comparison of the structure of debt and labor social networks between 2016–17 and 2020–21 highlights the importance of caste in the villages through the rise of intra-caste interpersonal relationships for low- and middle-caste Egos. The situation for the upper-caste group is more nuanced. The departure of most of the upper-caste communities from the villages threatens their positions at the top of the social hierarchy. The middle-caste group successfully climbed the macro-social structure to be currently more dominant, a form of domination different from the one traditionally set by the upper-caste group. The dominance of the middle-caste group along with the prevalence of intra-caste cooperation would rather reinforce inequalities in the absence of exchanges and contacts between social groups at different levels.

In the last section of this paper, we analyze how this development of intra-caste cooperation was mobilized during the lockdown, and to what extent the COVID-19 crisis may have undermined the ongoing trends.

4. Coping with the lockdown. The role of networks

Multiple strategies were deployed by households and individuals to face the consequences of the COVID-19 lockdown from the 24th of March till the 1st of June, 2020. The almost-3-month lockdown (March 23 – end of May, 2020) was harder to implement in rural areas than in urban areas. The further the villages were from cities, the lesser police controls were frequent and strict. The easily accessible villages close to Panruti and Villupuram, such as Manamthavizhinthaputhur, faced the omnipresence of police checkpoints set up on the main road and roaming in the rest of the village. In other villages, the police only checked the absence of people along the main road. Based on the phone survey, the first reaction was fear of the virus. An active awareness campaign was set up by the Tamil government and a range of information was spread over online social networks. Soon, the very few cases of visible and known infections became known,

but the most urgent need was to access food. Ultimately, a very small number of known infections were reported in the villages. Manamthavizhinthaputhur was the village the most impacted with around twenty official infection cases. This was also the only village with two official deaths.

4.1 Reducing consumption and relying on subsidized food

The COVID-19 lockdown struck every family, although unequally. All the households in our study dealt with a severe loss of income due to the impossibility of working. Some sectors proved more resilient, like agriculture, and especially because the lockdown was enacted at the end of the harvest season. Cash crops, however, were also impacted, due to the disruption of transport networks. Moreover, the lack of prospects—how long the lockdown would last, the lack of information on the exact nature of the pandemic and the virus—created unprecedented uncertainty.

In order to survive, reducing household consumption expenditure was a first strategy, starting with food. In 2020–21, only 25% of households attained access to enough food during the lockdown. 33% of households consider that they did not have enough food, 15% report that they barely had enough food, and 27% consider that they often had enough food. A large majority (76%) faced a decline in food quality. Not only had incomes fallen, but due to the disruption of transport networks, the cost of some foodstuffs rose, especially perishable products such as fruits and vegetables. Many households told us that they were forced to eat rice porridge without side dishes on a regular basis.

However, it seems that no household suffered from starvation. The role of subsidized food, through the Public Distribution System (PDS) shops, partially compensated for the drop in income and the increase in prices. Free usually provided commodities rations (rice, dhal, cooking oil, sugar) were distributed along with INR 1,000 in cash to all ration card holders in the state. Although the distribution was unequal, often involving long queues, it seems that the majority of households benefited from it. The PDS shops are used by almost all households (96% in 2016–17) and this percentage slightly increases in 2020–21 probably due to the COVID-19 crisis: 99% of households used their ration cards to get food in the ration shops. These figures are consistent with figures at the state level: 93% of households possessed ration cards in rural areas in 2015 (Anuradha 2018). The food distribution system in Tamil Nadu is more extended than the PDS set at the nation-wide level with a universal approach, wherein rice is supplied to all rice

cardholders without any discriminations and at zero cost. The Tamil system runs on a distribution of optional ration cards divided into four different categories: (i) rice cards, (ii) sugar cards, (iii) “No commodities” cards, (iv) khaki cards (Anuradha 2018). Applicants for ration cards are given a card based on their choice. 66% of the households considered subsidized food to have been an important part of their diet during the lockdown. The relatively low percentage of middle-caste households depending on subsidized food is noteworthy: only 60% of middle-caste households consider subsidized food to be an important part of their diet during the lockdown. In comparison, 65% of upper-caste households and 72% of low-caste households were dependent on ration cards during the lockdown.

It is also worth noting that 89% of Egos in 2020–21 consider that the government’s help was the most efficient help they received during the lockdown, compared to other sources of help (family, community, and other caste groups). However, this needs to be qualified. Free and subsidized food along with the INR 1,000 of cash are the only help the families received. Almost nobody benefited from the package announced by the central government, whether additional cash transfer or subsidized loans, shelters for homeless persons and migrants, common kitchens to be set up to cook and distribute food to the destitute, food to be supplied through “Amma Kitchens” and other ambitious measures.

Apart from food, other expenses were reduced: almost all social and religious rituals ceased, and slowly resumed from June onwards; the moratorium on loans, imposed by the Reserve Bank of India until the end of August, was a great relief. Even informal lenders tended to align on the moratorium and did not enforce repayments for a while. Many health expenses were postponed—public hospitals were inaccessible anyway or people were afraid of being stuck at the hospital. The lockdown was also an opportunity to put social networks to the test as a social security net and to activate solidarity ties, as we shall see now.

4.2 Using social networks during the lockdown

The first stage of the lockdown and the “collapse of trust”: Family and kinship as a primary form of protection

During the first weeks of the lockdown, all the testimonies collected by telephone express a shared feeling of panic. The usual self-help networks were severely challenged. Many mention the “collapse of trust” (*nambikai pochu*). “People close their doors” we were told again and again:

“Usually neighbours, sister in law, god will come... now no one is coming.”

“If there is any crisis, always someone is there to support, now all doors are closed.”

“There is no food, there is no cash, I have to find a way to protect myself; even the government says, close the doors, stay inside.”

“No one is ready to give. All say ‘we don’t have enough money.’ Moreover, we don’t ask money from neighbours and relations. Our only believe is daily coolie work.”

“Even *kai mathu* [help from hand to hand], that’s impossible. Everyone closes the door and does not want to talk to us. They fear that people won’t return the money. People plan that it may last for one year. My village is empty. No-one wants to see us.”

“Nobody wants to help ... everybody is in some sort of trauma to say they have cash. They even hide to their close relatives.”

A milk trader from Manappakkam whom we know well, who did whatever he could at the time of demonetization to support his network of producers, told us: “don’t ask anything!” We shall also give the example of this Dalit labor recruiter whom we have known for fifteen years. We have seen him gradually build up his network of workers and creditors, which he needs to provide wage advances. Over the years, he has built up an excellent reputation by regularly protecting his workers (loans or gifts in case of illness, unforeseen events, etc.). So far, he had used four trusted creditors from diverse caste and background with whom he has gradually built trust relationships. When the lockdown was announced, he could neither repay his creditors nor help his workers. Many of them were waiting for him in front of his house, hoping for some kind of help. He turned his phone on for only a few minutes a day. He called us in desperation. He went so far as to talk about suicide. His worst fear, he told us, was to lose his *nambikai* (reputation). We shall also mention these two co-wives, who remained hidden at home because they were indebted to several women in the neighborhood. Their son told us that they no longer dared to go out because they would feel obliged to give what little they had. At the same time, they felt terribly guilty.

Fear of the future and the loss of the usual networks of protection led to considerable anxiety—people kept asking when the lockdown would end, and more importantly, when economic activity would resume. In this atmosphere of very high uncertainty, kinship ties acted as the only source of support and protection, and this applied in particular within the household unit.

Different types of resources were mobilized through kin networks: (i) basic daily expenses, (ii) financial support, (iii) emotional support and (iv) information.

43% of families depend in normal times upon non-farm income, which in turn implies circular migration. Migrants, the vast majority of whom had lost their jobs, were back home and welcomed, even if it meant one more mouth to feed. For instance, in one of the surveyed villages, Semakottai, the son of an astrologer family was working as a wage worker in a private company in Chennai. He was sending INR 5,000 a month as remittances. When the lockdown was announced, he was at first forced to stay at home, unable to work and earn money. He then went back to his home village, where he moved in with his parents, who took care of him. In another family, the son, Rangathanan,¹⁸ was working as a lorry driver in the surroundings. He still lives with his parents who cultivate 3.5 acres in another village, Natham. As for many small farmers, agriculture surplus is often meagre and fluctuates depending on the seasons and crops. Up until then, Rangathanan's wage was the most important source of regular income. With the lockdown, Rangathanan was left unemployed but the family was able to manage with the farm income and take care of him. For families depending solely on off-farm income, feeding everyone meant seriously tightening their belts. But abandoning a family member, whatever the sacrifices, was unthinkable and we never came across such a situation. In some cases, the loss of urban income was—meagerly—compensated for by increased investment in agriculture, including labor. In Manamthavizhinthaputhur for instance, a land owner took advantage of the closure of his son's mechanic shop to make him work on the family land. This saved him money—less labor to pay—even though the gains were less than the son's loss of income.

Beyond food security, the emotional support provided by the family should also be highlighted. As mentioned above, most of the neighbors' doors were closed, suspicion was omnipresent. People were scared to get sick, especially at the beginning of the lockdown. Take the case of Prakash, who barely managed to return from Bangalore, combining bus travel and walking. His arrival aroused fear—is he not contaminated? There were some jobs available locally in agriculture, but migrants were frowned upon, those who never left the village were granted priority. As for many, the material and emotional support of the family was crucial.

We came across cases where broader kin ties, outside the residential unit, were used to access interest-free loans either to pay for agricultural inputs, for health care, or simply to buy food. In

¹⁸ Individual names have been changed.

Manamthavizhinthaputhur, a farmer took advantage of his good relationships with the rest of the family to benefit from loans even during the COVID-19 lockdown.

In some cases, kin ties were also used to access information about the pandemic. Relatives working in the health sector, and to some extent those living in cities, were better informed about the evolution of the pandemic, health measures and lockdown rules and spread this information to the rest of the family. In Semakottai, a family was constantly informed through their niece, a nurse working in a public state hospital. She kept them apprised about the evolution of the situation regarding the number of cases as well as the sanitary precautions to be adopted. Being able to count on information believed to be reliable was very reassuring.

Caste and neighborhood interdependency and solidarity

As mentioned above, the region has undergone a profound transformation in social relations, which are now characterized by strongly homophile and homogeneous networks between castes, including within the lower-caste group. Homophily and homogeneity reflect a greater interdependence within the caste, without prejudging mutual aid and equality in the relationship (a lender may well charge a high price for a loan to a borrower of the same caste). We have so far used the term interdependency, which does not prejudice mutual aid and equality in the relationship either (a lender can very well charge a very high price for a loan granted to a borrower of the same caste). During the lockdown, however, intra-caste interdependency translated into mutual aid, and thus solidarity. This included frequent exchanges of money, loans, job advice, and contact with employers.

During the first weeks of the lockdown, these networks were momentarily frozen and we were told many times that “doors are closed.”. As time went by however, exchanges resumed. Food sharing was relatively frequent, including subsidized food. Each street was served in turn by families in the neighborhood. The first-served shared with the others who would reciprocate later. Sometimes the better off helped the others. A woman from Semakottai explained that she regularly provided food to about 25 families from the same “valluvar community” living in the same neighborhood. She considered herself privileged and gave food whenever neighbors asked and whenever she could. In Elanthampattu, in one particular street, all the families suffered severely from the lockdown. And yet, it seems that they organized themselves to ensure that everyone had enough to eat.

While in the early days of the lockdown loans were conditioned on collateral (Guérin et al. 2022), over time people were willing to trust again and lend small amounts, with or without interest. It is also interesting to observe strategies for maintaining networks. People are well aware of the key role of these networks—for many of them it is their main asset, and they tried to maintain them. Take the case of Selvi, in Manappakkam, whose husband sells jute sacks to different traders in the surrounding villages. His business was in slow motion, and he ended up not moving because it was not profitable. His wife took the initiative to take her husband's address book and called all his customers one by one to keep in touch and get news.

Praba is *kiz-maistry*, which means that she assists a labor recruiter (*maistry*), who is her brother, in the cutting of sugar cane. She lives in Manappakkam. With the lockdown, the sugar mills were closed, the cane farmers decided not to harvest and the cane cutters lost their jobs. For Praba and her brother, their network of workers is their main asset. The brother took the initiative to set up an artisanal jaggery factory, allowing the cane to be used. The farmers, who thought they would lose their production, agreed to be paid less. The workers found a job. Praba and her brother have succeeded in strengthening their network.

The resurgence of old patronage networks?

In a number of cases, however (but we are unable to estimate precisely the extent), government support, kinship, intra-caste and neighborhood solidarity was not enough. As mentioned earlier, the system of agrarian interdependence and caste patronage, based on asymmetrical mutual obligations, combining protection and submission, has almost disappeared. Returning to these old forms of dependencies, from which many Dalits had tried to extricate themselves, was the only option. In the village of Kuvagam, for example, the main source of income for Dalits, often entire families, comes from seasonal migration to brickkilns. All of them came back without any income. Some own a small piece of land, but had no money to invest. Their recruiters (*maistries*), who usually provide them with wage advances and various kinds of help, were all in great difficulty. Some were in hiding and did not even want to see their workers (as in the example above, which is far from unique). The brick molders had no choice but to knock on the door of their former landowner's house, from when they—or their parents—used to be attached

workers.¹⁹ “I came back begging to my landowner, I haven’t seen his face for years,” as we were told. They received INR 2,000, INR 5000. The cost is not very clear and will be discussed later. When they got the money, the important thing was not the cost but the fact of having access to cash.

Far beyond this case, we have observed that many farmers adapted to the crisis by returning to subsistence crops, which are both easier to sell (as mentioned earlier, cash crops are severely vulnerable to the disruption of transport networks and the closure of agribusiness companies) and more labor intensive. Some of those who had unused land started subsistence farming, mainly vegetables such as pumpkins, lady fingers, ginger. For small farmers, who had abandoned agriculture for urban activities, it was a matter of survival, provided however that they had or found cash to invest. For larger farmers, they did it to earn more, but also under pressure from landless women who were desperately looking for jobs. Individually or collectively, women asked farmers to return to labor-intensive farming. There was an abundance of labor, so wages dropped and women agreed to share the work. Whereas women used to be paid INR 120 for three hours of work, during the lockdown they had to work double or triple that amount and in different locations. It also happened that wages were paid late or in kind, a reminiscence of a feudal past from which agricultural workers, often Dalits, had managed to escape. But it was better than nothing. Questions of prestige were put aside, the Dalits stifled their pride, and agreed to return to the old agrarian moral economies, where landowners provided protection, but also exploitation. While landlordism had almost disappeared in this region (Harriss 2013), it may be that the crisis has raised it from its ashes, even though landowners also suffered greatly from the crisis.

We shall take the example of Shakeela, a Dalit woman from Elanthampattu. She explained the difficulties she had in getting help. She took the example of a neighbor, whom she has known for thirty years. She is like my “sister.” They watch television together, in each other’s homes. She has often acted as a guarantor for her friend to help her access loans. But the friend refused to help, she told us. Her friend thought “she won’t be able to return even 5 kg of rice because my family is big.” Her only choice was to go to a Mudaliar (upper caste). Her father-in-law was once a worker attached to this Mudaliar. The Mudaliar has died but his son continues to cultivate the land. She had to explain the historical links between the two families and build a new

¹⁹ Attached workers used to be embedded in an arrangement of mutual interdependence. This form of unfree labor was enmeshed within a whole set of rights and obligations between the patrons and their clients (Bremen et al. 2009).

relationship. Together with other women, she managed to convince the Mudaliar landowner to plant cucumber and black gram and hire them. “It’s embarrassing to go begging,” she said, since her family was out of this dependency, but she had no choice, “he’s the only one who feeds us.”

5. Conclusion

In different regions of the world, the first wave of COVID-19 pandemic—and subsequent lockdowns in 2020 – have exposed pre-existing fragilities such as insufficient health systems, excessive concentration of production chains, dependency upon “essential workers,” including migrant workers—all of these fragilities have suddenly become visible. Using original and first-hand data and with a focus on a rural region of Tamil Nadu, this article explores how rural families coped with the 2020 lockdown by focusing on the use of social networks.

Ultimately, our network analysis highlights two salient results: the strengthening of intra-caste interdependence (measured here in terms of homophily and homogeneity) with a focus on access to credit and self-help to access employment, and at the same time a hierarchization of this interdependence. The segmentation and hierarchy of credit and labor markets strongly persists. In short, if low castes lend to and hire predominantly low castes, one rarely borrows from and hardly works for someone lower than oneself. The way people used their social networks during the 2020 COVID-19 pandemic confirms those trends. Kin and caste solidarity played a key role in helping households survive during this economic and social crisis. However, they did not prevent the resurgence of old forms of patronage.

For the poorest, current forms of protection remain very fragile. This is true of the welfare programs provided by the State, whose redistribution existed but remained insufficient, erratic and unequal. This was true of kin protection in the first stage of the lockdown, but it is necessarily limited in times of systemic and long-term crisis. This is probably also true of the relations recently created outside the kinship circle, both within the caste and outside it.

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Appendix 1.

Description of the social network data collection (name generator)

The module on interpersonal relationships has been implemented through NEEMIS-1 in 2016–17. Having capitalized on field experience, the first data analysis and the survey of literature on social networks contributed to the improvement of this module for NEEMIS-2 in 2020–21. For NEEMIS-2, we (i) added new questions on social networks with more diverse contexts, (ii) systematized the use of a harmonized name generator across all questions on social networks, and (iii) developed a technical process to build ties among Alters mentioned by different members of the same household. For this paper, we focus on debt-based and labor-based questions about social networks, which are common to both NEEMIS-1 (2016–17) and NEEMIS-2 (2020–21). Another specificity of NEEMIS-2 is that it contains unedited questions on the use of interpersonal relationships during the COVID-19 crisis.

The questions associated with a name generator were linked to a range of 14 questions for NEEMIS-1 and 25 questions for NEEMIS-2. In addition to the Alter's name, this range of questions is a way to collect information about the socioeconomic characteristics of Alter, the strength and the reciprocity of the relationship between Ego and his/her Alter. Alter is thus defined by his/her name, his/her relationship with Ego, his/her age, his/her *jati*, his/her education level, his/her occupation and his/her place of residence. The strength of the relationship between Alter and Ego might be assessed through the number of years Alter and Ego are in contact, their frequency of meetings, the reciprocity of invitation to family events such as weddings, and their level of intimacy.

As opposed to the NEEMIS-2 questionnaire in 2020–21, questions on social networks drawn from NEEMIS-1 are heterogeneous. Within the NEEMIS-1 questionnaire, information about Alter from the household questionnaire was not as systematic as in the individual questionnaire. We mainly focused on Alter's caste for debt-based interpersonal relationships, while labor-based interpersonal relationships include the whole range of questions about the socioeconomic characteristics of Alter. These differences during the data collection account for differences in the number of observations for descriptive statistics in our sample. **Tab. 5** describes the number of observations per attribute. Missing values are either due to the questionnaire design or to the data collection. Ego's knowledge might also be imprecise, voluntarily or involuntarily. Questions on social networks are globally more sensitive questions than others.

Finally, our analysis is based on seven questions belonging to the social networks module. All the questions have been collected either in relation to debt, or in relation to employment.

The questions cross-referencing interpersonal relationships and financial practices include:

- i)** Information about the lender for business loans (self-employed)
- ii)** Information about the money lender for all types of loans
- iii)** Additional information about the money lender for the main loans

The questions cross-referencing interpersonal relationships and employment include:

- i)** Information about the person Ego would ask help to recruit a worker (for self-employed workers)
- ii)** Information about the person Ego will contact to find a new job
- iii)** Information about the person Ego recommended for a job in the last 12 months
- iv)** Information about the person who got hired thanks to a recommendation from Ego

Besides interpersonal relationships collected through the sociological “name generator” approach, NEEMSI-1 and NEEMSI-2 questionnaires include information about formal social networks, i.e. individuals' involvement in different institutions. Questions were also asked about the resources of individual interpersonal networks linked to people with specific occupations/people that Ego could contact (Lin, 1990). Finally, both questionnaires include questions about trust in the community and social institutions in general.

Attribute	Number of observations	
	NEEMSI-1	NEEMSI-2
Occupation	1 135	1 936
Employment	1 166	2 016
Gender	1 144	2 016
Caste	1 471	2 016
Caste group	1 471	2 016
Age	357	2 016
Education	318	1 839
Place of living	357	2 016

Table 4: Number of observations for Alters between 2016–17 and 2020–21

(*source:* NEEMSI-1, NEEMSI-2)

Appendix 2

Method of sampling and sample

Quantitative data stem from a longitudinal household and individual survey collected at three points in time: RUME (2010), NEEMSI-1 (2016–17) and NEEMSI-2 (2020–21). The original sample used for the first RUME survey in 2010 was based on a sample of 405 households selected through a stratified random sampling. The NEEMSI-2 survey had been delayed by successive lockdowns from March 2020 till June 2021. The sample from which we have extracted statistics is based on 495 households.

Stratified random sampling is frequently used in empirical analysis. It aims at dividing a heterogeneous population into subgroups or strata. Each stratum is made-up of homogenous groups regarding the measurement of interest (e.g. gender, caste group, and village) who all share a similar characteristic. They are then randomly selected. Such a method guarantees representativeness by reducing sampling bias with the presence of all sub-groups and minorities.

NEEMSI-1 (2016–17) and NEEMSI-2 (2020–21) are based on the same sample as RUME, slightly enlarged. 105 additional households randomly selected in 2016–17 have been added to take into account the attrition rate of 4.2% (i.e. 17 households were not part of the sample anymore due to either migration, mortality, or survey non-response). About 10 new households per village were surveyed. For the NEEMSI-2 survey, the current attrition rate is 2.8% (i.e. 14 households are no longer part of the sample). To counterbalance this attrition rate, the survey aims to survey about 100 new households. The new households selected are a mix of randomly chosen households and a bundle of newly created households due to the departure of a married son with his nuclear family from the core household (his parents' house) to settle in the same village. This is a practice on the rise in the study area, where previously only girls used to leave their family once they got married to live with their husband's family.

Our sample is based on three criteria: (i) an agro-ecological criterion between dry and wet land (ii) a criterion of urban proximity, i.e. accessibility to close urban centers (Panruti, Villupuram, Neyveli) (iii) the caste group, i.e. the upper-, middle-or lower-caste groups. The first two criteria were a way to select villages, the last one was used to determine the number of households to be surveyed per caste group. **Table 4** sums up the percentage of households per caste group according to the survey.

	Number of households	Caste distribution		
		<i>Lower caste</i>	<i>Middle caste</i>	<i>Upper caste</i>
RUME (2010)	405	48%	36%	16%
NEEMSI-1 (2016–17)	492	48%	40%	12%
NEEMSI-2 (2020–21)	495	47%	42%	11%

Table 5: Caste group distribution across the three waves for our sample

(*source:* RUME (2010), NEEMSI-1 (2016–17), NEEMSI-2 (2020–21), authors' calculation)

Appendix 3

Successive improvements between RUME (2010), NEEMSI-1 (2016–17) and NEEMSI-2 (2020–21)

The **Rural Employment and Microfinance Survey** (RUME) conducted in 2010 was based on a household questionnaire. The survey was focused on a single respondent: the household head, although we collected information on all household members. The questionnaire was divided into 8 main modules:

1. General information
2. Employment
3. Migration
4. Financial practices
5. Remittances
6. Agriculture
7. Consumption and assets
8. Housing and facilities

The **Network, Employment, dEbt, Mobilities and Skills in India survey 1** (NEEMSI-1) conducted in 2016–17 directly stems from RUME (2010). The NEEMSI-1 questionnaire includes a few modifications all along the 8 modules to align with international standards. The biggest change brought by NEEMSI-1 (2016–17) to the panel data is a new survey unit: the individual level or “Egos” level. Two household members are directly addressed individual questionnaires: the respondent to the household questionnaire (called “Ego 1”) and one younger household member (“Ego 2”).

The NEEMSI-1 sample has 953 Egos. Ego 1 is the household head. Ego 2 is randomly selected on a criterion of age since NEEMSI-1 aims at collecting more detailed information about young people. A young member between 18 and 25 in the household roster is first selected and interviewed if available. If there is no such individual in this age range or this person is not available, we look for another young member between 26 and 35. Once again, if there is no one in that age range or none available to answer, NEEMSI-1 interviews a household member above 35.

Part I: Household questionnaire

1. General information
2. Education

3. Employment
4. Migration
5. Remittances
6. Financial practices
7. Agriculture
8. Consumption and assets
9. Marriage
10. Housing and facilities
11. Schemes

Part II: Individual questionnaire

1. Employment variables
2. Social Networks variables
3. Personality and behavior variables
4. Literacy and numeracy tests
5. Raven test
6. Demonetization policy

The **Network, Employment, dEbt, Mobilities and Skills in India survey 2** (NEEMSIS-2) conducted in 2016–17 directly stems from NEEMSIS-1. A series of additional questions have been added in the questionnaire including questions on decision making and reservation policies. A new module has been added to the individual questionnaire on working conditions and discrimination. The module on Social Networks has been harmonized and additional questions opening a name generator have been added. Benefitting from new tablets with better technology, we were also able to record geo-localized data. The NEEMSIS-2 questionnaire encompasses questions, scattered throughout the questionnaire, on the effects of the COVID-19 crisis.

The individual NEEMSIS-2 sample is bigger. Three household members are now directly addressed individual questionnaires with the addition of a third Ego. Ego 3 is randomly selected based on a criterion of age, like Ego 2 for NEEMSIS-1.

Part I: Household questionnaire

1. General information
2. Education
3. Employment
4. Migration
5. Remittances

6. Financial practices
7. Agriculture
8. Consumption and assets
9. Marriage
10. Housing and facilities
11. Schemes

Part II: Individual questionnaire

1. Employment variables
2. Working conditions and satisfaction at work
3. Social Networks variables
4. Personality and behavior variables
5. Literacy and numeracy tests
6. Raven test
7. The COVID-19 crisis

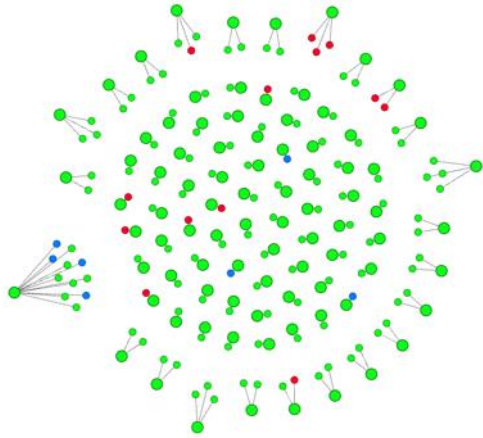


Figure 10a: Graph of the whole labour network for middle caste egonets in 2016-17.

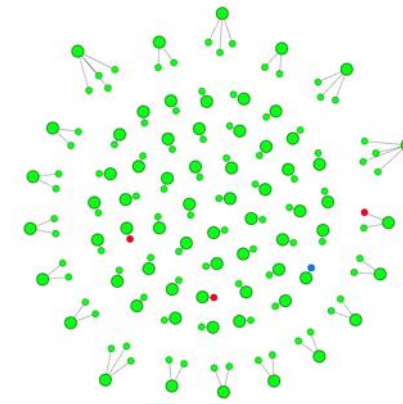


Figure 10b: Graph of the whole labour network for middle caste egonets in 2020-21.

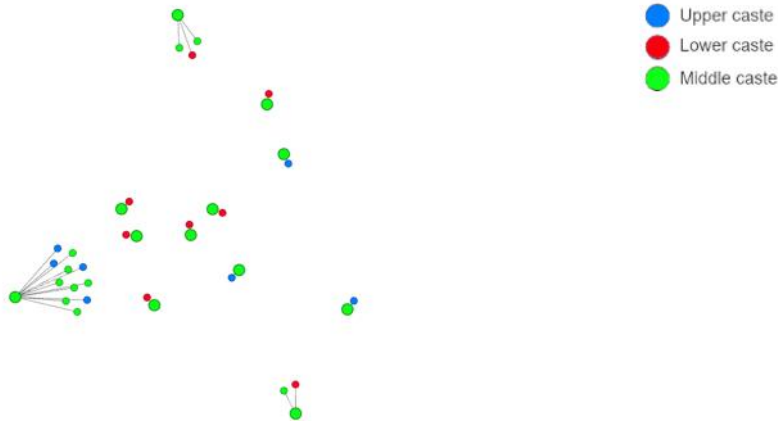


Figure 10c: Graph of the labour network for heterogenous and middle caste egonets in 2016-17

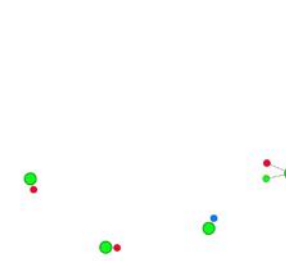


Figure 10d: Graph of the labour network for heterogenous and middle caste egonets in 2020-21.

Figure 10: Graphical representations of labour-based interpersonal relationships for middle-caste Egos in 2016-17 and 2020-21
(*source:* NEEMIS-1, 2016-17, NEEMIS-2, 2020-21)

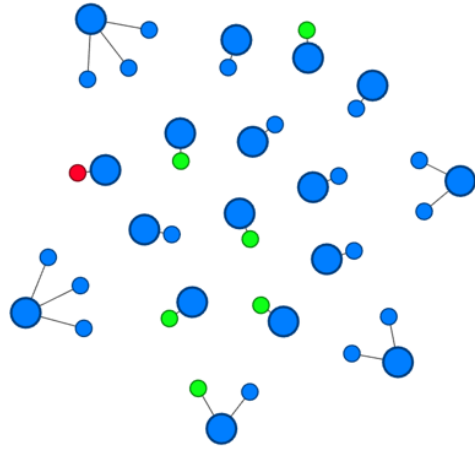


Figure 11a: Graph of the whole labour network for upper caste egonets in 2016-17.

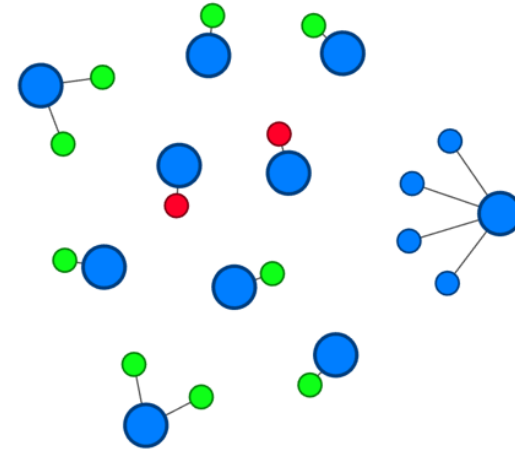


Figure 11b: Graph of the whole labour network for upper caste egonets in 2020-21.

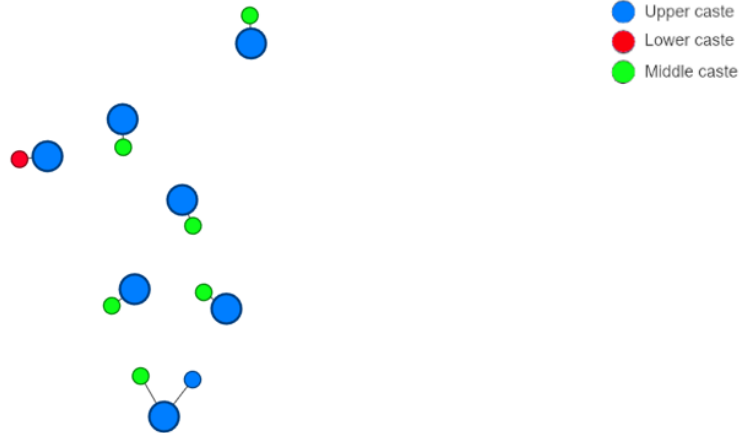


Figure 11c: Graph of the labour network for heterogenous and upper caste egonets in 2016-17

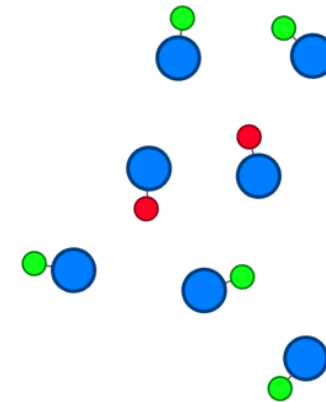


Figure 11d: Graph of the labour network for heterogenous and upper caste egonets in 2020-21.

Figure 11: Graphical representations of labour-based interpersonal relationships for upper-caste Egos in 2016-17 and 2020-21
(*source:* NEEMSIS-1, 2016-17, NEEMSIS-2, 2020-21)

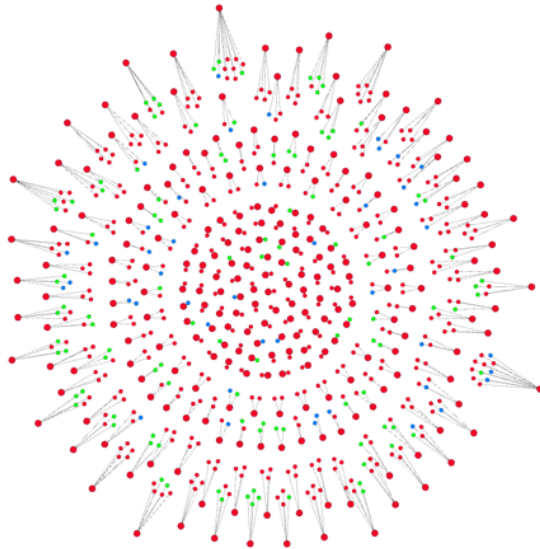


Figure 12a: Graph of the whole debt network for middle caste egonets in 2016-17.

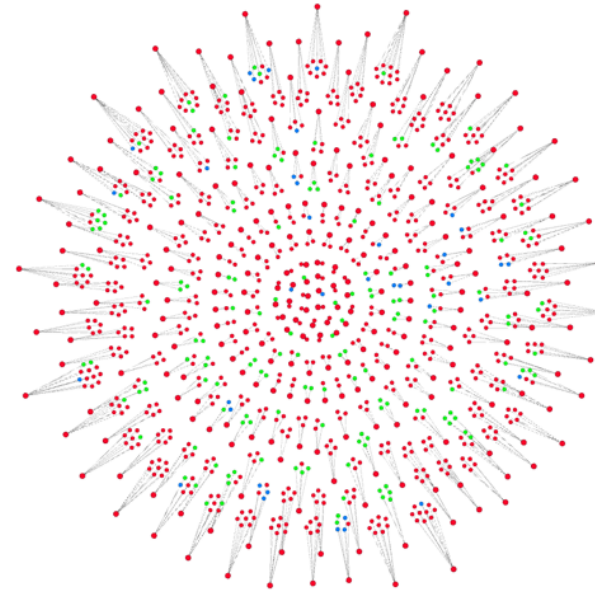


Figure 12b: Graph of the whole debt network for low caste egonets in 2020-21.

● Upper caste
● Lower caste
● Middle caste

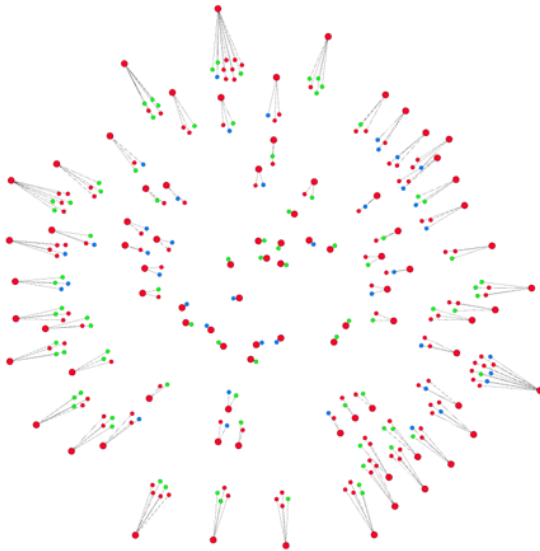


Figure 12c: Graph of the debt network for heterogeneous and middle caste egonets in 2016-17

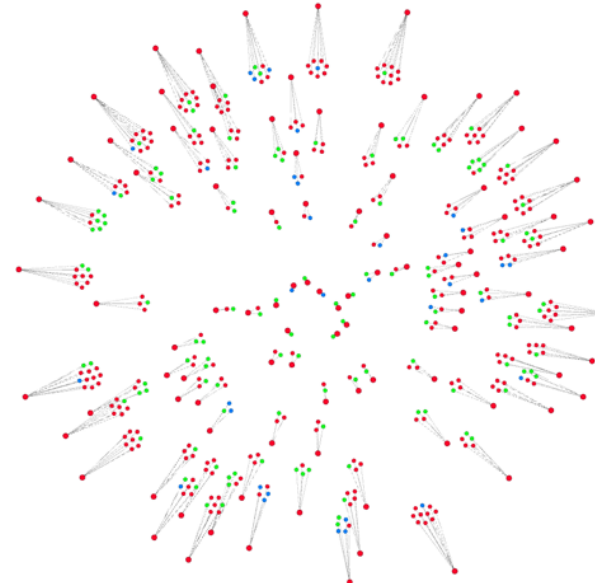


Figure 12d: Graph of the debt network for heterogeneous and low caste egonets in 2020-21.

Figure 12: Graphical representations of debt-based interpersonal relationships for lower-caste Egos in 2016-17 and 2020-21
(*source:* NEEMIS-1, 2016-17, NEEMIS-2, 2020-21)

Appendix 7

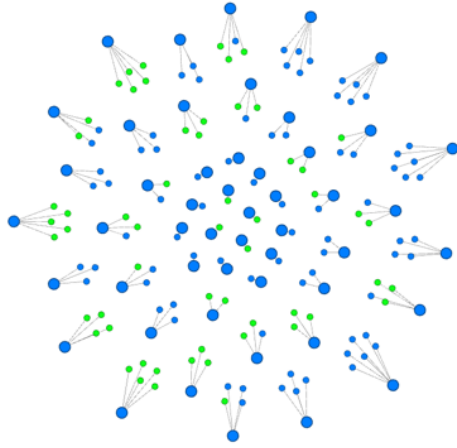


Figure 13a: Graph of the whole debt network for upper caste egonets in 2016-17.

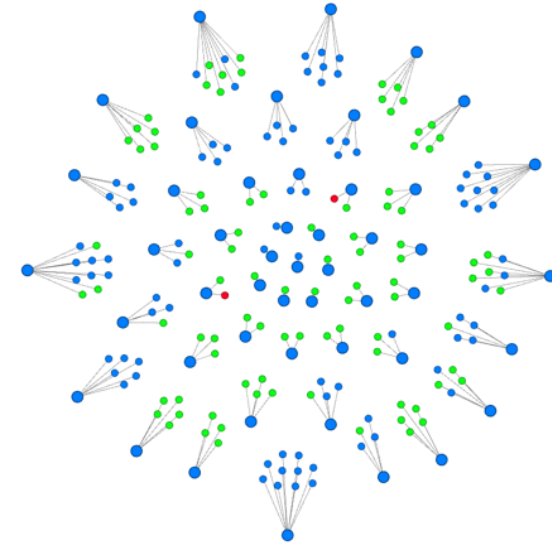


Figure 13b: Graph of the whole debt network for upper caste egonets in 2020-21.

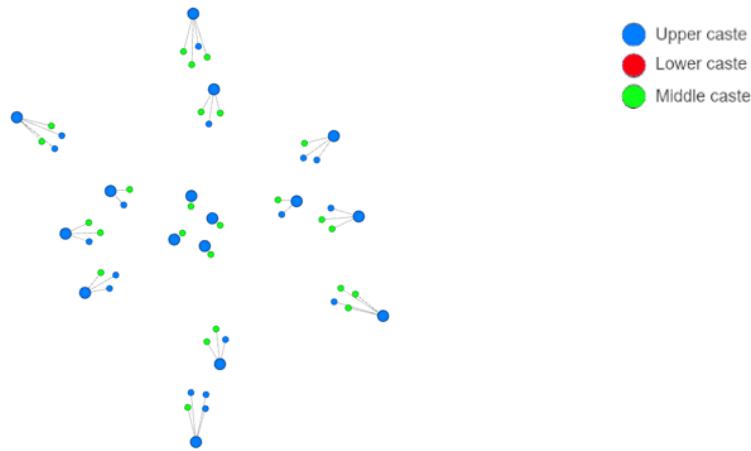


Figure 13c: Graph of the debt network for heterogenous and upper caste egonets in 2016-17

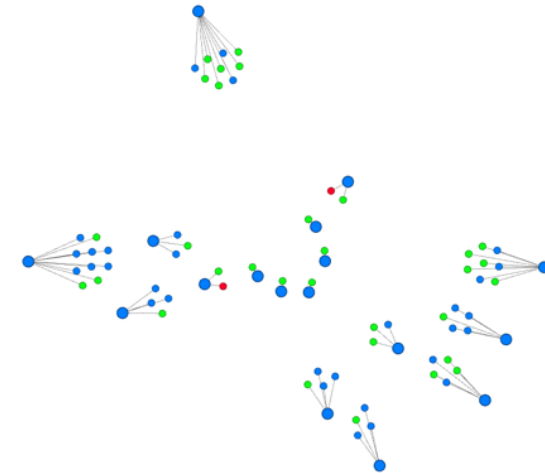


Figure 13d: Graph of the debt network for heterogenous and upper caste egonets in 2020-21.

Figure 13: Graphical representations of debt-based interpersonal relationships for upper-caste Egos in 2016-17 and 2020-21
(*source:* NEEMSIS-1, 2016-17, NEEMSIS-2, 2020-21)