ETHNIC HETEROGENEITY AND COOPERATION: EFFECT OF FRAGMENTATION ON TRUST AND ACCESS TO PUBLICLY PROVIDED GOODS

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CERTIFICATE

This is to certify that this dissertation is prepared as a fourth semester group project for the Paper of MA/MSc in Economics for the session 2022-24. I further certify that this is an original work on the part of the students and has not been submitted anywhere for any other purpose. This can be submitted to the respective Board of Examiners for adjudication.

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ABSTRACT

We try to examine whether caste fragmentation of a community has an impact on the level of trust and conflict between the members of the community. Additionally, we want to check the access to publicly provided goods in a heterogeneous community in rural India. We intend to use the Fractionalization index to measure the degree of fragmentation of a society. For our rural based study, we have used the IHDS dataset, both household and village level. We have found that the relationship between caste fragmentation and community conflict is negative and significant. In heterogeneous villages the Government provides more non-targeted public goods. However, we could not find any pattern of the provision of targeted public goods. We have also explored the relative strength of particular caste groups and how the relationship between fragmentation and community conflict are affected with variations in income.

KEYWORDS : Caste fragmentation; fractionalization; heterogeneity; trust; community conflict; targeted and non-targeted public goods.

ACKNOWLEDGEMENTS

TABLE OF CONTENTS

LIST OF TABLES

I INTRODUCTION

Ethnic fragmentation is a multifaceted phenomenon that encompasses various dimensions such as race, ethnicity, and income. While most traditional theories related to ethnic fragmentation based on other countries emphasize the negative impact of heterogeneity on trust, cooperation, and public goods provision, we want to check whether this is also true in the case of multilayered Indian society. The presence of different people from different ethnic origins, has persisted in almost all the societies in India. This difference varies across culture, race, religion, caste, income, occupation etc. Social divisions emerged when social identities were made important.

India is a prime example of reconciliation of many religions, namely, Hindus, Muslims, Sikhs, Christians etc. There are different caste groups in every religion. Hindus are divided majorly into six caste divisions, namely Brahmin, Forward, OBC, SC, ST and others, making the social structure more complex, maintaining a certain hierarchy. They all reside in a multilayered society following particular social norms. Thus, the concept of social heterogeneity arises.

Social divisions along caste and religious lines are noticeable all over India. It is particularly important for rural India due to the reason that in rural areas sustaining cooperation in presence of the divisions is important. Cooperation leads to better economic outcomes in rural India. According to Banerjee & Somanathan (2007), there is a clear negative correlation between social fragmentation—especially along caste and religious lines—and access to public goods in Indian society, where social fragmentation is notably strong.

The "divide and rule" strategy worsened pre-existing fault lines over the period of British colonialism, which ended in 1947. For administrative convenience, the British frequently pitted various groups against one another, widening the gaps between people based on religion and geography. Community tensions were further heightened by the 1947 religiously motivated division of British India into Pakistan and India, which resulted in

large-scale migration and intercommunal violence. To serve the varied populace, the Indian government established a democratic and secular framework after independence. Ethnic conflicts continued despite these attempts. The desire for Khalistan, a distinct Sikh state, first surfaced in Punjab in the 1980s, sparking a period of upheaval and violence.

Labour migration may be influenced by economic issues connected to regional or racial differences. Individuals from ethnically divided areas may relocate to locations with superior employment opportunities, frequently assisting in the growth of certain sectors or businesses.

To address these challenges, India has maintained a federal structure that allows for significant autonomy to states and union territories. The Constitution of India guarantees cultural and educational rights to various ethnic groups, promoting a sense of inclusivity. Race, ethnicity, and income are often the most significant contributors to social fragmentation. However, the impact of these divisions varies in terms of their persistence and influence over time. While ethnic fragmentation remains a complex issue, India's commitment to secularism, federalism, and pluralism has largely contributed to its unity amidst diversity.

Traditional theories have often posited a negative correlation between social fragmentation and societal well-being. These theories throw light upon the notion that increased diversity leads to a reduction in the provision of public goods, lower levels of civic participation, and diminished trust among members of society. This perspective, known as the 'diversity debit' suggests that heterogeneous societies face challenges in achieving common goals due to internal divisions. However, a counter argument arises in the form of the 'diversity dividend' theory, proposed by Gisselquist & Leiderer (2016) suggesting a positive relationship between ethnic diversity and the provision of public goods. The focus shifts from the nature of the relationship to the underlying causes that result in either negative or positive outcomes associated with social fragmentation.

 A study by Alesina, Baqir & Easterly (1999) conducted in the United States, supported the conventional perspective. The researchers found that

heterogeneity within a society negatively impacts both the provision of public goods and cooperation among its members. This reinforces the notion that internal divisions hinder collective efforts and the provision of common good. Furthermore, heterogeneity has a large impact on cooperation and trust in a group. Alesina& La Ferrara (2000) showed that in a heterogeneous society people trust others less and trust those who are like them. Furthermore, they concluded that the level of participation in social activities is inversely related to racial and ethnic fragmentation. There are studies showing that ethnic homogeneity enhances cooperation. Habyarimana, Humphreys, Posner & Weinstein (2007) suggested that ethnically homogenous communities exhibit effective cooperation driven by shared norms and accessible sanctioning through social networks.

The enduring divisions along caste and religious lines underscore the significance of understanding the causal links between social fragmentation and the provision of public goods for effective policy formulation and socio-economic development. In our study we have tried to analyze the relationship between ethnic fragmentation and provision of publicly provided goods from which we have come across contradictory results. This result will be further discussed in the later parts of the paper focusing on targeted and non-targeted public goods. Additionally, our paper highlights that the positive relationship between community level conflict and caste fragmentation does not depend on the dominant caste of the village.

Conventional literature suggests that there is an inverse relationship between caste fragmentation and the provision of public goods. However, that might not always be the case. The Government would tend to provide more community specific public goods in the highly fragmented villages to mitigate the risk of conflict. Additionally, there are few instances where the relationship is altered. Schündeln (2013) explores the idea that having a more diverse population can lead to increased support for public goods, particularly when there is uncertainty about how much of these goods will be provided. This positive relationship can be extended to political angle with the aspect of electoral competition as the paper by Cruz, Labonne & Querubin (2020) suggests.

In our study we have considered two types of public goods, targeted and non-targeted. In the case of India the Government provides the public benefits, unlike the distribution system mentioned in Alesina, Baqir & Easterly (1999). In that setting people would have to contribute in the form of direct tax for the public good. We expect that in our case, the Government might face effort constraints while providing public goods. We find that it is beneficial for the Government to provide non-targeted public goods in heterogeneous villages. However, for the targeted public goods there is no meaningful causality with fragmentation.

Next in section (II) we discuss our objectives for the study. Later in section (III) we review the relevant literature regarding the effect of caste fragmentation on the level of trust and access to publicly provided goods. We have used the IHDS II data set for our regression analysis. This has been mentioned in section (IV) in detail. Further in section (V) we discuss the relevant measure used for our purpose. Fractionalisation index has been constructed to measure the heterogeneity. Our empirical strategy for this study has been mentioned in section (VI). The main results have been explained in section (VII). Lastly we conclude our analysis in section (VIII).

II OBJECTIVE OF THE STUDY

We seek to find the relationship between ethnic fragmentation and the levels of trust and access to publicly provided goods. The levels of community trust might vary when we move from homogeneous to heterogeneous societies. Additionally the degree of heterogeneity is quite higher than average in a diverse country like India which is home for different types of religions, castes, races, ethnicities etc. Hence, almost all societies are expected to be heterogeneous to some degree.

Moreover, trust doesn't depend only on ethnic heterogeneity. Suppose in a community, people have more outside opportunities. In that case, they tend not to be trustworthy with the other members of their community. The implication is, better within-group trust and cooperation needs worse between-group trust and cooperation. Some other instances might be important in that case. If the distance of the village from the district town is shorter, then the villagers are more exposed to outside options and they are less cooperative among themselves. On the other hand, if the village is far away from the district town, people are then bound to be more trustworthy. The distance from the market which indicates the outside opportunities can be an important factor determining within-group cooperation, hence trust. Distance from the nearest railway station, pucca road, presence of self-help groups, festival groups might affect the level of trust.

Trust might vary with group size. In comparatively large groups, sustaining cooperation along with trust is problematic due to the fact that in large groups cheating a distant partner is less costly. Contrarily, in smaller groups cheating is hardly seen due to higher group cohesion.

The provision of public good is expected to be affected due to social heterogeneity. However, the effect may be ambiguous. In homogeneous communities, people vote for similar types of public goods. The difference in preferences may be lower. In contrast to that, in communities which are heterogeneous, the preferences of the members may vary due to their

different ethnic origins. This is not always true. In heterogeneous communities where the disagreement among members is severe, the state tends to provide more community specific public goods. As a whole the provision of public goods does not remain less. We predict that ethnic fragmentation may have an impact over the distribution of public goods. The dominant ethnic groups can be the key political actor or influence the political parties which in turn control the distribution of public goods. For example, local political leaders or the leaders of group politics approve projects or services which provide more benefits to the members of their own communities. Those goods and services may not add value to the society as a whole.

In our study we explore the possible channels through which trust and the access to publicly provided goods are connected to ethnic fragmentation. Fragmentation of a society applied to the caste lines might have an adverse impact on the trust levels of that society. India is a prime example of heterogeneity with social, ethnical, racial and religious division in almost all the societies. The degree of fragmentation of Indian society is very high with a mean of 0.9 in 1971 (the standard measure of ethnic fractionalization index) compared to the mean value of 0.26 for US cities that Alesina, Baquir and Easterly had reported.

The main hypothesis regarding our study is that in a heterogeneous community level of trust is expected to be lower. There is enough evidence from the previous literature like Alesina & La Ferrara (2000). Their study tells us that the average level of trust in an ethnically and racially heterogeneous place is lower. People do not trust those who are not similar to them and in a more heterogeneous community trust is lower due to the fact that inter-racial contacts are more frequent.

Our second hypothesis is that the access to publicly provided goods in a heterogeneous community is expected to be lesser compared to homogeneous communities. Alesina, Baqir & Easterly (1999) argued that areas where the ethnic groups are polarized the provision of public goods is low and efficient. We believe the fact that in mixed-communities the

provision of public goods might not be lower as the state wants to mitigate the risk of conflict by providing more community specific public goods.

In India, the Government provides non-targeted public goods and targeted benefits for its citizens. We expect that especially in villages, these benefits might depend on the structural composition of that village. Here, the Government is the sole decision maker of distribution of the public goods. Hence, the Government might follow different strategies while providing targeted and non-targeted benefits.

Different groups have different influences on the levels of trust. Whether the upper caste or the lower caste shows more in-group trustworthiness depends on the varying social capital within a particular caste group. Hence, the caste group having stronger in-group cohesion are expected to display higher levels of trust within their community. We want to check the impact of caste fragmentation on the levels of trust in a particular village, where either upper or lower caste forms the majority. Groups can also be formed based on the level of income. Conventional economic theories argue that the poorer section of the society are forced to trust each other more due to lesser outside opportunities. The richer section does not face any constraints as such.

Geographic mobility is also an important determinant of ethnic fragmentation. In more heterogeneous communities due to poor cooperation levels among the members, people tend to move out of that community. However, in our Indian village based study migration issues are not major concerns. We predict there is a very little effect of mobility. Hence, we control mobility issues.

III LITERATURE REVIEW

Historically diversity and heterogeneity have persisted in almost all societies, especially in rural areas, across India. Heterogeneity arises due to social fragmentation along the caste and religion lines which are quite prominent in Indian societies. Though there can be other sources of fragmentation like race, income inequality, ethnic origin, etc., our focus remains on caste. This has translated into different behaviors across societies and communities leading to variations in the level of trust. The level of trust may depend upon a number of factors as Alesina & La Ferrara (2000) argued in a USA based study. They have found that the average level of trust is high in those places which are all racially and ethnically very homogeneous and the places with lowest average trust are very heterogeneous. People from different castes and religions are not often seen together in social activities. However in a mixed community, cooperation and participation have the same kind of scenario as shown by Alesina & La Ferrara (2000). Participation in social activities is positively associated with trust and cooperation. In a mixed community, as the level of heterogeneity increases the level of trust and cooperation declines, thus participation in general falls.

Minorities and racially fragmented communities trust other people less. It is quite self-explanatory as suggested by Alesina & La Ferrara (2000). The authors have also shown two ways to interpret this result- people do not trust those who are not similar to them and in more heterogeneous communities trust is lower due to the fact that interracial contacts are more frequent. On the other hand, if an individual lives in a society full of non-trusting people, then that individual is expected to trust others less. So in a more heterogeneous society the percentage of minorities is higher. They all have a lower level of trust in others, so average trust of the society is lower and as an equilibrium response everybody trusts less. Alesina & La Ferrara (2000) observed when minorities are aware of their status, they are most likely to

participate more in political-social activities to preserve their identity and uphold their political and civil rights.

Within-group trust and cooperation varies across the groups according to the presence of the relative proportion of higher castes and lower castes. For example Hindus are divided along a few castes where the Brahmins are considered as the traditional higher caste belonging to the so-called elite group. Scheduled castes and scheduled tribes are at the bottom of the caste hierarchy. The distinction between the upper and lower castes is very sharp. We often observe that in the villages, social norms are dictated by the caste system.

Dinesen & Sønderskov (2015) in their paper analyzes how ethnic diversity of the immediate micro- context affects trust, where inter-ethnic exposure is the underlying factor. The relationship between ethnic diversity and social trust originates in a general human disposition to evaluate individuals with a different ethnic background as less trustworthy.

In a developing nation like India, trust and cooperation is very important to sustain good governance. Lack of formal institutions increases the dependency of relation based governance and cooperative behavior of citizens. We try to explore only one aspect of governance which is the distribution of public good and how it is influenced by ethnic diversity, if at all. Alesina, Baqir & Easterly (1999) on a US based study found that there is a negative relationship between ethnic heterogeneity and public good distribution. The areas where ethnic groups are polarized and where politicians have ethnic constituencies, the provision of public goods is low and inefficient. In India also the political figures tend to provide public goods, benefits and transfer programs only in some particular areas favoring their own community and kinship. The authors have also argued that the individuals choose lower public goods when a significant fraction of tax revenues collected on one ethnic group are used to provide public goods shared with other ethnic groups.

There might arise a situation where certain groups hold power within society that is disproportionate to their size and that those who exercise such

control over economic and social hierarchies might have an influence on the functioning of democratic institutions in their favor as noted by Banerjee, Iyer & Somanathan (2007). The authors also proposed that the higher within-group cooperation might lead to groups securing the public goods they want, the authors argue that it might not always be the case. They establish theoretically that when the group sizes are made smaller, it reduces the collective action problem for that group and hence, a collective of multiple such short groups do better than that of a few large groups.

Banerjee & Somanathan (2007) found that Brahmin dominated areas have more schools, post offices than other public goods in India. On the other hand, lower caste dominated areas have more of other public goods. They have also shown that Scheduled castes that are at the bottom of the Hindu caste hierarchy do better than Scheduled tribes. Though the Brahmins are likely to be a powerful caste in almost every aspect, Banerjee & Somanathan (2007) showed that the effect of Brahmins is not as strong as expected. They have argued that the provision of public goods increases with population density. One explanation of this may be that the state is willing to provide more public goods when there is a larger settlement, so that a big share of the population receives those goods.

Miguel (2001) found a negative correlation between ethnic diversity and funding for primary schools in rural western Kenya. However there may be an ambiguous relationship between ethnic heterogeneity and public good provision. The low levels of inter-ethnic cooperation may lead to reduced educational investment. Miguel (2001) observed that in high-diversity areas, there is a positive local sorting effect that leads to a greater correlation between ethnic diversity and school funding within schools compared to across-area averages.

Miguel & Gugerty (2005) in a Kenya based study, found a negative relationship between ethnic diversity and school funding. The main result found is that with an increase in ethnic diversity, the proportion of the total population of the contributing majority group decreases and that of free riding minority groups grow, leading to declining of total public good funding. They looked for the residential patterns which are stable,

households may send their children to schools which are far from their homes. To avoid this problem the authors took residential ethnic diversity as the principal measure of ethnic diversity. Another potential identification problem is that children may move to a relative's house to attend school that is not within walking distance but that is negligible. Thus the authors have identified the mobility issue, however they have controlled for this while estimating.

In a country like India, the larger portion of the population depends on the state provided services like education and water supply, about which we have mentioned previously. Another is police spending by the government which is related to the welfare of the society. It is crucial for India due to the conflicts that often arise along the caste and religion lines. In the paper authored by Alesina, Baqir & Easterly (1999) it is mentioned that the expenditure on police increases with ethnic fragmentation. After controlling the variable 'crime' they have found ethnic fragmentation to be still significant. Similar studies have been shown in the paper presented by Ajilore & Smith (2007) provides evidence that ethnically fragmented communities tend to spend more on police services.

Though some literature suggests that the state provides more public goods when there is a possibility of between-group conflicts, this is not true for all cases. One instance given by Munshi & Rosenzweig (2018). They have found a negative relation between ethnic diversity on the welfare distribution and public goods provision in India.

Lee (2018) discussed three hypotheses, such as diversity hypothesis, discriminatory hypothesis and alternative hypothesis to explain the determinants of public good provisions in diverse societies. The study finds that the presence of upper castes is positively associated with the provision of public goods, providing support for the discrimination hypothesis. However, the study also finds that diversity does not have a negative impact on public goods provision, contrary to what some previous studies have suggested. He suggests that certain socially and politically powerful ethnic groups are better able than others to obtain services for their communities

than others, whether because of their co-ethnic links to higher level political actors or the generally stronger social position of group members.

In Indian villages, individuals having a social or political position can attract more public goods and services towards themselves. It is commonly observed that the areas consisting of potential voters supporting the political party in power receive more public goods such as tubewells, drainage systems, roads etc. The local governments or Gram Panchayats, Block Development Offices sometimes behave biasedly towards politically powerful areas. One can think of the situation that the provision of public goods is thus mainly demand driven, irrespective of any social fragmentation. However, it may be the other way round as we have mentioned earlier that a particular ethnic group can be dominant and influence the political environment. Similar argument given by Banerjee & Somanathan (2007) is that the ability of communities to collectively articulate their demands to politicians and administrators is important in determining their location where the public good will be provided. Thus being politically well connected or having the ability to articulate demands effectively matters.

Income or wealth inequality is an important indicator of ethnic heterogeneity. If there is inequality between groups, disagreements among them become frequent. Therefore two things can happen. First, there will be less public spending leading to less public goods. However, the state can provide public goods exclusively to reduce the friction.

Similar arrangements for within-groups like between Brahmins and other lower castes is done. Thus the areas which are more socially fragmented might end up having larger provision of public goods. Chadha & Nandwani (2018) describe, the provision of public goods is not always negatively impacted by fragmentation; it seems possible to provide public goods exogenously to fragmentation, which can then act as a mitigating instrument in fragmented districts.

So far the literature we have reviewed, presented an inverse relationship between ethnic heterogeneity and access to public goods. Now we are going to display positive or direct relations. Schündeln (2013) explores the idea

that having a more diverse population can lead to increased support for public goods, particularly when there is uncertainty about how much of these goods will be provided. The empirical findings of the paper challenge conventional theories, revealing that increased ethnic diversity is associated with a higher individual willingness to contribute privately to public goods. The article posits that this unexpected association may be attributed to heightened uncertainty about others' contributions in ethnically diverse settings, leading to increased private contributions. The results remain robust across different public goods. According to the author, further analysis reveals that the effect of ethnic fractionalisation on willingness to contribute is more pronounced in poorer neighborhoods and is mitigated when individuals belong to a larger ethnic group.

This positive relationship can be extended to political angle with the aspect of electoral competition as the paper by Cruz, Labonne & Querubin (2020) suggests. This study focuses on local democracy in the Philippines, where political competition revolves around family alliances and clientelistic practices. They concluded that in less fragmented villages, clientelistic transactions are common, leading to concentrated political influence and lower public goods provision. Conversely, in highly fragmented villages, politicians may opt for broader public goods provision to attract a larger voter base.

IV DATA

We have used the Indian Human Development Survey (IHDS) data set for our study. The IHDS is a nationally representative multi-topic panel survey of households conducted in several rural and urban areas and neighbourhoods across India. It covers a wide range of topics including health education, employment, economic status, marriage fertility, gender relations, social capital, and more. According to the purpose of our study we have mainly focused on ethnic composition, trust vis-a-vis conflict and public goods aspects of the data.

IHDS II (2011-12) dataset contains both household and village-level data and questionnaires. We have constructed a caste fragmentation index using the village structure given in the village data set. The household level data set contains the information regarding trust, conflict and targeted public goods. For our purpose, we have merged the village data with the household data by using a unique ID (IDPSU).

Infrastructure and Demography

The demographic data in the IHDS II provides detailed information about the population characteristics and insights into the religious and social composition of the surveyed population. The number of households surveyed approximately is 42,152 across India in 1,410 villages. We want to check the impact of caste fragmentation on trust and publicly provided goods across rural India.

The village data set contains six caste groups which are Brahmin, Forward, OBC, SC, ST and Others. By using the shares of these caste groups we have constructed our Fractionalization index (F).

The IHDS II dataset offers a valuable resource to explore how trust and conflict are affected by heterogeneity with or without outside opportunities

in rural India. We have controlled for infrastructural variables such as distance to market place, district town, pucca road and closest railway station, availability of safe drinking water and health services. Additionally we have also taken the presence of social festival groups and self-help groups as our control variables. The data set contains these informations exclusively which can be key determinants of trust vis-a-vis conflict.

Migration is an important issue which might change the level of caste fragmentation. On the other hand, people can move out from the villages where caste fragmentation is very high. Hence, we have taken migration as a control variable in our regression model. While identifying the mobility issue, we have taken controls for migration. The households with at least one migrant are controlled in our regression analysis.

Income and Education

Income inequality can lead to conflict when households with differential income levels live together in a community. The IHDS II data set provides information about household's per capita income. The similar reasoning holds for the level of education. The data contains the household head's maximum level of education as a measure of education at household level. We have taken controls for both of the variables. In addition to that, the occupation of the household head's father is considered.

Next our objective is to check the dynamics of the relation between trust and caste fragmentation across the richer and poorer section of the society. The IHDS II household data set provides a measure of poverty by using the Tendulkar measure. Hence, we will run the regression for two different data sets one for poorer households and another for richer households.

Public Goods

In the IHDS-II dataset the provision of various public goods has been studied. We have analyzed the effect of caste fragmentation on public goods provided by the government.

We have tried to see the effect of public goods under two subsections - targeted and non targeted public goods. In our study, we analyze government strategies in providing targeted and non-targeted public goods to different neighborhoods. We explore which type of good benefits particular neighborhoods and how caste fragmentation influences the distribution of these goods.

Targeted public goods refer to services or benefits that are directed specifically to certain groups or individuals based on certain criteria, such as income level, demographic characteristics, or geographic location. Targeted public goods can be identified through variables that directly assess individuals' eligibility or receipt of specific government assistance programs or services. Distribution of MGNREGA job cards is one of the targeted public goods studied in the data. In the dataset it was studied that 30,110 individuals did not receive the MGNREGA job card and that of 12,042 received it.

Non-targeted public goods aim to benefit a larger section of society, irrespective of any caste or religion, unlike targeted goods which are aimed at specific groups. Two non-targeted goods considered are the availability of Pucca roads and Drainage systems. We have constructed binary dummy variables for these public goods; if it is available the dummy variable takes the value 1, otherwise 0.

Trust and Cooperation

For our study, trust is an essential social indicator that reflects the strength of interpersonal relationships and community dynamics which we have taken into account from the dataset. It can be measured through various proxies such as willingness to help neighbors, reliance on local institutions, or perceptions of government effectiveness. We check the effect of caste fragmentation on the level of community trust. The IHDS II dataset provides information about how much conflict is there among the jatis/communities. The data set provides the information of conflict in a community if any. Once again, we have constructed a dummy variable representing community conflict. If there is any level of conflict the value of the variable takes the value 1, otherwise 0.

V   MEASURE

We want to check how ethnic heterogeneity affects the level of trust and access to publicly provided goods. Taking into account caste fragmentation as a measure of ethnic heterogeneity, we try to find out varying degrees of caste fragmentation and its impact on trust and distribution of public goods.

Esteban & Ray (2008) have provided two measures of heterogeneity, namely Fractionalization (F) and Polarization (P). The fractionalization index (F) captures the degree to which a society is divided into distinct groups. It is defined as the probability that two randomly chosen individuals belong to different groups. Suppose, n_i is the share of population belonging to group 'i', hence the probability that an individual of group 'i' is chosen is n_i. Again the probability that she is matched with someone from another group is $n_i(1-n_i)$. Finally, the probability that any two individuals belong to different groups is F(.).For our analysis, we have generated the fragmentation index and created the share of caste per village from the percentage given in the IHDS dataset. This allows us to quantify the level of ethnic heterogeneity within each village, providing a foundation for examining its impact on trust, cooperation, and access to public goods. The index is given below.

$$F = 1 - \sum_i n_i{}^2$$

From the village structure in IHDS II village dataset, we have constructed the caste fragmentation index by using the shares of different castes belonging to a particular village. The caste fragmentation index ranges from 0 to 0.81. However, the measure of Polarization is not relevant for our particular work. We only focus on the Fractionalization index denoted by F. The same index in the same context has been used by numerous literatures like Alesina, Baqir & Easterly (1999), Alesina & La Ferrara (2000), Miguel (2001), Miguel & Gugerty (2005), Banerjee & Somanathan (2007) etc.

VI EMPIRICAL STRATEGY

The Specifications

We analyze the effect of ethnic fragmentation on the level of community trust and the access to public goods in the Indian context. We use the binary dependent variable model for this purpose. To examine the relationship between community trust levels and the level of ethnic fragmentation, we consider the following equation:

$$Y_{ivd} = \alpha + \beta F_{vd} + \gamma X_{ivd} + \delta Z_{vd} + \varphi_d + e_{ivd} \qquad (1)$$

Y_{ivd} represents community conflict reported by i^{th} household in v^{th} village of dth district. It takes the value 1 if there is any type of conflict, otherwise 0. F_{vd} represents caste fragmentation of vth village in d^{th} district. It is our main variable of interest. We anticipate that there is a positive relation between Y_{ivd} and F_{vd}, i.e, if fragmentation rises, community conflict tends to increase. X_{ivd} are the standard household level controls, such as per capita income, education, assets owned by the household, occupation of the household's head, availability of BPL ration card. Z_{vd} are the village level controls which are the distance of the village from closest railway station, pucca road, market, district town, availability of safe drinking water, whether there is any self-help group and social/festival group, availability of Government health facility and reported local crime. φ_d is the district fixed effects. There might be different district level characteristics that could affect community conflict other than through the channel of caste fragmentation. Hence, without controlling district fixed effects, the result is just a comparison between districts. In addition to that, this regression is done for two different samples. One is for the villages where the Brahmins are the major caste, who occupy the highest position in the caste hierarchy.

Another is for all villages where non-Brahmin castes, which include Forward, OBC, SC, ST and Others, are the majority. We emphasize the existing differences in the social capital of different castes which determines the level of conflict.

Moreover, the same analysis with the same regression equation is repeated conditioning on the fact that whether the household is poor or not. We expect for the poorer section of the society, the result to be insignificant because they do not have much outside opportunities, network and influence. Hence they are forced to trust and be cooperative with each other.

Next we focus on the access to publicly provided goods with varying levels of caste fragmentation index. Both targeted and non-targeted public goods have been taken into account. The Government takes the decision of the distribution of public goods and may find it beneficial to provide more non-targeted public goods in highly fragmented villages and targeted public goods in relatively homogeneous villages due to effort constraints and vote maximization. We have considered two non-targeted public goods such as the availability of pucca road and drainage system in a village, targeted public goods such as access to MGNREGA job cards.

The following equation shows the relationship between availability of public goods and caste fragmentation.

$$Y_{vd} = \alpha + \beta F_{vd} + \delta Z_{vd} + \varphi_d + e_{vd} \qquad (2)$$

It is a dummy dependent variable model, where Y_{vd} is a binary variable representing the access to publicly provided goods. It takes the value 1 if the particular public good is available, and 0 if not. F_{vd} represents caste fragmentation of vth village in d^{th} district. Z_{vd} represents the standard village level controls same as the model (1). φ_d is the district fixed effects. We expect that the results are positively significant for non-targeted public goods and negatively significant for targeted public goods.

Identification Issues

We seek to find how the level of trust and provision of public goods are affected by caste fragmentation. It is very true that the caste or religion of an individual does not change over time. The caste of an individual is exogenously determined. Caste fragmentation of a village is relatively fixed over time that the fragmentation on the basis of income or occupation. To prove this argument, we have constructed caste fragmentation indices for both IHDS I and II village level data. We have found that these two fragmentation indices are highly positively correlated with each other. We observe the correlation coefficient to be 0.51. However, there might be potential endogeneity issues that affect the result. If the endogeneity issue is present, we cannot establish the relationship between caste fragmentation and community conflict, as well as the access to publicly provided goods.

Additionally, migration could have an impact on fragmentation, as people might move out from a highly fragmented community due to frequently observed conflict. It changes the level of fragmentation of a village. We can ignore the effect of migration as long as the fragmentation indices are highly correlated which implies migration hardly changes the fragmentation indices over time.

There is another issue which arises due to dominance of some caste groups, which can affect the level of trust and provision of public goods. For example, Brahmins, traditionally occupying the highest position in the caste hierarchy, might attract more public goods than other lower caste groups. Banerjee & Somanathan (2007) argued that Brahmins, the traditional priestly class, have better access to schools and post offices. In our study we have done our analysis by using the regression model (1) for two different samples, one for the villages where the Brahmins are the major caste and another one where non-Brahmins hold the majority.

VII RESULTS

Community Conflict and Caste Fragmentation

In this section we discuss our main findings of our study. Firstly, we want to look at how community conflict is affected by caste fragmentation. By using a dummy dependent model, we have regressed community conflict on the level of caste fragmentation. Standard household level controls have been taken such as per capita income of the household, education of the household head and assets owned by the households. Additionally, we have taken the village level controls like the distance to nearest market, distance to nearest town and distance to closest railway station, occupation of the head of the household, availability of safe drinking water, distance to nearest pucca road, presence of a social/festival group in the village, access to BPL ration card, report of local crime within 12 months, presence of self-help groups in the village and migration. There might be different district level characteristics or fixed effects that would affect community conflict. Hence, we have also controlled for district fixed effects, otherwise the result would be just the comparisons among the districts.

The result we obtained is reported in Table 1 (Appendix A). We observe a significant positive relationship between community conflict and caste fragmentation at 10% level of significance after considering household and village level controls and district fixed effects. In heterogeneous villages, conflict is more frequently observed. The result supports our hypothesis which states that with the rise in caste fragmentation, the level of trust between the members of the community declines. Here, higher levels of community conflict, as reported by the households, correspond to lower trust among the community members.

The above regression is done for two different samples, which are shown in Table 2 (Appendix A). In column (4), we obtain a significant positive relation between community conflict and caste fragmentation in the villages where Brahmin is the major caste. Similarly, in column (8) significant positive relation is obtained in the villages where non-Brahmin castes hold

the majority. Thus we can argue that for every caste group, the obtained relationship between conflict and fragmentation holds true. Both the results are obtained by considering household, village level controls and district fixed effects.

Access to Publicly Provided Goods and Caste Fragmentation

Next we proceed to check what happens to the access to publicly provided goods with varying levels of caste fragmentation. We have considered two non-targeted public goods such as availability of Pucca road and Drainage system. Once again by using a dummy dependent variable model we regress availability of Pucca road on caste fragmentation. We have taken standard village level controls as mentioned previously and controlled for district fixed effects.

We can observe from Table 3 (Appendix B) that the availability of Pucca road increases with the level of caste fragmentation. The relationship is significant at 1% level of significance with village level controls and district fixed effects. When this is conditioned for the majority caste of the village being the upper caste Brahmins, the result is rendered insignificant. It implies that if Brahmins form the majority caste group of the village then caste fragmentation has no significant effect on the availability of Pucca road. On the other hand, when the same is conditioned for the majority caste of the village being non-Brahmin caste group, then the relationship between caste fragmentation and availability of Pucca road is positive and significant. Availability of Pucca road is more in case of heterogeneous villages.

By using the same procedure we obtain a similar significant positive relationship between availability of drainage system and caste fragmentation at 1% level of significance, as shown in Table 4 (Appendix B). Like the results obtained for Pucca road, here too we observe no significant relationship between drainage system and caste fragmentation when we consider the villages with Brahmin being the majority caste of those villages. The result becomes significant when we consider the Non-Brahmin

caste being the majority caste group in the village, implying that as the level of caste fragmentation rises, the availability of Drainage system also increases.

Most conventional literature suggests that there is a negative relationship between ethnic fragmentation and the provision of public goods. Our finding, thus, is quite intriguing. We try to explain the key factors that lead to such contrasting results. One plausible explanation could be the optimal behaviour of the Government, the sole provider of the public good. In the highly fragmented villages the Government might find it beneficial to provide non-targeted public goods, which benefit every caste group at the same time without harming anyone. On the other hand, the Government would try to provide more of the targeted public goods in relatively homogeneous villages, where the level of trust is quite higher and people do not get involved in conflict frequently. This strategy is optimal for the government in the face of effort constraint and vote maximization. However we could not find any meaningful relationship between targeted public goods and caste fragmentation.

The relationship between the targeted goods, i.e. access to MGNREGA job cards, and caste fragmentation levels is observed in Table 5 (Appendix B). In case of targeted public good, we have taken whether the households have the MGNREGA job card or not as our dummy dependent variable. Regressing it on caste fragmentation by using both standard household and village level controls as mentioned previously, we obtain insignificant results. The relationship, however, is negative and significant when we condition on Brahmin being the majority caste of the village. This implies that when the upper caste forms the majority in the village, the access to MGNREGA job cards falls with the rise in level of caste fragmentation. When we observe the result for the majority caste being the Non-Brahmin caste group, the relationship becomes insignificant.

Poverty , Community Conflict and Caste Fragmentation

Next we focus on the impact of caste fragmentation on the levels of trust for two different groups based on income level. For that purpose, the regression model (1) is further conditioned if the individuals are poor or not. Standard household and village level control variables as mentioned previously have been considered. The categorical variable POOR represents the poverty level, taking the value 1 if the household is poor, otherwise 0.

The results are shown in Table 6 (Appendix C). In column (1) we run the regression model (1) for the households belonging to poorer section of the society (i.e. POOR= 1), we get a positive significant relationship between caste fragmentation and community conflict. We can conclude that when the household belongs to the poorer section of the society, then with an increase in caste fragmentation, community conflict increases implying that trust among the poor people falls.

However, in case of non-poor (i.e. POOR = 0), obtained in column (2) we observe an insignificant result. Hence, we can infer that for the richer section of the society, change in caste fragmentation has no effect on community conflict and hence, increase in caste fragmentation among the non-poor has no effect on the trust among them.

VIII CONCLUSION

Our investigation aims to uncover the effects of ethnic fragmentation, on trust and cooperation, within and between communities. Furthermore, we introspect into the matter of how ethnic heterogeneity influences the distribution and accessibility of public goods. Firstly, our analysis confirms a significant positive relationship between community conflict and caste fragmentation. This proposition suggests that the more heterogeneous a community becomes, the weaker are the levels of trust and cooperation between the members of the community. In proportion with caste fragmentation, the level of conflict increases, as reported by households. This phenomenon is consistent across villages dominated by both Brahmin and non-Brahmin castes, suggesting that caste fragmentation universally exacerbates community discord irrespective of the predominant caste group. Thus, we can argue that for every caste group, the obtained relationship between conflict and fragmentation holds true. From our previous literature review, we find that the result may not always hold true if the members of a community in a society are frequently exposed to out group members, then the within group cooperation gets reduced. However, this time we've taken village level controls for this.

Secondly, we checked the relationship between the access to publicly provided goods and caste fragmentation. Earlier research posits a negative correlation between public good provision and degree of heterogeneity. In contrast, our results illustrate that the availability of non-targeted public goods, such as Pucca roads and Drainage systems, actually increases with the rise in degree of heterogeneity. To reduce tensions and to keep conflicts away, the government intentionally distributes non-targeted public goods within the highly fragmented societies. The goods are used by all the castes at once, thus minimizing tension that may stem from such things as competition. This also guarantees political support from a political center of a comprehensive diverse structure of the electorate in different caste systems.

On the other hand, the government would try to allocate more targeted public goods in those villages, which are relatively homogeneous in nature, where people are more trustworthy and cooperative. This strategy is optimal for the government as it consolidates support from cohesive groups that are more likely to recognize and appreciate targeted interventions, thereby maximizing vote from these communities. The fact that this differential policy approach has been adopted showcases that the government understands the dynamics and nature of socio- political environment in India well. In short, our analysis did not reveal any meaningful relationship between the provision of targeted public goods and the degree of caste fragmentation.

This study, in the context of Indian polity and society, opens up avenues for future studies to look at as to what shapes efficient targeting of diverse public goods.

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