

Geographic Isolation, Network Formation and Cooperation: Evidence from a Public Housing Experiment in India

Sharon Barnhardt, Erica Field, Rohini Pande
Preliminary Draft: May 13, 2010

1 Introduction

Although poverty and underdevelopment are an increasingly urban phenomenon throughout the developing world (Ravallion, Chen, and Sangraula 2007), little is understood about the extent to which spatial and social distance within cities affects the social networks of the poor and, therefore, their economic outcomes.¹ This paper exploits the random selection of slum-dwellers for improved housing on the outskirts of a large Indian metropolis to provide causal evidence on how social and spatial distance shape household's networks and their ability to use these networks for risk-sharing and collective action.

Cities are frequently modeled as thick and fluid environments in which social and spatial distance is lower and access to economic opportunities higher relative to rural areas. For instance, the urban poor are frequently presumed to have access to wider labor and financial markets and to broader and more varied social networks (for an overview of the relevant literature, see Lucas (1997)). However, the size and sprawl of many contemporary cities combined with the residential segregation and spatial inequality of public services that

¹ Using household survey data Ravallion, Chen, and Sangraula (2007) calculate that between 1993 and 2002, the count of a dollar a day poor fell by 150 million in rural areas but rose by 50 million in urban areas.

characterizes the majority of them imply that access to markets and social networks may be highly localized even in population-dense environments (Hewett and Montgomery 2001).

While a number of previous studies have empirically examined neighborhood effects in the developed world (a few examples are Kling, Liebman, and Katz (2007), Jacob (2004) and Oreopoulos (2003)), there are few quantitative estimates of their significance in the urban areas of developing countries (Montgomery and Hewett (2005) is an exception.) To the extent that these cities are typified by high levels of extreme poverty, as well as significant variation in access to public services and development of markets, we expect neighborhood effects to be significantly different in low-income countries, especially for the poor. For example, residential informality, which is common in urban settings in developing countries, is likely to increase the importance of social networks in addition to exerting an independent influence on outcomes and behavior. Ethnicity and income dynamics specific to low income settings are also likely to influence neighborhood effects.

In cities of the developing world, the poor live predominantly in informal slum housing.² High poverty rates, poor infrastructure and limited access to public services are typical. In South Asia, the central location of urban slums (i.e. near employment opportunities) raises important policy questions regarding the design of slum relocation policies. In particular, should slum upgradation programs favor the relocation of poor households away from crowded and unsafe neighborhoods or focus on upgrading slums without relocation? While there may be

² In 2001, approximately 900 million people - nearly 32% of the world's urban population - lived in slum neighborhoods (United Nations Human Settlements Programme 2003); between 5-15% of this slum population resides in India (Government of India 2001)).

benefits through improved housing conditions, less violence, and more community resources, there are also costs such as greater social isolation, higher commuting costs and less access to the human capital and agglomeration externalities associated with living near to the center of economic activity.

As the poor choose where to live, it is difficult to use observational data to evaluate the relative importance of these different factors. In this paper we exploit an urban relocation lottery program in a large Indian city, Ahmedabad, which used a housing lottery to allocate housing units in a safe but remote suburban neighborhood.³ The lottery occurred in 1987 and winners were able to move into their new homes in 1993. All lottery applicants were women who hand-rolled cigarettes (bidis) and belonged to the main informal workers' union in the city. The allocation of units through lottery provides a rare source of exogenous variation in residential location akin to the Moving to Opportunity (MTO) experiment in the US, and the length of time that has passed since subjects were provided housing in the new location allows examination of outcomes over a longer time period than is typically possible.

We find Winners of the lottery are currently more spatially isolated from centers of economic activity and from public services (hospitals and schools). They also have fewer bidi agents and less contact with their own daughters. Winners have more occupational ties but fewer caste/religious ties in their neighborhoods. Strikingly, they report greater collective action

³ This study is closely related to the body of work on the effect of a large experiment in urban public housing, Moving To Opportunity (MTO). Results from this policy experiment provide the most compelling evidence to date on the effects of relocating to better neighborhoods – there were significant neighborhood effects on adult health, safety, and behavior problems among boys, but none on economic self-sufficiency and employment (Kling, Liebman, and Katz (2001) and Kling, Liebman, and Katz (2007)).

and less social insurance. We interpret this pattern as a change in the shape of their network reducing costs for local cooperation, but increasing the correlation of risk within networks. They are thus less able to insure each other against large shocks. The remainder of this paper proceeds as follows. In Section 2 we describe Ahmedabad and the housing lottery we exploit. We describe our data set in Section 3 and our empirical strategy in Section 4. The basic results are presented in Section 5 and Section 6 explores alternative explanations. Section 7 concludes the analysis. Additional tables are in the Appendix.

2 Setting

In this section we describe the development of slums in Ahmedabad and their social and economic status of slum dwellers. We also give details about the housing program studied.

2.1 Slums in Ahmedabad

Ahmedabad, with a population of roughly 3.5 million, is India's sixth most populous city and the largest city in one of India's most industrialized and fastest-growing states, Gujarat (Government of India 2007). The urban poverty rate in Ahmedabad, a densely populated metropolis (roughly 718 persons per square kilometer), at about 34 percent is roughly 1.4 times the All India average (Cities Alliance 2002), largely on account of the steady decline of Ahmedabad's textile industry. The decline, which began in the 1960s and was most severe in the 1980s, significantly increased informal sector employment (Breman 2004; Mehta, Mehta, and Shivanand Swamy 1989). In 1999, the informal sector in Ahmedabad accounted for 76.7 per

cent of employment in the city and generated 46.8 per cent of city income (Unni 2000).⁴

Seasonal employment and low and variable pay characterize this sector, particularly among the large number of vendors and home-based piece-rate workers that constitute the bulk of the population we will study (Unni (2000) and Rani and Unni(2000)). Informal sector employment is also very sensitive to local shocks; Ahmedabad had a large earthquake in 2001, significant social unrest and riots in 2002, and an outbreak of the Chikungunya virus in 2006.⁵

Housing for the urban poor came up in the vicinity of the textile mills, and either consisted of units rented out by the mills or informal settlement. A textile mill would typically attract migrant workers with similar occupational and caste backgrounds, which meant these neighborhoods were typically segregated by caste (Gillion 1968). Starting the mid 1970s, the textile industry in Ahmedabad collapsed which left many men out of work and lead to the informalization of work in the city. By 1999 the informal sector accounted for about 76.7 per cent of employment in the city and generated 46.8 per cent of the city income (Unni 2000).

These informal workers' living arrangements, however, continue to consist of slums, chawls (multi-storied one room tenements with shared toilets) and pols (gated communities) in the eastern half of Ahmedabad (where most textile mills were located).⁶ Many of these slums continue to remain organized along ethnic lines (on this, see Mukerjee and Sinha (1961),

⁴ Over 35 percent of the male workers, and roughly 60 percent of the female workers in Ahmedabad, were self-employed and unpaid family workers.

⁵ Chikungunya fever is a viral disease carried by mosquitoes and is related to Dengue fever. Symptoms include a brief period of fever followed by a sometimes very long period of severe joint pains and swelling.

⁶ Survey evidence suggests that over 60 percent of slum dwellers are below the official Gujarat poverty line (Acharya and Parikh 2002). Roughly a quarter of the city's population lives in slums, with another 15 percent in chawls.

Majumdar, Reddy, and Bahadur (1960); and Hall (1980) provides a review.) Also see *The Times of India*, “Split Wide Open: India slinks into ghettos,” 20 April 2002.)

The housing stock in these neighborhoods is generally old and dilapidated, and access to public services more limited. However, these neighborhoods are near the commercial center of the city, where low-wage economic opportunities are most abundant (Bhatt 2003). Residential mobility within the city remains low: in a representative sample of 933 households, Mehta et al. (1989) find an average mobility rate of 1.7 percent and in a survey of three slums the average duration of the surveyed households’ stay in the slum was between 14 and 23 years (Aandahl 2002).⁷ Another important factor is the relevance of caste-based contacts in determining which trade individuals take up and where they live.⁸

Participation in the housing lottery being evaluated was restricted to female informal sector workers who rolled bidis. Bidis are low-cost, filterless cigarettes made by hand. A pinch of tobacco is rolled up in a leaf, which is then tied off with a string. Over 1.4 million women in India earn a living doing this work, making it one of the largest industries for female labor in the informal sector (Government of India 2001).

Bidi workers in Ahmedabad are women primarily from two “backward” castes, the Padmasali from Andhra Pradesh and Koshti from Maharashtra and Uttar Pradesh. These groups migrated to Ahmedabad so their male members could work in the textile industry, and

⁷ In our sample, the average time spent in any residence is 13 years.

⁸ Mitra (2004) provides corroborative evidence for Delhi slums. In survey data on 359 informal sector workers in Ahmedabad collected by us in 2005, 63 percent of the households reported homogeneity of occupations in their neighborhood.

women took up rolling bidis to earn additional income at home. There are also many Muslim women who roll bidis in Ahmedabad. Bidi workers typically deal with an agent who supplies raw materials and pays women for finished goods. The rate for bidis at the end of 2007 was about Rs.40-42 for 1,000 rolled bidis, which requires two half-days of work. The agent normally delivers the bidis to companies that package, brand, and distribute them to retail locations, though some agents sell unbranded bidis directly to consumers. Since women undertake this work at home, and need a dry place to store materials and finished goods, their homes are a production input.

2.2 The Housing Lottery

Our analysis builds on a housing lottery conducted by the union of female self-employed workers in Ahmedabad (Self Employed Women's Association (SEWA) Union).⁹ The Union began working with bidi rollers in the late 1970s, when they campaigned with the government to get home-based workers included under labor laws. During this campaign, the Union recognized the insecure and low quality shelter of bidi workers as a challenge to income generation.

In the late 1980s, SEWA Union approached the government to build a new housing colony for bidi workers. The Union worked with the Ahmedabad Urban Development Authority to identify land, construct homes, and secure housing loans.¹⁰ The houses were built on vacant government land on the periphery of the city, near the new (at the time) international airport.

⁹ Starting in 1972 with about 300 members in Gujarat, they now count over 950,000 women as members across 6 states and 1 Union Territory.

¹⁰ The housing loans came from the Housing and Urban Development Corporation Ltd (HUDCO), a government-owned entity charged with financing home construction and developing urban infrastructure.

They are single-story row-houses sharing a wall between next door houses with a narrow alley between rows built back-to-back. The area has an open public space where a temple was also constructed.

The Union drew up a list of the 497 poorest members who lived in a rented home and had a monthly household income below Rs.700. Most of the women in the lottery come from the two predominant caste groups in bidi work (35% Koshti, 41% Padmasali) or are Muslim (10%). The lottery was conducted publicly on International Housing Day at the *Martakandeya Mandir* in Rakhial, under the supervision of the founder of the Self-Employed Women's Association, Ela Bhatt. Slips of paper representing the 497 women were put into a bowl and the second in command at SEWA drew 110 names. These 110 women were offered homes in the newly constructed area we refer to here as *Colony A*.

The construction cost of the new homes was Rs. 24,800. Winners of the lottery paid Rs.900 as a down payment and were given 20-year housing loans of Rs.16,800, guaranteed by the Union.¹¹ Winners repay Rs.124 (about US \$2.75) in monthly installments. These payments also cover an approximately 300 square feet plot, which was sold at Rs.1 per square foot. The value of the land in 1987 is not known, but certainly higher than Rs.1. Under the most conservative assumption, that land was actually worth only Rs.1 per square foot, winners received a subsidy of nearly 30% of the value of the buildings and land at the end of 1993. The houses are currently valued at Rs.60,000-Rs.70,000, or approximately US \$1330 - \$1550.

¹¹ SEWA Bank signed an agreement with AUDA to pay up to Rs.9,00,000 (about \$20,000 at current rates) if the winners' loans are not repaid by 2014. SEWA took Rs.2000 from all winners and put it in a fixed deposit to be returned to the women upon repayment, apparently to increase repayment incentives.

Winners of the lottery did not receive a title to their homes; instead they received an “allotment letter” which will be converted to a title only after all 110 mortgages have been repaid. These allotment letters (and the future titles) are given in the bidi worker’s name, unlike the traditional system where men own assets and pass them to male heirs.¹² It is not known how much the weak property rights assigned to these homes depress their resale value.

3 Data

3.1 Identifying and Locating participants

A key issue in constructing and analyzing the dataset of lottery participants is the fact that a hard copy of the list of the 497 women who entered the lottery in 1987 has not survived. Therefore, a first step of the dataset construction was identifying the participants. We were able to identify up to 463 of the participants. Below, we describe the procedure followed and in Section 4 we describe how our analysis controls for potential biases in who was not identified.

The first source of names is the official and complete list of lottery winners, which includes participant name and address in Colony A. We refer to this as the *Winners List*. The 387 losers of the original lottery were invited to pay Rs. 250 and participate in a second housing draw. SEWA Union also supplied the list of 297 non-winning women who decided to do this. This list consisted of name, age, and, for some women, an address at the time of the lottery. We call this the *Non-Winners List*.

¹² Though this is the traditional system, it has recently changed to insure females a share in inherited properties. However, a newly purchased asset, such as a home, will normally be bought in a man’s name.

Our third source is a partial listing of the participants (literally, two pages of the full list), which survived in the home of a former employee. This subset lists 109 women, both winners and non-winners among them. Out of 109 names, 83 were already named on either the Winners List or the Non-Winners List, therefore it provided us with the names of an additional 26 women who lost the original lottery. This list included name, marital status, address in 1987, husband's occupation, and own, husband, and household income. In addition to giving us more names, this *Participant Subset* list also provides baseline characteristics.

Our fourth source of names is referrals from women who were in the lottery. In our tracking survey we have located additional non-winners by asking for names of friends and relatives who also participated. Participants named 91 women, of which 30 are new names not covered on our other lists. This list is called the *Referrals*. It is possible participants believe getting on our list will allow the referrals to participate in another housing program, or the second draw that never happened, despite our surveyors insistence otherwise. Since we are unable to verify referred women participated in the original lottery, our analysis will control for verifiability.

The biggest concern with our participant procedure is differential attrition among the non-winners. For instance, it may be that the richest losers chose not to enter the second lottery and therefore the non-winner list consists of the poorest losers. Alternatively, it may be that the poorest and least informed lottery losers were less likely to know about and enter the second lottery.

After constructing the participant list we also had to track these participants, many of whom had moved from their original address. If a participant did not live at the original address then we asked neighbors. In addition, we searched for participants' names on recent SEWA Union rolls and in SEWA Bank client records. Several women who work for different branches of SEWA – the Union, the Bank, and the Insurance group, also helped us trace out the participants. The main organizers of the lottery in 1987 scrutinized lists for names they knew. We also read out a list of unfound participants at a Union meeting in April 2007. In addition to SEWA, we used other bidi networks to locate participants, by talking to important bidi agents in areas where many bidi workers lived in 1987. Finally, we looked for names of the unfound women on the 2004 Ahmedabad electoral rolls. Table 1 shows our final tracking status.

Of the 463 named participants, 23 women have moved out of Ahmedabad. We tracked 17 of them as far away as Mumbai, Hyderabad, and Chennai. Another 29 women have died, and we were available to locate children or husband of 25 of them. An additional four women were located but unable to answer the survey due to incapacity, and their families were surveyed in their place. We were unable to track a final address for 10 women. Overall we surveyed 443 participants (or their family member in case of death or mental illness). Our final response rates are 89% of the original 497 participants and 96% of the 463 participants who could be named. No one refused the survey (see Table 1).

3.2 Survey

Our main survey was conducted between May and October 2007 and focused on obtaining a full mobility, housing and employment history for the participant and her

immediate family (husband and children). We have additional modules on children’s education, health, and the use of financial products. We also collected information on collective action, social networks, immediate neighbors, and bidi rolling. Finally, we obtained information on major shocks faced by the household and their coping mechanisms. Between February and April 2008 we revisited respondents to get additional information on the places they lived in 1987 and mapped them using handheld GPS devices.

3.3 Randomization Checks

Given that our participant sample frame differs from the original participant sample we conduct multiple randomization checks. First, we consider a random subsample of the original participant list: the *Participant Subset*. We observe no significant differences between winners and losers in this group for 1987 marital status, income, distance to the centers of the city, or husbands’ occupation (see Table 2 Panel A).

Second, we conduct a randomization check for the 463 identified participants (see Table 2 Panel B). We tracked a similar fraction of Winners and Non-Winners despite having named all of the Winners, but not the Non-Winners. This indicates that our multi-stage process of naming Non-Winners did not make them easier or hard to locate than Winners. Table 2 Panel B also indicates that there is a slight imbalance in the fraction of Winners and Non-Winners who are Muslim with Muslims being over-represented in the Non-Winner category by 6.5 percentage points. Our estimations will include controls for caste and religion.

Additional regressions in Appendix Table 1 indicate that while our surveyors were better able to find respondents who were named, which all Winners were due to the *Winners List*, this is not related to the dates the lists were made.

Finally, we do a randomization check for surveyed participants using data from the survey pertaining to individual and household-level characteristics before the housing draw took place. While the Muslim difference is also significant in Table 2 Panel C, there are no significant differences between the means for Winners and Non-Winners in any of the other 18 variables tested. Table 3 also demonstrates that Muslims are no more likely to report the lottery was fair or unfair than Hindus (columns 1 and 2).

4 Empirical Strategy

Given the lottery exogenously determined which union members were offered subsidized housing, our basic empirical strategy is straightforward. We estimate an average outcome (Y) for individual i using a dummy variable for Participant is a Lottery Winner as the independent variable.

$$Y_i = \alpha + \beta_1 \text{Winner}_i + \mu_i$$

In our second specification, we also add a series of controls (X_i) including age, ethnic identity (participant is Muslim, Koshti caste, or another caste, omitting Padmasali caste), a binary variable if the participant was never married, widowed or separated before the lottery, if the name was referred by another member (rather than on a list from the Union), and if a family member responded to the survey because the lottery participant has died or is unable to answer due to mental illness:

$$Y_i = \alpha + \beta_1 \text{Winner}_i + \bar{X}_i + \mu_i$$

Further, in estimating the interaction between participants and their immediate neighbors, we measure outcomes at the level of participant-neighbor pairs and cluster standard errors at the level of individual i in pair p :

$$Y_{ip} = \alpha + \beta_1 \text{Winner}_i + \bar{X}_i + \mu_{ip}$$

Finally, we provide 2SLS estimates where we instrument for currently living in Colony A by having won the housing lottery. Our first stage is the estimation of the outcome individual Lives in Colony A (currently or at the time of her death) using “Participant is Lottery Winner” as the instrument. In the second stage, we regress our outcome of interest on the estimated value of Lives in Colony A (A_i). The first stage regressions are reported in Appendix Table 2.

$$(1) A_i = \alpha + \beta_1 \text{Winner}_i + \bar{X}_i + \mu_i$$

$$(2) Y_i = \gamma + \beta_2 A_i + \bar{X}_i + \varepsilon_i$$

5 Results

5.1 Location and Isolation

We start by examining the current location of program participants and their social interactions. Table 4 shows that house Winners are more likely to currently live in Colony A (columns 1 and 2), as are their families (columns 3 and 4). The likelihood of this, however, is relatively low; only 30% of the winners currently live in Colony A. Winners and their families are also more likely to have ever lived in the area of the city where Colony A is located (columns 5 and 6). Finally, we see no difference in migration out of the city between winners and losers or in the number who are deceased or mentally incapacitated.

Given the relatively low rates of living in Colony A among winners, we provide more detail in Table 5 on the current status of lottery winners' homes. Thirty-seven households from the original group of winners currently live in this house, 16 rent it out, and another 32 have sold it. A relatively large number (20) say they have not sold it, do not rent it out, and no child has been reported to live there now.

Because at least 27 of the Winners never lived in the area where Colony A is located, Table 7 addresses reasons for not living in the house. The most common specific reason cited for not living in the Colony A is that it is located too far from husband's work or husband's family. Many also cite problems with gutters or electricity that would have been an issue in 1993, but are no longer widespread problems. A high percentage of winners also failed to specify a cause, though it was not one of the reasons offered. This table also confirms the very high percentage of participants that believe the lottery was done fairly. Given the relatively low percentage of Winners who are Muslim, it is important to note Muslims are no more likely to believe the lottery was done unfairly.

In Table 8 we examine whether winning the lottery was associated with greater suburbanization. Colony A is located on the periphery of the city, and we observe that winners are located farther from centers of economic activity including the center of Ahmedabad's Old City, which is densely populated with petty trade and low-income households (columns 1 and 2), and their Union's headquarters (columns 4 and 5). In columns (3) and (6) we restrict attention to the sample of households still living in Ahmedabad and find that the IV estimates are highly significant. Winners who live in Colony A need to travel approximately 3.5 to 4 miles

more than others to reach these centers (columns 3 and 6). The increase in distance from the center of employment activities also coincides with reduced access to public services. In their current locations, it takes winners longer to walk to a government schools (columns 7 to 9) and to a government hospital (columns 10 to 12). Winners are also more isolated from their daughters. While 90% of Non-Winners report seeing their daughters at least monthly, for Winners this result is 9 percentage points lower (columns 13 and 14). Winners have also had fewer bidi agents over the last 15 years (columns 16 and 17), perhaps indicating less access to a more competitive market (they also receive lower piece rates, not shown).

Taken together, these results show winning the lottery and relocating caused lasting spatial isolation. Next, in Table 9 we examine participants' current neighbors and interactions with them. The pattern of results indicates that winners have more occupational ties but fewer caste/religious ties in their neighborhoods. We asked respondents about the people who live in the four houses near them (across, behind, left and right) and how often they socialize through conversation, drinking tea together, sharing a meal, etc. The average number of immediate neighbors reported through this questioning was 2.7 for both Winners and Non-Winners. We run pairwise regressions on participant-neighbor pairs adjusting standard errors for clustering at the participant level. The level of interaction with immediate neighbors is high, 95% of pairs have interacted, but Winners are still more likely to have ever interacted socially with their neighbors (Table 9, columns 1 to 3). This greater interaction is despite the suggestion that Winners are weakly less likely to have neighbors who are from the same caste/religion (columns 4 to 6).

Winners live among more bidi workers. The probability of living next to a bidi worker is 12 percentage points higher for Winners (columns 7 and 8), and Winners have a weakly higher probability of rolling bidis in the company of other women rather than rolling alone (columns 10 and 11).

Taken together, these results suggest relocation reshaped social networks. Winners are more geographically isolated, but more integrated with their immediate neighbors. Because immediate neighbors are more likely to share the bidi rolling occupation and weakly less likely to share the same caste/religion, occupation-based links are more frequently reported while ethnic links are less common.

5.2 Risk Sharing

Next, we examine whether greater spatial concentration of an individual's network alters her access to informal risk sharing and social insurance arrangements. To investigate risk sharing, in Table 10 we make use of four questions in which the (living) respondent was asked from whom they borrow or lend items¹³ and details about this person. We first check if there is *anyone* the respondent can borrow from or lend to for any of the questions. Over 90 per cent of Non-Winners can borrow or lend from someone for at least one of the four items but this figure falls by nearly 10 percentage points for Winners (columns 1 and 2), meaning approximately 20% of Winners report they do not have someone from whom they can borrow Rs.50, kerosene, or rice. When we break this measure down into its individual questions (not reported) we see that

¹³ Who is the person you trust enough to lend Rs.50 for 24 hours? Who is the person you would ask to borrow Rs.50 from for 24 hours? Who is the person you would go to if you needed to borrow kerosene or rice for one day? In case of a health emergency, who would you go to for borrowing Rs. 500?

Winners are more likely both to have no one to whom they lend as well as no one from whom they can borrow. For those respondents who are able to borrow and lend, there is no difference in the relationship of the person with whom they lend or borrow (columns 4 through 9), or in the probability that they are from the same ethnic group (columns 10 to 12). Winners have known the persons who share risks with each other a shorter length of time by about three years (columns 13 and 14).

In Table 11 we examine the social insurance available to participants. Here, we make use of a series of questions about large shocks that affected the city of Ahmedabad over the past decade: riots, an earthquake, and an outbreak of the Chikungunya virus. Winners and Non-Winners were affected similarly by the shocks both in terms of responding they were involved (not shown) and in the total days of work lost to these large shocks (columns 10 to 12). These shocks accounted for 85 lost days of work for the average respondent. The amount of assistance received following these shocks was substantially lower for Winners. Only 12% of losers reported they received help following any of these shocks, and that fraction is a dramatic two-thirds lower for Winners (column 2). In Rupee terms, the value of help received is less than half for Winners of what it is for Non-Winners (column 5).

Despite getting less help following large shocks, when asked if their immediate neighbors help them following an emergency, Winners and losers are as likely to respond in the affirmative (columns 7 and 8).

This pattern is informative about the implications of relocation for social insurance. While Winners are as likely to get help from their immediate neighbors following an emergency,

when there is a large shock that affects nearly everyone in the neighborhood, Winners report significantly less assistance. One possibility is that winners have weaker ties outside the neighborhood. This should also mean that the more localized the shock, the less help someone with a highly local network will receive. As a mosquito-borne virus, Chikungunya is arguably the most localized of the large shocks, and while few Non-winners received help for Chikungunya, not a single Winner received any help (not reported). In the case of the riot and earthquake, Winners did receive some help, though less than Non-Winners.

5.3 Public Goods

As mentioned earlier, a likely benefit of investing in proximate social ties is the ability to act collectively for the local public good. In Table 12 we present striking evidence that winners act more collectively, consistent with a model of network shape change due to geographic isolation. We consider as outcomes a series of questions we asked about neighbors working together on a project for the collective good. Winners are nearly twice as likely to report their neighbors have worked together on a project (columns 1 to 2). They have also spent two and a half times more days (columns 4 and 5) and 70% more money (columns 7 and 8) on a community project in the last year. They are also twice as likely to report contributions being given by most of the neighborhood for the projects (columns 10 and 11). Appendix Table 3 summarizes the types of projects tackled.

6 Alternatives to Network-Based Explanations

A first possibility is that our results reflect differential investment choices related to differences in housing quality. Table 13 indicates the extra community activity of Winners is not

due to living in lower quality neighborhoods. We create two indices to measure the quality of building materials and amenities. The Durable Materials index is the mean of three binary variables individually equal to 1 when the roof, walls, or floor is made of a durable material.¹⁴ The Amenities Index is the mean of four binary variables individually equal to 1 when the house has a water tap in the house, separate kitchen, private toilet, or ceiling fan. Winners' houses are more often made from durable construction materials (columns 1 and 2) and have more amenities (columns 4 and 5). The measure of neighborhood safety for women we have shows Winners and Non-Winners neighborhoods are equally safe (columns 7 and 8).

A second possibility is that greater community activity reflects higher incentives to invest related to greater home ownership among winners, who are still more likely to own a home currently (Table 14, columns 1 and 2). However, we do not find Winners making significantly more home improvements (Table 15, columns 1 and 2) or more expensive improvements (columns 4 and 5) over the past 20 years, which should be the first place we would have observed an investment effect due to stronger property rights.

7 Conclusion

This essay demonstrates the importance of location on the formation of networks for the urban poor and, in turn, the consequences for informal cooperative arrangements. As networks became localized, public goods creation benefitted. The downside is that by relying more on others who live nearby, the ability to co-insure against spatially correlated, large shocks falls.

¹⁴ Durable walls include bricks and cement. Durable roofing materials include tile, cement and concrete. Durable flooring materials are cement, stone, tile and plaster.

This highlights the importance of changes in network shape potentially brought on by internal migration, urbanization, and housing relocation programs designed to improve living conditions for the urban poor.

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Table 1. Tracking summary results for named participants

| Status | Can't be found to survey | Surveyed Participant | Surveyed Family Member* | Total |
|------------------------------------|--------------------------------|-------------------------|-------------------------------|-------|
| Can't find/ no current information | 10 | 0 | 0 | 10 |
| Found in Ahmedabad | 0 | 397 | **4 | 401 |
| Moved away | 6 | 17 | 0 | 23 |
| Died | 4 | 0 | 22 | 26 |
| Died, family moved away | 0 | 0 | 3 | 3 |
| Total | 20 | 414 | 29 | 463 |
| Not named | 34 | 0 | 0 | 34 |
| Grand Total | 54 | 414 | 29 | 497 |
| Winners | 5 | 96 | 9 | 110 |
| Non-Winners | 49 | 318 | 20 | 387 |

*Surviving daughter, son, or husband surveyed

**4 respondents incapable of answering personally due to mental health or age

Table 2. Randomization Checks

| Panel A Participant Subset (data collected 1987) | Non-winner mean | Winner mean | Difference |
|--|----------------------------------|------------------------------|---------------------|
| Married | 0.800 [0.403] | 0.864 [0.347] | 0.064 (0.072) |
| Widow | 0.108 [0.312] | 0.068 [0.255] | -0.040 (0.055) |
| Household Income | 596.615 [115.343] | 623.409 [109.840] | 26.794 (21.869) |
| Participant's Income | 268.154 [108.281] | 252.500 [96.162] | -15.654 (19.752) |
| Distance from center of Old City (miles) ^a | 2.493 [0.753] | 2.583 [0.798] | 0.090 (0.153) |
| Distance from SEWA Union Office (miles) ^a | 3.135 [0.752] | 3.228 [0.819] | 0.093 (0.153) |
| Husband's Income ^b | 374.655 [176.935] | 395.854 [186.145] | 21.198 (37.187) |
| Husband Worked in Factory ^b | 0.397 [0.493] | 0.463 [0.505] | 0.067 (0.102) |
| Husband Worked as Tailor ^b | 0.224 [0.579] | 0.122 [0.331] | -0.102 (0.076) |
| N | 65 | 44 | |
| Panel B Participants Named | Non-winner mean | Winner mean | Difference |
| Muslim | 0.110 [0.314] | 0.045 [0.209] | -0.065** (0.026) |
| Padmasali | 0.394 [0.489] | 0.464 [0.501] | 0.070 (0.054) |
| Koshti | 0.368 [0.483] | 0.309 [0.464] | -0.059 (0.052) |
| Other Hindu Castes | 0.127 [0.334] | 0.054 [0.387] | 0.052 (0.038) |
| Found/ Surveyed | 0.958 [0.202] | 0.955 [0.209] | -0.003 (0.023) |
| N | 353 | 110 | |

Sample size notes: a) missing data on 1 Non-winner

b) N=99 (41 Winners and 58 Non-Winners with husbands)

(1) For Panel A: The statistics from a Wald test for the joint significance of all variables are: $F(1, 99) = 4.62$ Prob > F = 0.0340

(2) For Panel B: The statistics from a Wald test for the joint significance of all variables are: $F(1, 458) = 1.08$, Prob > F = 0.2987

(3) Standard errors of differences in parentheses; standard deviations in brackets.

(4) *** p<0.01, ** p<0.05, * p<0.1

Table 2 Continued. Randomization Checks

| Panel C Participants Found and Surveyed in 2007 | Non-winner | Winner | Difference |
|---|----------------------|------------------------|----------------------|
| | mean | mean | |
| Single at time of lottery (widowed or never married) | 0.148 [0.356] | 0.200 [0.402] | 0.052 (0.041) |
| Number children born before 1987 | 2.621 [2.129] | 2.619 [2.233] | -0.002 (0.241) |
| Muslim | 0.115 [0.320] | 0.048 [0.214] | -0.068** (0.033) |
| Padmasali | 0.393 [0.489] | 0.467 [0.501] | 0.073 (0.056) |
| Koshti | 0.367 [0.483] | 0.324 [0.470] | -0.043 (0.053) |
| Other Hindu Castes | 0.124 [0.330] | 0.162 [0.370] | 0.038 (0.040) |
| Current Age ^c | 47.969 [9.907] | 49.271 [9.868] | 1.302 (1.153) |
| Distance to center of city from 1987 house ^d | 2.277 [0.939] | 2.322 [1.065] | 0.045 (0.116) |
| Distance to SEWA Union headquarters ^d | 2.766 [0.963] | 2.838 [1.153] | 0.072 (0.124) |
| Time to walk to nearest govt. school from 1987 house ^e | 17.396 [15.505] | 15.653 [10.248] | -1.743 (1.330) |
| Time to walk to nearest govt. hospital from 1987 house ^e | 32.561 [22.226] | 30.871 [21.078] | -1.690 (2.426) |
| 1987 house had a water tap ^f | 0.866 [0.341] | 0.822 [0.385] | -0.044 (0.043) |
| 1987 house had a toilet ^g | 0.546 [0.497] | 0.500 [0.497] | -0.046 (0.057) |
| 1987 house had a separate kitchen ^g | 0.439 [0.497] | 0.420 [0.491] | -0.019 (0.056) |
| Woman could not walk safely alone after 10 PM ^h | 0.132 [0.339] | 0.112 [0.317] | -0.020 (0.037) |
| Schooling costs per child 1987 (if attending) ⁱ | 382.763 [441.074] | 625.000 [1,352.720] | 242.237 (173.863) |
| Husband had a mill job in 1987 (if working) ^j | 0.091 [0.288] | 0.147 [0.357] | 0.057 (0.047) |
| Time husband spent going to work in 1987 ^k | 20.186 [21.255] | 23.115 [20.963] | 2.929 (2.948) |
| Money husband spent going to work in 1987 ^l | 7.056 [46.509] | 2.391 [6.301] | -4.665 (3.156) |
| N | 338 | 105 | |

Sample size Notes: c) N= 414 (96 Winners and 318 Non-Winners)

d) N=442 (105 Winners, and 337 Non-Winners)

e) N= 429 (101 Winners and 328 Non-Winners)

f) N=428 (101 Winners and 327 Non-Winners)

g) N=428 (100 Winners and 328 Non-Winners)

h) N=409 (98 Winners and 311 Non-Winners)

i) N=426 (90 Winners and 337 Non-Winners)

j) N=311 (68 Winners and 293 Non-Winners)

k) N=293 (65 Winners and 228 Non-Winners)

l) N=296 (64 Winners and 232 Non-Winners)

(1) For Panel C: statistics from a Wald test for the joint significance of all variables are: $F(1, 409) = 0.03$, $\text{Prob} > F = 0.8539$.

(2) Standard errors of differences in parentheses; standard deviations in brackets.

(3) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 3. Housing Lottery

| VARIABLES | The lottery was done fairly | We won a house |
|-------------------------|--------------------------------|---------------------|
| | (1) | (2) |
| Participant Won Lottery | 0.157*** (0.028) | 0.915*** (0.026) |
| Muslim Participant | 0.048 (0.060) | 0.028 (0.038) |
| Winner * Muslim | -0.026 (0.062) | -0.168 (0.185) |
| Constant | 0.821*** (0.023) | 0.024*** (0.009) |
| Observations | 413 | 430 |
| R-squared | 0.037 | 0.810 |

(1) Robust standard errors in parentheses

(2) *** p<0.01, ** p<0.05, * p<0.1

(3) Column (1) not asked on family surveys

(4) N<443 in Column (2) due to missing data

Table 4. Location

| VARIABLES | Participant lives Colony A | | Any Family Member lives Colony A | | Any Family Member lived area around Colony A | | Participant lives outside Ahmedabad | | Dead or Mentally Incapacitated | |
|-------------------------|-------------------------------|---------------------|--|---------------------|--|---------------------|---|-------------------|--------------------------------------|------------------|
| | OLS | OLS | OLS | OLS | OLS | OLS | OLS | OLS | OLS | OLS |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
| Participant Won Lottery | 0.285*** (0.047) | 0.283*** (0.047) | 0.293*** (0.048) | 0.293*** (0.048) | 0.408*** (0.051) | 0.409*** (0.051) | 0.006 (0.021) | -0.004 (0.021) | 0.027 (0.030) | 0.018 (0.016) |
| Mean Non-winners | 0.038 [0.193] | | 0.059 [0.236] | | 0.068 [0.252] | | 0.033 [0.178] | | 0.059 [0.236] | |
| Controls | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes |
| Observations | 443 | 443 | 443 | 443 | 443 | 443 | 443 | 443 | 443 | 443 |
| R-squared | 0.155 | 0.175 | 0.139 | 0.164 | 0.219 | 0.238 | 0.000 | 0.059 | 0.002 | 0.673 |

(1) Controls: participant Muslim, Koshti caste, other Hindu castes (Padmasali omitted), never married/husband gone before 1987, referred, family survey, age. Column 10 does not contain a control for Family Surveyed.

(2) Column (2) is the first stage of the IV estimates throughout the rest of the tables except where noted.

(3) Robust standard errors in parentheses, standard deviations in brackets.

(4) *** p<0.01, ** p<0.05, * p<0.1

Table 5. House Status: Winners

| | Number |
|--|---------------|
| Participant Lives in House | 31 |
| Child lives in House without Participant | 4 |
| Family member in House without Participant | 2 |
| <i>House Rented Out</i> | |
| Ever Lived Nobalnagar | 1 |
| Never Lived Nobalnagar | 15 |
| <i>Sold House</i> | |
| Ever Lived Nobalnagar | 22 |
| Never Lived Nobalnagar | 10 |
| <i>House Status Unknown</i> | |
| Ever Lived Nobalnagar | 3 |
| Never Lived Nobalnagar | 17 |
| Not in House, Participant not located | 5 |
| | 110 |

Table 6. Reasons for selecting house location (1987 and current)

| | Chose 1987 location to be near family or friends | | | Chose 1987 location for resources | | | Chose 1987 location for price | | |
|-------------------------|---|------------------|------------------|-----------------------------------|-------------------|-------------------|-------------------------------|-------------------|-------------------|
| | OLS | OLS | IV | OLS | OLS | IV | OLS | OLS | IV |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Participant Won Lottery | 0.030 (0.047) | 0.061 (0.047) | | -0.009 (0.037) | -0.025 (0.037) | | -0.021 (0.024) | -0.030 (0.024) | |
| Lives Colony A | | | 0.219 (0.173) | | | -0.091 (0.136) | | | -0.110 (0.088) |
| Mean Non-Winners | 0.762 [0.426] | | | 0.128 [0.335] | | | 0.061 [0.240] | | |
| Observations | 429 | 429 | 429 | 429 | 429 | 429 | 429 | 429 | 429 |
| R-squared | 0.001 | 0.062 | 0.044 | 0.000 | 0.040 | 0.029 | 0.002 | 0.040 | 0.039 |

| | Chose current location to be near family or friends | | | Chose current location for resources | | | Chose current location for price | | |
|-------------------------|--|----------------------|----------------------|--------------------------------------|---------------------|---------------------|----------------------------------|---------------------|---------------------|
| | OLS | OLS | IV | OLS | OLS | IV | OLS | OLS | IV |
| | (10) | (11) | (12) | (13) | (14) | (15) | (16) | (17) | (18) |
| Participant Won Lottery | -0.180*** (0.054) | -0.148*** (0.054) | | -0.091** (0.046) | -0.111** (0.047) | | 0.222*** (0.050) | 0.214*** (0.050) | |
| Lives Colony A | | | -0.522*** (0.177) | | | -0.393** (0.158) | | | 0.758*** (0.127) |
| Mean Non-Winners | 0.541 [0.499] | | | 0.281 [0.450] | | | 0.121 [0.327] | | |
| Observations | 443 | 443 | 443 | 443 | 443 | 443 | 443 | 443 | 443 |
| R-squared | 0.023 | 0.089 | 0.116 | 0.008 | 0.055 | 0.066 | 0.062 | 0.082 | 0.264 |

(1) Robust standard errors in parentheses.

(2) *** p<0.01, ** p<0.05, * p<0.1

(3) Column (2) of Table 4 is the first stage of the IV estimates found in columns (12) and above.

Table 7. Why winners do not live in Colony A

| <i>Do not live there because...</i> | | | | | | | |
|-------------------------------------|-------------------|-----------|-----------------------|-------------------------------|---------------------------------|-------------------|-----------------|
| | Gutter problem | No School | Far from bidi work | Far from husband's work | Far from husband's family | It's too small | Other reason |
| | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Mean | 0.038 | 0.029 | 0.038 | 0.124 | 0.095 | 0.057 | 0.314 |
| | [0.192] | [0.167] | [0.192] | [0.331] | [0.295] | [0.233] | [0.466] |
| Obs | 105 | 105 | 105 | 105 | 105 | 105 | 105 |

(1) "Other" reasons include: child in house (n=4), don't know(n=2), didn't win (n=2), unspecified other (n=13), missing (n=11).

(2) Standard deviation in brackets.

Table 8. Isolation

| VARIABLES | Miles from 2007 house to center of Old City | | | Miles from 2007 house to SEWA Union | | | Time to walk to nearest government school current house | | | Time to walk to nearest government hospital current house | | |
|-------------------------|---|------------------|---------------------|-------------------------------------|------------------|---------------------|---|-------------------|-------------------|---|---------------------|----------------------|
| | OLS (1) | OLS (2) | IV (3) | OLS (4) | OLS (5) | IV (6) | OLS (7) | OLS (8) | IV (9) | OLS (10) | OLS (11) | IV (12) |
| Participant Won Lottery | 1.086*** (0.186) | 0.907 (1.268) | | 1.183*** (0.196) | 0.973 (1.270) | | 1.742 (1.331) | 2.524* (1.374) | | 7.800*** (2.612) | 9.458*** (2.693) | |
| Lives Colony A | | | 3.688*** (0.560) | | | 3.903*** (0.555) | | | 8.914* (4.849) | | | 33.407*** (9.733) |
| Mean Non-Winners | 2.883 [1.313] | | | 3.319 [1.305] | | | 15.124 [12.300] | | | 33.438 [24.157] | | |
| Controls | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Observations | 443 | 443 | 423 | 443 | 443 | 423 | 443 | 443 | 443 | 443 | 443 | 443 |
| R-squared | 0.772 | 0.783 | 0.293 | 0.771 | 0.783 | 0.359 | 0.004 | 0.051 | 0.061 | 0.019 | 0.082 | 0.062 |

| VARIABLES | See Daughter at least every Month | | | Number bidi agents last 15 years | | |
|-------------------------|-----------------------------------|---------------------|---------------------|----------------------------------|---------------------|---------------------|
| | OLS (13) | OLS (14) | IV (15) | OLS (16) | OLS (17) | IV (18) |
| Participant Won Lottery | -0.105** (0.043) | -0.088** (0.042) | | -0.193*** (0.068) | -0.185** (0.072) | |
| Lives Colony A | | | -0.280** (0.134) | | | -0.659** (0.273) |
| Mean Non-Winners | 0.908 [0.289] | | | 1.112 [0.705] | | |
| Observations | 678 | 678 | 678 | 414 | 414 | 414 |
| R-squared | 0.019 | 0.054 | 0.021 | 0.016 | 0.059 | 0.000 |

(1) Controls: participant Muslim, Koshti caste, other Hindu castes (Padmasali omitted), never married/husband gone before 1987, referred, family survey, age.

(2) Column (2) of Table 4 is the first stage of the IV estimates using the full sample of 443.

(3) Columns (1) through (6) also include controls for participant or family lives outside the city of Ahmedabad and its interaction with Lottery Winner.

(4) For columns (1) through (6) the mean is for Non-Winners living within the city of Ahmedabad.

(5) The first stage of the IVs in columns (3) and (6) includes the extra controls and can be found in Appendix Table 2.

(6) *** p<0.01, ** p<0.05, * p<0.1 (7) Robust standard errors in parentheses, standard deviations in brackets.

(8) Standard errors are clustered at the participant level for columns (13) through (15).

(9) Columns (3) and (6) are for those still living in Ahmedabad only.

Table 9. Interaction with Immediate Neighbors

| VARIABLES | Ever socializes with immediate neighbor | | | Same caste as immediate neighbor | | | Immediate neighbor rolls bidis | | | Participant worked with someone else last time she rolled bidis | | |
|-------------------------|---|--------------------|--------------------|----------------------------------|--------------------|--------------------|--------------------------------|---------------------|---------------------|---|------------------|------------------|
| | OLS | OLS | IV | OLS | OLS | IV | OLS | OLS | IV | OLS | OLS | IV |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| Participant Won Lottery | 0.025** (0.012) | 0.028** (0.013) | | -0.081** (0.039) | -0.076* (0.039) | | 0.116** (0.045) | 0.122*** (0.045) | | 0.109* (0.057) | 0.065 (0.056) | |
| Lives Colony A | | | 0.088** (0.041) | | | -0.233* (0.123) | | | 0.376*** (0.116) | | | 0.233 (0.198) |
| Mean Non-Winners | 0.954 [0.209] | | | 0.338 [0.473] | | | 0.289 [0.454] | | | 0.313 [0.465] | | |
| Controls | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Observations | 1,209 | 1,209 | 1,209 | 1,220 | 1,220 | 1,220 | 1,210 | 1,210 | 1,210 | 416 | 416 | 416 |
| R-squared | 0.003 | 0.017 | | 0.006 | 0.021 | 0.002 | 0.011 | 0.054 | 0.135 | 0.010 | 0.083 | 0.086 |

(1) Controls: never married/husband gone before 1987, referred, family survey, age. Except for “same caste”, other controls also include participant Muslim, Koshti caste, other Hindu castes (Padmasali omitted).

(2) The first stage of the IV estimates can be found in column (2) of Table 4.

(3) Standard errors in parentheses, SDs in brackets. SEs clustered at the participant level.

(4) *** p<0.01, ** p<0.05, * p<0.1

(5) Columns (1) through (9) are pairwise regressions. N<1220 reflects missing data.

(6) The mean neighbors reported for Non-Winners is 2.734, and it is not significantly different for Winners.

(7) The sample for columns (10) through (12) does not include deceased participants.

Table 10. Risk Sharing

| VARIABLES | Has anyone from whom can borrow or lend | | | Person from whom can borrow is a neighbor | | | Person from whom can borrow is a friend or family | | |
|-------------------------|---|---------------------|---------------------|---|------------------|------------------|---|------------------|------------------|
| | OLS | OLS | IV | OLS | OLS | IV | OLS | OLS | IV |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| Participant Won Lottery | -0.094** (0.041) | -0.097** (0.041) | | -0.003 (0.052) | 0.005 (0.053) | | 0.028 (0.055) | 0.023 (0.057) | |
| Lives Colony A | | | -0.346** (0.167) | | | 0.016 (0.189) | | | 0.083 (0.207) |
| Mean Non-Winners | 0.906 [0.292] | | | 0.675 [0.469] | | | 0.461 [0.499] | | |
| Controls | No | Yes | Yes | No One | Yes | Yes | No One | Yes | Yes |
| Observations | 414 | 414 | 414 | 413 | 413 | 413 | 413 | 413 | 413 |
| R-squared | 0.019 | 0.032 | | 0.163 | 0.185 | 0.187 | 0.077 | 0.102 | 0.086 |

| VARIABLES | Any one of people can borrow or lend from has the same caste | | | Average years known people from whom can borrow or lend | | |
|-------------------------|--|------------------|------------------|---|---------------------|---------------------|
| | OLS | OLS | IV | OLS | OLS | IV |
| | (10) | (11) | (12) | (13) | (14) | (15) |
| Participant Won Lottery | -0.018 (0.051) | 0.016 (0.049) | | -2.825*** (1.081) | -2.772** (1.125) | |
| Lives Colony A | | | 0.054 (0.171) | | | -9.628** (4.069) |
| Mean Non-Winners | 0.708 [0.455] | | | 20.045 [11.719] | | |
| Controls | No One | Yes | Yes | No One | Yes | Yes |
| Observations | 414 | 414 | 414 | 413 | 413 | 413 |
| R-squared | 0.183 | 0.306 | 0.301 | 0.226 | 0.279 | 0.264 |

(1) Controls: participant Muslim, Koshti caste, other Hindu castes (Padmasali omitted), never married/husband gone before 1987, referred, family survey, age. (4) through (15) also have a control for can borrow/lend from No One.

(2) The first stage of the IV estimates are shown in Appendix 2. (3) SEs in parentheses, SDs in brackets. (4) *** p<0.01, ** p<0.05, * p<0.1

Table 11. Social insurance

| VARIABLES | Anyone helped us after large shock | | | Total value of help following large shock | | | Can rely on immediate neighbor in an emergency | | | Total days of work lost following three large shocks | | |
|-------------------------|------------------------------------|----------------------|----------------------|---|------------------------|------------------------|--|-------------------|-------------------|--|-------------------|---------------------|
| | OLS (1) | OLS (2) | IV (3) | OLS (4) | OLS (5) | IV (6) | OLS (7) | OLS (8) | IV (9) | OLS (10) | OLS (11) | IV (12) |
| Participant Won Lottery | -0.095*** (0.026) | -0.082*** (0.027) | | -250.224** (103.455) | -173.621** (86.423) | | -0.042 (0.038) | -0.046 (0.039) | | -11.374 (7.372) | -5.671 (6.950) | |
| Lives Colony A | | | -0.294*** (0.107) | | | -624.828* (330.956) | | | -0.142 (0.122) | | | -20.410 (25.429) |
| Mean Non-Winners | 0.129 [0.336] | | | 316.544 [1,695.676] | | | 0.772 [0.420] | | | 88.282 [66.363] | | |
| Controls | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Observations | 414 | 414 | 414 | 414 | 414 | 414 | 1,199 | 1,199 | 1,199 | 414 | 414 | 414 |
| R-squared | 0.017 | 0.117 | 0.059 | 0.005 | 0.085 | 0.073 | 0.002 | 0.006 | | 0.005 | 0.157 | 0.151 |

(1) Controls: participant Muslim, Koshti caste, other Hindu castes, never married/husband gone before 1987, referred, age.

(2) Columns (4) to (12) include a control for Report No Shock. Questions not asked if family responded to survey due to death or incapacity.

(3) Columns (7) - (9) show the results of pairwise regressions with standard errors clustered at the participant level.

(4) The first stage of the IV estimates can be found in Appendix Table 2.

(5) Robust standard errors in parentheses, standard deviations in brackets.

(6) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

(7) Estimates for rely on neighbor are similar when a control for "neighbor is the same caste" is included.

Table 12. Collective Action

| VARIABLES | Neighbors have worked together to solve a common problem in the last three years | | | | | | Days spent in past year on most recent project | | | Money spent in past year on most recent project | | | Most or all people in the neighborhood contributed money for most recent project | | |
|-------------------------|--|---------------------|---------------------|--------------------|--------------------|---------------------|--|-----------------------|------------------------|---|---------------------|---------------------|--|--|--|
| | OLS | OLS | IV | OLS | OLS | IV | OLS | OLS | IV | OLS | OLS | IV | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | | | |
| Participant Won Lottery | 0.185*** (0.054) | 0.173*** (0.054) | | 2.906** (1.386) | 2.828** (1.392) | | 219.890** (104.193) | 211.565* (111.087) | | 0.196*** (0.054) | 0.184*** (0.054) | | | | |
| Lives Colony A | | | 0.617*** (0.164) | | | 10.132** (5.043) | | | 726.804** (347.746) | | | 0.656*** (0.160) | | | |
| Mean Non-Winners | 0.190 [0.393] | | | 1.667 [5.685] | | | 293.551 [1,107.523] | | | 0.169 [0.375] | | | | | |
| Controls | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes | | | |
| Observations | 412 | 412 | 412 | 411 | 411 | 411 | 407 | 407 | 407 | 410 | 410 | 410 | | | |
| R-squared | 0.034 | 0.070 | 0.191 | 0.023 | 0.035 | 0.045 | 0.008 | 0.019 | 0.069 | 0.041 | 0.081 | 0.215 | | | |

(1) Controls: participant Muslim, Koshti caste, other Hindu castes, never married/husband gone before 1987, referred, family survey, age.

(2) The first stage of the IV estimates can be found in column (2) of Table 4.

(3) Robust standard errors in parentheses, standard deviations in brackets.

(4) *** p<0.01, ** p<0.05, * p<0.1

(5) Questions not asked if lottery participant has died.

Table 13. Housing Materials and Amenities

| VARIABLES | Durable Construction Index | | | Amenity Index | | | A woman cannot walk around this neighborhood alone after 10 | | |
|-------------------------|----------------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---|------------------|------------------|
| | OLS (1) | OLS (2) | IV (3) | OLS (4) | OLS (5) | IV (6) | OLS (7) | OLS (8) | IV (9) |
| Participant Won Lottery | 0.124*** (0.021) | 0.120*** (0.022) | | 0.069*** (0.023) | 0.074*** (0.024) | | 0.058 (0.045) | 0.061 (0.046) | |
| Lives Colony A | | | 0.425*** (0.095) | | | 0.260*** (0.089) | | | 0.216 (0.161) |
| Mean Non-Winners | 0.554 [0.200] | | | 0.815 [0.250] | | | 0.158 [0.365] | | |
| Controls | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Observations | 442 | 442 | 442 | 443 | 443 | 443 | 438 | 438 | 438 |
| R-squared | 0.067 | 0.082 | | 0.015 | 0.041 | 0.018 | 0.004 | 0.033 | 0.052 |

(1) Controls: participant Muslim, Koshti caste, other Hindu castes (Padmasali omitted), never married/husband gone before 1987, referred, family survey, age.

(2) The first stage of the IV estimates can be found in column (2) of Table 4.

(3) Robust standard errors in parentheses, standard deviations in brackets.

(4) *** p<0.01, ** p<0.05, * p<0.1

(5) The Durable Construction Index is the mean of three variables individually equal to one when the current house is constructed from a durable material for the walls, floor, and roof.

Durable walls include bricks and cement. Durable roofing materials include tile, cement and concrete.

Durable flooring materials are cement, stone, tile and plaster.

(6) The Amenities Index is the mean of four variables individually equal to 1 when the current location has a water tap in the house, a separate kitchen, a private toilet, or a ceiling fan.

Table 14. Home ownership

| VARIABLES | Currently own a house | | | Ever owned a house | | | Number houses owned since 1987 | | |
|-------------------------|-----------------------|--------------------|--------------------|---------------------|---------------------|---------------------|--------------------------------|---------------------|---------------------|
| | OLS (1) | OLS (2) | IV (3) | OLS (4) | OLS (5) | IV (6) | OLS (7) | OLS (8) | IV (9) |
| Participant Won Lottery | 0.089* (0.047) | 0.098** (0.048) | | 0.157*** (0.030) | 0.179*** (0.032) | | 0.244*** (0.084) | 0.271*** (0.086) | |
| Lives Colony A | | | 0.347** (0.165) | | | 0.632*** (0.145) | | | 0.959*** (0.339) |
| Mean | 0.701 [0.458] | | | 0.796 [0.404] | | | 1.175 [0.842] | | |
| Controls | No | Yes | Yes | No | Yes | Yes | No | Yes | Yes |
| Observations | 443 | 443 | 443 | 443 | 443 | 443 | 443 | 443 | 443 |
| R-squared | 0.007 | 0.023 | 0.005 | 0.032 | 0.059 | | 0.016 | 0.038 | |

| VARIABLES | Number houses rented since 1987 | | | Times moved since 1987 | | |
|-------------------------|---------------------------------|--------------------|--------------------|------------------------|------------------|------------------|
| | OLS (10) | OLS (11) | IV (12) | OLS (13) | OLS (14) | IV (15) |
| Participant Won Lottery | -0.198 (0.122) | -0.234* (0.124) | | 0.053 (0.124) | 0.042 (0.121) | |
| Lives Colony A | | | -0.827* (0.456) | | | 0.148 (0.428) |
| Mean | 0.988 [1.372] | | | 2.166 [1.117] | | |
| Controls | No | Yes | Yes | No | Yes | Yes |
| Observations | 443 | 443 | 443 | 443 | 443 | 443 |
| R-squared | 0.004 | 0.043 | | 0.000 | 0.054 | 0.055 |

(1) Controls: participant Muslim, Koshti caste, other Hindu castes (Padmasali omitted), never married/husband gone before 1987, referred, family survey, age.

(2) The first stage of the IV estimates can be found in column (2) of Table 4.

(3) Results for number of houses owned and number of houses rented since 1993 are similar to columns (7) through (12).

(4) Robust standard errors in parentheses, standard deviations in brackets.

(5) *** p<0.01, ** p<0.05, * p<0.1

Table 15. Housing improvements

| VARIABLES | Total number of improvements over last 20 years | | | Total value of improvements over last 20 years | | |
|-------------------------|--|------------------|------------------|---|---------------------------|----------------------------|
| | OLS | OLS | IV | OLS | OLS | IV |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Participant Won Lottery | 0.245 (0.180) | 0.218 (0.169) | | -3,328.193 (4,142.073) | -1,656.374 (4,052.510) | |
| Lives Colony A | | | 0.769 (0.588) | | | -5,850.362 (14,404.733) |
| Mean Non-Winner | 2.660 [1.391] | | | 27,992.000 [58,505.820] | | |
| Controls | No | Yes | Yes | No | Yes | Yes |
| Observations | 443 | 443 | 443 | 443 | 443 | 443 |
| R-squared | 0.005 | 0.119 | 0.124 | 0.001 | 0.032 | 0.031 |

(1) Controls: participant Muslim, Koshti caste, other Hindu castes (Padmasali omitted), never married/
husband gone before 1987, referred, family survey, age.

(2) The first stage of the IV estimates can be found in column (2) of Table 4.

(3) Robust standard errors in parentheses, standard deviations in brackets.

(4) *** p<0.01, ** p<0.05, * p<0.1

Table A.1 Tracking, OLS

| | Surveyed | | Surveyed conditional on named | |
|---------------------------|---------------------|----------------------|----------------------------------|---------------------|
| | (1) | (2) | (3) | (4) |
| Non-Winner | -0.081** (0.026) | | 0.003 (0.023) | 0.003 (0.023) |
| No List | | -0.942*** (0.017) | | |
| Second Lottery | | 0.045* (0.019) | | |
| Referrals | | -0.009 (0.049) | | |
| Random Participant Subset | | -0.060* (0.025) | | |
| Date of list | | | | 0.000 (0.000) |
| Constant | 0.955*** (0.020) | 0.942*** (0.017) | 0.955*** (0.020) | 0.920*** (0.087) |
| Observations | 497 | 497 | 463 | 463 |
| R-squared | 0.010 | 0.614 | -0.002 | -0.004 |

(1) Robust standard errors in parentheses.

(2) *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

(3) Dates of Lists are assigned as the date of the earliest list participant's name found/given:

Random Participant Subset, 1987

Second Lottery, 1990

Winners, 1993

Referrals, 2007

Table A2. First stage of IV regressions with additional controls

| | Lives Colony A | | |
|-------------------------------|----------------------|---------------------|---------------------|
| | (1) | (2) | (3) |
| Participant Won Lottery | 0.298*** (0.049) | 0.279*** (0.048) | 0.288*** (0.049) |
| Found Outside Ahmedabad | -0.092*** (0.031) | | |
| Won * Found Outside Ahmedabad | -0.269*** (0.059) | | |
| Talk/Visit No One | | -0.036 (0.028) | |
| Lend to / Borrow from No One | | | -0.084* (0.050) |
| Mean Non-Winners In Ahmedabad | 0.040 [0.197] | | |
| Mean Non-Winners | | 0.038 [0.193] | |
| Controls | Yes | Yes | Yes |
| Observations | 443 | 414 | 414 |
| R-squared | 0.194 | 0.178 | 0.182 |

(1) Controls: participant Muslim, Koshti caste, other Hindu castes (Padmasali omitted), never married/husband gone before 1987, referred, family survey, age

(2) Robust standard errors in parentheses, standard deviation in brackets.

(3) *** p<0.01, ** p<0.05, * p<0.1

Table A3. Community Projects

What activities have you and your neighbors worked on to benefit the community in the past three years? (all that apply)

| | Non-Winners | Winners |
|------------------------------------|-------------|---------|
| Nothing | 258 | 60 |
| Gutters | 32 | 30 |
| Running water (not potable) | 11 | 1 |
| Potable running water | 9 | 3 |
| Improving the school | 0 | 1 |
| Something for the Temple or Mosque | 6 | 1 |
| Road improvements | 1 | 0 |
| Negotiating rates with agents | 1 | 0 |
| Wedding for a neighbor | 9 | 2 |
| Funeral for a neighbor | 13 | 2 |
| School fees | 1 | 0 |
| Caring for ill person | 2 | 2 |
| Stone wall to prevent rodents | 1 | 0 |
| Navratri | 1 | 0 |
| Lighting | 1 | 0 |
| Dig borewell | 0 | 1 |
| | 346 | 103 |

(1) Not asked in family surveys