

# For Whom the Phone Does (Not) Ring? Discrimination in the Rental Housing Market in Delhi, India

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## Preview

- Audit of caste & religious discrimination in Delhi's housing rental market:
  - Fictitious tenants on a large real estate website.
  - Landlord response rate, and callback counts.
  - Who gets called back first? Time to first response?
  - Interactions with landlord & house characteristics.
- Strong evidence of discrimination against Muslims, especially single Muslim men.
- No evidence of caste based discrimination.
- Ongoing research:
  - Hindu v. Muslim differentials.
  - Taste based v. statistical discrimination (prefix "Dr" to names)
  - Differences in landlord v broker behaviour.
  - Parallel markets for Muslims?
  - Test the "non-meat" eating hypothesis directly.

# Motivation

- Why does housing discrimination matter?
  - Fairness.
  - Can perpetuate inequality by reducing access to good schools, health care, credit, jobs etc.
- Long history of caste and religion based segregation in India.
- Does it carry over to growing, modernising cities?
  - Media attention to elite, professional Muslims being denied housing.
  - Growing religious polarisation since 2014.
- Important to understand discrimination in the online setting.

## The Indian Context- I

- Housing segregation has historically been central to the logic of the caste system.
  - Inter-dining and inter-marriage long been taboo.
  - Notions of purity (lower castes considered “polluting”).
  - Srinivas (1957), Ghurye (1961), Beteille et al (1969), Dumont (1980)
- Household surveys show that socio-economic outcomes vary positively with caste hierarchy
  - Consumption expenditures, education, employment, housing quality.
  - Muslims have worse outcomes than Hindus.
  - Deshpande (2001, 2005), Desai & Dubey (2012)

## The Indian Context - II

- Does the historical pattern carry over to modern cities with new upper and middle class neighbourhoods?
  - Anecdotal evidence of discrimination against Muslims, lower castes, and other minorities.
  - Segregation by caste greater than that by class (Vithayathil and Singh (2012)).
  - Often couched as a dietary preference (landlords prefer vegetarian tenants).
  - No clear law on housing discrimination.

# Literature - I

- Large literature on discrimination in labour, credit, and housing markets.
- Causal inference of discrimination challenging.
  - Quasi-experiments e.g. impact of blind auditions in orchestra hiring of women (Goldin & Rouse (2000))
  - Wide use of audits to study labour market discrimination.
  - Housing audit studies, e.g. paired-testing regularly conducted by the Dept of Housing and Urban Dev in the US in large cities (Turner et al 2002).

## Literature - II

- Audit studies are not double-blind.
- Bertrand & Mullainathan (2003) resume audit:
  - Rely on applying remotely (by mail or online.)
  - More credible.
  - Only provide an “early-stage” estimate of discrimination.
- Remote housing audits examples:
  - Ethnic & gender discrimination in Sweden (Ahmed & Hammerstadt (2008))
  - Ethnic, gender & class discrimination in Norway (Andersson et al (2012))

## Literature - India

- Resume audit study found mixed evidence of discrimination in IT & call centre jobs (Bannerjee et al (2008))
- Thorat et al (2015):
  - Studies discrimination in Delhi's rental housing market.
  - Samples ads from newspapers and websites.
  - Uses telephonic and face-to-face audit methods.
  - Matched set of auditors - Upper Caste (UC), Scheduled Caste (SC), and Muslim (M).
  - Positive response rate: UC (99.8%), SC (58.6%), M (33.5%)



## Experiment - Location & Sample

- Conducted on a large Indian online real estate website in summer 2015.
- Recently posted rental ads in Delhi and its two largest suburbs (Gurgaon & NOIDA) that form one large commuter zone.
- Convenience sample of 171 landlords:
  - Oversampled Muslim landlords.
  - Sought to maintain balance across property size & rental cost.

## Experiment - Design

- Fictitious tenants from 4 social categories:
  - Upper caste (UC)
  - Other Backward Caste (OBC)
  - Scheduled Caste (SC)
  - Muslim (M)
- Fully blocked design (171 landlords):
  - One of each type applied to each landlord.
  - Application had name, phone no., and email.
  - Used two different surnames for each type.
  - All male applicants - first names begin with "A"
  - Muslim names distinctive; SC & OBC names chosen to maximise signalling value.
  - Randomised order of application.
  - All four sent within a day but with gaps.

# Online Rental Application Query

The screenshot displays a mobile application interface for online rental queries. The top navigation bar includes filters for 'Lease Type', 'Listed By', and 'More', along with a 'Reset' button and a 'Get Alerts' button. The main content area is split into two panels. The left panel features a photograph of a room with arched doorways and windows. Below the image, the text reads: 'FLAT ID: 227478', '3 BHK , Unfurnished', 'Sector 7, Dwarka', and '₹ 25,000'. At the bottom of this panel are two buttons: 'Flat already taken?' and 'Report it'. The right panel is a white overlay containing a profile picture of a man, a verified agent name 'Rishabh Kumar' with a checkmark, the title 'Agent', and a phone number '9199 2227 2226'. Below this information are three input fields labeled 'NAME', 'PHONE', and 'EMAIL'. A prominent blue 'Send message' button is located at the bottom of the overlay.

Lease Type ▾ Listed By ▾ More ▾ Reset Get Alerts

FLAT ID: 227478  
3 BHK , Unfurnished  
Sector 7, Dwarka  
₹ 25,000

Flat already taken? Report it

Rishabh Kumar ✓  
Agent  
9199 2227 2226

NAME  
PHONE  
EMAIL

Send message

# Call Tracing

- Assigned a unique number to each type ( 4 Indian SIMs.).
- Tracked (missed) calls, texts, and emails to each type.
  - Counts, date, time, content (email, texts)
- Matched calls to landlords:
  - Many landlords use a masking number on the website.
  - Nontrivial fraction of calls are spam or uncontacted brokers.
  - Matched using web-based phone tracker (Truecaller), online searches, and manual calling.
- 118 unique callers (phone numbers):
  - 22 were spam or uncontacted brokers.
  - 89 mapped to landlords in our sample.
  - 7 numbers untraceable (4 only called once).

## Summary Statistics - Listings & Landlords

	Delhi City	Suburbs <sup>1</sup>	All
<b>House characteristics</b>			
<u>Num bedrooms:</u> <sup>2</sup>			
1	0.26	0.10	0.20
2 or 3	0.67	0.78	0.71
4+	0.07	0.12	0.09
Rent (Rs)	36100.90 (53348.86)	29333.32 (24292.45)	33726.31 (45353.01)
Floor area (Sq ft)	1138.92 (654.86)	1616.93 (702.55)	1306.64 (707.91)
Rent/sq. ft	28.47 (20.74)	18.12 (10.37)	24.84 (18.45)
<b>Landlord characteristics</b>			
% Female <sup>3</sup>	0.14	0.10	0.13
% Muslim <sup>4</sup>	0.16	0.03	0.12
N	111	60	171

<sup>1</sup> Standard errors in parenthesis.

<sup>2</sup> Suburbs - Gurgaon and NOIDA.

<sup>3</sup> 1-1.5 bedrooms coded as 1 bedroom, 2-3.5 as 2-3 bedrooms.

<sup>4</sup> We were unable to code gender for 13 of the 171 landlords (due to missing first name e.g. only initial). The reported female % is computed over all 171 landlords.

<sup>5</sup> We were unable to code religion for 1 of the 171 landlords. The reported muslim % is computed over all 171 landlords.

## Summary Statistics - Applicants

	Order	Daytime	Weekday	Gap (days)	N
UC	2.49 (1.11)	0.84 (0.37)	0.59 (0.49)	4.05 (7.59)	170
OBC	2.50 (1.12)	0.74 (0.44)	0.51 (0.50)	4.09 (7.58)	171
SC	2.47 (1.12)	0.72 (0.45)	0.51 (0.50)	4.08 (7.61)	170
M	2.51 (1.13)	0.84 (0.37)	0.59 (0.49)	4.03 (7.60)	170

Standard errors in parenthesis.

Order is the chronological position of the applicant type within the set of 4 applications sent to each landlord.

Daytime: 6:01AM-18:59PM; Weekday: Mon-Fri.

Gap is number of days between date of applying and date the ad was posted.

## Summary of Results

1. Landlords significantly less likely to respond to Muslim applicants (35% for UC v. 22% for M)
2. Landlords who do respond, make similar number of contact attempts for UC and M.
3. No evidence of caste based discrimination but a bounding exercise suggests bias may exist.
4. Suggestive evidence that landlords who call both UC and M applicants, call UC sooner.
5. Heterogeneity in response rates by landlord & property characteristics:
  - Additional 20% points drop in response rate for Muslims applying to 1-beds; very strong discrimination against single Muslim men?

# Counts of Responders & Responses

## A. Counts of Responders

	Unique Callers		Landlords who			
	Total (1)	Excl. spam (2)	Called <sup>1</sup> (3)	Texted (4)	Emailed (5)	Responded <sup>2</sup> (6)
UC	80	66	56	5	2	59
OBC	67	59	50	6	2	51
SC	63	58	55	4	3	58
M	52	40	35	4	3	38

## B. Counts of Responses

	All calls (1)	Excl. spam (2)	Traced to landlords:			Total (6)
			Calls (3)	Texts (4)	Emails (5)	
UC	192	157	132	5	2	139
OBC	165	149	142	6	2	150
SC	126	112	111	4	3	118
M	101	80	75	4	3	82

<sup>1</sup> In Panel A, Column (3) differs from (2) because some numbers cannot be traced, and because some landlords called from more than one number.

<sup>2</sup> In Panel A, Column (6) is not the sum of (3)-(5) since some landlords both, called and texted or emailed.



# % Response & Mean Responses per Landlord

	Fraction responding	Diff. vs. UC	Mean resp. (All landlords) <sup>1</sup>	Diff. vs. UC	Mean resp. (Resp. landlords) <sup>2</sup>	Diff. vs. UC	Range responses (min-max)
<b>UC</b>	0.35 (0.48)	-	0.82 (1.52)	-	2.36 (1.74)		0-9
<b>OBC</b>	0.3 (0.46)	0.05 (0.05)	0.88 (2.90)	-0.05 (0.25)	2.94 (4.74)	-0.58 (0.70)	0-33
<b>SC</b>	0.34 (0.48)	0.01 (0.05)	0.69 (1.50)	0.13 (0.16)	2.03 (1.96)	0.33 (0.34)	0-10
<b>M</b>	0.22 (0.42)	0.13** (0.05)	0.48 (1.12)	0.34** (0.14)	2.16 (1.42)	0.2 (0.32)	0-6

Responses include calls, emails and texts.

<sup>1</sup> Total traced responses divided by number of landlords contacted.

<sup>2</sup> Total traced responses divided by number of landlords who responded to that type.

## Regression - Probability of Response

	(1)	(2)	(3)
Muslim	-0.124*** [0.034]	-0.124*** [0.034]	-0.124*** [0.039]
OBC	-0.049 [0.032]	-0.04 [0.032]	-0.039 [0.037]
SC	-0.006 [0.034]	0.005 [0.034]	0.003 [0.040]
Controls <sup>1</sup>		x	x
Landlord FE			x
Constant	0.347*** [0.037]	0.269** [0.106]	0.369*** [0.120]
Observations	681	681	681
R-squared	0.012	0.079	0.671

OLS regression coefficients (linear probability models); the dependant variable is a dummy for any response from the landlord.

Robust standard errors in brackets, clustered on landlord.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

<sup>1</sup> Controls include gap in days between posting of ad and application, rent per sqft., and dummies for weekdays, daytime, suburbs, and number of beds.

## Regression - Response Counts

	(1)	(2)	(3)
Muslim	-0.528*** [0.146]	-0.531*** [0.146]	-0.531*** [0.147]
OBC	0.07 [0.263]	0.175 [0.273]	0.092 [0.220]
SC	-0.164 [0.142]	-0.064 [0.161]	-0.136 [0.134]
Controls <sup>1</sup>		x	x
Landlord FE			x
Constant	-0.201	0.106	-19.081***
Observations	681	681	681

Poisson regression coefficients (dep. variable is count of responses to an applicant)

Robust standard errors in brackets, clustered on landlord.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$  item [1] Controls include gap in days between posting of ad and application, rent per sqft., and dummies for weekdays, daytime, suburbs, and number of beds.

## Pairwise Contrasts - Time to 1st Response

	Hours between time application sent & first response received					
	UC v. OBC	UC v. SC	UC v. M	OBC v. SC	OBC v. M	SC v. M
OBC	-0.386 [5.939]					
SC		2.767 [4.735]		-0.331 [2.400]		
M			6.75 [7.036]		-0.244 [4.776]	0.977 [6.719]
Constant	49.021 [33.069]	29.782** [11.327]	26.800*** [1.539]	50.924*** [8.374]	21.524*** [6.875]	31.483** [11.944]
Landlord FE	X	X	X	X	X	X
Observations	78	84	62	88	46	58
R-squared	0.947	0.966	0.987	0.993	0.688	0.907

Robust standard errors in brackets, clustered on landlord.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

OLS regressions at the applicant level.

Each regression only includes landlords who replied to both types in the relevant pair.

Controls include the rank order of the type with the application set, weekday dummy, daytime dummy, gap in days between date ad posted and date application sent, and landlord FE.

## Pairwise Contrasts: Who Receives the 1st Response?

Type 1 v 2	N <sup>1</sup>	Type 1 1st applied <sup>2</sup>	Type 1 1st resp. <sup>3</sup>	Null Hypo. 1 <sup>4</sup>	p-value	Null Hypo. 2 <sup>5</sup>	p-value
UC v OBC	39	0.46	0.54	0.5	0.63	0.46	0.33
UC v SC	42	0.52	0.64	0.5	<b>0.07</b>	0.52	0.12
UC v M	31	0.61	0.65	0.5	0.11	0.61	0.71
OBC v SC	44	0.45	0.61	0.5	0.13	0.45	<b>0.03</b>
OBC v M	23	0.43	0.57	0.5	0.53	0.43	0.21
SC v M	29	0.41	0.52	0.5	0.85	0.41	0.26

<sup>1</sup> Number of landlords who responded to both types (includes those who responded to others as well.)

<sup>2</sup> The fraction of landlords to whom Type 1 applied to before Type 2.

<sup>3</sup> The fraction of landlords that responded to Type 1 before Type 2.

<sup>4</sup> The null is that landlords first respond to either type independent of the order in which the types apply.

<sup>5</sup> The null is that landlords first respond to the two types in the same order in which the types apply.

# Probability of Response - Interactions

	Interacting characteristic of landlord/property (Z):			
	Female	Muslim	One bed	High price
Z	-0.157 [0.095]	-0.224* [0.130]	-0.139 [0.085]	-0.146** [0.073]
OBC	-0.043 [0.034]	-0.043 [0.035]	-0.06 [0.040]	-0.110** [0.043]
OBC*Z	-0.048 [0.088]	-0.015 [0.081]	0.039 [0.031]	0.044 [0.048]
SC	-0.018 [0.038]	-0.007 [0.037]	0.002 [0.041]	-0.049 [0.046]
SC*Z	0.134* [0.078]	0.091 [0.105]	0.015 [0.060]	0.069 [0.052]
Muslim	-0.140*** [0.037]	-0.140*** [0.038]	-0.105*** [0.039]	-0.184*** [0.046]
Muslim*Z	0.036 [0.077]	-0.005 [0.008]	-0.200*** [0.070]	-0.052 [0.049]
Constant	0.289***	0.276***	0.305***	0.338***
Observations	630	677	681	681
R-squared	0.041	0.049	0.055	0.044

Robust standard errors in brackets, clustered on landlord.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ .

OLS regressions at the applicant level (linear probability model)

Controls include the rank order of the applicant with the application set, weekday dummy, daytime dummy, gap in days between date ad posted and date application sent.

## Caller Ratio Bounds

- 7 untraced numbers (don't call all types evenly).
- Can bound pairwise caller ratio (e.g. UC v M).
- 3 groups of untraced callers:
  - Only called UC.
  - Only called M.
  - Called both.
- Can create upper and lower bounds with different assumptions about which group(s) are landlords v. spammers.
  - E.g. assume that all untraced who called M (including those who also called UC) are landlords while those untraced who only called UC are spammers - yields lower bound.

## Caller Ratio Bounds Calculation

	Traced responders	Ratio (UC: .)	Upper bound	Lower bound
UC	59	1		
OBC	51	1.16	1.22	1.13
SC	58	1.02	1.1	1.02
M	38	1.55	1.68	1.5

See text for the derivation of the upper and lower bounds.



## Discussion & Conclusion

- 50% more landlords respond to UC compared to M tenants.
- Single Muslim men fare the worst.
- No evidence of caste-based discrimination (but caveats!)
- Difference from Thorat et al (2015)?
  - They find bias against SC as well (suggestive in our case).
  - We measure landlord behaviour in an early stage (35% response to UC while they find almost 100%).
  - Different platforms (online v. face-to-face or telephone).
  - Different samples of landlords?
- Important to understand discrimination in online platforms.