

# Do mandatory disclosures squeeze the lemons?

## The case of housing markets in India

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# Motivation

- ▶ Developing countries have **severe** information asymmetry
  - ⇒ Housing – Land title issues, developers flouting regulations, long delays
  - ⇒ Welfare implications – first-time buyers
- ▶ In Indian cities issues with projects lead to litigation
  - ⇒ 30% projects in Mumbai have litigation
- ▶ Scope of litigation is wide (exact nature of disputes not known)
  - ⇒ Land title disputes, land encroachment, NIMBYism
- ▶ Litigation delays completion due to high judicial pendency rates
- ▶ Sellers know litigation status; Buyers acquire information on status

# Motivation

- ▶ We study the effect of the introduction of disclosure law on housing markets in India.
  1. What is the impact of disclosures of litigation status on house prices?
  2. Do mandatory disclosures have differential impact across sub-markets?

# Outline

Literature and framework

Setting and Policy Reform

Data

Empirical Strategy and Baseline results

Sub-markets and income quartiles

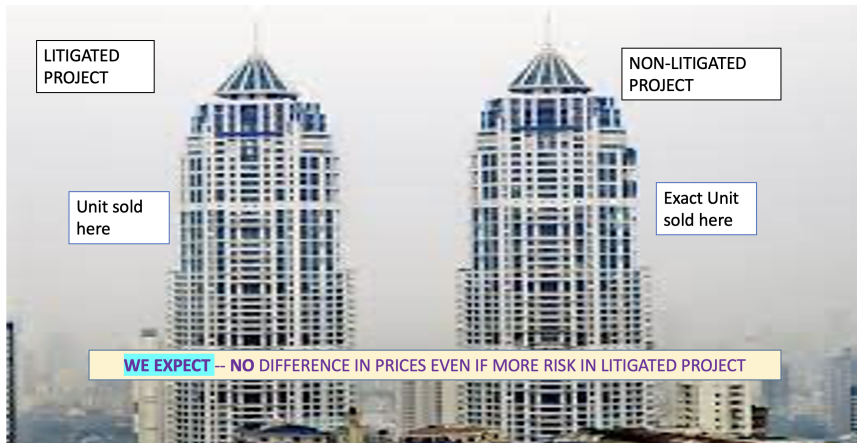
Mechanisms

# Literature

- ▶ Mandatory disclosure impacts have been mixed
  - ▶ Positive (Jin and Leslie, 2003; Johnson, 2020); Minimal to No impact (Ho et al., 2019; Ben-Shahar and Schneider, 2014)  
This paper: +ve impact
- ▶ Distributional impact in different sectors (Luco, 2019; Barahona et al., 2023)  
This paper: impact across incomes & sub-markets
- ▶ Disclosure impacts on housing markets in developed countries
  - ▶ (Nanda and Ross, 2012; Chau and Choy, 2011)  
This paper: developing country case
- ▶ Land use regulations in developing countries
  - ▶ (Brueckner et al., 2017; Harari, 2020; Henderson et al., 2021)  
This paper: Information asymmetry as friction

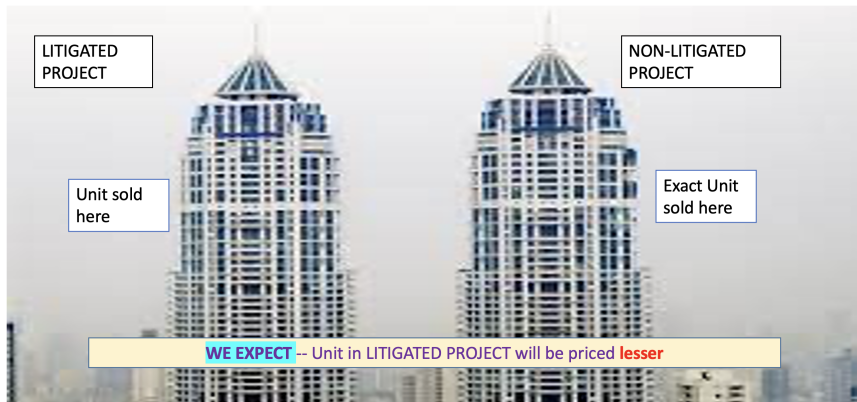
# Framework

1. **Pre-disclosure period** – a pooling equilibrium where lemons and non-lemons are not readily distinguishable,  $P_j^{t-k} - P_i^{t-k} = 0$



# Framework

1. **Pre-disclosure period** – a pooling equilibrium where lemons and non-lemons are not readily distinguishable,  $P_j^{t-k} - P_i^{t-k} = 0$
2. **Post-disclosure period**:  $P_i^{t+k} > P_i^{t-k}$  &  $P_j^{t+k} < P_j^{t-k}$



# Framework

### 3. Potential heterogeneous impact across high (H ) and Low (L) income buyers in pre-disclosure period

$$- P_{jH}^{t-k} - P_{iH}^{t-k} < 0$$

$$- P_{jL}^{t-k} - P_{iL}^{t-k} = 0$$

$i$  = non-lemon housing unit

$j$  = lemons

$t$  = timing of enacting a mandatory disclosure law;

$t+k$  being the post-disclosure period

$t-k$  being the pre-disclosure period.



# Setting - Policy reform

- ▶ The Real Estate (Regulation and Development) Act, 2016, aims at increasing transparency in the real estate sector
- ▶ It proposed setting up a real estate regulatory authority for every state
- ▶ Made it mandatory for developers to disclose relevant details on regulator's website
- ▶ 7 states' website report litigation status (29 do not report)

# Maharashtra RERA

- ▶ Government of Maharashtra set up the RERA website in May 2017
- ▶ All ongoing and new real estate projects registered with the Authority
- ▶ Including whether or not the project faced litigation

# Maharashtra RERA

## Project

Project Name (Mention as per Sanctioned Plan)	Shri Sai Vishram CHSL	Project Status	On-Going Project
Proposed Date of Completion	31/12/2019	Revised Proposed Date of Completion	31/12/2019
Extended Date of Completion	30/12/2022		
Litigations related to the project ?	Yes	Project Type	Residential
Are there any Promoter(Land Owner/ Investor) (as defined by MahaRERA Order) in the project ?	No		
File/reference no. of planning authority			
Plot Bearing No / CTS no / Survey Number/Final Plot no.	772/A, Survey No.138, Village Eksar, Taluka Borivali, Mumbai 400068	Boundaries East	Gokul CHS Ltd
Boundaries West	60 Feet wide road	Boundaries North	Kandarpada Gaothan
Boundaries South	Sai Niketan CHS Ltd	State/UT	MAHARASHTRA
Division	Konkan	District	Mumbai Suburban

# Data

## 1. Maharashtra RERA

- ▶ 3000 real estate projects in Mumbai
  - Project, developer and litigation details

## 2. Proprietary mortgage dataset from largest private bank

- ▶ Mumbai transactions between 2015 to 2020.
  - Loan attributes: loan amount, approval date, etc.
  - Unit attributes: area, price, postal code, RERA number
  - Buyer attributes: annual income, gender, occupation

# Data

- ▶ RERA data merged to create pooled cross section data
  - ▶ RERA + Mortgage: 11,553 units in 972 projects between 2015-2020
- ▶ Sample representativeness: T-test of means for projects within & not within sample shows no difference
- ▶ Litigated units in sample before and after reform is similar (including severe litigation). No evidence of:
  - lender discriminating against litigated units
  - developers bringing forward litigated unit before reform

▶ Share of litigation (pre and post)

# Method

► Baseline equation:

$$\ln Pr_{ijt} = \rho \text{Litigatn}_{ijt} + \mu \text{Post} + \beta \mathbf{1}(\text{Litigatn}) \times \mathbf{1}(\text{Post}) + \mathbb{X}_i + \delta_j + \lambda_t + \epsilon_{ijt} \quad (1)$$

where,

- $\ln Pr_{ijt}$  is the log price per sq ft of unit  $i$  in project  $j$  in year-quarter  $t$
- $\text{Litigatn}_{ijt}$  is a dummy variable with value 1 if unit  $i$  within  $j$  in  $t$  is litigated
- $\text{Post}$  is a time dummy taking value 1 after May 2017 and 0 before
- $\delta_j$  are project fixed effects
- $\mathbb{X}_i$  vector of unit and buyer characteristics
- $\lambda_t$  are year-quarter fixed effects
- $\epsilon_{ijt}$  clustered at  $j$

# Baseline results

Table: Effect of disclosure policy on log prices

VARIABLES	(1)	(2)	(3)
	Dep var: log of price per sq ft		
Litigation	-0.025 (0.034)	-0.021 (0.032)	-0.028 (0.037)
Post (RERA Introduction = 1)	-0.006 (0.021)	-0.012 (0.021)	-0.010 (0.021)
Litigation x Post	-0.044** (0.020)	-0.046** (0.019)	-0.059*** (0.018)
Constant	9.427*** (0.020)	9.410*** (0.026)	9.771*** (0.049)
Observations	11,553	11,553	11,553
R-squared	0.724	0.754	0.776
Year x quarter FE	Yes	Yes	Yes
Project FE	Yes	Yes	Yes
Property controls	No	Yes	Yes
Buyer controls	No	Yes	Yes
Year x Post code	No	No	Yes

# Classifying sub-markets

- ▶ Classify projects as luxury and non-luxury based on amenities
  - ▶ Luxury if – swimming pool, gymnasium, health club, steam room, spa and sauna, jacuzzi, etc.
  - ▶ **Robustness** – stricter definitions of luxury
- ▶ Estimate baseline regression separately for luxury and non-luxury projects



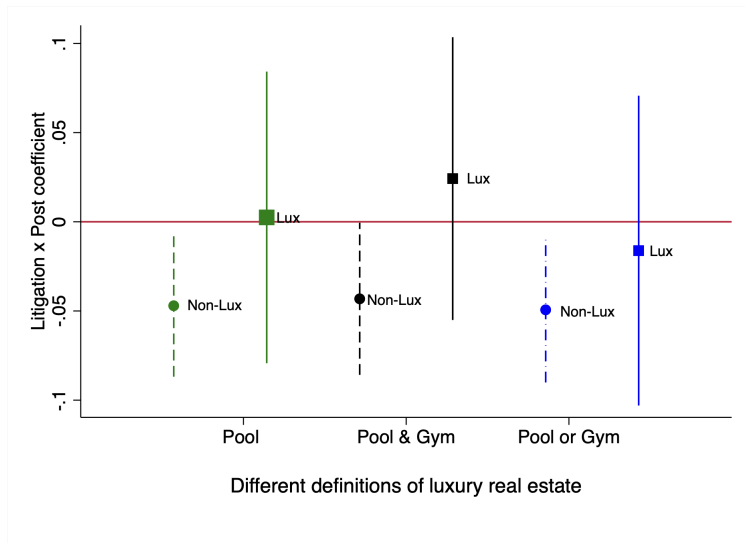
**Table: Disclosure policy only impacts non-luxury market**

VARIABLES	(1)	(2)	(3)	(4)
	Dep var: log of price per sq ft			
	Non-luxury projects		Luxury projects	
Litigation	0.016 (0.038)	0.013 (0.036)	<b>-0.107***</b> (0.031)	<b>-0.093***</b> (0.032)
Post (RERA Introduction = 1)	0.001 (0.025)	0.003 (0.024)	-0.030 (0.040)	-0.046 (0.041)
Litigation x Post	-0.053** (0.023)	-0.049** (0.022)	-0.022 (0.039)	-0.026 (0.037)
Constant	9.418*** (0.023)	9.439*** (0.033)	9.903*** (0.046)	9.861*** (0.051)
Observations	8,104	8,104	3,427	3,427
R-squared	0.731	0.763	0.695	0.730
Year x quarter FE	Yes	Yes	Yes	Yes
Project FE	Yes	Yes	Yes	Yes
Project and buyer controls	No	Yes	No	Yes

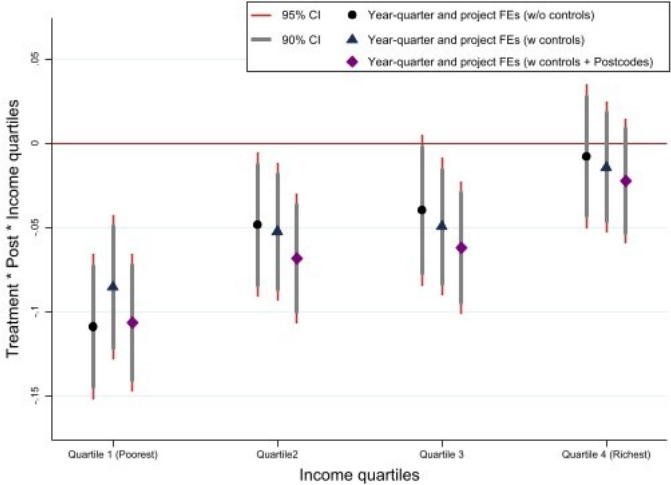
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# Alternative classifications of luxury and non-luxury sub-markets



# Effect of disclosure policy by income quartiles



▶ Regression table

# Takeaways of baseline results

- ▶ Buyers of luxury units have pre-period private information.
- ▶ Results are progressive as seen in income quartile results

# Mechanisms

- ▶ Reasons for price decline
- ▶ Differential impact across submarkets

# Mechanisms – Decline in prices

- ▶ Bargaining by buyers to reduce prices for litigated units
- ▶ Developer response – lower prices after observing fall in quantity sold

Indicative evidence for developer response: Test if quantity of sales for litigated projects decline post reform

# Mechanisms – Decline in prices

We test if sales of litigated units fell after the reform

$$\% Sales_{jt} = \rho Litigation_{jt} + \mu Post + \beta 1(Litigation) \times 1(Post) + \mathbb{X}_{jt} + \lambda_t + \delta_j + \epsilon_{jt} \quad (2)$$



- ▶ QSales declined by 0.5pp when Qsales is approx. 1%

**Table: Effect of disclosure policy on sales**

VARIABLES	(1)	(2)	(3)
	Dep var: % unit sales in a quarter		
	All	Non-Luxury	Luxury
Litigation	0.492** (0.231)	0.425 (0.262)	0.823** (0.403)
Post	3.593*** (0.179)	3.418*** (0.193)	4.480*** (0.483)
Litigation x Post	-0.462*** (0.128)	-0.434*** (0.139)	-0.600* (0.318)
Constant	-9.754*** (0.370)	-9.628*** (0.407)	-8.919*** (0.780)
Observations	16,345	13,633	2,616
R-squared	0.232	0.237	0.222
Year x quarter FE	Yes	Yes	Yes
Project FE	Yes	Yes	Yes

# Mechanisms – Differential effects of reform

## 1. Differences in buyer resources

- ▶ High-income buyers have the means to investigate the land title and legal disputes on the property (see [Glaeser et al., 2003](#))
- ▶ Test whether reform had an impact across luxury and non-luxury for the richest and poorest income groups

**Table: Heterogeneous effects by income and sub-market**

VARIABLES	Dep var: log of price per sq ft			
	Non-Luxury		Luxury	
Litigation x Post				
x Income Q1 (poor)	-0.107*** (0.025)	-0.088*** (0.025)	-0.108** (0.044)	-0.077* (0.044)
x Income Q2	-0.049* (0.026)	-0.051** (0.025)	-0.041 (0.041)	-0.044 (0.039)
x Income Q3	-0.049* (0.026)	-0.051** (0.025)	-0.017 (0.042)	-0.029 (0.039)
x Income Q4 (richest)	-0.022 (0.026)	-0.012 (0.025)	0.023 (0.040)	0.013 (0.037)
Litigation	0.017 (0.038)	0.013 (0.037)	-0.110*** (0.033)	-0.097*** (0.033)
Constant	9.421*** (0.024)	9.449*** (0.033)	10.233*** (0.051)	10.040*** (0.081)
Observations	8,104	8,104	3,427	3,427
R-squared	0.732	0.763	0.701	0.732
Year x quarter FE	Yes	Yes	Yes	Yes

# Mechanisms – Differential effects of reform

## 2. Media coverage of issues with luxury projects

- ▶ Disputes and issues facing luxury projects more likely to get media coverage
- ▶ Compare prices of litigated units with and without media coverage pre-reform period

**Table: Impact of negative media coverage on prices before disclosure policy**

VARIABLES	(1)	(2)	(3)
	Dep var: log of price per sq ft		
	All	Non-luxury	Luxury
Media dummy	0.011 (0.085)	-0.043 (0.076)	0.160 (0.114)
Constant	10.063*** (0.041)	9.707*** (0.058)	10.077*** (0.082)
Observations	1,320	841	479
R-squared	0.835	0.840	0.829
Year x quarter FE	Yes	Yes	Yes
Project FE	Yes	Yes	Yes
Unit & buyer controls	Yes	Yes	Yes

# Policy Implications

- ▶ Disclosure reveals true quality and prices of litigated units fall
- ▶ Important to investigate nature of litigation to know welfare effect
- ▶ Developers forced to bear the full cost of litigation
  - ▶ Creates incentives to improve quality; no reduction in supply
  - ▶ If litigation is unavoidable; unintended effect of developer exit and fall in supply
- ▶ Cross-cutting reforms for strengthening property rights and contract enforcement

**Thank you**  
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# Additional slides



# References

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# Summary statistics

Table: Summary statistics

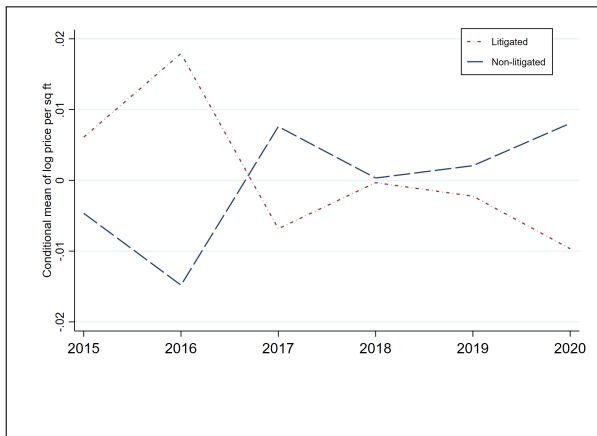
Variables	ALL		Litigated units		Non-litigated units	
	Mean	Std dev	Mean	Std dev	Mean	Std dev
Unit price per sq. ft. (INR)	14903	6475	15894	6456	13984	6356
Log of price per sq. ft.	9.54	0.38	9.61	0.36	9.47	0.39
Unit area (sq. ft.)	796	528	872	542	726	505
Unit completion (Dummy)	0.48	0.50	0.50	0.50	0.46	0.50
Buyer's annual income (INR million)	3.06	10.90	3.78	13.67	2.40	7.41
Loan to value ratio	0.60	0.20	0.60	0.20	0.60	0.20
Buyer's gender (Female =1)	0.18	0.39	0.17	0.37	0.20	0.40
Obs	11,553		5,561		5,992	

Table: Share of units with litigation pre- and post-reform

	Pre-reform	Post-reform
Share of litigated units (%)	45.2	49.1
Share of units with a case in upper courts (%)	31.8	33.4
Share of units with cases in lower courts (%)	13.4	15.7

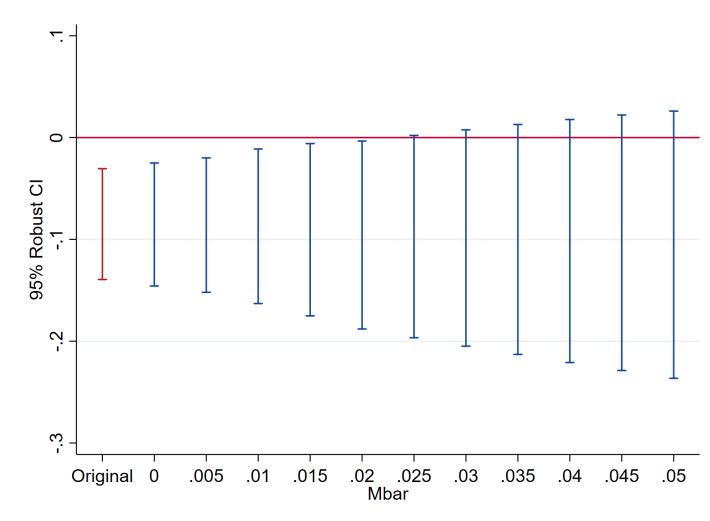
Note: The table presents the share of transacted units by litigation status and severity of litigation in the pre- and post- reform period. Units with at least one dispute in the upper courts (Bombay High Court and Supreme Court of India) are classified as facing severe litigation. The second row presents the share of total units facing litigation in the upper courts. Units with all disputes only in the lower courts are classified as facing less severe litigation.

# Conditional mean of log real price per square foot



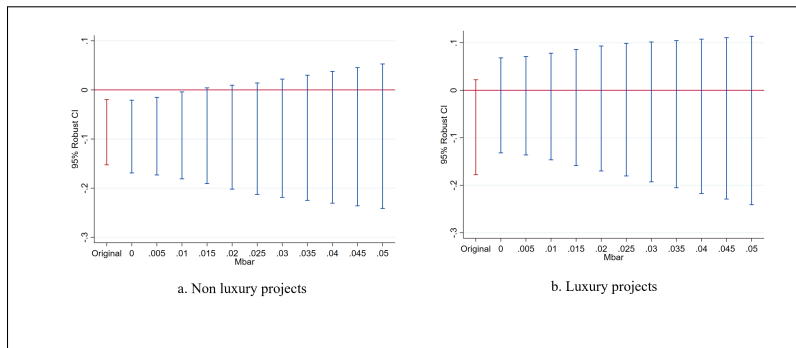
Note: Computed using data on prices of litigated and non-litigated units.

# Sensitivity to Non-Parallel Trends



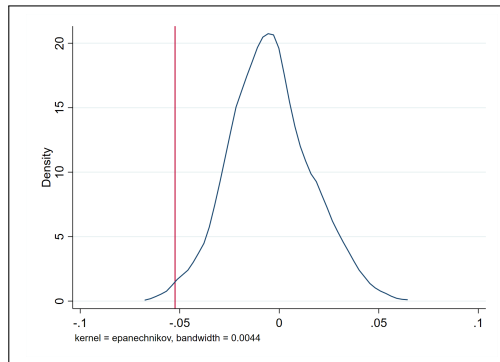
▶ Back-parallel trends

# Sensitivity analysis by type



► Back-parallel trends by type

# Permutation distribution

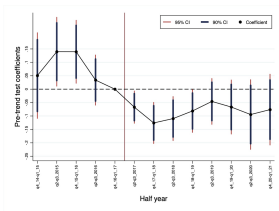


# Effect of disclosure policy on property prices by quartiles

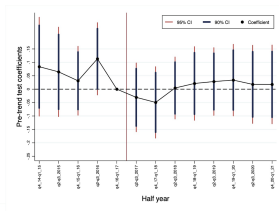
VARIABLES	Dep var: log of price per sq ft		
Litigation x Post			
x Income Q1 (poorest)	-0.109*** (0.022)	-0.087*** (0.022)	-0.107*** (0.021)
x Income Q2	-0.048** (0.022)	-0.053** (0.021)	-0.069*** (0.020)
x Income Q3	-0.040* (0.023)	-0.050** (0.021)	-0.062*** (0.020)
x Income Q4 (richest)	-0.008 (0.022)	-0.011 (0.020)	-0.019 (0.019)
Constant	9.430*** (0.020)	9.421*** (0.027)	9.404*** (0.034)
Observations	11,553	11,553	11,553
R-squared	0.726	0.755	0.777
Year x quarter FE	Yes	Yes	Yes
Project FE	Yes	Yes	Yes



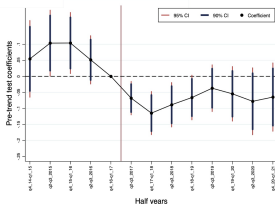
# Effect of disclosure policy using alternate property prices data



**a. Non-luxury projects**



**b. Luxury projects**



**c. All projects**

▶ Supp price data

# Robustness checks

- ▶ Supplementary price data ▶ PE price
- ▶ Testing violation of Stable Unit Treatment Value Assumption ▶ Sutva
- ▶ Matching – Distance and Size ▶ Matching



# Robustness checks

## Testing for violations of SUTVA

**Table: Results without non-litigated projects by developers who had litigated projects**

VARIABLES	Dep var: log of price per sq ft			
	Non luxury		Luxury	
Litigation	0.018 (0.039)	0.015 (0.037)	-0.107*** (0.031)	-0.093*** (0.032)
Post	0.005 (0.026)	0.009 (0.025)	-0.031 (0.042)	-0.047 (0.042)
Litigation x Post	-0.062*** (0.024)	-0.058** (0.022)	-0.021 (0.040)	-0.025 (0.038)
Constant	9.410*** (0.025)	9.430*** (0.035)	9.902*** (0.048)	9.859*** (0.054)
Observations	7,790	7,790	3,360	3,360
R-squared	0.727	0.760	0.695	0.730
Project FE	Yes	Yes	Yes	Yes

# Robustness checks

## Matching procedures

VARIABLES	Dep var: log of price per sq ft					
	Matched on distance (500 mts)			PSM (Size)		
	All	Non luxury	Luxury	All	Non luxury	Luxury
Litigation	0.088*** (0.024)	0.297*** (0.024)	0.292** (0.086)	-0.015 (0.040)	-0.004 (0.082)	-0.005 (0.040)
Post	0.032 (0.032)	0.058* (0.035)	-0.166** (0.057)	-0.018 (0.030)	0.004 (0.027)	-0.012 (0.069)
Litigation x Post	-0.106*** (0.028)	-0.117*** (0.029)	-0.127 (0.073)	-0.040* (0.021)	-0.059** (0.027)	-0.018 (0.048)
Constant	9.738*** (0.048)	9.697*** (0.049)	9.426*** (0.106)	9.781*** (0.057)	9.516*** (0.048)	9.770*** (0.063)
Observations	4,082	2,401	291	5,280	3,381	2,129
R-squared	0.682	0.709	0.682	0.750	0.772	0.705
Year x quarter FE	Yes	Yes	Yes	Yes	Yes	Yes
Project FE	Yes	Yes	Yes	Yes	Yes	Yes

▶ Back

# Policy Implications

- ▶ Case for providing litigation status on state RERA websites
- ▶ 27 states do not provide litigation status against projects (includes states like Uttar Pradesh, Delhi etc)