Consumer Protection in Housing Markets and the Democratization of Homeownership

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Abstract

Consumer protection regulation is central to household finance, yet its role in expanding homeownership access remains poorly understood. We study India's Real Estate Regulation and Development Act, which introduced consumer protections targeting real estate developers, the primary suppliers of housing. The effects are theoretically ambiguous: reduced developer risk may expand access, but compliance costs may restrict supply. Consumer protection expands mortgage access, with the largest gains for first-time buyers, women, lower-income households, and marginalized groups. Project completion improves and defaults decline. While some incumbents exit, new developers enter at a higher rate, expanding affordable housing supply. Consumer protection democratizes homeownership.

Keywords: consumer protection, home ownership, real estate developers, mortgage

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1 Introduction

Consumer protection regulation is a cornerstone of household finance, yet its application to protecting households through the process of acquiring a home – their single most consequential financial decision – remains less explored. For most households, a home is not just their largest asset but their primary vehicle for wealth accumulation (Chetty and Szeidl (2007), Chetty, Sándor and Szeidl (2017), Sodini et al. (2023) among others). Evidence from other financial markets establishes that weak consumer protection imposes severe and persistent harm on households (Egan, Matvos and Seru (2019), Egan, Matvos and Seru (2024)), and that well-designed regulation can correct these failures (Akerlof and Kranton (2000), Dobbie and Song (2015), Naritomi (2019) among others). Yet in housing, regulatory attention has focused almost exclusively on mortgage lenders (Bond, Musto and Yilmaz (2009), Gerardi, Rosen and Willen (2010) among others), leaving unexplored whether consumer protection can democratize homeownership. We study this question by examining how consumer protection regulation targeted at real estate developers, among the most consequential participants in housing markets, shapes homeownership access.

Real estate developers typically sell properties before construction is complete. In these presale housing markets, dominant across many economies, households transfer substantial savings to developers years before receiving a completed home.[1] These payments are neither fully collateralized nor insured, and enforcement is often slow or ineffective. Developers hold substantial consumer funds throughout construction with minimal regulatory oversight. When projects are delayed, funds are diverted, or developers default, households bear catastrophic losses.[2] The fear of such fraud and developer opportunism deters many potential buyers from entering housing markets entirely, particularly first-time buyers and credit-constrained households who cannot absorb such losses. Can consumer protection regulation targeting developers expand home ownership?

Answering this question requires understanding how regulation affects both buyers and developers. In housing markets, such regulation could reduce buyer risk and expand access for marginal households. However, the overall effect is theoretically ambiguous: tighter restrictions impose compliance costs that may drive developer exits and reduce housing supply, potentially offsetting gains in buyer confidence.

[1] This model dominates worldwide, representing 60% of sales in the U.S., 40% in the U.K., 70% in Hong Kong, and over 90% in China.

[2] Presale contracts inherently expose buyers to significant risks when developers delay completion, redirect funds to new projects, or default entirely. For instance, Unitech, a prominent Indian real estate developer, encountered multiple delays in completing its housing projects, affecting over 20,000 home buyers who had already committed substantial funds. There has been incidence of stalled residential project in many other countries and regions, including mainland China, Singapore, Malaysia, Thailand and Hongkong, among which, the problem is the most severe in mainland China which caused massive mortgage boycott against the banks.

Despite the importance of this question, consumer protection in housing markets remains poorly understood. Policy attention has focused primarily on mortgage lenders—financial authorities supervise disclosure practices and consumer treatment to protect borrowers (Inderst and Ottaviani (2009), Bond, Musto and Yilmaz (2009), Gerardi, Rosen and Willen (2010) among others). Meanwhile, developers control equally critical aspects of housing transactions: project completion, collateral quality, and delivery timing, all while holding buyer funds throughout construction. This regulatory gap leaves unaddressed the market failures between buyers and developers. We provide the first comprehensive evidence on consumer protection targeting developers, studying India's Real Estate Regulation and Development Act (RERA).

India introduced the Real Estate (Regulation and Development) Act (RERA), providing a unique opportunity to examine how reducing developer defaults and increasing market transparency affects home ownership patterns. RERA implements comprehensive reforms by mandating escrow accounts for project funds, enforcing timely completion deadlines, and requiring detailed disclosures about project specifications and approvals. These provisions create institutional safeguards that protect buyers and lenders against developer opportunism while simultaneously imposing new constraints and compliance costs on developers.

Using data on approximately 1.06 million individuals and over 13,000 residential projects, we investigate both sides of this regulatory intervention: how RERA's guarantees affect mortgage origination and home ownership rates, and how developers adapt their business strategies in response to increased accountability. We particularly examine who benefits from these reforms, whether the impact extends to first-time home buyers, marginalized groups, and smaller markets, and how developers respond through market exits, product adjustments, or pricing strategies when faced with stricter oversight, providing insights into how regulatory frameworks reshape both supply and demand dynamics in housing markets.

From an economic perspective, RERA's introduction creates competing effects on housing markets. On the demand side, improved transparency and reduced default risk should increase buyer confidence and mortgage availability, potentially expanding home ownership. However, the distributional impact remains theoretically ambiguous. On one hand, marginalized groups and first-time buyers, previously excluded due to wealth constraints and higher vulnerability to developer defaults, might benefit disproportionately, as institutional safeguards reduce the catastrophic impact of project failures. For these buyers, developer defaults represent potentially devastating financial setbacks from which recovery is difficult or impossible given their limited financial reserves. On the other hand, wealthier

individuals with greater financial capacity could leverage improved market conditions more effectively, potentially widening rather than narrowing home ownership gaps.

On the supply side, RERA imposes significant operational constraints on developers, likely driving exit among firms unable to meet compliance requirements or operate profitably under stricter oversight. Yet the regulation simultaneously transforms market signaling mechanisms, where previously, firm size and brand reputation served as costly signals of quality and reliability. With government-mandated guarantees now partially substituting for these signals, smaller developers may face lower barriers to entry, potentially increasing competition and affordability in previously concentrated markets.

This interplay between demand expansion, redistribution, developer exit, and new entry creates complex market dynamics that ultimately determine whether regulatory intervention democratizes or further stratifies home ownership. These theoretical ambiguities motivate our empirical investigation into RERA's actual impact on home purchases, which we study through comprehensive data on mortgage originations across diverse demographic groups and geographic areas.

Our empirical strategy leverages the staggered implementation of RERA across Indian states to identify its effects on home ownership through mortgage origination patterns. We address three potential challenges: First, to control for RERA's influence on overall credit supply, our specification compares mortgage origination within branches (branch × year-quarter) across treated and control areas. Second, we mitigate selection bias from systematic differences between early and late RERA adopters through pre-trend analyses, branch × location fixed effects, and balance tests across treatment groups. We further focus on areas along state borders and control for city-pair by year fixed effects to ensure the comparability between control and treated groups. Finally, we address potential state-level confounding events by confirming key macroeconomic variables affect control and treated groups similarly, and by exploiting within-state variation in RERA's applicability to builders. This approach demonstrates that the impact is concentrated on RERA-covered properties while exempt properties show no significant effects. We further ensure robustness by addressing methodological concerns regarding staggered difference-in-differences designs (Baker, Larcker and Wang, 2022; Sun and Abraham, 2021; Callaway and Sant'Anna, 2021).

We have 4 primary results in this paper. First, our empirical analysis reveals that the implementation of RERA leads to a significant increase in home purchases measured through mortgage origination, with a more pronounced effect for new homes compared to resale properties. This growth in mortgage access reflects both increased homebuyer participation and greater willingness from banks to extend credit. Following RERA's introduction, potential home buyers show increased confidence in entering the housing market,

as the regulatory safeguards reduce their exposure to developer defaults and project delays (Kurlat and Stroebel, 2015). Concurrently, lenders demonstrate greater readiness to provide mortgage financing as RERA's mandated disclosures and project registration requirements reduce information asymmetries in assessing collateral quality (Stroebel, 2016; Cerqueiro, Ongena and Roszbach, 2016). With standardized compliance mechanisms in place, banks can evaluate lending risk more accurately without relying heavily on developer reputation or size. The stronger effect for new properties compared to resale homes aligns with RERA's primary focus on regulating ongoing development projects, confirming that the regulation most effectively addresses uncertainties in new construction purchases.

Uncertainty about collateral quality in mortgage markets creates a cycle of exclusion in housing access. Banks manage this uncertainty through vertical integration with developers (Agarwal et al. (2014), Stroebel (2016) among others) or by concentrating lending among established clients with proven relationships (Petersen and Rajan (2002), Berger and Udell (1995), Degryse and Ongena (2005), Agarwal and Hauswald (2010) among others). These strategies systematically disadvantage first-time buyers and marginalized groups who lack banking connections. Simultaneously, these vulnerable populations often self-select out of mortgage applications, anticipating discrimination or unfavorable terms. The use of neighborhood characteristics as risk proxies further exacerbates this problem, as banks preferentially lend in affluent areas. This creates a dual barrier: banks restrict lending to perceived low-risk segments, while vulnerable groups withdraw from the market altogether. The resulting dynamic reinforces spatial concentration of mortgage availability and perpetuates socioeconomic disparities in home ownership access.

Our second set of results examines the heterogeneous effects of RERA implementation across demographic and geographic dimensions. We find that RERA's introduction is associated with increased mortgage originations for first-time borrowers, improved terms for women and marginalized castes, enhanced availability for properties in emerging neighborhoods, and a spatial redistribution from Tier 1 cities to Tier 2 and Tier 3 cities. These findings suggest that RERA's impact extends beyond aggregate market effects, potentially reducing barriers to entry and mitigating pre-existing disparities in mortgage access. The observed patterns are consistent with a democratization of home ownership and mortgage financing, indicating that regulatory interventions can have significant distributional consequences in credit markets.

The third set of results examines RERA's impact on housing project completion and subsequent mortgage performance. Utilizing project completion data, we document a statistically significant reduction in project delays following RERA implementation. Additionally, we observe lower delinquency and default rates in mortgage loans post-RERA. These find-

ings suggest that RERA's regulatory framework has had substantial effects on the housing market by enhancing project transparency and increasing the potential costs of delays for property developers. The resulting improvement in project completion rates appears to have facilitated greater mortgage origination while simultaneously reducing default risk.

Our final set of results examines RERA's real effects on developers and the housing market. We document both exit of established developers and a higher rate of new developer entry following RERA implementation. This market restructuring reflects RERA's dual impact: while project-specific escrow requirements and inter-project transfer prohibitions increase compliance costs driving some exits, the regulation simultaneously reduces signaling costs by substituting government standards for reputation-based quality signals, lowering barriers to entry for smaller developers. The resulting transformation increases competition particularly in the affordable housing segment, with new entrants focusing on smaller projects in emerging areas.

We find developers increasingly providing more affordable, smaller houses while reducing luxury housing availability. Concurrently, affordable home prices decrease while luxury home prices increase. These shifts in housing supply composition align with a democratization of home ownership, complementing our mortgage market findings and demonstrating how regulatory frameworks can reshape both financing access and physical housing stock distribution.

Our baseline results are robust to various checks. First, there could be potential issues surrounding the approach of staggered DiD as highlighted in Baker, Larcker and Wang (2022), we address the concerns by following Sun and Abraham (2021) and Callaway and Sant'Anna (2021). Next, since many of the primary variables of interest are count-like variables we show that the results are robust to alternate specifications of using Poisson regression (Cohn, Liu and Wardlaw, 2022). We also show that the impact is larger on the presale housing than on the resale housing, because RERA affect the resale market indirectly. We further restrict our sample to cities located along the state borders to improve the comparability between areas exposed to RERA and those that are not. In this specifcation, we control for state-pair-by-year-fixed effects. The variation thus comes from differences in outcomes between comparable areas within the same year.

Our paper contributes to four strands of literature. First, we contribute to the literature on consumer protection in markets with information asymmetries. Akerlof (1978) demonstrates how asymmetric information between buyers and sellers leads to market failures and adverse selection. Subsequent work examines how consumer protection regulation addresses these failures: Dobbie and Song (2015) show that bankruptcy protection affects household financial distress, while Naritomi (2019) demonstrate how consumer enforce-

ment improves tax compliance. In financial markets, Campbell et al. (2011) highlights the importance of consumer protection given household financial decision-making difficulties, Agarwal, Skiba and Tobacman (2009) and Agarwal et al. (2015) document systematic mistakes in credit markets and potential regulations in credit card markets. Recent evidence demonstrates severe consequences of financial misconduct: Egan, Matvos and Seru (2019) show that adviser misconduct reduces investor participation, while Piskorski, Seru and Witkin (2015) and Griffin and Maturana (2016) document widespread fraud in mortgage markets. However, despite extensive research on consumer protection in lending, developer-side protection remains largely unstudied. We provide the first comprehensive evidence on how consumer protection regulation targeting developers affects homeownership access, credit markets, and housing supply, demonstrating that protecting consumers from developer opportunism can simultaneously expand access for marginalized groups and improve market outcomes.

Second, this paper contributes to the literature studying the impact of government intervention in the housing market. Floetotto, Kirker and Stroebel (2016) lays down a general equilibrium model to study the effect of government policies like taxes on property and/or rent on home prices, quantities, and allocations, and welfare. Various other works have empirically investigated different government policies on home prices and home ownership such as tax policies (Gervais, 2002; Sommer and Sullivan, 2018), and subsidies (Berger, Turner and Zwick, 2020). However, limited attention is given to the impact of real estate developers on the housing market. In this paper we contribute to this literature by showing government policies targeted toward real estate developers mandating them to be more transparent and increasing their cost to delay on projects (RERA) can impact allocative outcomes in the housing market and consequently in the mortgage market. We find that the passage of RERA leads to greater access of housing by first-time borrowers, and borrowers from smaller regions. More importantly, although RERA's higher costs may drive some developers out, its improved transparency attracts new entrants and ultimately promotes increased home ownership.

Third, our paper also contributes to the literature studying the role of collateral and the uncertainty surrounding collateral quality in affecting household debt. There is a large literature that highlights the importance of information asymmetry in credit disbursement (Petersen and Rajan (1994), Karlan et al. (2009) among others). Relationship between banks and borrowers have been highlighted to reduce information asymmetry and affect household debt like mortgage, credit card debt and also impacts default (Agarwal et al. (2018), Guiso, Sapienza and Zingales (2013) among others). In the context of the mortgage market, Stroebel (2016) highlights that lenders with superior information about collateral quality can reduce

foreclosure in mortgages. It builds on works of Agarwal et al. (2014) that highlight the role of vertical integration of real estate developers and banks as a tool to mitigate information uncertainty in the collateral quality. We add to this literature by showing that regulating real estate developers can create a scenario that improves transparency of the underlying collateral and facilitate higher mortgage origination.

Finally, we contribute to the literature that studies the factors that can expand or hinder access to owning homes across various groups. Barriers to mortgage access often stem from political/electoral factors (Akey et al. (2018), McCartney (2021) among others), discrimination based on race, gender, and religion in both the mortgage and housing market (Munnell et al. (1996), Bhutta and Hizmo (2021) among others), and self-selection out of these markets due to fear of discrimination (Charles and Hurst (2002), Park, Sarkar and Vats (2021) among others).[3] Other factors that can impact the dispersion of ownership could be segmented nature of search in the housing market leading to excess demand in a small neighborhood (Piazzesi, Schneider and Stroebel, 2020), the potential difference in historical mortgage-market reforms (Andersen, 2011) and differential appeal of the American dream of owning a home (Agarwal, Hu and Huang, 2016). We contribute to this literature by showing that making real estate builders more transparent and reducing the potential cost of default could have asymmetric impact on groups that were previously excluded from the housing market and can lead to democratization of the home ownership landscape.

The remainder of the paper is organized as follows: Section 2 details the institutional background of the housing market in India and the changes brought about by RERA. Section 3 introduces the data. Section 4 outlines the empirical strategy used in the paper and section 5 presents the results. Section 6 sets up a conceptual framework to rationalize the major empirical findings. Finally, section 7 concludes.

2 Institutional Details

This section presents the institutional design of home ownership in India: the way the housing market worked before the implementation of RERA, and the necessary changes that RERA brought in the housing market. More details on the housing and mortgage market in India can be found in Appendix B.

[3]Several studies have highlighted supply-side bottlenecks that prevent access to mortgages across various groups like race, gender. See Holmes and Horvitz (1994), Tootell (1996), Ross et al. (2008), Ghent, Hernandez-Murillo and Owyang (2014), Cheng, Lin and Liu (2015), Hanson et al. (2016), Giacoletti, Heimer and Yu (2021), Bartlett et al. (2022), Ambrose, Conklin and Lopez (2021), Begley and Purnanandam (2021), Bhutta, Hizmo and Ringo (2021), Fuster et al. (2022), Howell et al. (2022), Butler, Mayer and Weston (2023), among others.

2.1 Pre-RERA Landscape of Housing Sector in India

Before the advent of the Real Estate (Regulation and Development) Act (RERA), the Indian housing sector faced a host of intricate challenges that impeded its functionality and credibility. Prior to the enactment of RERA, there was no national-level regulation concerning the pre-sale market, leading to a lack of oversight and transparency. Despite the mandatory requirement for developers to initiate projects solely after obtaining required approvals from the authorities, due to the lack of monitoring, it was common for the developers to violate these rules and launch pre-sales preemptively, sometimes before the land title was even settled.

Regarding the payment mode, it varies significantly depending on the discretion of individual developers and typically includes three options: the construction-linked plan, the downpayment plan and the flexi plan. Under the construction linked-plan, buyers initially pay a minimal proportion of the total price at the time of booking, with subsequent payments tied to the agreed-upon milestones in the construction progress. Conversely, in the downpayment plan, a small proportion, typically 10% of the total cost, is paid upfront as a downpayment, followed by a substantial portion of the remaining amount one month after the booking time, leaving only a negligible balance (around 5%) to be settled upon possession. The flexi plan, as its name suggests, offers a flexible blend of the aforementioned approaches. It incorporates an initial downpayment at the time of booking, accompanied by a smaller amount paid 30 days later, distinct from the downpayment plan's structure. The remaining sum is then tied to the construction milestones, akin to the construction-linked plan. Notably, developers often incentivize buyers by offering substantial discounts for opting for the downpayment plan, aiming to expedite the receipt of sales proceeds. This suggests that developers are willing to sacrifice profit on a single project in exchange for early receipt of sale proceeds. Because of inadequate oversight on how the developers use the sales proceeds, it was common that they use the fund for purpose unrelated to the ongoing project, leading to construction delays to a lack of liquidity.

Under such scheme, transparency was notably lacking, leaving prospective home buyers grappling with a shortage of comprehensive and accurate information concerning various housing projects. This lack of transparency created an atmosphere filled with uncertainties, exposing home buyers to misleading representations and financial risks. Moreover, persistent project delays left many home buyers in a state of uncertainty, despite significant financial commitments. Deceptive advertising, promising amenities that often failed to materialize, compounded the sector's problems. The absence of robust grievance redressal mechanisms further exacerbated home buyers' plight, amplifying financial vulnerabilities and discontent within the housing sector. In such a "lemon" market, homebuyers lack accurate information,

and have to rely on noisy signals like the firm size to make purchase decision, making it more difficult for small developers to operate.

RERA's implementation not only seeks to protect home buyers but also affects banks and financial institutions. The Act's focus on ensuring project completion within stipulated timelines and enhancing transparency can reduce default risks associated with delayed or incomplete projects, thereby positively impacting banks by mitigating non-performing assets (NPAs) and potential loan defaults related to the real estate sector. Additionally, RERA's stringent regulations and mechanisms for dispute resolution can potentially foster a more secure lending environment for banks, contributing to increased confidence in financing real estate projects.

2.2 RERA's Intervention and Key Provisions

The advent of the Real Estate (Regulation and Development) Act in March 2016 marked an epochal shift in the Indian housing sector, ushering in a paradigm of reforms aimed at rectifying long-standing industry maladies. Figure 1 illustrates the detailed policy instruments of RERA. RERA's core mandate revolved around enhancing transparency, instilling accountability, and fortifying consumer protection. Mandating the registration of real estate projects above stipulated thresholds, RERA engineered a seismic shift towards transparency, mandating developers to provide comprehensive disclosures. These encompassed detailed project timelines, layouts, approvals, and periodic progress updates, empowering buyers with crucial information for informed decision-making. Notably, the Act underscored the imperative of fair practices, imposing stringent regulations to curtail misleading advertisements and ensuring strict adherence to disclosed project plans and stipulated timelines.

The introduction of escrow accounts emerged as a pivotal measure, aiming to prevent fund diversion and safeguard home buyers' financial interests. Developers were compelled to deposit 70% of collected funds into dedicated accounts and withdraw funds to cover the cost of the project based on the progress of the project which will be certified by the authority, thereby mitigating the risks associated with fund diversion and ensuring their judicious utilization for project completion. The account number of the escrow account is made public to ensure the public awareness of this account, and the developers should regularly update the status of the account, such as recent withdrawals and account balances. RERA also requires regular auditing to monitor the financial statements submitted by the developers and to ensure that the withdrawal from the escrow account has been in compliance with the progress of the projects.

Crucially, RERA heralded the establishment of state-level regulatory bodies tasked

with the onerous responsibility of enforcement, compliance monitoring, dispute resolution, and efficient grievance redressal, thus infusing an element of accountability and oversight within the sector. State RERAs operate online platforms where home buyers and contractors can directly file complaints over the developers. RERA also introduce rigorous punishment mechanism. Any violation of the law will incur upto 10% of estimated cost of the project and/or imprisonment upto 3 years. For any delay in the delivery of the project, the developers have to refund the buyers along with the due interest. If the buyer decides not to withdraw the property possession, the developers will compensate the buyers for the delay in the form of monthly interest till the delivery of the property.

RERA's implementation epitomized a transformative juncture, catalyzing a seismic shift towards a more transparent, accountable, and consumer-centric housing sector in India. The Act's stringent regulations and emphasis on transparency are believed to have significantly bolstered buyer confidence by instilling trust in the sector's integrity. Timely project deliveries, adherence to quality standards, and the assurance of comprehensive disclosures aim to augment the sector's reliability, mitigating uncertainties associated with project delays and unfair practices. Additionally, RERA's pivotal focus on establishing efficient mechanisms for dispute resolution and robust grievance redressal engendered a more consumer-friendly housing market, fostering a harmonious ecosystem conducive to sustainable growth and heightened investor confidence. In essence, RERA's legacy transcends mere regulatory reforms; it has been instrumental in transforming the erstwhile opaque and uncertain housing domain into a transparent, accountable, and consumer-centric industry, envisaging a future characterized by resilience, fairness, and sustained growth. By the end of 2023, over 100,000 cases had been solved by State RERA, according to the Ministry of Housing and Urban Affairs, and over 100,000 projects were registered under RERA. [4]

2.3 Home Loan Application & Repayment in India

Mortgage market has been booming in India due to rapid housing price increase and urbanization rate. According to the report by the National Housing Bank, the ratio of mortgage to GDP rose from 10% in FY18 to 12.3% in FY23.

Application and Sanction of Loan - The home loan application process in India involves several key steps. Initially, borrowers submit applications, including personal information such as age, years until retirement, proof of salary, or proof of business address for non-salaried individuals, along with assets, liabilities, and credit scores. Lenders meticulously review these materials to assess creditworthiness and conduct property valuations, a process

[4] https://www.business-standard.com/finance/personal-finance/record-rally-realty-project-registrations-under-rera-touch-1-16-lakh-in-2-years-123122200750_1.html

typically spanning 3-4 weeks. Decisions regarding loan approval, amount, and interest rate are then made by lenders. According to Reserve Bank of India (RBI) guidelines, the Loan-to-value (LTV) ratio is capped at different percentages based on loan amounts. It is capped at 90% for loans up to ₹300,000, 80% for loans between ₹300,001 to ₹750,000, and 75% for loans above ₹750,000. The interest rate is calculated by adding a risk premium to the base rate [5], with factors such as home loan scheme, credit score, collateral quality, loan tenure, LTV, occupation and gender influencing the risk premium. Female and salaried borrowers may receive interest rate concessions. The tenure of home loans are up to 30 years. Borrowers aged between 18 to 70 years old are eligible.

If a loan application is rejected, the borrower must seek alternative lenders. Conversely, if the loan is approved, borrowers proceed to sign the loan agreement, and lenders disburse the loan amount to the seller or developer. A processing fee, typically 0.35% of the loan amount, subject to a minimum of ₹2,000 and a maximum of ₹10,000, is deducted from the total loan amount. However, certain categories of home loans may qualify for a waiver of this fee. The borrower commits to paying an equivalent monthly installment (EMI) as per the agreement, with charges applicable for prepayments.

Delinquent and Default - If a borrower misses fewer than three EMIs, the bank typically issues a warning; after three consecutive missed payments, the borrower is classified as being in default, and the bank issues a formal notice. Borrowers may approach the lenders to explain their situation, in which case the bank might grant a grace period. If the issue remains unresolved, the bank may issue a final 60-day notice. Failure to settle the outstanding dues within this period leads to a follow-up notice indicating the auction date of the collateral property. Under the Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest (SARFESI) Act, banks are authorized to directly seize and auction the collateral. If the auction proceeds are insufficient to recover the loan amount, banks may pursue recovery from the borrowers' other assets. Missing EMI payment or default are reported to credit bureaus, which can negatively affect the borrowers' credit score.

2.4 Real Estate Sector and Housing Market in India

As in many other developing countries, the real estate sector in India is closely linked with various industries and contributes significantly to the economic output. According to data from the Ministry of Statistics and Programme Implementation, the GVA by the real estate sector reached ₹25.87 trillion in FY 2018-19, accounting for 15.3% of the national GVA. From FY 2014-15 to FY 2018-19, the sector's GVA grew at an average annual rate of 13% .

[5] From 1 April, 2016, the base rate is replaced by Marginal Cost of Funds based Lending Rate (MCLR).

Urban housing development expanded rapidly during our sample period, driven by a steadily rising urbanization rate. The urban housing market in India comprises of a primary market where home buyers purchase directly or with the assistance of real estate brokers from the developers, and a secondary market where properties are transacted between individuals. Figure A3 shows the quarterly housing price index, published by the Federal Reserve Bank of St. Louis. Prior to 2012, housing prices in India experienced a steady increase driven by rapid economic growth. However, from 2013 to 2014, prices declined slightly due to oversupply and economic slowdown. From 2015 and 2018, growth of housing demand is lower due to weaker real GDP growth and policy interventions such as demonetization, the implementation of RERA and Goods and Service Tax Act. As a result, the housing price saw only modest appreciation during this period. In 2019, housing price decreased marginally, reflecting liquidity constraints faced by developers and an increased supply of affordable housing.

3 Data and Summary Statistics

The primary analysis of the paper hinges two different sources of data – mortgage transactions data, and data on real estate purchases. We augment these data with the information on the passage and implementation of RERA from the Ministry of Housing Affairs in India. In this section we provide an overview of the data:

Mortgage transactions data The data includes the mortgage originated by all branches of a state-owned commercial bank in India from the 1990s to 2023. This bank is one of the largest in India, with over 20,000 branches across all states and union territories and has over 32% of the market share in home loans. The distribution of branches across the country is presented in Panel (a) of Figure 2. There are over 19,000 PIN codes and over 1,100 districts in India, and this bank has branches in over 57% of the PIN codes and over 92% of the districts.

The data includes loan information, collateral attributes, borrower information, and branch information. Loan information includes the date of disbursement, loan amount, interest rate, loan term, whether the interest rate is fixed, monthly repayments, and loan performance. Attributes of the collateral include the address and the PIN code[6] of the home, the purchase price, the appraised value, and the square footage of the home. Borrower information includes each borrower's unique identifier, gender, age, occupation, income, caste, and religion. Branch information includes PIN code where the branch is located and a unique identifier for each branch.

[6] A PIN code (short for Postal Index Number) is India's equivalent of a postal code or ZIP code. On average, each PIN code serves about 20,000–50,000 people, though this differs by region and population density.

We keep the mortgages originated from April 2015 to December 2019 and remove the four years from 2020 to 2023 to avoid the confounding effect of the COVID-19 pandemic. We only keep the branches that issued the first mortgage before October 2016 which is the month when the first few states announced the state-level RERA policy and delete branches that started home loan business after RERA. We exclude mortgages that rank in the top and bottom 1% of all mortgages in terms of the loan amount, purchase cost, or square footage. We also removed mortgages that were missing the collateral PIN code. After the screening, we have above 1 million mortgages.

Table 1 presents summary statistics of key variables. In Panel A, we construct a panel of branch and collateral PIN code by calendar quarters. Every quarter, ₹713,000 or 0.36 mortgage loans are originated per branch per PIN. These mortgages are obtained by 0.35 borrowers, of which 0.26 are first-time borrowers, i.e. the borrowers who have no prior lending relationship with the bank. The average size of each mortgage (=*Loan Amount/Loan Number*) is ₹2.11 million. "*Prob. of Getting Loan*" is a dummy variable equal to one if "Loan Amount" is greater than zero.

In Panel B, we construct a panel of branch and state of collateral by calendar quarters. We focus on the number of unique PIN codes that received loans with this data structure. "*No. of New PIN*" represents the number of PIN codes that received mortgages from our bank for the first time ever, while "*No. of Existing PIN*" represents the number of PIN codes that obtained loans previously. Each quarter, on average 1.07 PIN codes within a state obtain a mortgage from each branch, with nearly no PIN codes obtaining a loan for the first time.

In Panel C, we examine the loan-level data. The average interest rate is 8.69%, and the average loan amount is ₹2 million. The average property cost is ₹3.24 million, with a mean build-up area of 885.80 square feet. The average loan-to-value ratio is 56.26%. Among borrowers, 27% are female, 82% are first-time borrowers, and 5% belong to the backward caste.

Real Estate data We obtain data from a proprietary real estate analytics platform that compiles information on residential real estate development projects in India. The dataset is structured at the project level and includes both static project characteristics and time-varying indicators for projects active between 2010 and 2020 across 12 cities[7] in 9 states. Key variables include project location, developer, property segment, project score, RERA status, delays, number of units, unit size, and transacted prices. Property segment refers to the three segments including luxury, mid-tier and affordable housing. Project score is a composite quality index calculated by the platform based on absorption rate, average price per square

[7]The 12 cities are Ahmedabad, Bengaluru, Chennai, Faridabad, Ghaziabad, Greater Noida, Gurugram, Hyderabad, Kolkata, New Delhi, Noida, and Pune.

foot , developer rating, property segment, and completion delays. Delay is measured as the number of months between the planned and actual completion date. We restrict the sample to projects launched within five years before and after the RERA enactment in the respective states. This results in a total of 13,357 development projects.

Panel D provides the summary statistics of project-level variables. The average project size is 297.97 units. Among all projects, 21% of the units are affordable apartments with another 21% as luxury apartments. The mean project score is 6.64 with an average delay of 14.41 months. The average unit size is 1,378.14 square feet and the average per square feet price is ₹4,183.88.

Company financial statements The data includes key financial indicators of sample of companies in India from the Ministry of Corporate Affairs (MCA), both listed and unlisted, at an annual frequency. This dataset is used by the Indian government to calculate private sector value-added and is representative of the entire formal private sector. It includes firms' registration and closure dates and precise operational addresses, enabling us to construct a spatiotemporal dataset of private sector activity in India.

Implementation of RERA The dates of RERA implementation are collected from the official RERA website for each state. For states where official notifications are unavailable, we supplement this with dates manually collected from news articles. The quarterly implementation of RERA across various states is presented graphically in Figure 2 Panel B. We observe significant variations in the timing of implementation across the country.

State Macroeconomic variables We obtain state-specific macroeconomic variables like GDP per capita, gross value added for the construction sector, the CPI of housing, and credit issued by scheduled commercial banks from the Handbook of Indian Statistics maintained by the Reserve Bank of India.

4 Empirical Strategy

In this section, we describe the primary empirical strategy used to examine the effect of RERA on mortgage outcomes, leveraging the proprietary data from a large bank in India. We then use real estate data to study the impact of RERA on the housing market.

4.1 Effect on Mortgage

We adopt a staggered difference-in-differences approach that compares states that have implemented RERA with those that have yet to implement it. As introduced in Section 2,

RERA was announced at the national level by the central government in 2016, while the state governments retained discretion over the timing of its implementation.

In our baseline regression, we examine the impact of RERA on mortgage loans originated to the borrowers whose collateral is located in the treated states. Our empirical specification is presented below:

$$Y_{bpq} = \beta \cdot Post_{pq} + \alpha_{bp} + \alpha_{bq} + \varepsilon_{bpq} \tag{1}$$

Where Y_{bpq} denotes the following outcomes: (1) the probability of receiving a loan from branch b in a PIN code p during quarter q; (2) the amount of loan originated by branch b during quarter q to borrowers whose collateral is located in PIN code p; (3) the number of borrowers receiving a loan from branch b during quarter q with collateral located in a PIN code p; (4) the average loan size measured as the ratio between the total amount and ratio of loans originated by branch b to collaterals located PIN code p in quarter q; (5) the total number of first-time borrowers receiving a loan from branch b in quarter q with collateral located in PIN code p; (6) the total number of existing borrowers receiving a loan from branch b in quarter q with collateral located in PIN code p. "Post" is a binary variable that takes 1 if a PIN code p belongs to a state that has implemented RERA at time q. The regression specification includes branch×PIN fixed effects (α_{bp}) and branch×year-quarter fixed effects (α_{bq}). Branch×PIN code fixed effects control for time-invariant factors influencing a branch's propensity to originate mortgage to a specific PIN code, such as distance, home bias, etc. This allows the estimation to rely on time-series variation in RERA implementation status in a state. Branch×year-quarter fixed effects control for unobserved, time varying factors affecting a branch in a given quarter. This ensures that identification comes from within-branch variation across PIN codes, one located in a state that has implemented RERA and another in a state that has not.

We also investigate the changes in mortgage attributes including the loan amount, LTV, and interest rate using the data at loan-level with the regression specified in equation (1).

To capture the dynamic effects over time, we define a series of binary variables, $"Event_{pq}"$, indicating each event quarter from 4 quarters before to 8 quarters after the implementation of RERA in each state. Additionally, we define two binary variables: "$Event_{pq(<=-5)}$", which captures all quarters leading up to the fourth quarter preceding the implementation, and "$Event_{pq(>=9)}$", which captures all quarters following the ninth quarter post-implementation. To show the aggregated effect of the policy in each event quarter t, we

visualize the cumulative effect $b_t = \sum_{q=-4}^{t} \beta_q$ in Figures 3 to 4.

$$Y_{bpq} = \beta_{q(<=-5)} \cdot Event_{pq(<=-5)} + \sum_{q=-4, q\neq -1}^{8} \beta_q \cdot Event_{pq} + \beta_{q(>=9)} \cdot Event_{pq(>=9)} + \alpha_{bp} + \alpha_{bq} + \varepsilon_{bpq} \quad (2)$$

We then conduct heterogeneity analysis to examine whether the effect of RERA varies across collaterals located in different cities. Specifically, we estimate the following regression with data at the branch × PIN code level:

$$Y_{bpq} = \beta_1 \cdot Post_{pq} + \beta_2 \cdot Post_{pq} \times Tier2 + \beta_3 \cdot Post_{pq} \times Tier1 + \alpha_{bp} + \alpha_{bq} + \varepsilon_{bpq} \quad (3)$$

where the binary variables *"Tier 1"* and *"Tier 2"* equal 1 if the collateral is located in a Tier 1 or Tier 2 city, respectively, and 0 otherwise. Tier 3 cities are the omitted reference group.

We use the following specification to examine the effects of RERA on borrowers with different socio-economic status:

$$Y_l = \beta_1 \cdot Post_{pq} \times Group_i + \beta_2 \cdot Post_{pq} + \beta_3 \cdot Group_i + \alpha_{bp} + \alpha_{bq} + \alpha_{sq} + \alpha_{sg} + \varepsilon_l \quad (4)$$

where l represents loan, and i represents borrower. *"*$Group_i$*"* is a binary variable indicating the borrower's gender, income, and new borrower status. This specification also includes state×quarter fixed effects (α_{sq}), which control for state-specific macroeconomic confounders and will absorb $Post_{pq}$. We also include state×Group fixed effects (α_{sg}) to account for time-invariant characteristics of each group within states. This will absorb $Group_i$.

4.2 Effect on Housing Projects

To evaluate the effect of RERA on housing project characteristics, we estimate a project level regression with the following specification:

$$Y_{ijq} = \beta \cdot Post_{ijq} + \alpha_j + \gamma_q + \varepsilon_{ijq} \quad (5)$$

where Y_{ijq} includes project segment, score, delay, average unit size, and launch price per per square feet for project i in city j during quarter q. The regression specifications include city fixed effect α_j and quarter fixed effects γ_q. The city fixed effects control for time-invariant heterogeneity across city, allowing identification to come from the time-varying implementation of RERA within a city. Meanwhile, year-quarter fixed effects absorb common shocks over time.

We evaluate the effect of RERA enactment on RERA-registered projects and its spillover

effects on non-registered projects through the following specifications:

$$Y_{ijq} = \beta_1 \cdot Post_{ijq} \times R_i + \beta_2 \cdot Post_{ijq} \times NR_i + \alpha_j + \gamma_q + \varepsilon_{ijq} \tag{6}$$

where the binary variables R and NR take 1 if the project is RERA-registered or not registered respectively, and 0 otherwise.

The dynamic effects of RERA on housing project characteristics are estimated using the following specifications:

$$Y_{ijq} = \sum_{q=-5}^{-2} \beta_q \cdot Event_{jq} + \sum_{q=0}^{9} \beta_q \cdot Event_{jq} + \alpha_j + \gamma_q + \varepsilon_{ijq} \tag{7}$$

while the dynamic effects by RERA-registration status are evaluated using:

$$Y_{ijq} = \sum_{q=-5}^{-2} \beta_q \cdot Event_{jq} + \sum_{q=0}^{9} \beta_{1q} \cdot Event_{jq} \times R_i + \sum_{q=0}^{9} \beta_{2q} \cdot Event_{jq} \times NR_i + \alpha_j + \gamma_q + \varepsilon_{ijq} \tag{8}$$

We further investigate the effect of of RERA by property segment using the following specification:

$$Y_{ijq} = \beta_1 \cdot Post_{ijq} \times Seg1_i + \beta_2 \cdot Post_{ijq} \times Seg2_i + \beta_3 \cdot Post_{ijq} \times Seg3_i + \alpha_j + \gamma_q + \varepsilon_{ijq} \tag{9}$$

where the binary variables *"Seg 1"*, *"Seg 2"*, and *"Seg 3"* take 1 if the development project belongs to affordable, mid, and luxury segment, respectively, and 0 otherwise.

5 Result

This section presents the results from the empirical analysis described in Section 4. First, using the detailed data on mortgages, we study the impact of RERA on mortgage origination, and exploit various geographic and demographic cross-sections. Next, we use data on real estate projects to study the impact of RERA on the various aspects of housing market. Then, we show the impact of RERA on housing project completion and mortgage performances. Lastly, we examine the operation of real estate developers to understand the post-RERA organization of the industry.

5.1 Effect of RERA on Mortgage Origination

We start by investigating the effect of RERA on mortgage origination, which is one of the cornerstones of home ownership.[8] We exploit the staggered implementation of RERA and employ a difference-in-differences empirical strategy using the baseline regression specification in equation (1). The results are reported in Table 2. In columns (1) and (2), the dependent variable is a binary variable taking the value 1 if a home mortgage loan is extended by a branch to a PIN code in a given quarter. We find that RERA implementation increases the probability of a mortgage being issued to a PIN code in treated state by 0.8 percentage points, relative to untreated states. Given the unconditional mean of approximately 16 percent, this represents an increase of over 5% in the probability of receiving a mortgage. Column 1 includes branch×year-quarter and PIN code fixed effects, column 2 replaces the PIN code fixed effects with branch×PIN code fixed effects and include year-quarter fixed effects, and column 3 includes the most granular branch×PIN code fixed effects and branch×year-quarter fixed effects. Branch×year-quarter fixed effects control for unobserved shocks affecting each branch in a given quarter, allowing identification to come from within-branch variation across PIN codes—one in a state that has implemented RERA and one in a state that has not. The branch × PIN code fixed effects control for time-invariant characteristics of a branch's propensity to lend to specific PIN codes, such as distance or home bias, enabling identification from time-series variation in RERA implementation status within each branch–PIN code pair. In columns 4 to 6 of Table 2, the main variable is the amount of loans disbursed. We perform a log transformation of the variable using ln(0.01 + loan amount). We find that RERA imeplementation leads to an over 4% increase in the disbursal of home loans. Column 4 includes branch×year-quarter and PIN code fixed effects, column 5 includes branch×PIN code fixed effects and include year-quarter fixed effects, and column 6 includes the most granular branch×PIN code fixed effects and branch×year-quarter fixed effects. Similarly, we observe an approximately 4% increase in the numbers of loans disbursed in the PIN codes located in states that implemented RERA. The effects are consistent in columns 7 to 9 of Table 2. Taken together, the results highlight that there is an increase in the aggregate mortgage loans disbursed after the implementation of RERA.

Next, we estimate the dynamic version of the regression specification (1) as presented in the empirical specification (2). Since the effect may persist over time, we focus on plotting the cumulative effect in each period, following the methodology in Agarwal and Qian (2014). The results are shown in Figure 3. Panel A shows the dynamic trend in the amount

[8] A large number of homes are purchased through mortgage borrowing. In FY 2023 the mortgage-to-GDP ratio was 12.3%. Moreover, Indian households have strong unsatisfied demand for mortgages. A survey conducted by Knight Frank (2024)) on a group of representative urban residents in India shows that 79% respondents prefer to use mortgage to finance their house.

of loan disbursed. We observe no statistically significant difference between the treated and control group before the implementation of RERA, supporting the parallel trends critical to difference-in-differences analysis. Following RERA implementation, however, we find a sharp and sustained increase in lending toward PIN codes located in treated states. We observe similar dynamic patterns for the number of loans and the probability of loan disbursal, as presented in Panels B and C of Figure 3.

Robustness Checks: We conduct a series of robustness checsk to validate our baseline results. First, to address the recent criticisms of the staggered difference-in-differences design highlighted by Baker, Larcker and Wang (2022), we implement the estimation process proposed in Sun and Abraham (2021) and Callaway and Sant'Anna (2021). The results are presented in Appendix Tables A1 and A2.

We address concerns about the usage of log(1+.) transformation for count-like variables. We follow the recommendation of Cohn, Liu and Wardlaw (2022) and estimate a Poisson regression model. The results are shown in Table A3.

RERA is implemented primarily at the state level. However, to control for local unobservables, our main analysis is conducted at the PIN code level. A potential concern with this level of granularity is that the increase in the number of observations may artificially inflate the t-statistics. To address this, we re-estimate our baseline specification using data collapsed to the branch–state–quarter level, instead of the branch–PIN–quarter level. The results are presented in A4.

We also address concerns about the non-random timing of RERA implementation across states by examining whether observable state-level characteristics predict the timing of adoption. In Appendix Table A5, we present the relationship between state-specific macroeconomic factors and the probability of RERA implementation. We find no significant effect of lagged GDP, construction sector growth, aggregate credit flow, or the CPI for housing on the timing of implementation. Furthermore, we include these variables as controls in our baseline specification and find that the results remain qualitatively and quantitatively unchanged. These robustness results are reported in Appendix Table A6.

We conduct a placebo test by randomly assigning RERA implementation status across states and plotting the distribution of estimated coefficients. The actual coefficient lies outside this distribution, suggesting that the observed effect is unlikely to be obtained by chance. The placebo results are shown in Appendix Figure A1.

To address the concern that treated and control groups may be geographically distant—and thus differ along unobserved dimensions—we restrict the sample to PIN codes located in districts that straddle state borders, as illustrated in Figure A4. We estimate the baseline regression specification (1) on this restricted sample and present the results in the

odd-numbered columns of Table A7. In the even-numbered columns, we additionally include state-pair×year fixed effects to control for time-varying bilateral trends. The results are consistent with our baseline findings.

Lastly, we replicate the regressions reported in columns (3), (6), (9) and (!2) in Table 2 and columns (1) and (2) in Table 3 by dropping one state at a time and confirms that the results in not driven by one state. The coefficients are visualized in Figure A2. In an unreported robustness test, we also remove five north-easten states, including Assam, Arunachal Pradesh, Tripura, Mizoram and West Bengal, and confirms that the subsample results are similar to our baseline results.

5.2 Heterogeneity

In this section, we explore heterogeneity in the data to better understand the pathways through which RERA implementation can affect housing market dynamics. Specially, we examine variations in the following dimensions: whether the borrower had a prior relationship with the bank, the status of the collateral, and the borrower's location, gender, income level, and caste.

We begin by exploring variation across borrowers with an existing relationship with the lending branch. The motivation of this test stems from the role of relationship lending in mitigating informational frictions, particularly in the presence of asymmetric information (Boot and Thakor (2000), Sufi (2007) among others). As discussed in Section 2, before the implementation of RERA, uncertainty surrounding the quality of collateral may have limited lending to new borrowers, while favoring borrowers with established relationships. Following RERA, which enhanced transparency around project and collateral quality, we expect banks to rely less on prior borrower relationships—resulting in increased lending to first-time borrowers.

We present a cross-sectional comparison of the new and existing borrowers in Table 3 using the same panel data structure as in Table 2. In columns 1-2, we estimate the empirical specification in equation (1) separately for new and existing borrowers. The dependent variable is the natural logarithm of the number of borrowers of each type. We find a 2.4% increase in the number of new borrowers following the implementation of RERA, while there is no economically or statistically significant effect for the existing borrowers. Similarly, in columns 3 to 4, we find a significant increase in the amount of loan being issued to the new borrowers, but no statistically significant impact for existing borrowers. In Column 5, we examine the number of unique PIN codes a branch lends to in states that have implemented RERA. The idea is that, after RERA improves collateral transparency, branches may expand

lending to new areas where they previously had no borrower relationships, consistent with Agarwal and Hauswald (2010). The regression is conducted based on data at the branch × state × year-quarter level. We find that branches lend to 9.5% more PIN codes after the implementation of RERA.

We also present the dynamic effects of RERA on new and existing borrowers in Figure 4. Panel A shows the result on the total number of borrowers, we find an increase in the total number of borrowers after RERA with no significant pre-trends. Panel B focuses on new borrowers and similarly shows an increase after RERA. In contrast, Panel C presents results for existing borrowers, where we find no discernible effect of RERA implementation.

RERA primarily targets the presale housing market and is therefore expected to directly affect the mortgage loans used to purchase new apartments, with potential spillover effects on the resale market. To explore the heterogeneous effect on the loan outcomes based on collateral status, i.e., new versus resale housing, we repeat the regressions specified in equation (1), defining the dependent variable Y_{bpq} for loans originated against new and resale housing. Specifically, Y_{bpq} is measured at the branch (b) - PIN code (p) - quarter (q) level, and is defined as: (1) the probability of a loan being originated for new housing; (2) the probability of a loan being originated for resale housing; (3) the total loan amount originated for new housing; (4) the total loan amount originated for resale housing; (5) the total number of loan originated for new housing; (6) the total number of loan originated for resale housing; (7) the number of borrowers receiving loans backed by new housing; (8) the number of borrowers receiving loans backed by resale housing.

The results in Table 4 suggest the increase in mortgage loan origination is primarily driven by loans backed by new housing. Columns 1 and 2 show that the probability of originating a loan for new housing increases by 0.6 percentage points following RERA implementation, while the corresponding increase for resale housing is a statistically insignificant 0.2 percentage points. Columns 3 and 4 show that the total loan amount originated for new housing increases by 3.3% per quarter, comparing to an insignificant 0.8% increase for resale housing. Similarly, the number of loans originated for new housing increases by 2.9%, while the increase for resale housing is again 0.8%. While the coefficients on resale housing are not statistically significant, likely because any spillover effects are indirect, their magnitudes remain economically meaningful.

Next, we explore heterogeneity by the geographic location of the purchased home, specifically, whether it is purchased in a Tier 1, Tier 2, or Tier 3 city, using the classification in Table 5. Tier 1 cities are metropolitan areas with high commercial value and relatively better access to information on the business in general and housing quality. In contrast, Tier 3 cities tend to have greater uncertainty regarding project quality and market condition. Consistent

with our hypothesis, the implementation of RERA would increase the propensity to lend more substantially in Tier 3 cities.

In Table 6, we examine the effect of RERA implementation on mortgage characteristics, including the Loan-to-value ratio (LTV) and interest rate. The results show that, although the implementation of RERA leads to an increase in loan origination, it does not significantly affect the LTV or interest rate, suggesting that borrowing cost and downpayment requirement are not higher. However, we observe significant heterogeneity across borrower groups. Mortgage loans originated to new borrowers, female borrowers, low income borrowers, and borrowers from backward castes are issued with relatively higher LTV and lower interest rates. For new borrowers, the LTV increases by 2.805 percentage points, and the interest rate declines by 4.1 basis points. For female borrowers, the LTV increases by an insigificant 0.406 percentage points, while the interest rate is 3.9 basis points lower. Among borrowers with annual income below ₹480,000, the LTV increases by 0.693 percentage points, and the interest rate drops by 10.5 basis points. For borrowers from backward castes, the LTV increases by 0.453 percentage points, while the interest rate decreases by an insignificant 17.4 basis points. These results suggest that the disadvantaged borrowers receive mortgage loans with relatively better terms after RERA implementation. In Table A8, we re-estimate these effects by controlling for borrower characteristics, including income, gender, age, and occupation. We also use interest spread as an alternative dependent variable in Table A9. The results are consistent with the baseline results reported in Table 6.

5.3 Effect on Housing Projects

In this section, we investigate the effect of RERA on the characteristics of housing projects, including unit size, per-square-foot price, and project quality, which may in turn affect housing affordability.

The overall trends in housing project characteristics are presented in Figure 5 Panels (a) and (b). Prior to the implementation of RERA, we observe a steady increase in both the size of residential units and per-square-foot prices. Both factors could make homes less affordable for potential buyers. The implementation of RERA appears to interrupt these trends, slowing the growth in both dimensions. Empirical results from our staggered difference-in-differences regressions, presented in Table 7, supports these observations. As shown in Panel B columns 1 and 2, the implementation of RERA reduces the unit size by 13% for RERA-registered projects with no statically significant changes in per-square-foot prices; while for non-registered projects, both unit size and per-square-foot price reduces, by 6.1% and 8.6% respectively. These results suggest that housing becomes more affordable after

RERA implementation, regardless of registration status, although the adjustment mechanism differs across project types.

We further examine RERA's impact on housing affordability by estimating its heterogeneous effects across different market segments, namely, affordable, mid-tier and luxury sectors. As shown in Table 7 Panel C columns 1 and 2, we find a decrease in both unit size and per-square-foot price for affordable and mid-tier housing sectors, with affordable sector experiencing a larger reduction. The unit size and per-square-foot price for luxury homes, on the other hand, increase. Additionally, without changes in the trend of total housing supply before and after the implementation of RERA, as shown in Panel (a) of Figure 6, the proportion of affordable apartments increases while the proportion of luxury apartments reduces (Panels (b) to (d) of Figure 6). Taken together, these results suggest that the implementation of RERA improves housing affordability by reducing prices and unit sizes in lower-market segments and shifting supply towards more affordable housing options.

Prior to RERA implementation, the quality of housing projects was declining, as indicated by a downward trend in project scores shown in Figure 5 Panel (c). Following RERA, this deterioration slowed for RERA-registered projects. Our empirical estimates show a 0.79 point increase in project score post-RERA implementation for RERA-registered project (column 3 of Panel B in Table 7). This improvement suggests an enhancement in collateral quality, which may facilitate greater access to credit for home purchases and consequently improve housing affordability.

We conduct event studies to understand the dynamic effects of RERA on housing project characteristics. The results are presented in Panel (a) of Figures 7 and 8. We observe statistically insignificant differences between the pre-RERA estimates to that of the baseline period, the quarter immediately preceding RERA implementation, validating the difference-in-differences research design.

5.4 Delay and Default

Figure 5 Panel (d) shows a trend of increasing delays in housing project completion, which slows significantly for RERA-registered project following RERA implementation, while delays for non-registered projects continue to increase more rapidly. Column 4 in Panel B of Table 7 shows that the estimated delays for RERA-register projects reduces by 5.088 months on average whereas it increases by 3.667 months for non-registered projects. Column 4 in Panel (c) of Table 7 further shows that delays are reduced in the affordable housing segment, but increase in luxury segment. The dynamic effects of RERA on project completion delays by RERA-registration status are presented in Panel (b) of Figure 8.

Next, we investigate if the implementation of RERA affected the performance of the mortgage outstanding. The premise is that, by reducing project delays and increasing transparency, RERA improves loan outcomes, both by allowing the banks to better screen borrowers and by enabling borrowers to make more informed purchase decisions. The results are reported in Table 8. In column 1, we find that the probability of a loan becoming default within one year of the disbursal decreases by approximately 1.3 percentage points. Column 2 shows that a 7.4 percentage points reduction in the proportion of loans under default for those disbursed after the implementation of RERA. Column 3 indicates a reduction in the total number of loans remain in default. Column 4 shows a reduction in the proportion of loans that were categorized as under default. Overall, these results show a reduction in delinquency of mortgage loans disbursed after the implementation of RERA. Our results also highlight that the enhancement of market transparency enables the bank to expand credit accessibility to the marginalized groups without increasing the default risk.

5.5 Effect on Developers

The previous results suggest that the real estate industry is affected by the implementation of RERA. In this section, we examine the effect of RERA on real estate developers. RERA imposes stricter regulations and transparency requirements, which increase compliance costs and limit developers' ability to divert funds across projects. Specifically, RERA mandates that a significant part of project funds be held in escrow accounts, reducing financial flexibility and potentially increasing reliance on external financing hence borrowing costs. Additionally, RERA's provisions for timely project completion and penalties for delays may lead to higher operational costs and reduced profit margins. The increased transparency and accountability also empower buyers, potentially limiting developers' ability to inflate prices or engage in unfair practices. These regulatory pressures, combined with the need for greater upfront capital and professional management, may force less efficient developers out of the market. At the same time, RERA enhances the market transparency so that potential home buyers are exposed to lower risk. Without RERA, the housing market was a "lemon market" with strong unceertainty in terms of product quality. RERA resolves the uncertainth with government endorsement, which may attract previously marginalized home buyers and boost housing demand. Moreover, developers, especially the small ones may benefit from reduced signaling cost as in a more transparent market, as credibility becomes less reliant on reputation and more on verifiable compliance. Therefore, the overall effect of RERA on developer performance is theoretically ambiguous and remains an empirical question.

To test this hypothesis, we examine firm entry and exits for real estate companies

relative to those in other industries, as presented in Table 9. The results reported in columns 1 to 2 demonstrate a statistically significant increase in the number of exiting firms for real estate sector post-RERA. The number of firm entries is marginally higher than the number of exits: As shown in columns 4 to 5, net entry, defined as the number of new entries minus the number of exits, is significantly higher for real estate industry. In particular, there are 5.7 more new entrants than exits per district per year. While we note that the coefficient estimates for entry may be imprecise due to the limited sample period, the overall evidence suggests a substantial effect of RERA on the survival rates of real estate firms. These findings imply that as the pre-sale housing market becomes more transparent, the developers no longer need large capital to signal credibility. As a result, high-quality but previously constrained developers are more likely to enter the market, while less efficient or non-compliant firms are pushed out due to their inability to meet the regulatory standards.

In Table 10, we compute the Herfindahl-Hirschman Index (HHI) by state and industry to assess the level of competitiveness. The HHI value, measured by firm size and total profit, are 15% and 25% lower, respectively, in the post-RERA period. This indicates a more even distribution of firm size and profit, suggesting increased competition among the real estate developers. These findings align with previous result that firm entries exceeds exits in the real estate sector after RERA implementation.

Using a dataset that include the financial statements of all firms in India, we analyze the profitability of real estate firms relative to firms in other sectors, as reported in Table 11. Columns 1 to 3 show a decline in return on assets (ROA), return on total assets (ROTA)[9], and return on equity (ROE) by approximately 24 to 30 basis points following RERA implementation. We also show that the negative impact is most pronounced among large firms, those ranked above 50% by total asset, while firms in the bottom 25% of the size experience an increase in profitability relative to the pre-RERA period. This result is consistent with our hypothesis that with higher market transparency, the developers no longer need large capital to signal creditability. As a result, small developers benefit more than the large developers due to greater regulatory scrutiny.

Overall, our results in this section show that RERA improves the transparency of pre-sale housing market by crowding out the developers that fail to comply with the new regulations, while facilitating the entry of higher-quality developers who benefit from a more transparent environment. These changes lead to a healthier and more competitive real estate sector and potentially support broader access to homeownership.

[9]ROTA is the ratio of EBIT and total asset.

6 Economic Foundations of the Empirical Results

Our empirical findings in Section 5 reveal that RERA's implementation leads to increased mortgage origination with heterogeneous effects across demographic groups, alongside fundamental changes in developer market structure. However, the mechanisms underlying these patterns and their theoretical foundations merit closer examination. This exercise also demonstrates that our findings align with fundamental economic principles rather than reflecting idiosyncratic features of the Indian institutional context—the heterogeneous effects we observe follow naturally from standard economic reasoning about risk exposure and market structure.

Our empirical results reveal two patterns whose theoretical foundations merit clarification. First, who benefits most from RERA? We observe disproportionate gains for first-time buyers, women, lower-income borrowers, and marginalized castes—groups that standard portfolio theory predicts should be most sensitive to default risk reductions given their higher housing-to-wealth ratios and limited capacity to absorb losses. Second, how does RERA reshape the developer market? We document increased entry and competition despite compliance costs—an outcome consistent with standard signaling theory where government-mandated standards substitute for costly reputation signals, lowering barriers for smaller developers.

To provide economic intuition for our empirical findings and resolve these theoretical ambiguities, we develop a parsimonious framework with two components. We first model home buyers' expected utility when purchasing presale properties, focusing on how default risk affects different buyer segments. This allows us to derive predictions about which demographic groups should experience the largest gains in home ownership access following RERA implementation. We then model the developer market, comparing equilibrium outcomes before and after regulatory intervention to understand how RERA's dual impacts—increasing compliance costs while reducing signaling costs—affect market structure, pricing, and housing supply.

Through this theoretical exercise, we establish intuition that guides interpretation of our empirical results on home ownership democratization and market transformation. The model is intentionally stylized to illuminate core mechanisms rather than capture all institutional details.

6.1 The Decision of home buyers

We examine home buyers' sensitivity to developer default risk. Let $U(W)$ denote the utility function of home buyers. The expected utility from home purchasing is:

$$E(U) = \delta \times U(W_0 - C + V) + (1 - \delta) \times U(W_0 - C - L)$$

where δ is the probability that the presale housing is delivered. W_0 represents the buyer's wealth excluding the house, C is consumption of numeraire goods, and V is the value of the housing. $W_0 - C + V$ represents household wealth if the house is delivered as promised.

In the case of developer default, the homebuyer loses the house and may incur extra costs, such as temporary housing expenses, search costs for a new property if the home buyers decides to withdraw, opportunity cost of capital and legal fees if litigation is required. These extra costs are denoted as L. $W_0 - C - L$ represents the wealth if the developer defaults.

Buyers' sensitivity to default is:

$$\frac{\partial E(U)}{\partial \delta} = U(W_0 - C + V) - U(W_0 - C - L) \tag{10}$$

The relationships between the buyers' sensitivity to default ($\frac{\partial E(U)}{\partial \delta}$) and other parameters are derived below:

$$\frac{\partial^2 E(U)}{\partial \delta \partial W_0} = U'(W_0 - C + V) - U'(W_0 - C - L) < 0 \tag{11}$$

$$\frac{\partial^2 E(U)}{\partial \delta \partial L} = U'(W_0 - C - L) > 0 \tag{12}$$

$$\frac{\partial^2 E(U)}{\partial \delta \partial V} = U'(W_0 - C + V) > 0 \tag{13}$$

Let the ratio of housing value in total wealth be $r = \frac{V}{W_0}$. It can be proved that

$$\frac{\partial^2 E(U)}{\partial \delta \partial r} = W_0 U'(W_0(1 + r) - C) > 0 \tag{14}$$

The detailed proof can be found in Appendix C.

To conclude, the buyers' sensitivity to default ($\frac{\partial E(U)}{\partial \delta}$) is negatively related to wealth (W_0), and positively related to both the value of the house (V) and the losses incurred from developer default (L). More importantly, the sensitivity is positively related to the ratio of housing wealth in total wealth ($\frac{V}{W_0}$).

Consistent with our empirical findings, the model implies that disadvantage groups,

those with lower wealth, higher proportion of wealth allocated to housing[10] and have limited means to recover the loss upon default, are more sensitive to default risk and thus benefit more from RERA. One example of such buyers are the new home buyers.

Likewise, according to the model, new home buyers benefit more from RERA than existing home buyers (upgraders) who already own a house. First-time buyers typically have lower wealth and are therefore more sensitive to developer default. Thus, they will increase purchase more than other buyers. As a result, the reduction in default risk caused by RERA has a larger impact on purchasing decisions compared to other buyers.

6.2 The Operation of Developers

This section compares the developer behavior before and after RERA. For tractability, we define the following linear demand function:

$$Q^D = q_0 - \frac{P}{\theta}$$

We model the cost function as a linear quadratic with decreasing return to scale, consistent with standard formulations in the literature.

$$C(q) = c_0 q + \frac{1}{2} c_1 q^2 + F + 1_{Before} \times \frac{\alpha}{S} q + 1_{after} \times \left[\gamma(1-\theta) q + \frac{\beta}{S} q \right]$$

where q represents the number of units supplied, and $c_0 q + \frac{1}{2} c_1 q^2 + F$ represents the normal development costs, where F represents the fixed costs. S denotes firm size, and $\frac{\alpha}{S} q$ represents the signaling cost required to establish buyer trust. Since firm size may act as a positive signal for credibility (see Bafera and Kleinert (2023) for a comprehensive review), signaling costs are assumed to decline with firm size. θ denotes the creditworthiness of the developers. 1_{Before} indicates that the signaling costs are only incurred before the introduction of RERA, which enhances market transparency and thereby reduces the need for costly signaling. $\gamma(1-\theta)$ represents the expected default penalty under RERA. As RERA mandates compensation for homes not delivered on time, developers with higher creditworthiness (θ) face lower expected penalties. Here, γ represents the penalty per unit of housing defaulted.

We then derive the number of real estate developers (N^*), the housing price (P^*) and the number of supply (q^*) in equilibrium, and compare the changes in these variables before and after RERA. Detailed steps and proofs can be found in Appendix D.

The equilibrium before RERA is express in equations (15), (17) and (16).

[10] OECD (2020) documents that in 20 OECD countries, the proportion of budget allocated to housing decreases with income.

$$P^* = \sqrt{2Fc_1} + c_0 + \frac{\alpha}{S} \tag{15}$$

$$N^* = \frac{c_1\left[q_0 - \frac{1}{\theta}(\sqrt{2Fc_1} + c_0 + \frac{\alpha}{S})\right]}{\sqrt{2Fc_1}} \tag{16}$$

$$q^* = \sqrt{\frac{2F}{c_1}} \tag{17}$$

The equlibrium after RERA is expressed in equations (18), (19) and (20).

$$P^* = \sqrt{2Fc_1} + c_0 + \gamma(1-\theta) + \frac{\beta}{S} \tag{18}$$

$$N^* = \frac{c_1\left\{q_0 - \frac{1}{\theta}\left[\sqrt{2Fc_1} + c_0 + \gamma(1-\theta) + \frac{\beta}{S}\right]\right\}}{\sqrt{2Fc_1}} \tag{19}$$

$$q^* = \sqrt{\frac{2F}{c_1}} \tag{20}$$

The model has the following three implications: Regarding the total number of developers, all else equal, if the compliance costs incurred by RERA are lower than the saved signaling, the equilibrium number of firms will increase. Besides, it can be proved that the number of small firms increase more than large firms, because the cost saving due to RERA is more significant for small firms, as shown in in equation (D11). Likewise, it can be shown that the equilibrium price will be lower if the compliance costs incurred by RERA are not very high.

To conclude, after RERA, as developers become more trustworthy and no signaling is needed, equilibrium price falls, the number of firms rises and total transactions increase. Besides, with a higher creditworthiness, the market demand (Q^D) is higher. Consequently, both total supply and total demand expand following the implementation of RERA.

7 Concluding Remarks

Consumer protection regulation plays a critical role in expanding access to home ownership, yet its application to real estate developers has been largely overlooked. The growing influence of developers on homeownership globally—through presale markets where buyers pay before construction—creates significant risks: project delays, fund diversion, defaults, and fraud. We address this gap by examining India's Real Estate Regulation and Development Act (RERA), which mandated escrow accounts, completion deadlines, and project disclosures to regulate developer behavior.

Our findings demonstrate that consumer protection targeting developers simultane-

ously expands homeownership access and improves market efficiency. RERA increases mortgage origination by 4 percent, with substantially larger effects for first-time buyers, marginalized groups, and smaller cities. Developer market structure transforms: compliance costs drive some exits, but reduced signaling costs enable new entry, increasing competition and expanding affordable housing supply. These results resolve the theoretical ambiguity surrounding developer regulation decisively in favor of net positive effects.

The policy implications are substantial and extend far beyond individual transactions. Housing wealth represents the primary asset for most households, often constituting 60-80 percent of household wealth in emerging economies. In many countries, mandatory retirement savings and provident funds flow predominantly into real estate investments, amplifying the welfare consequences of market failures. When developer fraud and delays are prevalent, retirement funds face substantial risk, potentially devastating household financial security at life's most vulnerable stage. Our findings suggest that consumer protection regulation safeguards not only current homebuyers but also future retirees whose financial security depends on housing wealth accumulation. Given the scale of retirement savings channeled into housing, the stakes of developer regulation extend to the retirement security of millions.

Beyond retirement security, our results highlight how housing market structure perpetuates inequality. When developer opportunism deters marginal buyers, homeownership becomes concentrated among wealthier households who can absorb losses. This exclusionary dynamic perpetuates wealth inequality across generations, as excluded households miss wealth-building opportunities through home appreciation. By reducing developer risk and expanding access to credit-constrained groups, consumer protection regulation breaks this cycle and democratizes homeownership.

Our findings also speak to regulatory design. While financial authorities have extensively regulated mortgage lenders, developers—who control equally critical aspects of housing transactions—have operated with minimal oversight. This regulatory asymmetry leaves unaddressed the principal-agent problems central to presale market failures. Balancing regulatory attention between demand-side (lending) and supply-side (development) actors yields substantial welfare gains. Our evidence resonates with economic theories emphasizing the role of transparent information and reduced information asymmetries in fostering efficient markets.

The mechanisms we identify—information asymmetries, fear-driven market withdrawal, and the tradeoff between compliance costs and signaling costs—apply broadly across countries where presale housing dominates. As economies worldwide grapple with housing sector challenges, our findings offer valuable insights for policymakers aiming to balance

market dynamism with homebuyer protection.

This paper demonstrates that consumer protection regulation targeting real estate developers can democratize homeownership while improving market efficiency. As housing wealth becomes increasingly central to household financial security and retirement planning, ensuring adequate consumer protection in housing markets takes on heightened importance. When well-designed, such regulatory measures can reshape market dynamics, expand access for marginalized populations, and protect the retirement security of millions whose financial futures depend on housing wealth accumulation.

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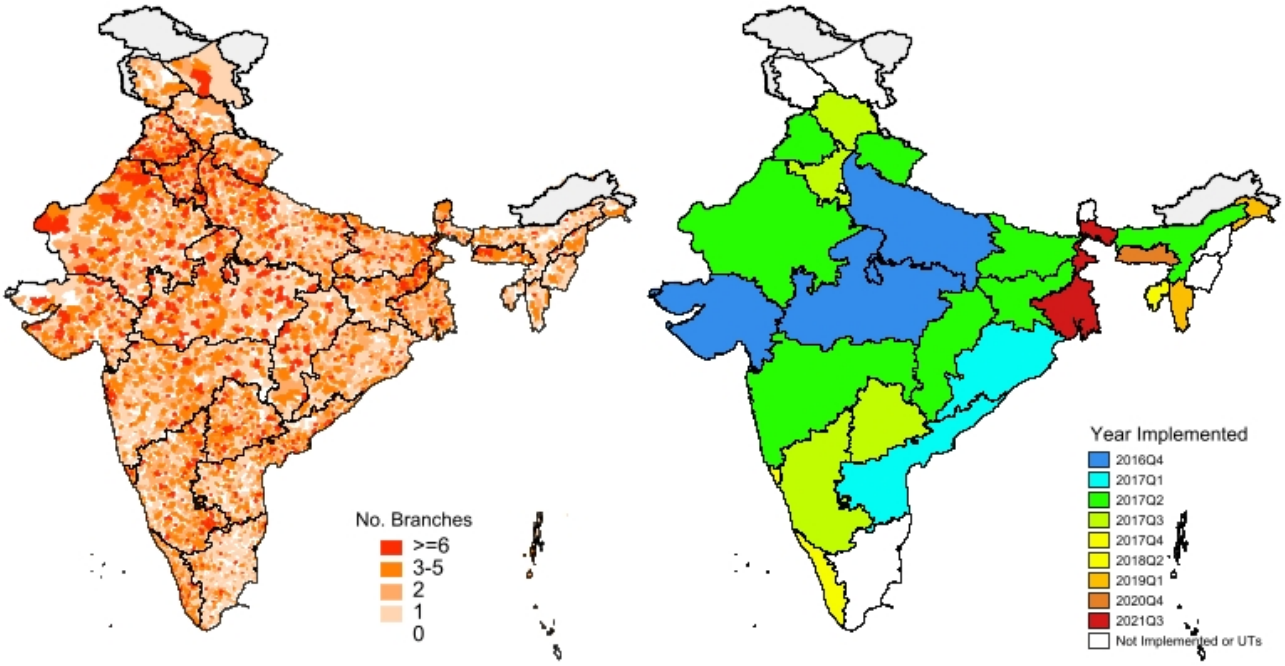
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Figure 1: Highlights of RERA



Figure 2: Location of the Bank Branches and Timing of RERA Implementation

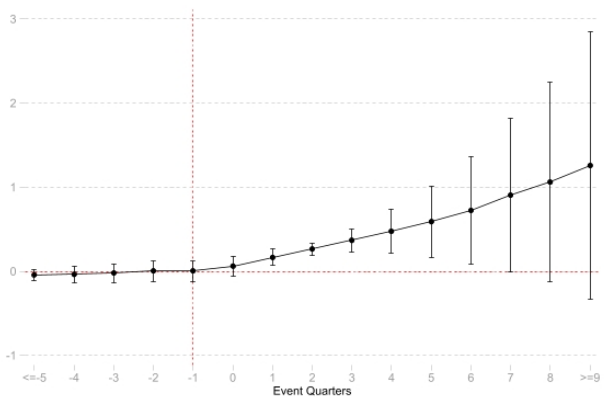


(a) Number of Branches in Each PIN code

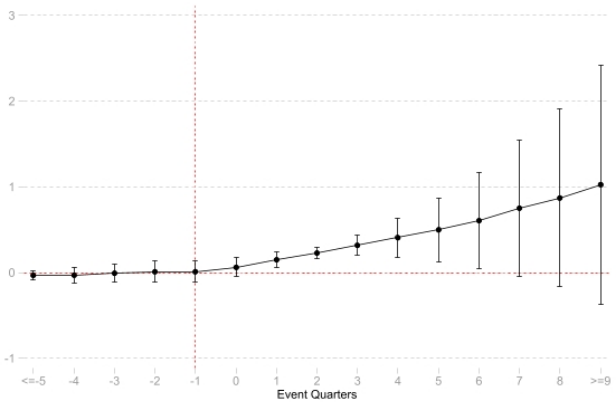
(b) Quarter Implementing RERA

This figure presents the distribution of branches across the various PIN codes in India, presented in Panel A. Panel B presents the timing for the implementation of RERA across different states in India. Map data is acquired from UN Geospatial Information Section. The areas in grey are disputed territories. Boundaries shown and the designations used on this map do not imply official endorsement or acceptance by the author or affiliated institution.

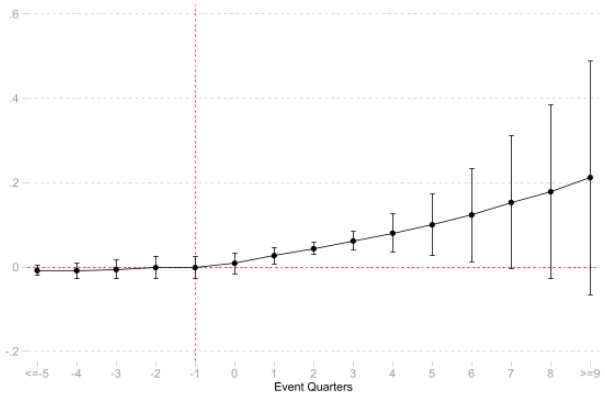
Figure 3: Evolution Lending around RERA Act



(a) Amount of Loan Disbursal



(b) Number of Loan Disbursal



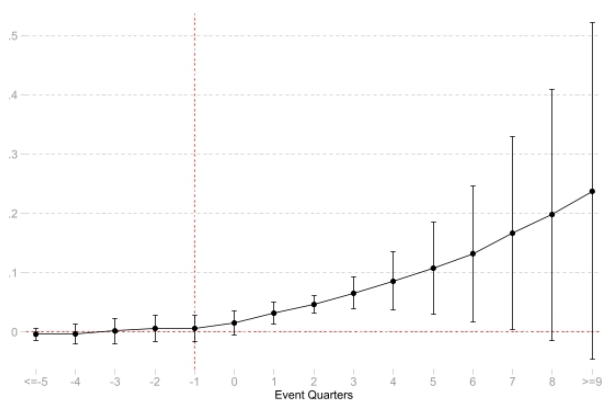
(c) Probability of Loan Disbursal

This figure plots the evolution of the loans disbursed around the passage of Real Estate Regulatory Authority (RERA) Act. We plot the cumulated coefficient, $b_t = \sum_{q=-4}^{t} \beta_q$ from the specification

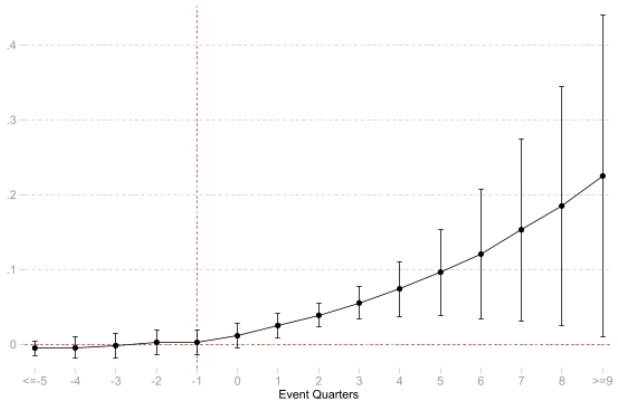
$$Y_{bpq} = \beta_q(<= -5) \cdot Event_{pq(<=-5)} + \sum_{q=-4, q\neq -1}^{8} \beta_q \cdot Event_{pq} + \beta_q(>= 9) \cdot Event_{pq(>=9)} + \alpha_{bp} + \alpha_{bq} + \varepsilon_{bpq}$$

Where Y_{bpq} is: the amount of loan disbursal by branch b to PIN code p in quarter q in Panel (a), the number of loan disbursal by branch b to PIN code p in quarter q in Panel (b), the probability of disbursal of a loan by branch b to PIN code p in quarter q in Panel (c). We include branch × PIN code fixed effects α_{bp} and branch × quarter fixed effects α_{bq}

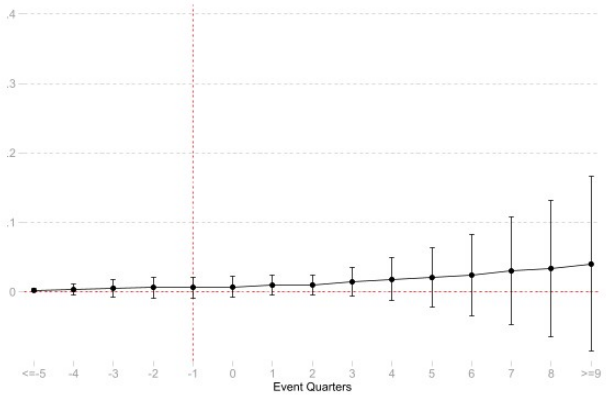
Figure 4: New vs. Existing Borrowers around RERA Act



(a) Total Number of Borrowers



(b) Number of New Borrowers



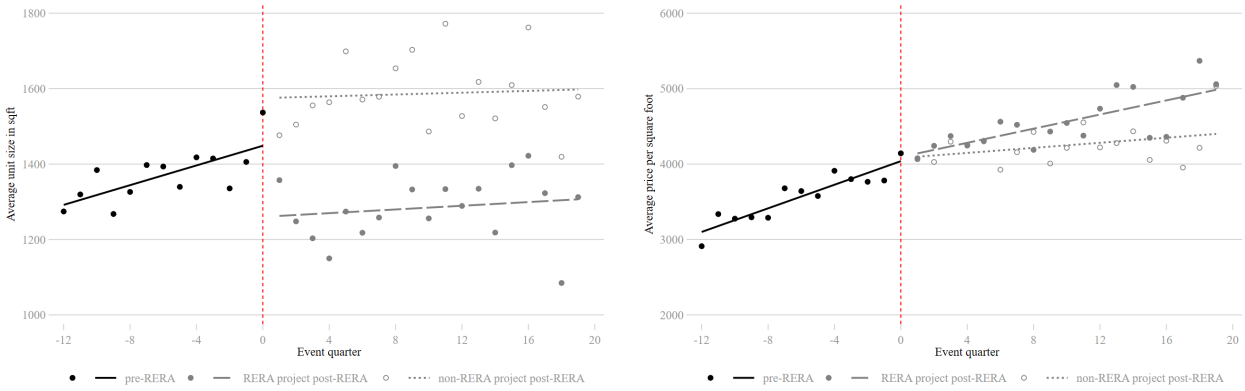
(c) Number of Existing Borrowers

This figure plots the evolution of the number of borrowers around the passage of Real Estate Regulatory Authority (RERA) Act. We plot the cumulated coefficient, $b_t = \sum_{q=-4}^{t} \beta_q$ from the specification

$$Y_{bpq} = \beta_q(<= -5) \cdot Event_{pq(<=-5)} + \sum_{q=-4, q\neq -1}^{8} \beta_q \cdot Event_{pq} + \beta_q(>= 9) \cdot Event_{pq(>=9)} + \alpha_{bp} + \alpha_{bq} + \varepsilon_{bpq}$$

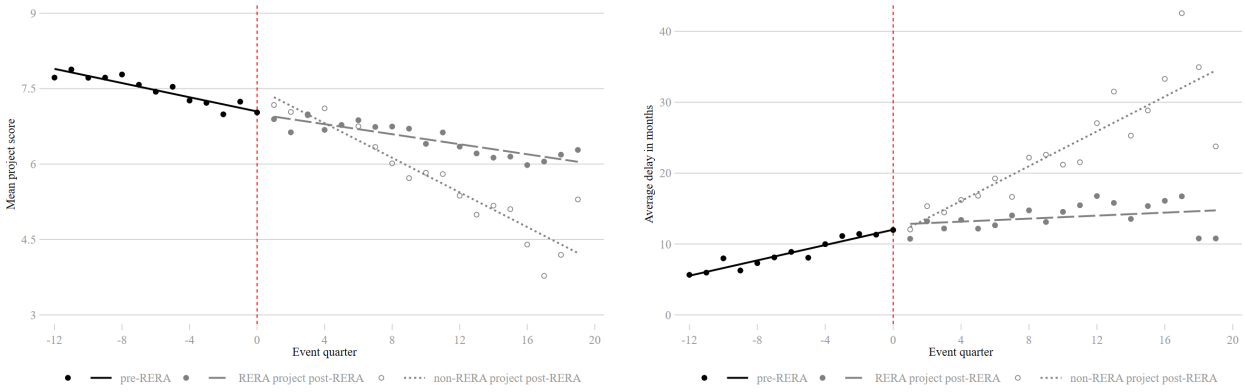
Where Y_{bpq} is: the total number of borrowers receiving loans from branch b from PIN code p in quarter q in Panel (a), the number of new borrowers receiving loans from branch b from PIN code p in quarter q in Panel (b), the number of existing borrowers receiving loans from branch b from PIN code p in quarter q in Panel (c). We include branch × PIN code fixed effects α_{bp} and branch × quarter fixed effects α_{bq}

Figure 5: Trends in Housing Project Characteristics by RERA-Registration Status



(a) Unit size

(b) Price per square foot

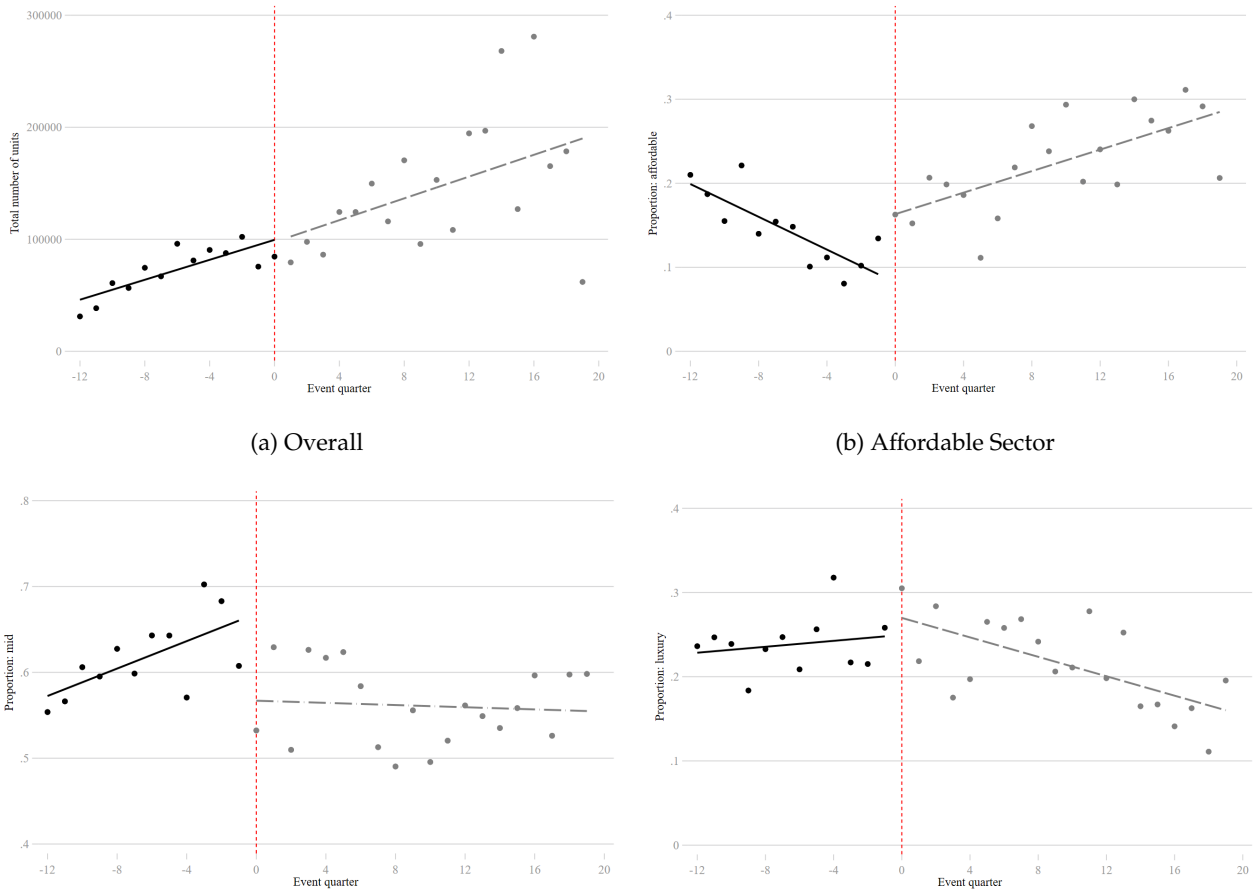


(c) Project Score

(d) Delay

The figure shows the trends in the mean unit size (Panel (a)), price per square foot (Panel (b)), project score (Panel (c)), delay in month (Panel (d)) for all housing development projects in each quarter before the state-level RERA-enactment and for housing projects by RERA-registration status in each quarter after the state-level RERA-enactment.

Figure 6: Trends in Various Segments of Housing Market



(a) Overall

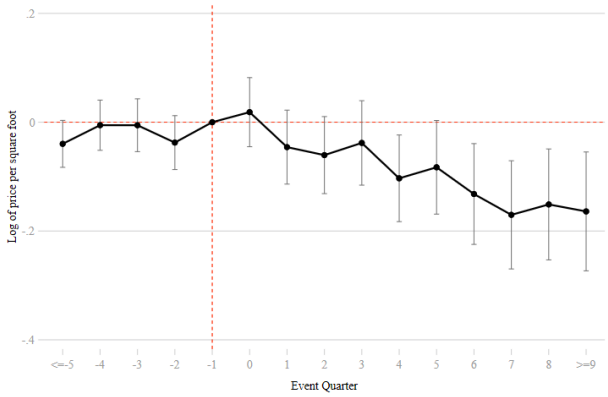
(b) Affordable Sector

(c) Mid-Tier Sector

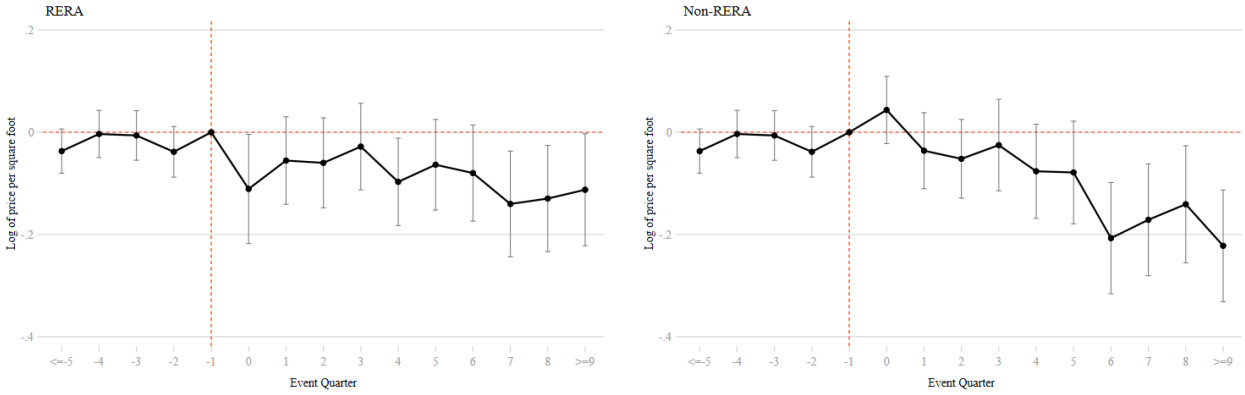
(d) Luxury Sector

The figure shows the trends in the total number of housing units developed (Panel (a)) and the proportion of affordable, mid-tier, and luxury housing units (Panels (b)-(d)) in each quarter before and after the state-level RERA-enactment.

Figure 7: Evolutionary Effect of RERA on Price Per Square Foot



(a) Overall



(b) RERA

(c) Non-RERA

Panel (a) of this figure plots the evolutionary effect of RERA on price per square foot estiamted using the following specification:

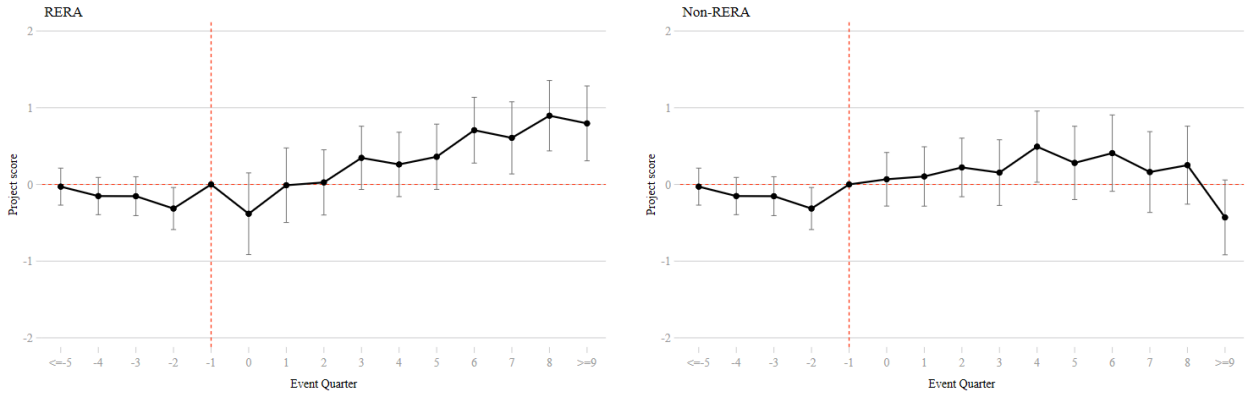
$$Y_{ijq} = \sum_{q=-5}^{-2} \beta_q \cdot Event_{jq} + \sum_{q=0}^{9} \beta_q \cdot Event_{jq} + \alpha_j + \gamma_q + \varepsilon_{ijq}$$

Panel (b) plots the evolutionary effects by registration status estimated from the specification of

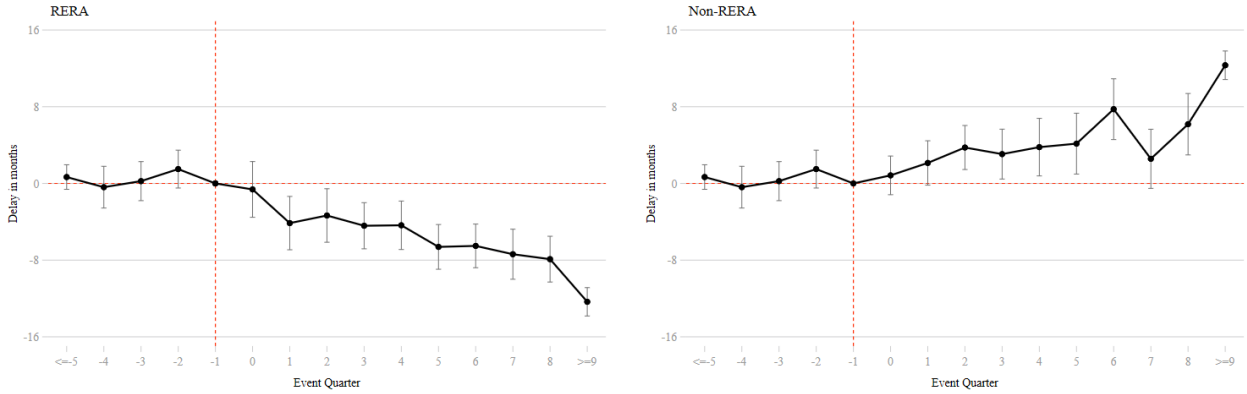
$$Y_{ijq} = \sum_{q=-5}^{-2} \beta_q \cdot Event_{jq} + \sum_{q=0}^{9} \beta_{1q} \cdot Event_{jq} \times R + \sum_{q=0}^{9} \beta_{2q} \cdot Event_{jq} \times NR + \alpha_j + \gamma_q + \varepsilon_{ijq}$$

where Y_{ijq} is the log of price per square foot, project score, and delay in month for project i in city j in the quarter q. We include city fixed effects α_j and year-quarter fixed effects γ_q.

Figure 8: Evolutionary Effect of RERA on Housing Project Characteristics



(a) Project score



(b) Delay

This figure plots the evolutionary effect of RERA on housing project characteristics by registration status estimated from the specification

$$Y_{ijq} = \sum_{q=-5}^{-2} \beta_q \cdot Event_{jq} + \sum_{q=0}^{9} \beta_{1q} \cdot Event_{jq} \times R + \sum_{q=0}^{9} \beta_{2q} \cdot Event_{jq} \times NR + \alpha_j + \gamma_q + \varepsilon_{ijq}$$

where Y_{ijq} is project score (Panel (a)) and delay in month (Panel (b)) for project i in city j in the quarter q. We include city fixed effects α_j and year-quarter fixed effects γ_q.

Table 1: Summary Statistics

Variables	(1) N	(2) Mean	(3) Std. Dev.	(4) Median
	Panel A Branch×PIN level			
Loan Amount	3,004,584	713,098.10	3,267,849.95	0.00
Loan Number	3,004,584	0.36	1.57	0.00
No. of Borrowers	3,004,584	0.35	1.52	0.00
No. of New Borrowers	3,004,584	0.26	1.26	0.00
Loan Size	474,800	2,115,340.25	1,338,859.11	1,800,000.00
Prob. of Getting Loan	3,004,584	0.16	0.36	0.00
	Panel B Branch×State level			
No. of PIN	148,124	1.07	2.41	0.00
No. of New PIN	148,124	0.00	0.06	0.00
No. of Existing PIN	148,124	1.07	2.40	0.00
	Panel C Loan Level			
Interest Rate	962,763	8.69	1.21	8.75
Loan Amount	950,154	1,904,126.70	1,301,430.76	1,600,000.00
Square Footage	944,246	885.80	767.56	824.37
Purchase Cost	943,606	3,238,181.82	2,547,394.55	2,775,000.00
LTV	910,014	56.26	23.50	59.34
Price\Sq. Feet	927,929	17772.17	59,740.38	3,628.197
Loan\Sq. Feet	932,154	11957.7	44,431.43	2,320.19
Female borrower=1	962,763	0.27	0.44	0.00
New borrower=1	962,763	0.82	0.38	1.00
Backward Caste	962,763	0.05	0.22	0.00
Loan Tenure (mo)	962,763	241.91	73.21	243.5
Default = 1	961,562	0.01	0.08	0.00
Amount of Loan in Default	961,562	7179.98	135626.60	0.00
Number of Loans in Default	961,562	0.01	0.17	0.00
	Panel D Project level			
Number of Units	13,357	297.97	490.51	134.00
Project Segment (Affordable=1)	13,357	0.21	0.41	0.00
Project Segment (Luxury=1)	13,357	0.21	0.41	0.00
Project Score	13,357	6.64	2.07	6.90
Delay in Months	13,357	14.41	17.59	8.00
Square Footage	13,357	1,378.14	885.13	1,200.00
Price\Sq. Feet	13,357	4,183.88	2,107.49	3,700.00

This table reports the summary statistics of the primary variable of interest. Panel A reports the summary with the data granularity being branch × PIN of collateral × quarter. The granularity of Panel B being branch × state of collateral × quarter. Panel C is the analysis at the loan level. Panel D provides summary statistics of the data on real estate development projects.

Table 2: Effect of RERA on Mortgage Lending

Dep. Var.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Binary loan = 1			Amount of Loan			Number of Loan			Average Loan Size		
Post	0.008***	0.011***	0.008***	0.043***	0.054**	0.043***	0.037***	0.058***	0.037***	-0.010	-0.036**	-0.092
	(0.001)	(0.004)	(0.001)	(0.007)	(0.020)	(0.007)	(0.006)	(0.019)	(0.006)	(0.036)	(0.014)	(0.079)
Observations	3,004,584	3,041,520	3,004,584	3,004,584	3,041,520	3,004,584	3,004,584	3,041,520	3,004,584	378,737	399,561	281,469
R-squared	0.180	0.291	0.375	0.185	0.338	0.415	0.194	0.354	0.434	0.499	0.483	0.638
PIN FE	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
YQ FE	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Branch*PIN FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Branch*YQ FE	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes

This table reports the results from the following regression specification:

$$Y_{bpq} = \beta_q \cdot Post_{pq} + \alpha_{bp} + \alpha_{bq} + \varepsilon_{bpq}$$

Where Y_{bpq} is: the probability of PIN code p to receive a loan from branch b in quarter q in columns 1 to 3; the amount of loan from branch b to PIN code p in quarter q in columns 4 to 6; the number of borrowers in PIN code p receiving a loan from branch b in quarter q in columns 7 to 9; the average size of a loan from branch b to PIN code p in quarter q in columns 10 to 12. *Post* is the binary variable that takes 1 if a PIN code p belongs to the state after the adherence to RERA. The regression specifications include α_{bp} representing branch×PIN fixed effects and α_{bq} representing the branch × quarter fixed effects. Robust standard errors clustered by state are reported in parenthesis.

Table 3: Effect of RERA on Mortgage Lending – New vs Existing Borrowers

Dep. Var.	(1) Number of New Borrowers	(2) Number of Existing Borrowers	(3) Amount Loan to New Borrowers	(4) Amount Loan to Existing Borrowers	(5) Number of PIN codes
Post	0.024***	0.009	0.029***	0.012	0.095***
	(0.003)	(0.001)	(0.006)	(0.010)	(0.024)
Observations	3,004,584	3,004,584	3,004,584	3,004,584	148,124
R-squared	0.528	0.466	0.397	0.378	0.297
Branch*PIN FE	Yes	Yes	Yes	Yes	No
Branch*YQ FE	Yes	Yes	Yes	Yes	Yes
Branch*State FE	No	No	No	No	Yes

Columns 1 to 4 of this table report the results from the following regression specification:

$$Y_{bpq} = \beta_q \cdot Post_{p(b)q} + \alpha_{bp} + \alpha_{bq} + \varepsilon_{bpq}$$

where Y_{bpq} include (1) the number of new borrowers (column 1), (2) the number of existing borrowers (column 2), (3) the amount of loans to new borrowers (column 3), (4) the amount of loans to existing borrowers (column 4) from branch b to PIN code p in quarter q. The regression specifications include α_{bp} for branch×PIN fixed effects and α_{bq} for branch × quarter fixed effects. Column 5 estimate the following regression:

$$Y_{bsq} = \beta_q \cdot Post_{s(b)q} + \alpha_{bs} + \alpha_{bq} + \varepsilon_{bsq}$$

where Y_{bsq} is the number of PIN codes in a state s that receive the loans from branch b in quarter q. The regression specifications include α_{bs} for branch×state fixed effects and α_{bq} for branch × quarter fixed effects.
In columns 1 to 4 the granularity of the specification is at branch ×PIN × quarter level. In column 5 the granularity of the specification is at branch ×state × quarter level. Robust standard errors clustered by state are reported in parenthesis.

Table 4: Effect of RERA on Mortgage Lending – New vs Resale Apartments

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Collateral Status	New	Resale	New	Resale	New	Resale	New	Resale
Dep. Var.	Binary loan = 1		Amount of Loan		Number of Loan		Number of Borrowers	
Post	0.006***	0.002	0.033***	0.008	0.029***	0.008	0.028***	0.008
	(0.001)	(0.001)	(0.006)	(0.007)	(0.005)	(0.006)	(0.005)	(0.006)
Observations	3,004,584	3,004,584	3,004,584	3,004,584	3,004,584	3,004,584	3,004,584	3,004,584
R-squared	0.353	0.384	0.375	0.409	0.391	0.426	0.392	0.427
Branch*PIN FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Branch*YQ FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table repeats the baseline regression reported in Columns 2, 4, and 6 of Table 2 by replacing the dependent variable considering the loan originated against new (Columns 1, 3, 5, and 7) and resale apartments (Columns 2, 4, 6, and 8).

The regression specification is

$$Y_{bpq} = \beta_q \cdot Post_{pq} + \alpha_{bp} + \alpha_{bq} + \varepsilon_{bpq}$$

Where Y_{bpq} is: the probability of PIN code p to receive a loan from branch b in quarter q in panel in columns 1 and 2; the amount of loan from branch b to PIN code p in quarter q in columns 3 and 4; the number of loan from branch b to PIN code p in quarter q in columns 5 and 6; the number of borrowers in PIN code p receiving a loan from branch b in quarter q in columns 7 and 8. *Post* is the binary variable that takes 1 if a PIN code p belongs to the state after the adherence to RERA. The regression specifications include α_{bp} representing branch×PIN fixed effects and α_{bq} is the branch × quarter fixed effects. Robust standard errors clustered by state are reported in parenthesis.

Table 5: Effect of RERA on Mortgage Lending – Geographic Disparity

Dep. Var.	(1) Binary loan = 1	(2) Amount of Loan	(3) Number of Loan	(4) Number of New Borrowers
Post	0.008***	0.048***	0.039***	0.024***
	(0.002)	(0.012)	(0.010)	(0.008)
Post*Tier 2	0.002	0.003	0.012	0.009
	(0.004)	(0.026)	(0.026)	(0.023)
Post*Tier 1	-0.006**	-0.043***	-0.037**	-0.020
	(0.002)	(0.015)	(0.015)	(0.012)
Observations	3,004,584	3,004,584	3,004,584	3,004,584
R-squared	0.375	0.415	0.434	0.416
Branch*PIN FE	Yes	Yes	Yes	Yes
Branch*YQ FE	Yes	Yes	Yes	Yes

This table reports the results from the following regression specification:

$$Y_{bpq} = \beta_1 \cdot Post_{pq} + \beta_2 \cdot Post_{pq} \times Tier2 + \beta_3 \cdot Post_{pq} \times Tier1 + \alpha_{bp} + \alpha_{bq} + \varepsilon_{bpq}$$

where Y_{bpq} includes (1) the probability of a PIN code p receiving a loan from branch b in quarter q in column 1; (2) the amount of loan from branch b to a PIN code p in quarter q in column 2; (3) the number of borrowers in a PIN code p receiving a loan from branch b in quarter q in column 3; (4) the number of new borrowers in a PIN code p who receive a loan from branch b in quarter q in column 4. $Post_{pq}$ is the binary variable that takes 1 if a PIN code p belongs to the state after the adherence to RERA. The regression specifications include α_{bp}, branch×PIN fixed effects and α_{bq}, branch × quarter fixed effects. Robust standard errors clustered by state are reported in parenthesis.

Table 6: Effect of RERA on Loan Characteristics

Group by	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	All		New Borrowers		Female		Low Income		Backward Caste	
Dep. Var.	LTV	Interest Rate	LTV	Interest Rate	LTV	Interest Rate	LTV	Interest Rate	LTV	Interest Rate
Post	4.967*	0.058								
	(2.481)	(0.066)								
Post*Group			2.805***	-0.041*	0.406	-0.039**	0.693***	-0.105***	0.453**	-0.017
			(0.473)	(0.022)	(0.323)	(0.014)	(0.183)	(0.019)	(0.201)	(0.015)
Observations	948,856	962,763	948,856	931,369	948,856	928,713	468,030	475,810	948,856	963,214
R-squared	0.361	0.510	0.477	0.528	0.363	0.524	0.410	0.537	0.361	0.510
Branch*PIN FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Branch*YQ FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State * Group FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State* YQ FE	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Columns 1-2 in this table reports the results from the following regresion specification:

$$Y_{bpq} = \beta_q \cdot Post_{pq} + \alpha_{bp} + \alpha_{bq} + \varepsilon_{bpq}$$

Columns 3-8 in this table reports the results from the following regression specification separately for various groups:

$$Y_l = \beta_1 \cdot Post_{pq} \times Group_i + \alpha_{bp} + \alpha_{bq} + \alpha_{sq} + \alpha_{sg} + \varepsilon_l$$

Where Y_l is the loan to value (LTV) ratio and interest rate of a loan l. We study the effect for all borrowers in columns 1 and 2. The binary variable $Group_i$ takes 1 when a borrower is first time borrower i(columns 3 to 4), is female (columns 5 to 6), has an income below ₹480,000 (columns 7 to 8), or is from a backward caste (columns 9 to 10). $Post_{pq}$ is the binary variable that takes 1 if a PIN code p belongs to the state after the adherence to RERA. The regression specifications include α_{bp} for branch×PIN fixed effects, α_{bq} for branch × quarter fixed effects, α_{sq} for state × quarter fixed effects, and α_{sg} for state × group fixed effects. The granularity of the specification is at the loan level. Robust standard errors clustered by state are reported in parenthesis.

Table 7: Effect of RERA on Housing Project Characteristics

Dep. Var.	(1) Ln (size)	(2) Ln(price\sqft)	(3) Score	(4) Delay
Panel A Overall effect				
Post	-0.082***	-0.064**	0.224**	1.015
	(0.028)	(0.025)	(0.107)	(0.895)
Panel B Effect by RERA-registration status				
Post*Non-RERA	-0.061**	-0.086***	-0.023	3.667***
	(0.028)	(0.025)	(0.110)	(0.919)
Post*RERA	-0.130***	-0.013	0.791***	-5.088***
	(0.030)	(0.026)	(0.114)	(0.969)
Panel C: Effect by market segment				
Post*Affordable	-0.555***	-0.437***	-0.082	-2.095**
	(0.028)	(0.025)	(0.116)	(0.953)
Post*Mid	-0.143***	-0.086***	0.725***	-0.422
	(0.027)	(0.024)	(0.108)	(0.906)
Post*Luxury	0.475***	0.325***	-0.481***	6.717***
	(0.029)	(0.026)	(0.114)	(1.030)
Observations	13,357	13,357	13,357	13,357
City FE	Yes	Yes	Yes	Yes
Year-month FE	Yes	Yes	Yes	Yes

Panel A of this table reports the overall effect estimated from the following specification:

$$Y_{ijq} = \beta \cdot Post_{ijq} + \alpha_j + \gamma_q + \varepsilon_{ijq}$$

Panel B of this table reports the effects by RERA-registration status using the following specification:

$$Y_{ijq} = \beta_1 \cdot Post_{ijq} \times R_i + \beta_2 \cdot Post_{ijq} \times NR_i + \alpha_j + \gamma_q + \varepsilon_{ijq}$$

and Panel C of this table reports the effects by housing segment estimated using:

$$Y_{ijq} = \beta_1 \cdot Post_{ijq} \times Seg1_i + \beta_2 \cdot Post_{ijq} \times Seg2_i + \beta_3 \cdot Post_{ijq} \times Seg3_i + \alpha_j + \gamma_q + \varepsilon_{ijq}$$

where Y_{ijq} is the log of unit size, log of price per square foot, project score, and delay in months for columns (1) to (4), respectively. *Post* is a binary variable that takes the value of 1 if project i in city j is launched after the state-level enactment of RERA. All regressions include city fixed effects α_j and quarter fixed effects γ_q. Robust standard errors are reported in parenthesis.

Table 8: Effect of RERA on Loan Performances

	(1)	(2)	(3)	(4)
		Loan Level		Branch*PIN
Dep. Var.	Default=1	ln(Amount Loan in Default)	ln(Number Loan in Default)	Proportion of Loan in Default
Post	-0.013***	-0.074***	-0.067***	-0.019***
	(0.003)	(0.015)	(0.013)	(0.006)
Observations	963,320	961,562	961,112	281,399
R-squared	0.278	0.272	0.326	0.539
Branch*PIN FE	Yes	Yes	Yes	Yes
Branch*YQ FE	Yes	Yes	Yes	Yes

This table reports the effect of RERA on loan performance, measured by four variables: the probability of default within one year after loan sanctioning ("*Default=1*", column 1), the amount of loan under default within one year after loan sanctioning ("*ln(Amount Loan in Default)*", column 2), the number loans in default within one year after loan sanctioning ("*ln(Number Loan in Default)*", column 3), and the proportion of loan amounts in default within one year at the branch–PIN code–quarter level ("*Proportion of Loan in Default*", column 4). The coefficients from columns 1 to 3 are estimated from the following regression specification:

$$Y_l = \beta \cdot Post_{pq} + \alpha_b p + \alpha_{bq} + \varepsilon_l$$

and the coefficient in column 4 is estimated from the following regression specification:

$$Y_{bpq} = \beta_q \cdot Post_{pq} + \alpha_{bp} + \alpha_{bq} + \varepsilon_{bpq}$$

$Post_{pq}$ is the binary variable that takes 1 if the collateral of a loan l is located in PIN code p which belongs to the state after the adherence to RERA. The regression specifications include α_{bp} for branch×PIN fixed effects and α_{bq} for branch × quarter fixed effects. Robust standard errors clustered by state are reported in parenthesis.

Table 9: Effect of RERA on Firm Entry and Exit

	(1)	(2)	(3)	(4)	(5)
Sample Period	2015-2019			2015-2016	
Regression Method	Poisson	Log1plus			
Dep.Var.	No. Exit	log(num exit)	Exit=1	No. Net Entry	Net Entry>0
Post * RE	0.276*	0.036***	0.003	5.720***	0.182***
	(0.151)	(0.014)	(0.002)	(1.499)	(0.050)
Observations	252	7,476	7,476	2,108	2,108
R-squared	0.9973	0.994	0.981	0.931	0.917
District*RE FE	Yes	Yes	Yes	Yes	Yes
District*Year FE	Yes	Yes	Yes	Yes	Yes
Mean DV	1108.42	1108.42	0.03	14.36	0.59

This table reports the effect of RERA on the exit and entry of firms into the real estate industry. The coefficients are estimated from the following regression specification:

$$Y_{dyi} = \beta_1 \cdot Post_{dy} \cdot RE_i + \beta_2 \cdot Post_{dy} + \alpha_{di} + \alpha_{dy} + \varepsilon_{dyi}$$

$Post_{dy}$ is an indicator variable that takes 1 if district (d) belongs to the state after the adherence to RERA. RE_i is an indicator variables that takes 1 for the real estate industry. α_{di} and α_{dy} represent district *times* industry fixed effects and district *times* year fixed effects, respectively. The sample period for the district-level firm entry data only covers 2015 and 2016, thus we only use data from these two years from columns 4 to 5, while the firm exit data covers the period from 2015 to 2019. Robust standard errors clustered by district are reported in parenthesis.

Table 10: Effect of RERA on Industry Competiton

VARIABLES	(1) ln(HHI Asset)	(2) ln(HHI Profit)	(3) ln(HHI Asset)	(4) ln(HHI Profit)
Post*RE	-0.154***	-0.256**	-0.148***	-0.247**
	(0.045)	(0.103)	(0.045)	(0.106)
Post	0.123***	0.089*		
	(0.042)	(0.051)		
Observations	5,428	5,280	5,428	5,280
R-squared	0.968	0.976	0.973	0.981
Industry*State FE	Yes	Yes	Yes	Yes
Industry*Year FE	Yes	Yes	Yes	Yes
State*Year FE	No	No	Yes	Yes
Mean DV	3508.1	3505.47	3508.1	3505.47

This table reports the effect of RERA on the competition of firms in real estate industry. The coefficients are estimated from the following regression specification:

$$Y_{syi} = \beta_1 \cdot Post_{s(i)y} \cdot RE_i + \beta_2 \cdot Post_{s(i)y} + \alpha_{si} + \alpha_{sy} + \alpha_{iy} + \varepsilon_{syi}$$

$Post_{s(i)y}$ is an indicator variable that takes 1 for states after RERA implementation, and is omitted in columns (3) to (4) once we control for state × year fixed effects. RE_i is an indicator variables that takes 1 for real estate industry. α_{si}, α_{iy} and α_{sy} represent state × industry fixed effects, industry × year fixed effects and state × year fixed effects, respectively. Robust standard errors clustered by state are reported in parenthesis.

Table 11: Effect of RERA on Firm Profitability

Dep.Var.	(1) ROA	(2) ROTA	(3) ROE	(4) ROA	(5) ROTA	(6) ROE
Post * RE	-0.269***	-0.237***	-0.296**	0.321*	0.310*	1.408***
	(0.062)	(0.064)	(0.144)	(0.178)	(0.182)	(0.326)
Post * RE* Size_Q1-Median				-0.311	-0.335	-0.727
				(0.218)	(0.225)	(0.443)
Post * RE* Size_Median-Q3				-0.508**	-0.369*	-1.210***
				(0.208)	(0.214)	(0.432)
Post * RE* Size_AboveQ3				-0.443**	-0.072	-2.523***
				(0.192)	(0.196)	(0.412)
Post	0.347***	0.456***	0.684***	0.525***	0.803***	1.370***
	(0.048)	(0.049)	(0.104)	(0.076)	(0.079)	(0.144)
Post * Size_Q1-Median				-1.001***	-1.155***	-2.444***
				(0.082)	(0.085)	(0.144)
Post * Size_Median-Q3				-0.717***	-1.106***	-2.558***
				(0.076)	(0.078)	(0.139)
Post * Size_AboveQ3				-0.669***	-1.254***	-1.667***
				(0.070)	(0.072)	(0.131)
Observations	1,417,363	1,417,363	1,417,363	1,054,658	1,054,658	1,054,658
R-squared	0.615	0.627	0.492	0.564	0.582	0.447
Firm FE	Y	Y	Y	Y	Y	Y
FinYear FE	Y	Y	Y	Y	Y	Y
meanDV	-3.49	-1.18	0.27	-2.14	0.32	0.96

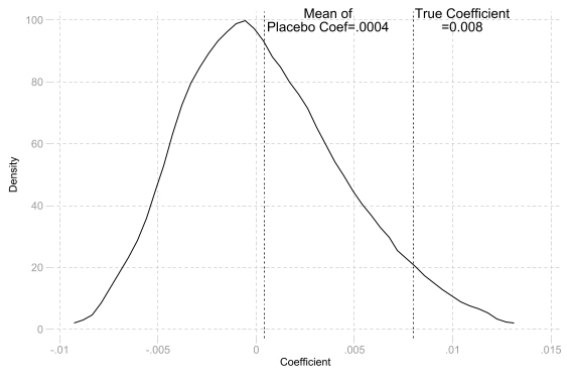
This table reports the effect of RERA on the performances of real estate developers, measured by ROA, ROAT, ROE. ROA is the net profit divided by the total asset, ROAT is the EBIT divided by the total asset, and ROE is the net profit divided by the book value of equity. From columns 1 to 3, the coefficients are estimated from the following regression specification:

$$Y_{fy} = \beta_1 \cdot Post_{fy} \cdot RE_f + \beta_2 \cdot Post_{fy} + \alpha_f + \alpha_y + \varepsilon_{fy}$$

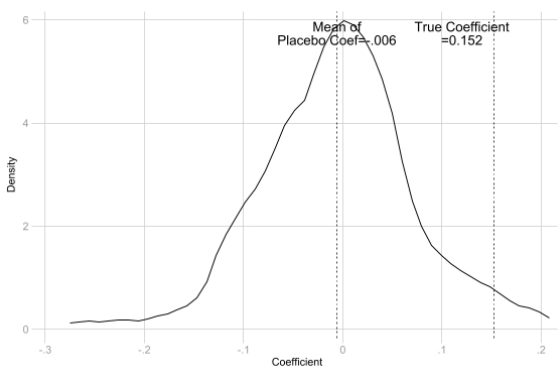
$Post_{fy}$ is an indicator variable that takes 1 if firm f is located in the state s that has implemented RERA in year y. RE_f is an indicator variables that takes 1 for real estate developers. α_f and α_y represent firm fixed effects and financial year fixed effects, respectively. In columns 4 to 6, quartiles of firm size are interacted with $Post_{f(s)y} \times RE$ and $Post_{f(s)y}$ to reflect the heterogeneity. Robust standard errors clustered by firm are reported in parenthesis.

Appendix A

Figure A1: Placebo Test with Random Timing of RERA Implementation



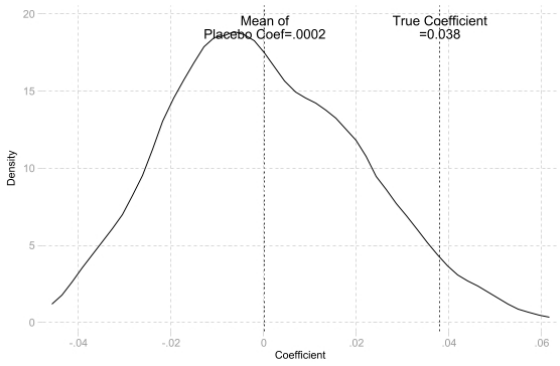
(a) Binary loan = 1



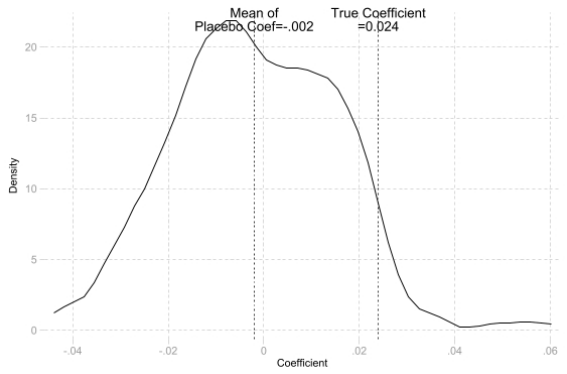
(b) Amount of Loan



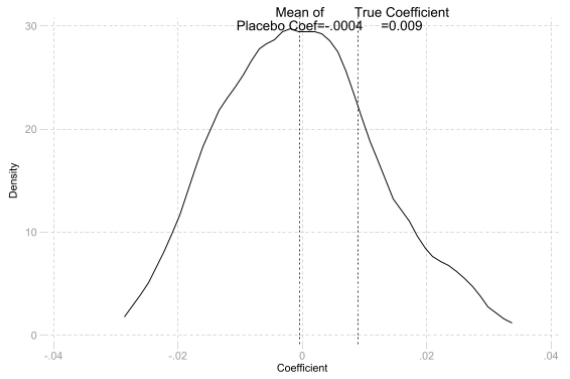
(c) Number of Loan



(d) Number of Borrower



(e) Number of New Borrower



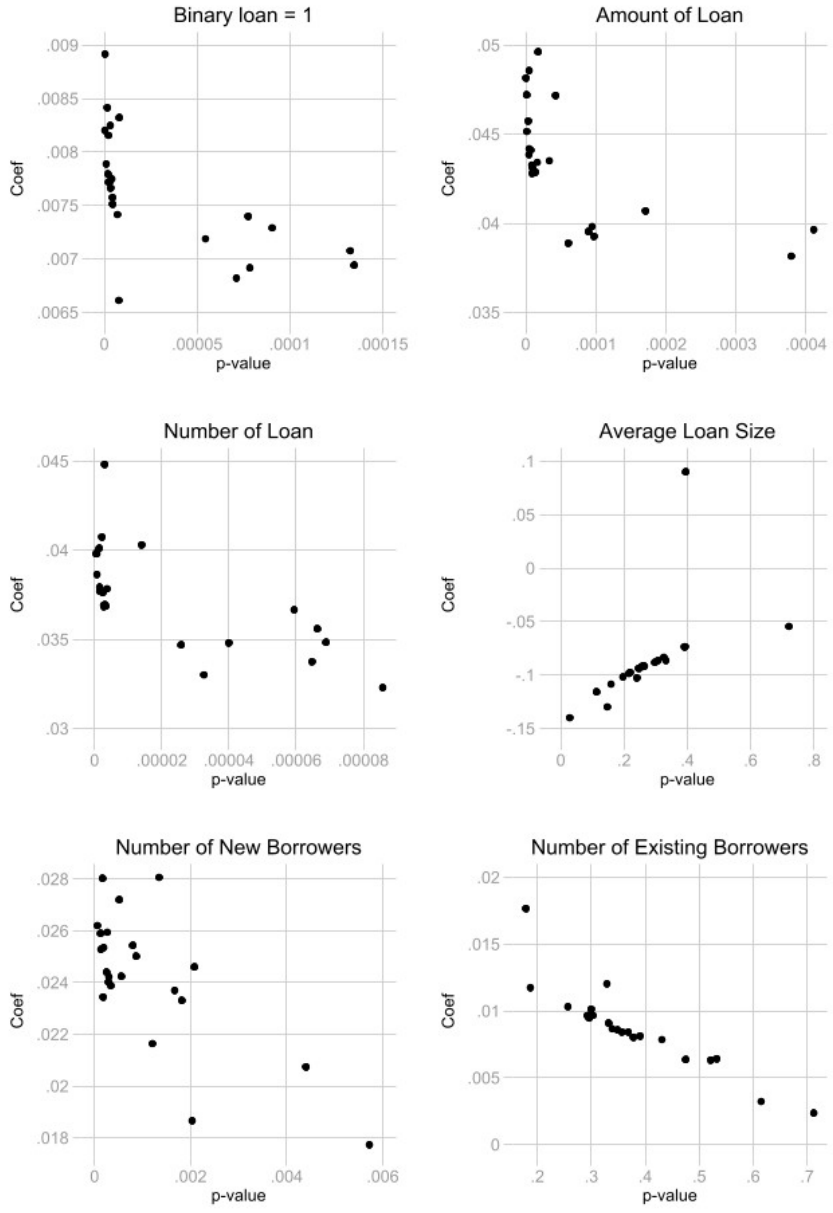
(f) Number of Existing Borrower

This figure plots the coefficients of the placebo tests. We randomly assign a quarter of policy implementation for each state and rerun the baseline specifcation below:

$$Y_{bpq} = \beta_q \cdot Post_{pq} + \alpha_{bp} + \alpha_{bq} + \varepsilon_{bpq}$$

We plot the coefficient β_q in the figures for the dependent variables including *Binary loan* = 1, *Amount of Loan*, *Number of Loan*, *Number of Borrowers*, *Number of New Borrowers* and *Number Existing Borrowers*. The last five variables are in log term.

Figure A2: Coefficient of *Post* Dropping One State at a Time



This figure replicates the regressions in columns (3), (6), (9) and (12) of Table 2 and columns (1) and (2) of Table 3 by dropping one state at a time and visualizes the coefficient of *Post*.

Figure A3: National Housing Price Index



The figure visualizes the housing price index from 2010 to 2020 in India. The grey shaded area is our sample period from 2015 Q2 to 2019 Q4. Data source: Federal Reserve Bank of St. Louis (https://fred.stlouisfed.org/series/QINR628BIS).

Table A1: Effect of RERA on Mortgage Lending – Interaction Weighted Estimator

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var.	Binary loan = 1	Amount of Loan	Number of Loan	Number of Borrower	Number of New Borrower	Number of Exsiting Borrower
Post	0.009***	0.054***	0.010***	0.010***	0.007***	0.003**
	(0.003)	(0.018)	(0.003)	(0.003)	(0.003)	(0.001)
Observations	1,897,632	1,897,632	1,897,632	1,897,632	1,897,632	1,897,632
R-squared	0.412	0.447	0.468	0.469	0.453	0.408
Branch*PIN FE	Yes	Yes	Yes	Yes	Yes	Yes
Branch*YQ FE	Yes	Yes	Yes	Yes	Yes	Yes
SE Cluster	State	State	State	State	State	State

This table rerun the results reported in Tables 2 and 3 using the Interaction Weighted estimator as in Sun and Abraham (2021) to address the estimation bias of staggered DID. Robust standard errors clustered by state are reported in parenthesis.

Table A2: Effect of RERA on Mortgage Lending – Callaway & Sant' Anna (2021)

Dep. Var.	(1) Binary loan = 1	(2) Amount of Loan	(3) Number of Loan	(4) Number of Borrower	(5) Number of New Borrower	(6) Number of Exsiting Borrower
ATT	0.020***	0.116***	0.111***	0.110***	0.072***	0.083***
	(0.007)	(0.038)	(0.038)	(0.038)	(0.026)	(0.022)
Observations	1,920,348	1,920,348	1,920,348	1,920,348	1,920,348	1,920,348
Branch*PIN FE	Yes	Yes	Yes	Yes	Yes	Yes
YQ FE	Yes	Yes	Yes	Yes	Yes	Yes
SE Cluster	State	State	State	State	State	State

This table rerun the results reported in Tables 2 and 3 using the DID with multiple periods estimator developed in Callaway and Sant'Anna (2021) to address the estimation bias of staggered DID. Robust standard errors clustered by state are reported in parenthesis.

Table A3: Effect of RERA on Mortgage Lending – Poisson Regressions

	(1)	(2)	(3)	(4)	(5)
Data Structure	Branch-PIN-YQ				Branch-State-YQ
Dep. Var.	Amount of Loans	Number of Loans	Number of New Borrowers	Number of Borrowers	Number of PINs
Post	0.157***	0.169***	0.143***	0.162***	0.137***
	(0.022)	(0.024)	(0.036)	(0.045)	(0.024)
Observations	2,514,548	2,514,548	2,166,480	2,514,548	120,042
R-squared	0.66	0.56	0.53	0.56	0.66
Branch*PIN FE	Yes	Yes	Yes	Yes	No
Branch*YQ FE	Yes	Yes	Yes	Yes	Yes
Branch*State FE	No	No	No	No	Yes

This table rerun the results reported in Tables 2 and 3 using poisson regression. We use the following regression specification:

$$log[E(Y_{bpq}|\cdot)] = \beta \cdot Post_{pq} + \alpha_{bp} + \alpha_{bq}$$

$Post_{p(b)q}$ is a binary variable that takes 1 if PIN code p belongs to the state that has implemented RERA at time q. The regression specifications include α_{bp} representing branch×PIN fixed effects and α_{bq} representing the branch × quarter fixed effects. Robust standard errors clustered by state are reported in parenthesis.

Table A4: Effect of RERA on Mortgage Lending – Branch × State × Quarter

Dep. Var.	(1) Binary loan	(2) $=1$	(3) Amount of Loan	(4)	(5) Number of Loan	(6)	(7) Average Loan Size	(8)
Post	0.022***	0.022***	0.123***	0.123***	0.108**	0.108**	-0.023	0.001
	(0.005)	(0.005)	(0.029)	(0.029)	(0.027)	(0.027)	(0.048)	(0.032)
Observations	148,124	148,124	148,124	148,124	148,124	148,124	6,398	12,195
R-squared	0.797	0.302	0.814	0.299	0.855	0.297	0.740	0.583
Branch*State FE	Yes	No	Yes	No	Yes	No	Yes	No
Branch*YQ FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State FE	No	Yes	No	Yes	No	Yes	No	Yes

This table rerun the results reported in Tables 2 and 3 using data at branch × state × quarter level. We use the following regression specification:

$$Y_{bsq} = \beta_q \cdot Post_{sq} + \alpha_{bs} + \alpha_{bq} + \varepsilon_{bsq}$$

$Post_{sq}$ is a binary variable that takes 1 for states after the adherence to RERA. The regression specifications include α_{bs} representing branch×state fixed effects and α_{bq} representing the branch × quarter fixed effects. Robust standard errors clustered by state are reported in parenthesis.

Table A5: Balance Test

Dep. Var.	(1)	(2)	(3) Post = 1	(4)	(5)
ln(GDP per Capita)	-0.430				-0.304
	(1.227)				(1.174)
ln(GVA Construction)		-0.237			0.010
		(0.675)			(0.535)
ln(CPI_HP Index)			0.133		0.130
			(0.136)		(0.126)
ln(Credit Scheduled Commercial Bank)				-0.009	-0.017
				(0.120)	(0.144)
Observations	91	91	91	90	90
R-squared	0.792	0.791	0.798	0.790	0.797
Year FE	Yes	Yes	Yes	Yes	Yes
State FE	Yes	Yes	Yes	Yes	Yes

This table report the association between the timing of RERA implementation and the variables representing the economic development of each state. We run the following specification:

$$Post_{s,t} = X_{s,t} + \alpha_s + \alpha_t + \epsilon_{s,t}$$

where $Post_{s,t}$ is the binary variable that take 1 if a state s is treated in year t. $X_{s,t}$ includes GDP per capita, Gross value addded for the construction sector, the CPI of housing, and the credit issued by scheduled commercial banks. In columns 1 to 5, the sample period is from 2014 to the year that RERA is adopted in a state. Robust standard errors clustered by state are reported in parenthesis.

Table A6: Baseline Results with State × Year-Level Controls

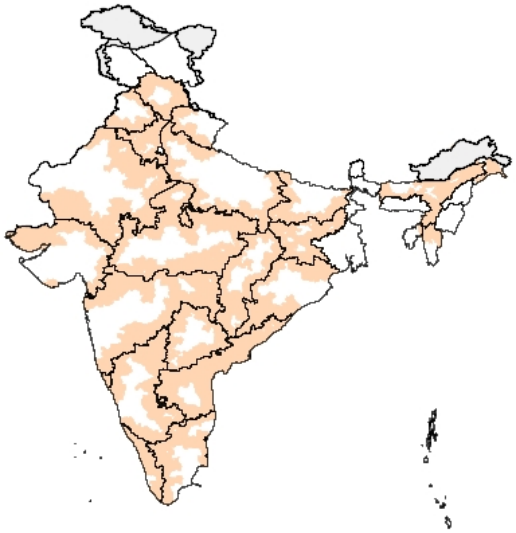
Dep. Var.	(1) Binary loan = 1	(2) Amount of Loan	(3) Number of Loan	(4) Number of Borrower	(5) Number of New Borrower	(6) Number of Exsiting Borrower
Post	0.007***	0.040***	0.034***	0.034***	0.019**	0.008
	(0.002)	(0.010)	(0.008)	(0.008)	(0.008)	(0.009)
Observations	3,003,748	3,003,748	3,003,748	3,003,748	3,003,748	3,003,748
R-squared	0.375	0.414	0.434	0.435	0.416	0.390
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Branch*PIN FE	Yes	Yes	Yes	Yes	Yes	Yes
Branch*YQ FE	Yes	Yes	Yes	Yes	Yes	Yes

In this table, we rerun the baseline results reported in Tables 2 and 3 by controlling for variables indicating the economic development of each state. We use the following regression specification:

$$Y_{bpq} = \beta_q \cdot Post_{pq} + \alpha_{bp} + \alpha_{bq} + X_{sq} + \varepsilon_{bpq}$$

Post is the binary variable that takes 1 if a PIN code p belongs to the state after the adherence to RERA. The regression specifications include α_{bp} representing branch×PIN fixed effects and α_{bq} representing the branch × quarter fixed effects. The control variables denoted by X_{sq} include GDP per capita, gross value added of the construction sector, the CPI of housing, and credit issued by scheduled commercial banks. Robust standard errors clustered by state are reported in parenthesis.

Figure A4: Districts on State Borders Included in the Sample



The map visualizes the districts on the state borders included in the regressions reported in Table A7. Map data is acquired from UN Geospatial Information Section. The areas in grey are disputed territories. Boundaries shown and the designations used on this map do not imply official endorsement or acceptance by the author or affiliated institution.".

Table A7: Baseline Results Keeping Border Districts

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dep. Var.	Binary loan = 1		Amount of Loan		Number of Loan		Number of Borrower		Number of New Borrower		Number of Existing Borrower	
Post	0.008***	0.016**	0.042***	0.081*	0.039***	0.079**	0.039***	0.079**	0.024***	0.062*	0.016	0.033*
	(0.002)	(0.007)	(0.010)	(0.044)	(0.008)	(0.038)	(0.008)	(0.037)	(0.007)	(0.034)	(0.010)	(0.017)
Observations	1,597,919	1,597,919	1,597,919	1,597,919	1,597,919	1,597,919	1,597,919	1,597,919	1,597,919	1,597,919	1,597,919	1,597,919
R-squared	0.400	0.401	0.441	0.442	0.458	0.459	0.459	0.459	0.439	0.440	0.408	0.409
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Pair*YQ FE	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Branch*PIN FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Branch*YQ FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table rerun the results reported in Tables 2 and 3 by restricting the sample to bordering areas as shown in Figure A4. We use the following regression specification:

$$Y_{bpq} = \beta_q \cdot Post_{pq} + \alpha_{bp} + \alpha_{bq} + \alpha_{pair,q} + \varepsilon_{bpq}$$

$Post_{p(b)q}$ is the binary variable that takes 1 if PIN code p belongs to the state after the adherence to RERA. The regression specifications include α_{bp} representing branch×PIN fixed effects, α_{bq} representing the branch × quarter fixed effects and $\alpha_{pair,q}$ representing the state-pair×quarter fixed effects. Note that the state-pair×quarter fixed effects are only controlled for in even-numbered columns. Robust standard errors clustered by state are reported in parenthesis.

Table A8: Robustness Test: Adding Controls to Table 6

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Group by	All		New Borrowers		Female		Low Income		Backward Caste	
Dep. Var.	LTV	Interest Rate	LTV	Interest Rate	LTV	Interest Rate	LTV	Interest Rate	LTV	Interest Rate
Post	7.842***	-0.158								
	(1.424)	(0.104)								
Post*Group			2.704***	-0.037***	0.205	-0.045***	0.516***	-0.100***	0.376*	-0.023
			(0.445)	(0.013)	(0.350)	(0.010)	(0.177)	(0.019)	(0.194)	(0.019)
ln(income)	0.075	-0.033***	0.075***	-0.033***	0.077	-0.033***		0.074	-0.033***	
	(0.045)	(0.003)	(0.045)	(0.001)	(0.045)	(0.001)		(0.045)	(0.003)	
Female	0.715**	-0.010	0.699***	-0.010**			0.746**	-0.011	0.714**	-0.010
	(0.289)	(0.021)	(0.285)	(0.005)			(0.295)	(0.022)	(0.288)	(0.021)
New Borrower	23.164***	0.033**			23.157***	0.033***	23.183***	0.031*	23.166***	0.033**
	(0.553)	(0.016)			(0.553)	(0.006)	(0.554)	(0.015)	(0.553)	(0.016)
Age	-0.309***	-0.002	-0.308***	-0.002***	-0.309***	-0.001***	-0.308***	-0.002	-0.308***	-0.002
	(0.019)	(0.001)	(0.019)	(0.000)	(0.019)	(0.000)	(0.019)	(0.001)	(0.019)	(0.001)
Govt Staff	1.570***	-0.287***	1.580***	-0.286***	1.577***	-0.284***	1.503***	-0.279***	1.544***	-0.284***
	(0.276)	(0.029)	(0.272)	(0.006)	(0.271)	(0.006)	(0.271)	(0.029)	(0.276)	(0.029)
Observations	467,549	475,312	467,549	475,007	467,549	475,007	467,549	475,312	467,549	475,312
R-squared	0.526	0.543	0.527	0.543	0.526	0.543	0.526	0.544	0.526	0.543
Branch*PIN FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Branch*YQ FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State * Group FE	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State* YQ FE	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

This table rerun the results reported in Table 6 by including borrower characteristics, including the annual income, gender, an indicator of first-times borrower, age and an indicator of government staff. Branch × PIN fixed effects and branch × quarter fixed effects are included in columns 1-2. Branch × PIN, branch × quarter, state × group, and state × quarter fixed effects are included from columns 3 to 10.

Table A9: Robustness Test: Effect on Interest Rate Spread

	(1)	(2)	(3)	(4)	(5)
Group by	All	New Borrowers	Female	Low Income	Backward Caste
Dep. Var.			Interest Spread		
Post	0.064				
	(0.064)				
Post*Group		-0.041*	-0.039**	-0.105***	-0.018
		(0.022)	(0.014)	(0.019)	(0.015)
Observations	963,214	963,214	963,214	475,810	963,214
R-squared	0.541	0.542	0.542	0.576	0.542
Branch*PIN FE	Yes	Yes	Yes	Yes	Yes
Branch*YQ FE	Yes	Yes	Yes	Yes	Yes
State * Group FE	No	Yes	Yes	Yes	Yes
State* YQ FE	No	Yes	Yes	Yes	Yes

This table rerun the results reported in Table 6 by replacing the dependent variable with the interest spread. Prior to April 2016, interest spread is calculated by deducting the base rate from the loan interest rate. Beginning in April 2016, the interest spread was calculated by subtracting the Marginal Cost of Funds based Lending Rate (MCLR) from the loan interest rate, in accordance with the formula change mandated by the Reserve Bank of India.

Appendix B

This section provide more detailed introduction on the housing and mortgage market in India.

India housing market - According to the Census of India 2011, approximately 86.6 percent of Indian households owned their dwelling, with homeownership rates markedly higher in rural areas (95 percent) than in urban areas (69.2 percent). Average household size (persons per household) in India (Census 2011) was around 4.85 persons per household for the country overall. Rural 4.94, urban 4.66. With urbanisation and migration of young people to urban area, there is a trend towards smaller household sizes. The decline in family size and population growth in urban area boosted housing demand, and significantly drive up housing price before 2020, as visualized in Figure A3

Despite rapid urbanization and increasing housing price, homeownership remains a deeply rooted aspiration across income groups: around 80 percent of urban respondents view owning a home as a key life priority[11]. Gender patterns in ownership are also evolving, with women accounting for about 22 percent of residential transactions in major cities in 2024, up from 20 percent in 2023, while female-headed households represented roughly 10–11 percent of all households in the 2011 Census. Although Scheduled Caste (SC) and Scheduled Tribe (ST) households exhibit homeownership rates similar to non-SC/ST groups, their housing quality is significantly poorer, reflected in a 10–15 percentage-point lower likelihood of having tap water, in-house sanitation, or drainage facilities. Among disadvantaged and lower-income households, affordability constraints, insecure tenure, and limited access to formal mortgage finance have historically hindered home purchase, leading most low-income acquisitions before 2020 to occur through self-construction, inheritance, or government housing programs.

Introduction to mortgage market - The home loan market in India has expanded significantly over the past two decades, reflecting both rising aspirations for homeownership and the growing role of formal credit in housing finance. According to the *Banking on Bricks report* by Knight Frank (2024), nearly 79% of surveyed urban Indian homebuyers prefer to finance their purchase through a home loan, indicating a strong inclination toward leveraging credit for housing. The mortgage-to-GDP ratio grew from 10% in FY2018 to nearly 13% in FY2023. The penetration of mortgages is uneven across regions, with more developed states such as Maharashtra, Telangana, and Delhi recording outstanding home loans equivalent to over 18% of their state GDP, while rural and less developed regions lag far behind (National Housing Bank, 2023).

At the household level, housing represents a key motive for borrowing. The All-India Debt and Investment Survey (AIDIS) 77th Round (2018–19) identifies housing as the second most important reason for households to take loans. According to Reserve Bank of India (2024), housing loans now account for about 29% of total household debt as of March 2025, underscoring the sector's growing systemic importance. Lending patterns also reflect the dominance of urban borrowers: in FY2023, between 78% and 93% of outstanding home loans across states were issued to urban areas (National Housing Bank, 2023). Most loans are

[11] The survey was conducted by Knight Frank India in 2025.
The report can be found https://www.knightfrank.com/research/report-library/beyond-bricks-the-pulse-of-home-buying-2025-12177.aspx

directed toward new housing (61% during 2021–2024), with smaller shares for purchasing second-hand homes (32%) or for renovation and reconstruction. Overall, these trends point to a deepening formal mortgage market driven by urban demand, even as structural constraints—such as credit access in less developed regions—continue to limit broader financial inclusion in housing finance.

Typical Mortgage Contract Term - In India, mortgage loans—commonly referred to as home loans—typically have repayment tenures ranging from 15 to 30 years, with 20 years being the most common term offered by commercial banks and housing finance companies. The Reserve Bank of India allows flexible repayment structures, and most lenders provide both fixed and floating interest rate options, with the majority of borrowers opting for floating-rate loans linked to external benchmarks such as the repo rate. According to data from the National Housing Bank and industry reports, the average outstanding loan tenure for Indian homebuyers is around 12–15 years, as many borrowers prepay or refinance before maturity. Loan-to-value (LTV) ratios are typically capped at 75–90 percent depending on property value and borrower profile, with longer tenures often associated with lower monthly repayment burdens but higher overall interest costs.

Appendix C

In this Appendix, we derive a simple model to identify the buyers that benefit the most from increased developer accountability by illustrating the factors that influence the buyers' sensitivity to developer default.

Let $U(W)$ denote the utility function of homebuyers. If the presale house is delivered as promised, the utility is:

$$U(W_1) = U(W_0 - C + V)$$

where W_0 represents the buyer's wealth excluding the house, C is consumption of numeraire goods, and V is the value of the housing.

In the case of developer default, the homebuyer loses the house and may incur extra costs, such as temporary housing expenses, search costs for a new property, and legal fees if litigation is required. These extra costs are denoted by L. The utility under default is:

$$U(W_2) = U(W_0 - C - L)$$

Let δ denote the probability that the house is delivered. The expected utility of home buyers is:

$$E(U) = \delta \times U(W_0 - C + V) + (1 - \delta) \times U(W_0 - C - L)$$

Buyers' sensitivity to the probability of default is:

$$\frac{\partial E(U)}{\partial \delta} = U(W_0 - C + V) - U(W_0 - C - L) \tag{C1}$$

Equation (C1) shows that buyers' sensitivity to developer default depends on W_0, V and L, as well as their risk attitude, which influences the curvature of the utility function. The relationship between default and buyers' utility with respect to these parameters is derived below:

$$\frac{\partial^2 E(U)}{\partial \delta \partial W_0} = U'(W_0 - C + V) - U'(W_0 - C - L) < 0 \tag{C2}$$

$$\frac{\partial^2 E(U)}{\partial \delta \partial L} = U'(W_0 - C - L) > 0 \tag{C3}$$

$$\frac{\partial^2 E(U)}{\partial \delta \partial V} = U'(W_0 - C + V) > 0 \tag{C4}$$

Let the ratio of housing value in total wealth be $r = \frac{V}{W_0}$. The sensitivity to δ with regards to r is represented as:

$$\frac{\partial^2 E(U)}{\partial \delta \partial r} = W_0 U'(W_0(1+r) - C) > 0 \tag{C5}$$

Model Interpretation:

- From equation (C2), all else equal, the sensitivity to default is stronger when the households have lower wealth.
- From equation (C3), all else equal, the sensitivity to default is stronger when the loss from developer default is higher.
- From equation (C4), all else equal, the sensitivity to default is stronger when the house adds more value to household wealth.
- From equation (C5), all else equal, the sensitivity to default is stronger for households with higher proportion of wealth allocated to housing.

Appendix D

In this Appendix, we derive a simple model to illustrate how RERA affects the developer market structure.

D1.1 Demand Function

For tractability, we define the following linear demand function:

$$Q^D = q_0 - \frac{P}{\theta}$$

where θ represents the probability that the house is delivered on time. We assume that higher developer creditworthiness, reflected in a larger θ, increases market demand.

D1.2 Cost Function

We model the cost function as linear-quadratic with decreasing return to scale, consistent with standard formulations in the literature.

$$C(q) = c_0 q + \frac{1}{2} c_1 q^2 + F + 1_{Before} \times \frac{\alpha}{S} q + 1_{after} \times \left[\gamma(1-\theta) q + \frac{\beta}{S} q \right] \tag{D1}$$

where q represents the number of units supplied, and $c_0 q + \frac{1}{2} c_1 q^2 + F$ represents the normal development costs, where F represents the fixed costs. S denotes firm size, and $\frac{\alpha}{S} q$ represents the signaling cost required to establish buyer trust. Since firm size may act as a positive signal for credibility (see Bafera and Kleinert (2023) for a comprehensive review), signaling costs are assumed to decline with firm size. θ denotes the creditworthiness of the developers. 1_{Before} indicates that the signaling costs are only incurred before the introduction of RERA, which enhances market transparency and thereby reduces the need for costly signaling. $\gamma(1-\theta)$ represents the expected default penalty under RERA. As RERA mandates compensation for homes not delivered on time, developers with higher creditworthiness (θ) face lower expected penalties. Here, γ represents the penalty per unit of housing defaulted.

$\frac{\beta}{S}$ represents the additional financing cost arising when a developer is no longer able to freely use the presale proceeds in the escrow account, reflecting the reliance on internal and external financing due to RERA's escrow account requirements[12]. Abundant empirical evidence shows that the financial costs of small firms are higher than those of the large firms (Hall and Weiss (1967) and Beck, Demirgüç-Kunt and Maksimovic (2005), among others), so we assumes that the extra financing cost incurred by RERA is a decreasing function of firm size S. 1_{After} indicates that both the delay penalty and the additional financing costs are only relevant after the implementation of RERA.

[12] We assume that the use of internal financing may also incur financing cost, because there will be an opportunity cost given that the firms have to give up on other investment opportunities.

D1.3 Market Equilibrium

This section derives the market equilibrium before and after the implementation of RERA.

D1.3.1 Before RERA

For simplicity, we assume that the firm size (S) follows a binary distribution: half of the firms are large with size $\bar{S}$, and the other half are small with size $\underline{S}$.

(1) Profit Maximization Under the assumption of free-entry, which drives economic profits to zero ($C(q) = Pq$), we can derive the price of housing supply for developers of difference sizes

$$q = \frac{1}{c_1}(P - c_0 - \frac{\alpha}{S}) \tag{D2}$$

(2) Free-entry

New firms will enter the market until profit of all firms becomes zero. Thus, let $Pq = C(q)$ and derive the equilibrium price.

$$P^* = \sqrt{2Fc_1} + c_0 + \frac{\alpha}{S} \tag{D3}$$

Substitute equation (D3) into equation (D2), and derive the equilibrium supply.

$$q^* = \sqrt{\frac{2F}{c_1}} \tag{D4}$$

(3) Market clearing condition

Define N as the number of developers. The total supply can be expressed as $Q^S = N_{\times} q^*$. Let $Q^S = Q^D$, and substitute equation (D3) into this equation, we can derive the equilibrium number of firms:

$$N^* = \frac{c_1\left[q_0 - \frac{1}{\theta}(\sqrt{2Fc_1} + c_0 + \frac{\alpha}{S})\right]}{\sqrt{2Fc_1}} \tag{D5}$$

D1.3.2 After RERA

(1) Profit Maximization

Let $C'(q) = P$, we can drive the following function:

$$q = \frac{1}{c_1}\left[P - c_0 - \gamma(1-\theta) - \frac{\beta}{S}\right] \tag{D6}$$

(2) Market clearing condition

Let $Q^D = Q^S$, we can derive the number of firms:

$$N = \frac{c_1(q_0 - \frac{P}{\theta})}{P - c_0 - \gamma(1-\theta) - \frac{\beta}{S}} \tag{D7}$$

(3) Free-entry

New firms will enter the market until profit is zero. Thus, let $Pq = C(q)$, and derive the equilibrium price:

$$P^* = \sqrt{2Fc_1} + c_0 + \gamma(1-\theta) + \frac{\beta}{S} \tag{D8}$$

Substituting equation (D8) into equation (D7) and derive the number of firms in equilibrium:

$$N^* = \frac{c_1\left\{q_0 - \frac{1}{\theta}\left[\sqrt{2Fc_1} + c_0 + \gamma(1-\theta) + \frac{\beta}{S}\right]\right\}}{\sqrt{2Fc_1}} \tag{D9}$$

Substituting equation (D8) into equation (D6) and derive the equilibrium supply of each developer:

$$q^* = \sqrt{\frac{2F}{c_1}} \tag{D10}$$

D1.4 Comparative Statics

(1) Number of Firms:

To understand the effect of RERA on the equilibrium number of firms, define $\Delta_{N^*} = N^*_{after} - N^*_{before}$,

$$\Delta_{N^*} = \frac{c_1}{\theta\sqrt{2Fc_1}}[\frac{\alpha}{S} - \frac{\beta}{S} - \gamma(1-\theta)] \tag{D11}$$

From above equation, we have $N^*_{Before} < N^*_{After}$ if $\gamma(1-\theta) + \frac{\beta}{S} < \frac{\alpha}{S}$. This condition implies that the number of firms increases after RERA when the additional cost imposed by RERA is less than the signaling cost previously borne by small firms.

To understand the change of firm numbers for large and small firms, we take derivatives of Δ over S:

$$\frac{\delta\Delta}{\delta S} = \frac{c_1}{\theta\sqrt{2Fc_1}} \times \frac{\beta - \alpha}{S^2} \tag{D12}$$

when $\beta < \alpha$, we have $\frac{\delta\Delta}{\delta S} < 0$. In other words, when the financing cost ($\frac{\beta}{S}$) is lower than the signaling cost ($\frac{\alpha}{S}$), the increase in the number of developers is larger for small firms than for large ones. This condition always hold if $\gamma(1-\theta) + \frac{\beta}{S} < \frac{\alpha}{S}$. Intuitively, the number of small firms increases more than large firms because the cost saving due to RERA is more significant for small firms.

(2) Equilibrium Price: From equations (D3) and (D8), we have $P^*_{After} < P^*_{Before}$ if $\gamma(1-\theta) + \frac{\beta}{S} < \frac{\alpha}{\underline{S}}$. The lower equilibrium price after RERA implies a higher transaction volume Q^*, assuming the demand curve is unchanged or shifts upward.

To conclude, after the introduction of RERA, as developer credibility improves (i.e., higher θ) and when the signaling cost is larger than the cost incurred by RERA ($\gamma(1-\theta) + \frac{\beta}{S} < \frac{\alpha}{\underline{S}}$), the model predicts a lower equilibrium price (P^*), a greater number firms (N^*) and a higher volume of transactions (Q^*). The number of firms (N^*) increase more for small ones. Both total supply and total demand increase in equilibrium.