Directors of a Feather Merge Together: Information Flows, Familiarity Bias and M&A Outcomes

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Abstract

We show that cultural proximity between two firms' boards leads to a higher likelihood of the two firms entering a merger and acquisition (M&A) deal in India. This phenomenon may indicate firms' reliance on culture, as measured by caste, as an informal channel of information when making critical investment decisions with imperfect information. However, it may also be driven by familiarity bias leading to sub-optimal investments. Indeed, caste-proximate M&A deals are value destroying for both acquirer and target, as well as the merged entity. There is also no transfer of value from acquirers to targets, and no significant reduction in time to completion, indicating that potential trust among directors with similar caste identities does not benefit the negotiation process. Overall, our findings show that familiarity bias in favor of culturally proximate agents can lead to sub-optimal investment decisions.

JEL Classifications: G11, G14, G34, Z10

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1 Introduction

The success of investment decisions hinges on the amount and quality of information available to investors. Thus, in environments characterized by information asymmetry, agents often rely on informal channels of information. For example, banks rely on their relationships with firms to obtain soft information before giving them loans, investors invest in geographically proximate firms, and venture capitalists select startups founded by individuals ethnically similar to themselves.[1] An important corporate investment decision especially plagued by information asymmetry is whether to merge or acquire another firm.[2] A recent Harvard Business Review report puts the failure rate of merger and acquisition (M&A henceforth) deals between 70% and 90%, attributing a large number of the failures to poor information leading to inaccurate assessment of potential gains from such deals. Studies have shown that firms considering M&A deals try to overcome information frictions by relying on alternative channels such as cultural values, geographical proximity of firms, social ties of their directors, and ethnic similarity of their locations.[3]

However, relying on such informal channels can also be costly. For example, while social networks can aid information flows, they can also lead to sub-optimal investments by creating familiarity or in-group bias, groupthink, pressure for social conformity, and by reducing the choice set for investments. For example, Ishii and Xuan (2014) show that social connections between directors and senior executives of firms entering M&A deals lead to value destruction. Similarly, French and Poterba (1991) show that home bias in investments leads to under-diversification of individuals' asset portfolios. Thus, it becomes an empirical question whether the positive information benefits of relying on these informal channels are strong enough to offset the negative bias effects.

In this paper, we examine the role of a hitherto unexplored informal channel in firm's M&A decisions- the cultural similarity between directors of firms. We choose the setting of Indian firms and investigate the extent to which firms engaging in M&As in India rely on the cultural

[1] See, among others, Rajan and Zingales (1995) for reliance on bank-firm lending relationships, Coval and Moskowitz (1999) for home bias in investments, and Hegde and Tumlinson (2013) for venture capitalists' startup selections.

[2] See Eckbo et al. (1990).

[3] See Ahern et al. (2015), Kedia et al. (2008), Cai and Sevilir (2012), Ishii and Xuan (2014), Rousseau and Stroup (2015), and Shi and Tang (2015).

Acquirer \ Target	Brahmin	Kshatriya	Vaishya	Shudra	Dalit
Brahmin	47.1	12.1	24.5	16.4	0
Kshatriya	30.5	28.6	20.1	20.8	0
Vaishya	23.9	12.2	51.4	11.9	0.6
Shudra	21.3	13.8	18.7	45.8	0.4
Dalit	50	0	0	0	50

construct of the caste system, and whether it creates net information gains or familiarity bias. India serves as a useful laboratory to study this question for several reasons. First, the caste system, along which the Hindu society is organized, explicitly identifies the social and cultural groups that individuals belong to.[4] It influences myriad aspects of economic outcomes and people feel strong affinity to members of their own caste groups. As such, the caste system can both serve as a conduit for information flows[5] and cause in-group bias[6] Second, India has witnessed rapid growth in the number of M&As in recent years. The number of M&A deals announced equaled 595 in the year 2000 but more than doubled to 1208 in 2017. Third, just like other economies, economic transactions in India are characterized by information frictions.[7]

A first examination of the data reveals that a high proportion of M&As in India are between firms with boards dominated by the same caste. Table 1 presents the composition of all observed M&A deals by the dominant *varna* of acquirer and target boards. Each cell shows the percentage of acquirer firms dominated by a given *varna* that acquire a target whose board is dominated by a specific *varna* (rows add to 100%). We see that a remarkably large proportion of M&As are between firms whose boards are dominated by the same *varna*. This is evident from the high percentages on the diagonal that represents same-*varna* deals. Rigorous analysis shows that this is not coincidental. For example, 51.4% of all firms whose boards are dominated by *vaishya* acquire targets whose boards are also dominated by *vaishyas*. The same is true for other *varnas*. Further, we find that caste-proximate mergers are value destroying for both acquirer and target firms, suggesting that in-group bias more than offsets any information gains. We

[4]Under this system the Hindus are divided into four hierarchical *varnas* - *Brahmins*, *Kshatriyas*, *Vaishyas*, and *Shudras* – in that order, and a fifth de facto lowest varna of *Dalits*. The *varnas* are further subdivided into hundreds of *jatis*.

[5]See Munshi (2011) and Bonte and Filipiak (2012).

[6]See Bhagavatula et al. (2018), Damaraju and Makhija (2018) and Acharya et al. (in press).

[7]See, Allen (2014) and David et al. (2016).

also do not see any evidence that the negotiation process is aided by potentially greater trust between directors with similar caste identities.

We build a novel database of mergers and acquisitions in India during 2000-2016 by combining data from several sources. We obtain data on M&As from Thomson One SDC and Prowess, a database of large Indian firms. The latter also provides us with data on corporate directors and firms' financial information. The caste (*varna/jati*) identities of directors are assigned using the last name to caste mapping developed by Bhagavatula et al. (2018).

We conduct our analysis in four steps with four key takeaways. We first assess whether a firm pair with caste proximate boards is more likely to enter an M&A deal than others. To this end, we compare the percentage of mergers in our sample that are between caste proximate firms to the corresponding percentages in several simulations wherein we choose a hundred random samples of firm pairs that are matched so as to satisfy a range of conditions. For each simulation, we find that the percentage of realized M&A transactions in our sample that are between caste proximate firms are substantially higher than the corresponding mean percentages across the hundred random samples. These results indicate that firms with boards dominated by the same caste tend to enter deals systematically more than firms with boards dominated by different castes. We also show that caste has an independent influence on the likelihood of M&A besides alternative cultural information channels such as language and geography. In ongoing work, we use changes to board composition in response to a corporate governance reform as an exogenous source of variation in caste proximity of boards to examine the causal effect of caste on the likelihood of M&As. Results will be presented in our next draft.

Next, we examine how M&A deals between firms with caste-proximate boards affect firm values. We measure firm value by looking at the cumulative abnormal returns (CARs) of acquirer, target, and merged firms around the time of deal announcement. Results of this analysis show that caste proximity of boards of transacting firms destroys value – CARs are significantly lower for mergers between caste-proximate relative to caste-distant firms. This is true for both acquirer and target, and consequently for the merged entity. The result holds for several measures of caste proximity – indicator for whether the dominant caste on the two boards is the same, the proportion of same-caste director pairs among all possible director pairs, distance between castes based on *varna* hierarchy. We analyze results for both *varna* and

jati proximity and find stronger results for the former. This analysis shows that the market reacts negatively to merger announcements between firms whose directors have similar caste backgrounds.

This perverse outcome does not appear to mask underlying benefits of caste similarity of directors during the negotiation process. We infer this from results from the third step in our investigation where we examine how takeover premiums and time to deal completion are associated with caste proximity of the two firms' directors. We find that neither *varna* nor *jati* similarity of directors have any robust association with the takeover premiums paid by acquirers to targets. Further, if familiarity stemming from similar caste backgrounds creates trust among directors, we ex ante expect it to ease the negotiation process, making it quicker. Consistent with this expectation, we do find that the time to deal completion is shorter for M&As between firms with caste-proximate boards. However, this association is not statistically significant.

Thus far, evidence indicates that the familiarity bias among directors of similar caste backgrounds leads to sub-optimal M&A decisions. However, we want to assess whether the possibility of obtaining greater information plays any role as an incentive for firms to rely on directors' caste proximity when making these important investment decisions. For this purpose, we examine whether firms are less likely to rely on caste when they have alternative formal or informal mechanisms to obtain information about potential targets (acquirers). We consider the following possibilities: board interlocks, toeholds, disclosures on annual reports, and other proxies for firm opacity such as firm size. This analysis is currently under way.

The paper relates to the broad literature on how culture affects economics outcomes. While a thorough review of this literature is beyond the scope of this paper, we highlight a few strands of this research. Papers have shown that cultural norms and values affect a vast range of economic phenomena such as female labor force participation, growth, public good provision, etc.[8] Closer to our study, some papers consider how agents' cultural identity and group membership affects their economic decisions. For example, Fisman et al. (2017) show that cultural proximity affects loan outcomes. Coval and Moskowitz (1999) (among many others) show that investors

[8]See, among others, Alesina et al. (2013), Fernandez (2013, 2007), Fernandez and Fogli (2009, 2006), Guiso et al. (2003), Barro and McCleary (2003, 2006), Noland (2005), Ashraf, Galor (2007), Tabellini (2010), Fernandez (2010), Alesina and Giuliano (2010), Campante and Yanagizawa-Drott (2015), Alesina et al. (2017), Benjamin et al. (2012), and Alesina et al. (1999).

are biased towards domestic assets. Research collaborations also are more likely to occur among scholars with similar cultural backgrounds (Freeman and Huang, 2015). We contribute to this strand of work by documenting that caste similarity of corporate directors can affect cross-firm investment decisions.

Researchers have only recently begun examining how culture affects firm decisions. Bloom et al. (2012), Bloom et al. (2014) and Bloom et al. (2016) show that countries' cultural values affect firms' management practices and organizational structures. Several papers show that board composition along traits such as gender, culture, or country of origin affects firm performance (see, for example, Ahern and Dittmar (2012), Bernile et al. (2018), Green and Homroy (2018), among others). Closest to our paper are the few recent studies that document the influence of socio-cultural and geographical factors in merger and acquisition decisions of firms. Kedia et al. (2008) show that firms tend to acquire geographical proximate firms. Cai and Sevilir (2012) and Ishii and Xuan (2014) show that board interlocks and directors' social connections, respectively, increase the likelihood of M&As between firms. Rousseau and Stroup (2015) show that historical board interlocks also increase the likelihood of M&As. Shi and Tang (2015) show that firms located in counties with residents of similar religious compositions are also more likely to enter M&A deals. Ahern et al. (2015) similarly show that cultural distance between nations where firms are located affects the likelihood of cross-border M&As and the value created by them. A few other papers show that cultural heritage of CEOs and corporate culture also affect M&A decisions (see, for instance, Malmendier and Tate (2005)). To the best of our knowledge, we are the first to consider cultural proximity of directors as a potential factor affecting M&As. We show that this in fact constitutes a highly influential factor underlying M&As, and leads to perverse outcomes.

There is a large literature examining the interplay between caste and socio-economic outcomes in India. Most previous studies have examined how individuals belonging to disadvantaged caste groups fare compared to relatively advantaged castes in terms of education, intergenerational mobility, political representation, etc. (see, among others, Hnatkovska et al. (2012, 2013), Ghani, Kerr, and O'Connell (2011), Damodaran (2008), Thorat, Kundu and Sadana (2010), Jodhka (2010), and Varshney (2012)). Instead, we focus on how agents' economic decisions are influenced by their affinity towards others of similar caste backgrounds,

regardless of whether those castes are disadvantaged or not. Only a few recent studies have also examined caste through a similar lens. Munshi (2011) shows that information flows among individuals of the same caste help overcome occupational traps. Fisman et al. (2017) show that the likelihood of loans being made and repaid is higher when loan officers and borrowers belong to the same caste. Damaraju and Makhija (2018) show that corporate directors tend to hire CEOs of the same caste as themselves. Bhagavatula et al. (2018) show that corporate boards are characterized by high levels of caste homophily. We contribute to this recent strand of the literature by showing that the extremely important corporate investment decision of whether to merge or acquire another firm is also affected by caste considerations, with perverse consequences.

The literature on M&As in India or by Indian firms is sparse. Nayyar (2008) and Athreye and Kapur (2009) have documented the rise in acquisitions by Indian firms across industries and countries. Banerjee et al. (2014), Chakrabarti (2008), Zhu and Malhotra (2008), Gubbi et al. (2010), Dixit (2011), and Kohli and Mann (2012) show that Indian acquirers realize positive market returns. However, no paper examines how firms attempt to overcome information asymmetry in these deals and whether informal channels such as caste connections and board interlocks influence them. To the best of our knowledge, we are the first to examine how caste proximity among directors affects M&As in India.

The rest of the paper is organized as follows. Section 2 describes our data sources and presents summary statistics. In section 3, we show that firms with caste-proximate boards are systematically more likely to enter M&A transactions. Section 4 demonstrates that cumulative abnormal returns for acquirer, target, and merged entity are negatively associated with the announcement of M&A deals between caste-proximate firms. In section 5, we document that key measurable aspects of the negotiation process are also not aided by directors of merging firms belonging to same caste. While these analyses show that the bias effects of caste dominate, Section 6 investigates whether there is any role of caste connections in aiding information flows between firms. Section 7 concludes.

2 Data and descriptive statistics

2.1 Data sources

We combine data from three main sources: Thomson One SDC Deals database, Prowess, a firm level database, and last names to caste mapping developed by Bhagavatula et al. (2018). We describe each of these sources below.

Thomson One SDC: The Deals database of Thomson One SDC is our main source for M&A deals among Indian firms. To use these data, we start with the population of all M&A deals during 2000-2017 where both acquirer and target are Indian firms. Next, we collect several deal related variables – announcement date, effective date, deal status (we only take completed and pending deals), deal attitude (hostile, friendly, or neutral), transaction value, percentage of shares acquired, percentage of transaction value paid in cash, and toehold (defined as $I(\text{percentage of shares owned after transaction} - \text{percentage of shares acquired} > 0)$), and time to completion of deal (effective date - announcement date).[9]

Prowess: Prowess is a database of large public, private, and government owned firms that account for about 84% of India's GDP. The data are sourced mainly from annual reports, quarterly financial statements, and profit and loss accounts of firms. Thus, information on all listed companies that are reasonably active on the major stock exchanges of India is available in the database. Though the database includes mostly publicly listed firms, a smaller number of unlisted (public and private) firms are also included. The reason for smaller coverage of these firms is that they are not required to disclose their financial statements. The sample period we consider is 2000-2017, as the number of firms covered by Prowess is much smaller prior to 2000. We use detailed data on several financial variables and other characteristics of these firms – size (real assets), age (year - incorporation year), export status, state of incorporation, industry (National Industrial Classification (NIC) 2008), public and listing status, operating cash flow relative to assets, debt-to-assets ratio, Tobin's Q,[10] and return on assets (sales - operating

[9] Occasionally, we see the same firms entering multiple deals on the same day, although they have different SDC deal numbers that uniquely identify deals. In these cases, we randomly choose only one deal.

[10] Tobin's Q is calculated as $\frac{\text{book value of debt + book value of preferred stock + market value of common stock}}{\text{book value of total assets}}$.

expenses).

We gather additional M&A deals from Prowess. As in SDC, here we have information on three kinds of deals – mergers, acquisitions, and sale of assets.[11] For each deal, we can identify the acquirer and target firms. Further, we see several events related to a deal, such as first media announcement, stock exchange announcement, high court approval, etc., along with their respective dates. We take the chronologically the first event with the word "announcement" to identify the announcement date of the deal.

Using data on firm characteristics, we create several deal related variables. Deals are classified as horizontal when the firms belong to the same two digit industry and vertical when they belong to industries that have a producer-supplier relationship.[12]. The remaining deals between firms belonging to different industries that do not appear in the same supply chain are classified as unrelated. We also calculate the size of the acquiring firm relative to that of target, and measure acquirer's stock performance and volatility in the year prior to the deal.[13] We additionally identify whether a deal occurs between firms in the same state or between states speaking predominantly the same language.

Two key variables of interest with regard to M&As that we consider are: announcement period cumulative abnormal returns (CAR) for acquirer, target and merged entity, and takeover premiums. The CAR for a given firm's stock is defined as the difference between the return on the stock over the announcement window minus the corresponding return on the market return. Specifically, the abnormal daily return is then calculated as $ar_{i,t} = r_{i,t} - r_{m,t}$, where $r_{i,t}$ and $r_{m,t}$ represent the daily returns[14], in logs, on the firm i' stock and on the index portfolio (Bombay Stock Exchange (BSE) Sensex or BSE 500), respectively.[15] Finally, we calculate $CAR_i = \sum_{\text{event window}} ar_{i,t}$, where the event windows we consider are $[0, 1]$, $[-1, 1]$, and $[-2, 2]$ centered on $t = 0$, the day of the deal's public announcement. The CAR for the merged

[11]Prowess only records deals for which at least one of the transacting firms is already covered in its sample.

[12]Prowess provides information on products produced and inputs used by firms. Combining this information with their two digit NIC classifications, we are able to determine whether two industries have an upstream-downstream relationship. Alternatively, we use the input-output tables available from the Ministry of Statistics and Programme Implementation.

[13]We can observe stock related information only for target firms that are publicly traded. Since only a small proportion of targets in our sample of deals are public firms, we do not control for their stock related information in our regressions.

[14]Note that the daily return is adjusted for corporate actions like stock splits, bonus and dividend declarations.

[15]While the majority of firms are traded on BSE, some are traded on the National Stock Exchange (NSE). For these firms, we use the NSE NIFTY 50 index.

entity is calculated as the weighted sum of the CARs of the acquirer and target firms where the weight is the market capitalization of the acquirer (target) relative to the sum of the market capitalizations of both firms 43 trading days prior to the announcement date. Takeover premium is defined as the transaction value divided by the percentage of shares acquired*market capitalization of the target 43 trading days before announcement.

Finally, we obtain information on firm's boards of directors. The main variable of interest with regard to boards is their caste composition, as this is needed to calculate caste proximity between boards of firms entering an M&A deal. For this purpose we use the last names of the firms' directors and assign them their most likely *varna* and *jati*. The procedure of identifying their caste is described later in the section. We also calculate the size of the board and the percentages of directors that are independent or non-executive[16] Additionally, we consider how busy the directors are; busyness is defined as the mean number of other directorships held by board members. We also measure diligence of directors as their mean attendance rate at board meetings (i.e., board meetings attended/total meetings held in a year). We create an indicator for CEO duality, i.e, whether the chairperson of the board is also the CEO of the firm. Finally, we measure board interlocks between firms entering an M&A deal. For this purpose, we use unique director identification numbers (DINs) (or names when DINs are unavailable) and see whether there are any individuals with the same DINs or names serving on the boards of both firms. We create an indicator that takes the value of one when there is at least one such member and zero otherwise.[17]

Last name to caste mapping: To measure caste proximity between firms entering an M&A transaction, we first need to identify castes of directors serving on the two boards. To that end, we use the probabilistic mapping of last names to *varna* and *jati* developed by Bhagavatula et al. (2018). While the authors describe the methodology underlying this mapping in detail in their paper, we provide a brief summary here. The mapping exploits two aspects of the caste system in India: (a) caste is endogamous and (b) last names are indicative of caste. Data are taken on six million profiles registered on three matrimonial websites which contain information on

[16]Details about how we classified these things when they weren't obvious.
[17]Comparison of director names between boards is done manually.

individuals' last names and their self-identified religion, *varna*, and *jati*. All spelling variations of a last name are grouped together and considered as one last name. Since the same last name may not always belong to the same caste, the authors probabilistically assign castes (*varnas* and *jatis*) to all last names in the group. The probability for a last name belonging to a given caste equals the proportion of times the users with that last name self-identify as belonging to that caste.

We use this last name to caste mapping to assign caste to corporate directors based on their last names. However, we identify a director as uniquely belonging to the most likely caste for his/her last name from the mapping. Although the likelihood of the most likely caste is quite high (73% for *varna* and 59% for *jati*), we expect this approach to misclassify some directors' castes. Note, however, that this potential misclassification is likely to occur systematically across states and industries. This is because some castes may be geographically concentrated so that the same last name may map to different castes depending on where the individual belongs to geographically. Also, some communities may dominate some industries that may or may not be regionally concentrated. But all regressions include state and industry fixed effects. Ex ante, we have no reason to expect the misclassification to be systematic within states and industries. Thus, the remaining measurement error in caste assignments to directors, and hence in the caste proximity measures, would cause attenuation bias and works against finding economically and statistically significant results.

Other sources: We additionally obtain information from several other data sources. To calculate the cumulative abnormal returns after deal announcement, we get the S&P Bombay Stock Exchange (BSE) Sensex and S&P BSE 500 index from the BSE website, and the NIFTY 50 index from the National Stock Exchange (NSE) website. In our regressions, we control for whether a deal is between firms located in states that speak the same language. Language information is gathered from Wikipedia. To construct the Clause 49 based instrumental variable we use the Prime database to assign independence status to directors when the same information is not available in Prowess. We corroborate our classification of deals as vertical or horizontal by alternatively using the input-output tables available from the Ministry of Statistics and Programme Implementation. Finally, we deflate nominal values by the all-India CPI for industrial

workers series available from the Reserve Bank of India (2001=1).

2.2 Building the sample of M&As

To build our final sample of M&A deals, we begin with the population of M&A deals in SDC and later combine additional deals from Prowess. However, all deals are ultimately matched across both data sources since neither database alone provides all the information about deals and firms that we need for our analyses. To match deals between SDC and Prowess, we first use ticker symbols of firms traded on BSE and NSE. However, these are not available for many firms. Therefore, we next use firm names to do string matching between the two data sources.[18] In matching deals between the two sources, we also match on the announcement dates besides firm names. Here, we observe that the announcement dates are not exactly the same for some deals. In cases of discrepancy we allow a difference of up to 30 days between SDC and Prowess announcement dates for a deal to be retained in the sample. In our analysis, we only use SDC announcement dates. We also drop all M&A deals that occur between the same corporate entity. For all deals thus obtained, we combine them with data on the financial, board, and other characteristics of the acquirer and target firms as described in section 2.1. To get board and financial information of firms, we go back at most one year from the date of deal announcement.

Note that requiring data on all variables needed for our analysis quickly leads the sample size to shrink. In particular, we lose observations mainly because of two factors. Targets are often private firms that we are unable to find financial and board information for since they are not required to publicly disclose such information. Also, any variables that are based on market trading activities cannot be calculated for private firms. Second, we are unable to find caste identity for all directors' last names using the Bhagavatula et al. (2018) mapping. We retain deals only among those firms for which we could identify caste for at least 85% of their directors.[19] In our final sample, we have 1312 M&A deals for the period 2000-2017.

Measures of caste proximity: We define the cultural proximity between any two firm boards in a few ways. Our first measure of cultural proximity is an indicator variable that takes on

[18] We use all name matches with a Stata match score of at least 0.85 and manually check all matches below a score of 1.

[19] Requiring caste assignment for 100% of directors for every firm severely reduces the sample size.

the value of 1 if the two boards have the same dominant *varna* (*jati*). Second, we define a continuous variable which returns the percentage of same *varna* (*jati*) pairs among all possible pairwise combinations of directors between the two boards. Finally, we define a measure which calculates the distance between the dominant *varnas* of the two boards using the hierarchy of the castes, so that pairs of dominant *varnas* which are close in the hierarchy are assigned lower values than pairs of dominant *varnas* differ greatly in their location in the hierarchy.

2.3 Sample statistics

Table 1 presents basic summary statistics for the final sample. Panel A presents basic characteristics of firms in our sample for the two end points of our sample – 2000 and 2017. We note that the average size of firms, as measured by real assets, has grown considerably over the sample period. Also, a large proportion of firms are public, although it is higher at the beginning of the period. Panel B presents characteristics specific to M&A deals in the sample. In particular, the majority of deals are between public firms. Slightly less than half of the deals are among firms located in the same state or with directors who dominantly speak the same language. Nearly 74% of the deals are cash financed. Further, as expected, acquirers are larger than targets, and a larger proportion of them are public. Acquirers have larger returns on assets, are less leveraged, have less tangible assets, and have lower Tobin's Q. Panel C presents caste-proximity characteristics for merging firms. We see that 39% (21%) of all deals are among firms whose boards are dominated by the same *varna* (*jati*). The mean *varna* overlap is 23% and the mean *varna* hierarchy indicates that, on average, the dominant caste of acquirer boards is over three caste categories higher than the dominant caste of the target board.

3 Caste proximity increases likelihood of M&A

The first question we examine is whether caste proximity between two firms' boards increases the likelihood of the two firms entering into an M& deal. Effectively, we test whether the decision of firms to pair through M&A is influenced by the caste proximity of the two firms. We describe our empirical strategy followed by results.

3.1 Empirical Approach

The main challenge we face in addressing this question is that the data are censored, i.e., we do not observe firm pairs that did not engage in M&A deals. To overcome this challenge, we compare the sample of observed M&A deals to different subsets of firm pairs that could *potentially* have merged. We employ three alternative methods to compare actual and potential merger pairings. In the first method, we compare the average caste proximity of firm pairs that engaged in observed M& deals in each year to the corresponding yearly average across one hundred simulated populations in which firm pairs are *randomly selected*. The null hypothesis in this setting is that firms pair by chance, while the alternative is that firms are more likely to pair through M&A deals if they are caste proximate. We perform this simulation analysis using ten different sets of criteria for randomly selecting acquirer and target pairs, allowing the pairing to be completely random and also to be conditioned on important observable firm and firm-pair characteristics. We first perform an unconditional simulation in which for every observed merger, we draw a completely random acquirer and completely random target from the set of firms for which we observe financial and board information in the year of the observed merger. We refer to this simulated sample as the unconditional simulated sample.

In a second test, we condition our choice of random firms on the industry pairs observed in the sample of actual M&A deals. Specifically, for every observed merger deal, we randomly draw one firm from the acquiring firm's industry and one firm from the target firm's industry from the set of firms for which we observe financial and board information in the year of the observed merger. A comparison of the caste proximity of the actual deals to those in this conditional simulated population of deals then controls for the distribution of caste of directors over industries and the distribution of industry pairings observed in merger deals. We refer to this sample as the industry-pair conditional simulated sample. Next, we condition our choice of random firms on the geographic state pairs observed in the sample of actual M&A deals. Specifically, for every observed merger deal, we randomly draw one firm from the acquiring firm's state and one firm from the target firm's state from the set of firms for which we observe financial and board information in the year of the observed merger. A comparison of the caste proximity of the actual deals to those in this conditional simulated population of deals

then controls for the distribution of caste of directors over states as well as the distribution of state pairings observed in merger deals. We refer to this sample as the state-pair conditional simulated sample. We also condition our simulated samples on the identity of acquirers and targets. In the acquirer conditional simulated samples, we draw a random target firm for each observed actual acquiring firm. We create three acquirer conditional samples by varying the criterion used for drawing the random target. We draw the random target (1) from the set of all firms in a given year, (2) from the set of firms in the industry of the observed target, and (3) from the set of firms headquartered in the same state as the observed target. In the target conditional sample, we draw a random acquirer firm for each observed target firm also using the same three criteria: (1) from the set of all firms, (2) from the set of firms in the observed target firm's industry, and (3) from the set of firms headquartered in the observed firm's state.

Finally, we create a simulated population conditional on observed participation in the M&A market. For this simulation, we take as our universe of firms to draw from the subset of acquirers and targets from the observed M&A deals. Then, we randomly pair a target from this universe to an acquiring firm from the universe. In the observed M&A participant conditional sample, we control for unobserved characteristics that make firms likely to engage in this type of deal.

For each of the described simulated populations, we draw 100 random samples according to the described criteria. Each sample contains the exact same number of simulated pairings to actual pairings in a given year. We then compute the average caste proximity in the simulated pairings and compare it to the caste proximity of firm pairings in observed M&A deals, testing for equality between the means of the two described samples using t-tests. The results of these extensive simulation exercises are described in the section that follows.

In an alternative approach, we go beyond the univariate simulation approach and estimate multivariate logistic regressions on a stacked sample of observed mergers (1) and synthetic firm pairs that did not merge (0) , following Bena and Li (2014). In particular, for each observed acquirer (target) we choose five random targets (acquirers) (a) unconditionally from the full population of Prowess firm pairs, (b) conditional on the industry of the observed target (acquirer), and (c) conditional on the state of the observed target (acquirer). The randomly chosen firm-pairs constitute our control samples of firm pairs potentially entering M&A deals. We then estimate a multivariate logit model on the likelihood of two firms merging as a function

of caste proximity, firm level controls, firm-pair level controls, and time fixed effects. Specifically, for each of the six synthetic populations, we estimate the following model:

$$I(M_{i,j,t}) = \beta_0 + \beta_1 CP_{i,j,t} + \beta_2 X^a_{i,t} + \beta_3 X^t_{j,t} + \beta_4 X^{at}_{i,j,t} + \eta_{i,j} + \tau_t + \epsilon_{i,j,t} \tag{3.1}$$

where $I(M_{i,j,t})$ is a binary outcome that takes the value 1 if the firm pair (i, j) entered into an M&A deal in year t, $CP_{i,j,t}$ represents the caste proximity of the firm pair (i, j) in year t, $X^a_{i,t}$ is a vector of time varying characteristics of the acquiring firm, $X^t_{j,t}$ is a vector of time varying characteristics of the target firm, $X^{at}_{i,j,t}$ is a vector of characteristics of the i, j pair, $\eta_{i,j}$ denotes industry-pair fixed effects, and τ_t are year fixed effects. β_1, the coefficient of interest, captures the effect of the caste proximity of the firm pair on the likelihood of the firms entering into an M&A deal. In this analysis, identification of the effect of caste proximity on the likelihood of an M&A deal comes from cross-sectional variation.

In a third approach, we exploit exogenous changes to board composition in response to a corporate governance reform. We instrument the cultural proximity between two firms using their individual requirements to comply with the Clause 49 regulation requiring that a firms board of directors contain a minimum percentage of independent directors. Note that the reform required changes in board composition; these changes then led to changes in the caste proximity of the two firms. We then analyze the relationship between the instrumented changes in caste proximity and the likelihood of firm pairs choosing to merge. For this analysis, we use a panel dataset, following firm pairs over time, allowing for the inclusion of firm-pair fixed effects to capture any unobservable features of the pair that may be driving both the decision to merge and the caste proximity. As a result, identification of the effect of caste proximity on the likelihood of an M&A deal comes from exogenous, *within firm-pair* variation in caste proximity.

3.2 Results

Figure 1 presents comparisons of percentages of caste (*varna*) proximate M&A deals in our sample to corresponding percentages in the simulations described above. The figure is organized into four panels. Panel A (the three graphs in the first row) presents results for simulations

where we randomly choose both acquirer and target firms. Panel B (the three graphs in the second row) presents results for simulations where we choose a random target for each acquirer firm in our sample. Panel C (the three graphs in the third row) presents results for simulations where we choose a random acquirer for each target firm in our sample. Panel D (the graph in the fourth row) presents results from simulations where we choose random targets and acquirers from our observed sample of firms engaged in M&A deals. For panels A, B, and C, the three graphs are for simulations where: (a) firms are paired unconditionally, (b) randomly chosen firms are paired on the basis of states that observed deals occur between, and (c) randomly chosen firms are paired on the basis of industries (two-digit) that observed deals occur between. Across all graphs, it is clear that in all cases the percentage of observed caste-proximate M&As among all deals is systematically higher than the corresponding percentages simulated samples. The same results hold for caste measured as *jati*.

Figure 1: Percentage of Same-Varna Deals in Observed and Random Simulations

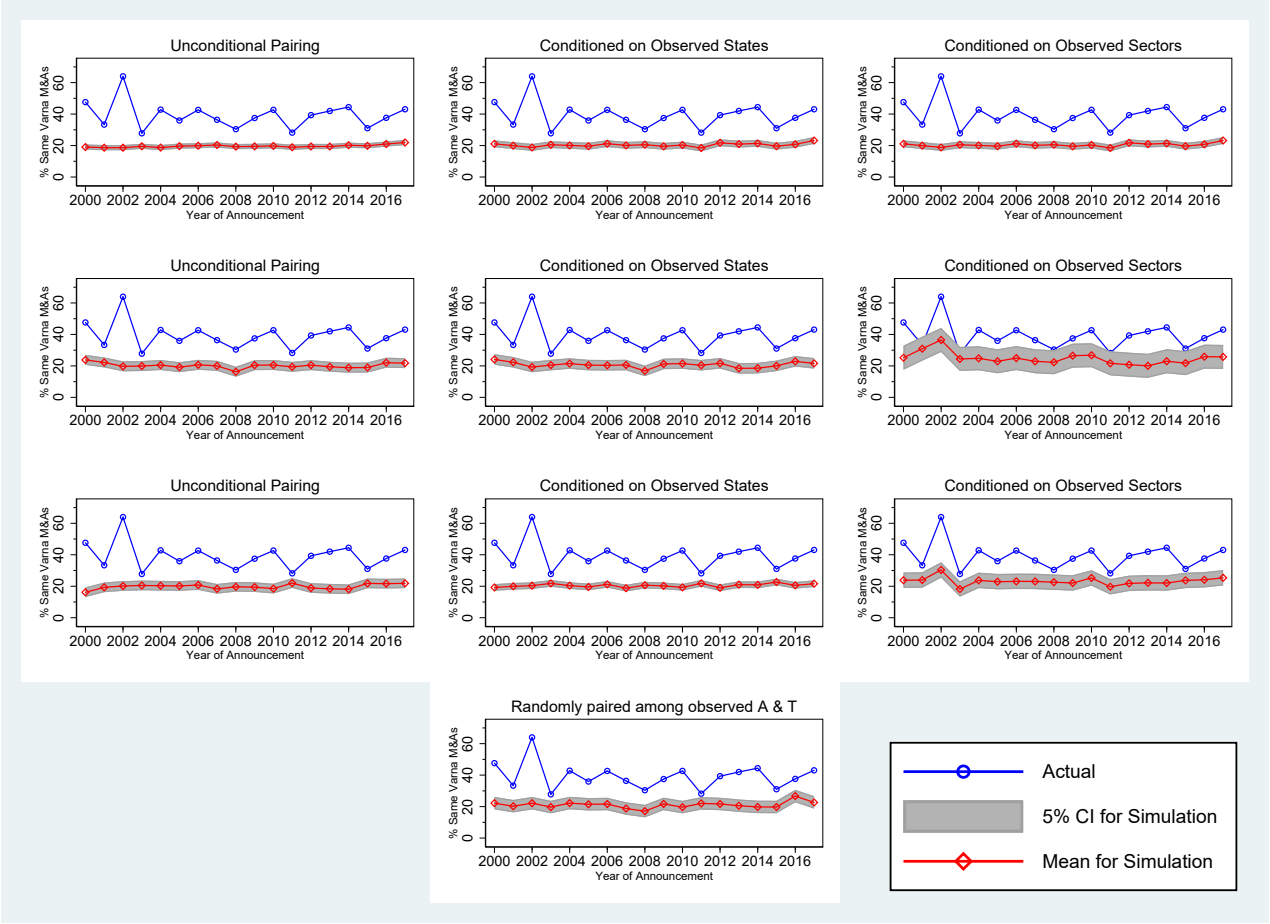

Table 1: Summary Statistics

Panel A: Firm characteristics

Characteristic	2000	2017
N	2473	5448
Mean real assets (rupees million)	2928.84	15401.47
Mean return on assets (ROA)	0.05	0.02
Mean leverage	0.47	1.57
Mean tangibility	0.37	0.27
Mean Tobin's Q	0.51	0.71
% Public	91.3	81.8

Panel B: Deal characteristics (financial and other)

Characteristic	Value
N	1312
% public-public	85.5
% same state	45.2
% same language	48.3
Mean takeover premium	-0.39
Mean time to completion	111.10
Mean transaction value	5775.73
Mean % cash financed	73.65
% public acquirers	95.50
% public targets	89.48

Characteristic	Acquirer	Target
Mean real assets	174351.12	15833.81
Mean ROA	0.09	0.05
Mean leverage	0.28	0.39
Mean tangibility	0.26	0.33
Mean Tobin's Q	0.30	0.44
Mean board size	10.22	8.12
Mean % independent directors	44.37	38.86
Mean % non-executive directors	74.48	74.26
% dual CEOs	37.20	24.01

Panel C: Deal characteristics (cultural)

Characteristic	Value
% same jati	20.96
% same varna	38.57
Mean jati overlap	9.00
Mean varna overlap	23.34
Mean varna hierarchy	3.79

Table 2: Percentage of Same-Varna Deals in Random Simulations

Percentage of Same-Varna Mergers in Observed Sample: 39.27%			
	(1)	(2)	(3)
Simulation Criteria	Mean Percentage of Same-Varna Mergers in 100 Simulated Samples	Diff: Observed Percentage - Simulation Percentage	t-stat
Unconditional	19.66%	19.61%	9.75***
Conditional On Industry Pairs	20.43%	18.84%	9.33***
Conditional on State Pairs	22.65%	16.62%	8.14***
Observed Acquirer Random Target (Unconditional)	20.24%	19.03%	9.33***
Observed Acquirer Random Target (Conditional on Industry)	20.68%	18.59%	9.09***
Observed Acquirer Random Target (Conditional on State)	24.83%	14.44%	6.55***
Observed Target Random Acquirer (Unconditional)	19.78%	19.49%	9.57***
Observed Target Random Acquirer (Conditional on Industry)	20.51%	18.76%	9.29***
Observed Target Random Acquirer (Conditional on State)	23.22%	16.05%	7.69***
Random Pairing of Firms Conditional on Participation in M&A Market	21.11%	18.16%	8.82***

Notes: This table presents comparisons of sample mean percentages of same-varna M&A deals in simulated samples to the percentage of same-varna M&A deals in the observed sample. Simulations are created by randomly selecting a pair of firms for each observed merger using ten different sets of criteria for the randomly selected population. Column 1 presents the mean over 100 simulated samples of the percentage of same-varna mergers for each of the ten different sets of criteria for random selection. Column 2 shows the difference between the percentage of same-varna deals in the observed sample and the average percentage of same-varna deals in the simulated sample. Column 3 displays the t-statistic for a comparison of means test with the null hypothesis that the mean percentage in a simulated sample equals the percentage observed in the actual sample of M&A deals.The ten simulation criteria are described in detail in section 3.1. *p<0.01, ** p<0.05, * p<0.10.

Table 2 shows the overall comparison across all years of the percentages of caste-proximate M&A deals in the observed and simulated samples. In the top row we present the percentage of same-varna mergers in the observed sample (39.27%). Column 1 presents the average over all years of the mean percentages of same-*varna* deals across a hundred random samples for each simulation. In column 2 we present the difference between the observed percentage and the average percentage in the simulated sample. In column 3, we present the t-statistics for a test of whether the observed and simulated mean percentages of same-*varna* deals are statistically different. The table shows that compared to each simulation, the observed proportion of same-*varna* M&As are significantly higher than the corresponding simulated means by a wide margin. Results in Figure 1 and Table 2 show that caste-proximate mergers are not occurring by chance in the Indian economy. Firms systematically are more likely to choose to enter M&A deals with other firms when their boards are dominated by directors belonging to the same castes.[20]

[20]This results also holds for comparisons of observed versus simulated means of proportions of same-*jati* deals.

Table 3: Percentage of Same-Varna Deals in Random Simulations, Controlling for Same-State or Same-Language

	(1)	(2)	(3)	(4)
Panel A: Same-State Merger Subset				
Simulation Criteria	Mean Percentage of Same-Varna Mergers in 100 Simulated Samples	Percentage of Same-Varna Mergers in Observed Sample	Diff: Observed Percentage - Simulation Percentage	t-stat
Random Acquirer, Random Target	23.67%	49.52%	25.85%	8.50***
Observed Acquirer, Random Target	24.44%	49.52%	25.08%	8.15***
Observed Target, Random Acquirer	22.89%	49.52%	26.63%	8.82***
Panel B: Same-Language Merger Subset				
Simulation Criteria	Mean Percentage of Same-Varna Mergers in 100 Simulated Samples	Percentage of Same-Varna Mergers in Observed Sample	Diff: Observed Percentage - Simulation Percentage	t-stat
Random Acquirer, Random Target	24.45%	47.87%	23.42%	7.43***
Observed Acquirer, Random Target	25.14%	47.87%	22.73%	7.13***
Observed Target, Random Acquirer	23.71%	47.87%	24.16%	7.70***

Notes: This table presents comparisons of sample mean percentages of same-varna M&A deals in simulated samples to the percentage of same-varna M&A deals in the observed sample. In Panel A, we compare the average percent of same-varna deals in one hundred simulated trials to the percent of same-varna deals observed in the actual M&A sample *for the subset of mergers taking place between two firms headquartered in the same state.* In Panel B, we compare the average percent of same-varna deals in one hundred simulated trials to the percent of same-varna deals observed in the actual M&A sample for the subset of mergers taking place between two firms whose directors dominantly speak the same language. In Panel A (B), Column 1 presents the mean over 100 simulated samples of the percentage of same-varna mergers in the subset of same-state (same-language) mergers for each of the three different sets of criteria for random selection. Column 2 shows percentage of same-varna mergers in the observed sub-sample of same-state (same-language) mergers. Column 3 presents the difference between the average percentage in the simulated sample and the observed percentage. Column 4 displays the t-statistic for a comparison of means test between the observed and simulated samples. Simulations are created by randomly selecting a pair of firms for each observed merger using three different sets of criteria for the randomly selected population. The simulation criteria are described in detail in section 3.1. ***p<0.01, ** p<0.05, * p<0.10.

Further, we show in Table 3 that caste has an independent role to play in increasing the likelihood of M&A deals controlling for other informal or cultural channels of information or sources of bias. In particular, we compare observed and simulated mean percentages of same-caste M&As when the firms are headquartered in the same state or when their directors dominantly speak the same language. State and language also have a bearing on agents' cultural identities, and hence may constitute alternative groups along which they share information or display biases.

Table 3 presents the proportion of caste-proximate mergers, in the simulated versus observed populations, for two relevant sub-samples: the subset of same-state mergers and the subset of same-language mergers. Note that in both sub-samples, and for each different set of criteria for generating the simulated population, the proportion of same-*varna* mergers in the observed population is statistically significantly higher than that in the simulated population, as evidenced by the positive and statistically significant t-statistics for the difference in means tests displayed in column 4. Even when other informal information channels exist, for example common language and proximate location, we see that same-*varna* mergers are not occuring by chance and play an independent role in increasing the likelihood of M&A deals.

4 Caste proximity reduces deal value

In this section, we examine the market's valuation of M&A deals as a function of the caste proximity of the target and acquiring firm boards.

4.1 Empirical Approach

To gauge the effect of caste proximity on the market's valuation of the M&A deal, we analyze abnormal firm returns (acquirer, target, and combined firm) in a small window centered on the date of announcement of a deal. For this analysis, we use the sample of observed M&A deals described in sections 2.2. Specifically, we include in our sample the subset of announced deals in the 2000 - 2017 sample period whose deal status is recorded as either Completed or Pending in the SDC database. The abnormal return is defined as the return on a firm's stock over a

window of (-1,0) days centered on the announcement date of the deal[21] minus the return on the BSE Sensex Index over the same window.

We estimate the following model:

$$CAR_{i,j,t} = \beta_0 + \beta_1 CP_{i,j,t} + \beta_2 X^a_{i,t} + \beta_3 X^t_{j,t} + \beta_4 X^{at}_{i,j,t} + \beta_5 D_{i,j,t} + \eta_{i,j} + \tau_t + \epsilon_{i,j,t} \qquad (4.1)$$

where $CAR_{i,j,t}$ is the cumulative abnormal return observed upon announcement of a merger between firms i and j in year t, $CP_{i,j,t}$ represents the caste proximity of the firm pair (i, j) in year t, $X^a_{i,t}$ is a vector of time varying characteristics of the acquiring firm, $X^t_{j,t}$ is a vector of time varying characteristics of the target firm, $X^{at}_{i,j,t}$ is a vector of characteristics of the i, j pair, $D_{i,j,t}$ is a vector of deal characteristics, $\eta_{i,j}$ denotes industry-pair fixed effects, and τ_T are year fixed effects. β_1, the coefficient of interest, captures the effect of the caste proximity of the market's valuation of the deal upon announcement. Note that we estimate the model above for acquirer, target, and combined firm CARS.

4.2 Results

The results of estimating equation 4.1 are presented below, starting with Table 4 which presents results for the acquirer firm CARs. The coefficient on caste proximity, displayed in the first row of the table, is statistically significant for most of the measures of caste proximity. Specifically, column (1) shows that when the boards of directors of the target and acquirer have the same dominant *varna*, the CAR upon announcement of the deal is 1.2% lower than if the boards of directors of the pair of firms were not caste-proximate. Similarly, when caste proximity is measured using the fraction of possible board-member pairs across the two boards that are from the same varna, we see that the coefficient on caste proximity is again negative and statistically significant (column 3). Finally, in column (5) we note that the larger the hierarchal distance between the dominant varna of the acquiring firm's board and that of the target firm's board, the larger the observed acquirer CAR.

A similar result emerges when examining the CARs of target firms around the announcement

[21] Note that our results are robust to the definition of the announcement window and hold for windows of (-1,1) and (-2,2) days centered on the announcement date of the deal.

Table 4: Announcement Day Acquirer CARs and Caste Proximity

	(1)	(2)	(3)	(4)	(5)
	Dependent Variable: Acquirer Firm Abnormal Announcement Day Return				
Caste Proximity Measure	Same Varna	Same Jati	Overlap Varna	Overlap Jati	Varna Hierarchy Distance
Caste Proximity	-0.012***	-0.005	-0.040**	-0.045*	0.005**
	(0.004)	(0.005)	(0.016)	(0.023)	(0.002)
Size (A)	-0.004***	-0.004***	-0.005***	-0.005***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Size (T)	0.003**	0.003**	0.003**	0.003**	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
I(Vertical Merger)	0.009	0.007	0.007	0.007	0.011
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
I(Exporter A)	0.008	0.008	0.007	0.008	0.003
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
I(Exporter T)	-0.007	-0.006	-0.006	-0.006	-0.005
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
I(Same Language)	0.012	0.013	0.015	0.014	0.014
	(0.011)	(0.011)	(0.011)	(0.011)	(0.013)
I(Same State)	-0.010	-0.011	-0.011	-0.011	-0.014
	(0.011)	(0.011)	(0.011)	(0.011)	(0.013)
Age (A)	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age (T)	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Previous Year Stock Performance (A)	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
Previous Year Stock Volatility (A)	0.260	0.259	0.285	0.264	0.316
	(0.218)	(0.215)	(0.214)	(0.217)	(0.230)
Operating CF Ratio (A)	-0.051**	-0.054**	-0.051**	-0.054**	-0.029
	(0.021)	(0.021)	(0.021)	(0.021)	(0.025)
Leverage (A)	-0.010	-0.013	-0.010	-0.012	-0.014
	(0.011)	(0.011)	(0.011)	(0.011)	(0.012)
Relative Size	0.000*	0.000**	0.000*	0.000*	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
I(All Cash Deal)	0.011	0.010	0.010	0.009	0.012
	(0.010)	(0.010)	(0.010)	(0.010)	(0.012)
I(All Equity Deal)	0.009	0.008	0.008	0.008	0.007
	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)
Constant	0.001	0.003	0.008	0.006	-0.012
	(0.027)	(0.027)	(0.027)	(0.027)	(0.030)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Pair Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	750	750	750	750	607
R-squared	0.154	0.145	0.151	0.149	0.178

Notes: This table presents coefficient estimates from a multivariate regression of announcement day acquirer CARS on caste proximity, firm level controls, and deal level controls. The sample includes M&A deals with Indian acquirers and targets in the sample period 2000 - 2017. The announcement day acquirer CAR for a given M&A deal is calculated as the return on the acquirer firm's stock minus the return on the market return over a window of (-1,0) days around the first public announcement of the deal. In column 1 (2), caste proximity is measured as an indicator variable that takes the value 1 when the acquirer board and target board have the same dominant varna (jati). In column 3 (4), caste proximity is measured as the total number of same-varna (jati) pairs of acquirer-target board members as a fraction of the number of all posible acquirer-target board member pairs. In column 5, caste proximity is calculated as the hierarchal distance between the dominant varna of the acquirer and target board. Size is defined as the log of total assets; relative size is defined as the ratio of total assets of the acquirer to total assets of the target. The dependent variable and all continous independent variables are winsorized at the 1% level. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

of M&A deals: caste proximity between the boards of the acquirer and target firms reduces the market's valuation of the deal. In Table 5, we note a negative and statistically signficant coefficient on the caste proximity variable in columns 1,2, and 4. Taken together with the results on acquirer CARs, we conclude that the market's reduced valuation of caste-proximate M&A deals reflects a net reduction of value, and not a transfer between the target and the acquiring firm.

This net reduction in value of caste-proximate M&A deals is confirmed when we examine the CARs of the combined entity in Table 6 below. Note that the CAR of the combined firm is a market value weighted average[22] of the acquirer and target CARs. Note that the caste proximity variable is significant using most of the caste proximity measures. In column 1 of Table 6, we note the negative and statistically significant coefficient on the same-varna measure: if the acquirer and target firm boards share the same dominant varna, the announcement day CARs of the combined firm are on average 2.2% lower than for mergers in which the two boards do not share a dominant varna. Similarly, using the continous distance measured based on the fraction of possible board member pairs across the two boards that share a *varna*, we see the same negative and significant results in column 3. Finally, for a given increase in the hierarchal distance between the dominant varna of the acquirer and target boards respectively, the combined firm CAR also increases, as evidenced by the positive and statistically significant coefficient in column 5.

The results of the announcement day CAR tests reveal that the market penalizes caste-proximate firm pairs. This is consistent with the market's suspicion of familiarity bias dominating any information benefits that accrue from the caste-proximity of the target and acquirer firm boards.

5 Negotiation unaffected by caste proximity

We next look for evidence on a specific channel through which caste proximity might effect the value of an M&A deal. To this end, we examine the role of caste proximity in the negotiation process between the acquirer and target firm. We look for evidence of the effect of caste

[22]The market value is measured 43 days prior to the announcement of the deal.

Table 5: Announcement Day Target CARs and Caste Proximity

	(1)	(2)	(3)	(4)	(5)
	Dependent Variable: Target Firm Abnormal Announcement Day Return				
Caste Proximity Measure	Same Varna	Same Jati	Overlap Varna	Overlap Jati	Varna Hierarchy Distance
Caste Proximity	-0.020**	-0.024**	-0.079*	-0.138**	0.006
	(0.010)	(0.011)	(0.044)	(0.061)	(0.005)
Size (A)	-0.002	-0.003	-0.003	-0.003	-0.002
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Size (T)	-0.004	-0.004	-0.005	-0.004	-0.005
	(0.003)	(0.003)	(0.003)	(0.003)	(0.004)
I(Vertical Merger)	-0.021	-0.021	-0.023	-0.023	-0.035**
	(0.014)	(0.015)	(0.014)	(0.015)	(0.016)
I(Exporter A)	0.003	0.003	0.001	0.003	0.003
	(0.012)	(0.012)	(0.012)	(0.012)	(0.014)
I(Exporter T)	0.011	0.011	0.011	0.011	0.004
	(0.010)	(0.010)	(0.010)	(0.010)	(0.011)
I(Same Language)	-0.005	-0.012	-0.003	-0.006	-0.017
	(0.035)	(0.034)	(0.035)	(0.035)	(0.047)
I(Same State)	0.004	0.014	0.005	0.011	0.020
	(0.035)	(0.035)	(0.035)	(0.035)	(0.047)
Age (A)	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age (T)	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Previous Year Stock Performance (A)	0.002	0.002	0.001	-0.000	-0.001
	(0.010)	(0.011)	(0.010)	(0.010)	(0.011)
Previous Year Stock Volatility (A)	-0.940**	-0.950**	-0.917**	-0.896**	-0.898**
	(0.419)	(0.418)	(0.414)	(0.414)	(0.455)
Operating CF Ratio (A)	-0.038	-0.042	-0.037	-0.048	-0.028
	(0.048)	(0.049)	(0.048)	(0.049)	(0.054)
Leverage (A)	0.009	0.007	0.008	0.008	0.011
	(0.026)	(0.025)	(0.025)	(0.025)	(0.026)
Relative Size	-0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
I(All Cash Deal)	0.085**	0.083**	0.079***	0.076**	0.086**
	(0.036)	(0.034)	(0.030)	(0.036)	(0.037)
I(All Equity Deal)	0.081**	0.079**	0.075**	0.074**	0.079**
	(0.038)	(0.036)	(0.032)	(0.038)	(0.038)
Constant	0.061	0.084	0.090	0.085	0.064
	(0.064)	(0.067)	(0.062)	(0.064)	(0.068)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Pair Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	376	376	376	376	312
R-squared	0.235	0.235	0.232	0.235	0.264

Notes: This table presents coefficient estimates from a multivariate regression of announcement day acquirer CARS on caste proximity, firm level controls, and deal level controls. The sample includes M&A deals with Indian acquirers and targets in the sample period 2000 - 2017. The announcement day target CAR for a given M&A deal is calculated as the return on the target firm's stock minus the return on the market return over a window of (-1,0) days around the first public announcement of the deal. In column 1 (2), caste proximity is measured as an indicator variable that takes the value 1 when the acquirer board and target board have the same dominant varna (jati). In column 3 (4), caste proximity is measured as the total number of same-varna (jati) pairs of acquirer-target board members as a fraction of the number of all posible acquirer-target board member pairs. In column 5, caste proximity is calculated as the hierarchal distance between the dominant varna of the acquirer and target board. Size is defined as the log of total assets; relative size is defined as the ratio of total assets of the acquirer to total assets of the target. The dependent variable and all continous independent variables are winsorized at the 1% level. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table 6: Announcement Day CARs of Combined Firm and Caste Proximity

	(1)	(2)	(3)	(4)	(5)
	Dependent Variable: Combined Firm Abnormal Announcement Day Return				
Caste Proximity Measure	Same Varna	Same Jati	Overlap Varna	Overlap Jati	Varna Hierarchy Distance
Caste Proximity	-0.022***	-0.002	-0.085***	-0.040	0.007**
	(0.006)	(0.007)	(0.028)	(0.040)	(0.003)
Size (A)	-0.007***	-0.006***	-0.007***	-0.007***	-0.006***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Size (T)	0.002	0.001	0.001	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
I(Vertical Merger)	-0.006	-0.010	-0.009	-0.009	-0.008
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
I(Exporter A)	0.009	0.007	0.006	0.007	0.005
	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)
I(Exporter T)	-0.008	-0.006	-0.007	-0.006	-0.006
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
I(Same Language)	0.010	0.010	0.011	0.010	0.011
	(0.035)	(0.036)	(0.035)	(0.036)	(0.041)
I(Same State)	-0.008	-0.008	-0.007	-0.007	-0.010
	(0.036)	(0.036)	(0.035)	(0.036)	(0.041)
Age (A)	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age (T)	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Previous Year Stock Performance (A)	-0.006	-0.007	-0.008	-0.007	-0.008
	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
Previous Year Stock Volatility (A)	-0.375	-0.323	-0.350	-0.321	-0.371
	(0.289)	(0.300)	(0.288)	(0.296)	(0.314)
Operating CF Ratio (A)	-0.037	-0.048	-0.036	-0.049	-0.036
	(0.030)	(0.032)	(0.031)	(0.032)	(0.035)
Leverage (A)	-0.008	-0.019	-0.009	-0.016	-0.009
	(0.015)	(0.015)	(0.015)	(0.015)	(0.017)
Relative Size	-0.000	0.000	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
I(All Cash Deal)	0.056**	0.054*	0.050	0.052*	0.062
	(0.025)	(0.030)	(0.033)	(0.030)	(0.038)
I(All Equity Deal)	0.059**	0.055*	0.053	0.054*	0.058
	(0.026)	(0.031)	(0.034)	(0.031)	(0.039)
Constant	0.006	0.018	0.038	0.021	-0.007
	(0.045)	(0.052)	(0.052)	(0.051)	(0.055)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Pair Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	372	372	372	372	308
R-squared	0.241	0.202	0.227	0.204	0.241

Notes: This table presents coefficient estimates from a multivariate regression of announcement day acquirer CARS on caste proximity, firm level controls, and deal level controls. The sample includes M&A deals with Indian acquirers and targets in the sample period 2000 - 2017. The announcement day combined CAR for a given M&A deal is calculated as the market cap weighted average return on the acquirer and target firm stocks minus the return on the market return over a window of (-1,0) days around the first public announcement of the deal. In column 1 (2), caste proximity is measured as an indicator variable that takes the value 1 when the acquirer board and target board have the same dominant varna (jati). In column 3 (4), caste proximity is measured as the total number of same-varna (jati) pairs of acquirer-target board members as a fraction of the number of all posible acquirer-target board member pairs. In column 5, caste proximity is calculated as the hierarchal distance between the dominant varna of the acquirer and target board. Size is defined as the log of total assets; relative size is defined as the ratio of total assets of the acquirer to total assets of the target. The dependent variable and all continous independent variables are winsorized at the 1% level. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

proximity on two critical negotiation outcomes: the takeover premium paid by the acquiring firm and the time taken to complete the deal. The takeover premium is measured by the ratio of the price paid by the acquiring firm for the target firm's equity divided by the market value of the target firm's transferred equity 43 days prior to the announcement of the deal. Time to completion is measured by the days between the first public announcement of the M&A deal and the date the deal became effective. For this analysis, we use the sample of observed M&A deals described in sections 2.2. Specifically, we include in our sample the subset of completed deals in the 2000 - 2017 sample period.

5.1 Empirical Approach

We estimate the following model:

$$Y_{i,j,t} = \beta_0 + \beta_1 CP_{i,j,t} + \beta_2 X^a_{i,t} + \beta_3 X^t_{j,t} + \beta_4 X^{a,t}_{i,j,t} + \beta_5 D_{i,j,t} + \eta_{i,j} + \tau_t + \epsilon_{i,j,t} \tag{5.1}$$

Note that this is identical to equation 4.1 above with the exception of the dependent variable. $Y_{i,j,t}$ represents a negotiation outcome, either the takeover premium or the time to completion of the deal.

5.2 Results

The results of estimating equation 5.1 are presented below in Tables 7 and 8. Table 7 presents coefficient estimates from regressions of takeover premium on caste proximity and controls. The coefficient estimates in the first row, for the caste proximity measure, are all insignificant. Caste proximity, measured either through *varna* or through *jati*, does not appear to have an effect on the takeover premium agreed on by the target and acquirer firms. Further, these results confirm that the negative acquirer CARs for caste-proximate deals do not reflect a transfer of value between targets and acquirers, as would be evidenced by a sensitivity of the takeover premium to caste proximity.

Table 8 presents coefficient estimates from regressions with time to completion of deal as the dependent variable. Examining the coefficient estimates on the caste proximity variable in

the first row, we find weak evidence that caste proximity leads to shorter times to completion. Note that the sign of the caste proximity coefficient is negative consistently for the *varna* (*jati*) indicator measures (columns 1 and 2) as well as the *varna* (*jati*) continuous distance measures (columns 3 and 4). This negative coefficient estimate is consistent with the increased trust, and consequent easier negotiation process, that can come with caste proximity between the two boards. Note, however, that the coefficient estimates, while consistent in sign, are not statistically significant.

6 Information through other means reduces reliance on caste

Results thus far suggest that the frequent reliance on caste proximity for M&A deals in India leads to value destruction for the acquirer, target, and merged entity. Moreover, since this is not simply caused by transfer of value from acquirer to target by way of high takeover premiums, this result is indicative of a strong familiarity bias leading to sub-optimal investment decisions. Next, we provide several pieces of evidence that show that although bias effects may be stronger, caste proximity does aid information flow between dealing firms.

6.1 Empirical Approach

In order to examine the presence and strength of the information channel, we consider several scenarios where firms can exploit alternative sources of information besides caste connections. We examine whether the incidence of caste proximate M&As falls in these cases, and whether the CARs are even more negatively impacted when firms continue to rely on caste even in the presence of these alternate information channels.

We are able to observe several firm and firm-pair characteristics that can potentially serve as formal and informal communication channels between firms. Board interlocks between transacting firms can be a potentially useful source of information.[23] Toeholds, or minority equity interests, form another channel through which acquirers can get information about targets.

[23]In this paper, we are able to measure only current board interlocks between dealing firms. Of course, other types of interlocks (eg. past interlocks between the firms, indirect interlocks through directors of the dealing firms also serving currently on another firm's board or having served on another board in the past) also constitute potential channels of information. But, as described in section 2, it is very difficult for us to measure these types of interlocks accurately in our data.

Table 7: Takeover Premiums and Caste Proximity

	(1)	(2)	(3)	(4)	(5)
	Dependent Variable: Takeover Premium				
Caste Proximity Measure	Same Varna	Same Jati	Overlap Varna	Overlap Jati	Varna Hierarchy Distance
Caste Proximity	-0.003	0.002	0.009	0.031	0.000
	(0.003)	(0.004)	(0.013)	(0.022)	(0.001)
Size (A)	0.002**	0.002**	0.002**	0.003**	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Size (T)	-0.003**	-0.003***	-0.003**	-0.003**	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
I(Vertical Merger)	-0.002	-0.003	-0.002	-0.002	-0.001
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
I(Exporter A)	0.003	0.003	0.003	0.003	0.004
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
I(Exporter T)	-0.001	-0.001	-0.001	-0.001	0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.003)
I(Same Language)	-0.006	-0.005	-0.006	-0.006	-0.011
	(0.007)	(0.007)	(0.008)	(0.008)	(0.008)
I(Same State)	0.004	0.002	0.003	0.003	0.007
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)
Age (A)	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age (T)	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Previous Year Stock Performance (A)	-0.000	0.000	0.000	0.000	-0.005
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Previous Year Stock Volatility (A)	0.293***	0.309***	0.297***	0.316***	0.317**
	(0.109)	(0.115)	(0.110)	(0.112)	(0.158)
Operating CF Ratio (A)	-0.013	-0.014	-0.013	-0.013	-0.000
	(0.014)	(0.014)	(0.014)	(0.014)	(0.012)
Leverage (A)	0.000	-0.003	-0.003	-0.004	0.000
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)
Relative Size	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
I(All Cash Deal)	0.038***	0.033***	0.033***	0.038***	
	(0.012)	(0.012)	(0.012)	(0.013)	
I(All Equity Deal)	0.030***	0.024**	0.025**	0.028**	-0.011***
	(0.010)	(0.010)	(0.010)	(0.011)	(0.004)
Constant	-1.012***	-1.015***	-1.018***	-1.021***	-1.020***
	(0.013)	(0.014)	(0.015)	(0.015)	(0.029)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Pair Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	180	180	180	180	144
R-squared	0.377	0.371	0.371	0.378	0.439

Notes: This table presents coefficient estimates from a multivariate regression of takeover premiums of M&A deals on caste proximity, firm level controls, and deal level controls. The sample includes M&A deals with Indian acquirers and targets in the sample period 2000 - 2017. The takeover premium for a given M&A deal is defined as the ratio of the transaction value to the market capitalization of the target firm's shares measured 43 days prior to the announcement date of the deal. In column 1 (2), caste proximity is measured as an indicator variable that takes the value 1 when the acquirer board and target board have the same dominant varna (jati). In column 3 (4), caste proximity is measured as the total number of same-varna (jati) pairs of acquirer-target board members as a fraction of the number of all posible acquirer-target board member pairs. In column 5, caste proximity is calculated as the hierarchal distance between the dominant varna of the acquirer and target board. Size is defined as the log of total assets; relative size is defined as the ratio of total assets of the acquirer to total assets of the target. The dependent variable and all continous independent variables are winsorized at the 1% level.Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table 8: Time to Completion of Deal and Caste Proximity

	(1)	(2)	(3)	(4)	(5)
	Dependent Variable: Time to Completion of Deal				
Caste Proximity Measure	Same Varna	Same Jati	Overlap Varna	Overlap Jati	Varna Hierarchy Distance
Caste Proximity	-36.954*	-2.960	-17.410	-107.220	15.492
	(19.873)	(21.146)	(68.865)	(90.985)	(10.404)
Size (A)	-11.172**	-10.806**	-10.859**	-11.832**	-9.393*
	(4.680)	(4.861)	(4.789)	(4.897)	(5.161)
Size (T)	5.149	4.186	4.117	4.462	6.691
	(4.507)	(4.772)	(4.668)	(4.710)	(4.997)
I(Vertical Merger)	40.852	36.450	36.200	36.972	63.821**
	(30.989)	(31.256)	(31.032)	(30.988)	(32.220)
I(Exporter A)	38.964**	34.161**	33.830**	35.540**	25.273
	(16.251)	(16.371)	(16.404)	(16.613)	(19.879)
I(Exporter T)	5.089	8.151	8.138	7.771	16.899
	(21.652)	(21.736)	(21.739)	(21.674)	(25.410)
I(Same Language)	90.949*	80.159	81.779	84.197	69.221
	(54.888)	(55.846)	(56.321)	(55.340)	(61.218)
I(Same State)	-91.181	-84.719	-85.611	-84.019	-59.476
	(56.551)	(57.833)	(57.906)	(57.393)	(63.837)
Age (A)	0.161	0.131	0.135	0.149	0.604
	(0.432)	(0.433)	(0.431)	(0.432)	(0.430)
Age (T)	0.968**	0.964**	0.961**	0.933**	0.820
	(0.466)	(0.466)	(0.466)	(0.467)	(0.526)
Previous Year Stock Performance (A)	-20.363	-20.801	-20.928	-21.753	-27.763
	(19.599)	(19.594)	(19.683)	(19.688)	(23.592)
Previous Year Stock Volatility (A)	-1,050.364	-1,082.690	-1,063.170	-1,063.361	-10.500
	(642.808)	(658.379)	(652.341)	(654.414)	(633.725)
Operating CF Ratio (A)	-173.374**	-179.685**	-177.831**	-175.779**	-54.488
	(72.375)	(73.724)	(73.525)	(73.196)	(78.142)
Leverage (A)	27.598	16.349	17.625	19.658	30.534
	(37.512)	(35.676)	(36.228)	(35.615)	(42.135)
Relative Size	0.001	0.001	0.001	0.001	0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
I(All Cash Deal)	0.515	-3.699	-3.311	-6.050	12.412
	(40.045)	(40.660)	(40.696)	(40.326)	(45.901)
I(All Equity Deal)	189.635***	186.139***	186.315***	188.346***	210.132***
	(44.795)	(45.293)	(45.073)	(45.101)	(50.773)
Constant	291.413	284.774	285.906	300.013	179.428
	(211.593)	(216.696)	(220.141)	(219.167)	(196.527)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes
Industry Pair Fixed Effects	Yes	Yes	Yes	Yes	Yes
Observations	480	480	480	480	388
R-squared	0.269	0.262	0.262	0.264	0.307

Notes: This table presents coefficient estimates from a multivariate regression of the time to deal completion on caste proximity, firm level controls, and deal level controls. The sample includes M&A deals with Indian acquirers and targets in the sample period 2000 - 2017. The time to completion for a given M&A deal is defined as the difference (in days) between the effective date and the announcement date of the deal. In column 1 (2), caste proximity is measured as an indicator variable that takes the value 1 when the acquirer board and target board have the same dominant varna (jati). In column 3 (4), caste proximity is measured as the total number of same-varna (jati) pairs of acquirer-target board members as a fraction of the number of all posible acquirer-target board member pairs. In column 5, caste proximity is calculated as the hierarchal distance between the dominant varna of the acquirer and target board. Size is defined as the log of total assets; relative size is defined as the ratio of total assets of the acquirer to total assets of the target. The dependent variable and all continous independent variables are winsorized at the 1% level. Robust standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Toeholds are often observed in cases of hostile M&A deals wherein acquirers buy a minority stake in a potential target before they actually bid for control of the firm. This can reduce information asymmetry between the two firms aiding the assessment of synergies from a potential merger or takeover. Similarly, some firms disclose more information in their annual reports than others. We expect that the more informationally transparent a target firm is, the less would be the need for an acquiring firm to rely on caste connections of its directors. Prowess allows us to measure a subset of the disclosures that firms might make. We calculate the number of these disclosures that firms make as a proxy for how transparent a firm is. The size (real assets) of a target firm is likely correlated with how much information about the firm is publicly available. We use this as another proxy for informational transparency of the firm. Finally, a firm that is looking to acquire a target in the same industry or state, or one that has directors that speak the same language as its own is also likely to have more information about that target, reducing the need to rely on caste to obtain information.

These analyses are currently ongoing. Results will be included in our next draft.

7 Conclusion

We show that cultural proximity between two firms' boards leads to a higher likelihood of the two firms entering a merger and acquisition (M&A) deal in India. This phenomenon may indicate firms' reliance on culture, as measured by caste, as an informal channel of information when making critical investment decisions with imperfect information. However, it may also be driven by familiarity bias leading to sub-optimal investments. Indeed, caste-proximate M&A deals are value destroying for both acquirer and target, as well as the merged entity. There is also no transfer of value from acquirers to targets, and no significant reduction in time to completion, indicating that potential trust among directors with similar caste identities does not benefit the negotiation process. Overall, our findings show that familiarity bias in favor of culturally proximate agents can lead to sub-optimal investment decisions.

We are currently enhancing the analysis along a few dimensions. The next draft, available soon, will feature the results of the multivariate logistic regression analysis of the relationship between caste proximity and the likelihood of two firms entering into an M&A deal. In addition,

we will include results from an attempt at causal identification of the effect of caste proximity on the likelihood of merger, using the Clause 49 corporate governance reform to instrument caste proximity. Finally, we plan to add a detailed investigation into the mechanisms linking cultural proximity to mergers. Specifically, we are investigating the possibility that caste proximity might play a role in the reduction of information asymetry, even if the net result is that the bias cost dominates the information benefit of caste proximity. Results will be included in the next ddraft.

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