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House Prices in India

How High, and for How Long?

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CSEP RESEARCH

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House prices in India

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List of Abbreviations

AIDIS	All-India Debt and Investment Survey
APAC	Asia Pacific
BSE	Bombay Stock Exchange
CAGR	Compound Annual Growth Rate
EWS	Economically Weaker Section
FAR	Floor Area Ratio
FSI	Floor Space Index
GDP	Gross Domestic Product
HDFC	Housing Development Finance Corporation Limited
HFC	Housing Finance Company
HPI	House Price Index
LIG	Low-Income Group
MGI	McKinsey Global Institute
MIG	Middle Income Group
MOSPI	Ministry of Statistics and Programme Implementation
NHB	National Housing Bank
NSS	National Sample Survey
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
PMAY	Pradhan Mantri Awas Yojana
PPP	Purchasing Power Parity
PTI	Price-to-Income
RBI	Reserve Bank of India
RERA	Real Estate (Regulation and Development) Act, 2016
WPI	Wholesale Price Index

Executive Summary

Addressing the nation on Independence Day, 2023, the Prime Minister announced that the government is working on an interest relief scheme to help urban residents living in rented housing, slums, and chawls own a house. The intent is well-placed since access to housing is a prerequisite for a dignified life, and yet, it remains unattainable for a significant proportion of Indians; 17% of all urban households live in slums. The situation is especially grave in India's bigger cities—41% of households in Greater Mumbai, 30% in Kolkata, and 29% in Chennai live in slums. Successive governments have focused on providing housing to the disadvantaged, arguably the most notable efforts being the Indira Awas Yojana (IAY) for rural areas, and the ongoing Pradhan Mantri Awas Yojana (PMAY) for urban areas. Given the scale of the housing deficit, despite a significant push by the government to resolve this problem, it is imperative to understand two fundamental questions: (a) How expensive is housing in India, and why? (b) What explains the tepid increase in house price growth over the last 7–8 years? Answering these questions will provide clarity on how to tackle this challenge going forward.

Housing in India is indeed expensive relative to its yardstick of affordability, but we are not alone. At a price-to-income ratio (PTI) of 11, housing in India is more than twice as expensive as its affordability benchmark of 5. Housing in countries like the United States, Australia, and Germany with PTIs of 3.6, 7.6, and 9, respectively, is more affordable. On the other hand, several other countries, especially in the developing world, such as Bangladesh, Sri Lanka, and China have PTIs that are worse than India's at 12.3, 26.3, and 29.1, respectively.

India's high house prices are, however, not due to a supernormal price increase over the past 30 years, but due to structural problems afflicting the real estate sector. House prices have appreciated by 9.3% on an annual basis between 1991–2021, which is similar to gold at 9.2% and lower than the Sensex at 13.5%. This pattern and profile of returns across assets is consistent with those in other countries. House prices (housing affordability) move in tandem with the degree of transparency of the real estate industry, which comprises structural elements such as the regulatory and legal architecture, and transparency across transaction

processes, among others. For countries comprising the 'highly transparent' cohort in JLL's Global Real Estate Transparency Index, the average PTI is 8, compared to an average PTI of close to 14 for the 'low transparency' countries. India is currently part of the 'semi-transparent' cohort, which has an average PTI of 13.6. It is noteworthy that we have been adjudged as the "best improver" in the Asia Pacific (APAC) region over the past couple of years by this Index as a result of reforms like the digitisation of land records through the Digital India Land Record Modernization Programme, and the implementation of the Real Estate (Regulation and Development) Act.

One of the key reasons for India's 'semi-transparent' ranking is the lack of credible and rigorous land use planning and implementation, which leads to a constrained and unpredictable supply of land. Only 28% of Indian cities have approved master plans and almost none are granular enough, and do not contain the requisite financing and sequencing for key plan proposals. This absence of granularity and concomitant financing makes it unclear and uncertain if the city will actually develop according to the plan and by what timeline. This milieu makes the entry of new real estate players (developers) difficult, giving rise to a less-than-competitive industry structure. Such an industry structure incentivises and enables real estate developers to maximise profits by keeping prices high and supply low. It comes as no surprise, then, that when compared to other industries like IT, Auto, and FMCG, real estate in India has a significant number of firms making supernormal profits (of more than 20%) in the long run. A less-than-competitive real estate industry operating in a semi-transparent environment induces economic agents, especially those with unaccounted income (the shadow economy) and/or insider information (about planning policies such as land use changes), to invest in real estate, reinforcing the high price structure. It is testimony to the general popularity of the asset that 77% of India's household wealth is in real estate compared to 62% for China, 44% for the US, and 37% for Germany.

A corollary of the argument thus far is that the tepid house price growth witnessed in the last few years does not portend a more affordable housing regime in the future. House prices go through decadal cycles of rapid price growth followed by downturns that co-move with the broader macroeconomic environment in the coun-

try, and the current cycle is no different. House prices have gone up by 3.7% per annum between 2017 and 2022, compared to an annualised increase of about 9.3% between 1991 and 2021. During the same period, real GDP growth was 3.9% and 5.8% respectively. The real estate industry is beginning to show signs of revitalisation on the back of strengthening economic fundamentals, particularly GDP growth. In 2022, house prices in major cities appreciated by 4–11%, sales recorded a 68% y-o-y increase, and new launches increased by 81% y-o-y. *Ceteris paribus*, house price growth in the future will depend on how the underlying macroeconomic trajectory evolves from hereon.

The need of the hour, thus, is to accelerate the implementation of policy reforms by focusing on releasing

(developable) land supply in a transparent manner through credible and rigorous land use and implementation. This will increase competition by enabling and encouraging the entry of new real estate developers, putting pressure on prices, and in turn, improving affordability. Not only will this provide a large segment of Indians with access to decent housing, but in the process will also boost GDP growth and create much-needed non-farm employment. To ensure that such reforms actually have the desired impact, the government needs to institutionalise rigorous measurement and tracking of key metrics like the PTI across cities, industry competitiveness, and transparency of the sector, all of which are critical for affordable housing.

1. Introduction

Access to decent housing¹ is a prerequisite for a good quality of life. It features prominently in both, the multidimensional poverty index (MPI) calculated by NITI Aayog (2021), and the Bare Necessities Framework proposed in the Economic Survey of 2020–2021 (Ministry of Finance, 2021). Despite its importance for a dignified life, housing remains unattainable for a large section of India's population. An obvious and tangible manifestation of the lack of decent housing is the number of people living in slums. The Census of India (2011) defines slums as “residential areas where dwellings are unfit for human habitation by reasons of dilapidation, overcrowding, faulty arrangements and design of such buildings, narrowness or faulty arrangement of street, lack of ventilation, light, or sanitation facilities or any combination of these factors which are detrimental to the safety and health.” Close to 17% of all urban households live in slums. The situation is especially grave in larger cities—41% of Greater Mumbai Municipal Corporation, 30% of Kolkata Municipal Corporation, and 29% of Chennai Municipal Corporation households live in slums (Census of India, 2011).

Given the pervasiveness of the problem and its debilitating impact on the wellbeing of individuals, the Government of India has launched several schemes over the years to address this challenge. On Independence Day, 2023, the Prime Minister announced that the government is working on an interest relief scheme to help urban residents who live in rented housing, slums, and chawls own a house (The Economic Times, 2023). The scheme is set to provide assistance of Rs 60,000 crore over the next five years (The Times of India, 2023). In rural India, where about two-thirds of India's population still resides, the Indira Awas Yojana (IAY) helped construct around 24 million houses between 1985–2012 (Ministry of Rural Development, 2013; Tiwari & Jyoti, 2016); this is more than 10% of the total rural housing stock of 221 million houses as enumerated in the Census of India, 2011. While the ongoing Pradhan Mantri Awas Yojana (PMAY) has been the most ambitious housing scheme to address the urban housing shortage. According to latest estimates, 11.89 million houses have been sanctioned under the scheme at an

estimated central outlay of Rs 2 lakh crore, of which 7.7 million houses have been completed and Rs 1.52 lakh crore of central assistance released (PMAY, 2023).² This broadly corresponds with 9.2% of the urban housing stock of 110 million houses as per the Census of India, 2011. Government interventions to alleviate this housing shortage are usually justified since it is commonly understood that the key cause behind this issue is inordinately high land prices that seem to appreciate at runaway rates, making housing unaffordable for many, despite it being a necessity. A prime example of this is Mumbai, which ranks as the 18th priciest housing real estate³ market in the world, and ranks 37th in terms of price appreciation globally (Knight Frank, 2023).

However, this scenario seems to be changing of late as house price growth has lost its momentum over the past 7–8 years. For example, while house prices grew by 15.5% annually between FY 2011 and FY 2016, growth in annual prices was a tepid 3.7% between FY 2017 and FY 2022 (Reserve Bank of India, 2022). The stagnation in house price growth also overlapped with a high level of unsold inventory. At the end of 2017, 440,000 housing units remained unsold in seven big cities (Business Standard, 2018), which went up to 455,000 unsold units by 2020. In light of these mellow market conditions, developers slowed down new launches, which went down by 18% between 2016 and 2017, while sales outdid this decline and fell by 34% (JLL, 2020). By 2020, as new launches had recovered and increased to their 2016 level, sales witnessed a nearly 10% decline relative to their 2016 numbers (JLL, 2020).

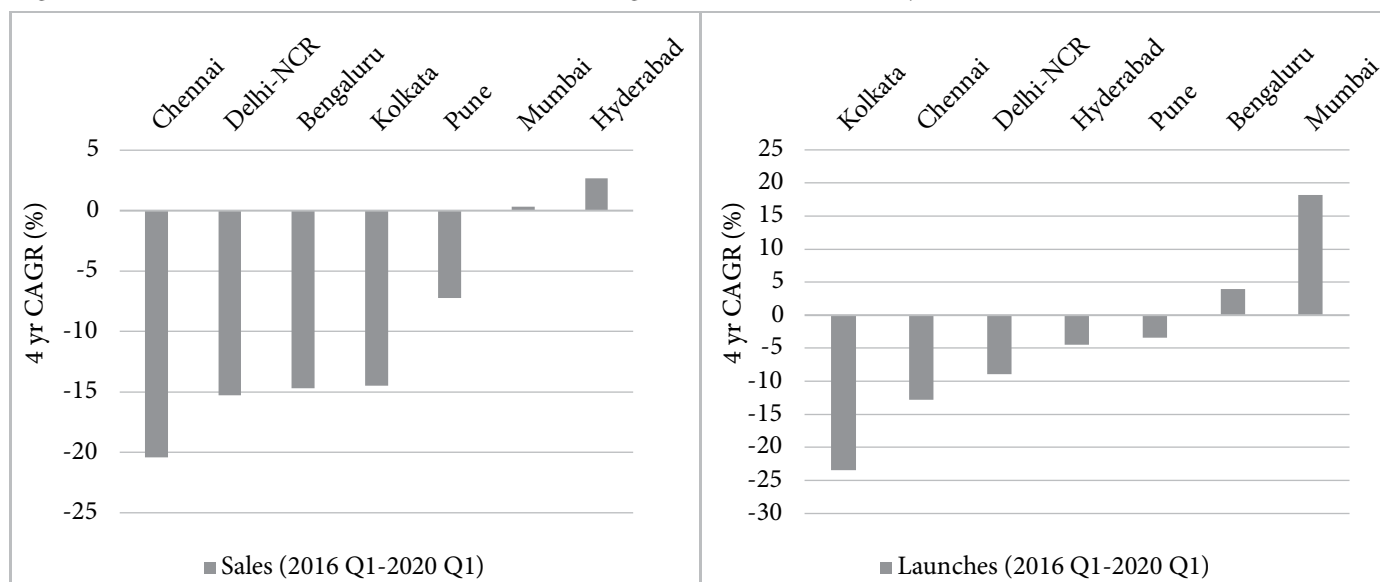
This downward trend in house price growth coincided with the onset of some pivotal new reforms—the Digital India Land Record Modernization Programme in 2016, the Real Estate (Regulation and Development) Act (RERA) in 2016, the setting up of the Insolvency and Bankruptcy Board in 2016—which aimed at increasing formalisation in the economic system in general, and transparency in the real estate sector in particular.

Given the importance and scale of this housing challenge, the consequent public resources devoted to it, and the ostensible change in the price growth trend over the past 7–8 years, we ask two fundamental questions in this paper:

¹ Housing, unless otherwise stated, refers predominantly to urban housing.

² As on 3rd October, 2023

³ Unless otherwise stated, real estate and property refer to housing in this paper.

Figure 1: Decline in sales and launches of housing real estate across major cities in India

Source: JLL, RBI.

1. How expensive is housing in India, and why?
2. What explains the tepid increase in house price growth over the last 7–8 years?

Answering these questions robustly will provide a holistic framework which is essential for robust policy-making in the future.

A primary reason for the lack of a comprehensive view on the status of housing affordability is that formal and consistent tracking of house prices in India began as late as 2008–2009.⁴ In Section 2, we discuss the scarce availability of house price data in India and how our unique dataset from HDFC gives us the ability to track house prices from 1991–2021. Section 3 answers our first question and concludes that house prices today are high not due to a supernormal price increase over the past 30 years, but due to structural issues—the lack of credible and rigorous land use planning and implementation leading to constrained and unpredictable land supply, a less-than-competitive real estate industry, and the presence of a moderate-sized shadow economy. In Section 4, we develop an econometric model to explain house price growth as a function of its demand and supply factors, and conclude that it moves with underlying macroeconomic cycles. Consequently, the past 7–8 years of tepid growth are part of a cyclical

downswing and, *ceteris paribus*, the evolution of house price growth in the future is contingent on the strength of broader economic recovery. The paper concludes with recommendations for policymakers and future research in Section 5.

2. Data constraints and our way out

Despite the importance of land and housing for India's growth and development, systematic and publicly accessible tracking of property prices in India did not begin until nearly 2009. Considering that we wanted to understand property price behaviour and its drivers, the availability of data for at least a few decades was imperative, but unavailable in the public domain.

2.1. Lack of historical time series on property prices in India

The two commonly available data sources for house price data in India are the Reserve Bank of India's (RBI) House Price Index and the National Housing Bank's (NHB) Residex. However, neither source gives publicly available data on property prices before 2008–2009. The RBI's House Price Index (HPI) gives indexed values for property prices in nine major cities (Mumbai, Delhi, Chennai, Kolkata, Bengaluru, Lucknow, Ahmedabad,

⁴ The Reserve Bank of India's House Price Index data for multiple cities begins in Q4 of FY 2008-2009.

Table 1: Predominant sources for property price data do not give a long enough historical series

Source	Time period	Methodology
RBI House Price Index	2008–09 onwards (quarterly)*	Uses registration price data of transacted houses collected from the Registration Departments of the respective state governments
NHB Residex	City-level indices: 2012–13 onwards (quarterly)# Absolute prices at the city level: 2013–14 onwards (quarterly)	Uses three different data sets to compute the index: (a) evaluated property values (provided by banks and Housing Finance Companies (HFCs)), (b) listed price (of marketed projects), and (c) registration price (as noted by civic authorities). The absolute price (HPI@Assessment price) is given in carpet area prices across cities for three housing sizes: ≤ 60 sq. mt., >60 sq. mt., >110 sq. mt. Prices are also given separately for properties under construction.

Notes: *2000–09 to 2012–13 (with base year 2008–09), 2010–11 onwards (with base year 2010–11).

#City-level indices are given for:

2012–13 to 2014–15 (with base year 2007)

2013–14 to 2017–18 (with base year 2012–13)

2018–19 onwards (with base year 2017–18).

A composite all-India index is given for 2013–14 onwards (with base year 2018).

Jaipur, and Kanpur) beginning in 2008–2009, based on transaction-level house registration data (Reserve Bank of India, 2012). NHB's Residex gives indexed values from 2012–2013 and carpet area prices (per square foot) from 2013. Also, beginning in 2013, the NHB gives two house price series for 50 cities, namely, 'HPI@Assessment Prices' and 'HPI@Market Prices for Under-Construction Properties' (National Housing Bank, 2020).

From Table 1, it is evident that these datasets are insufficient to give us a trend of price movement over the long run, which is a must to answer our two questions.

2.2. Using unit-level mortgage data for long-term property prices

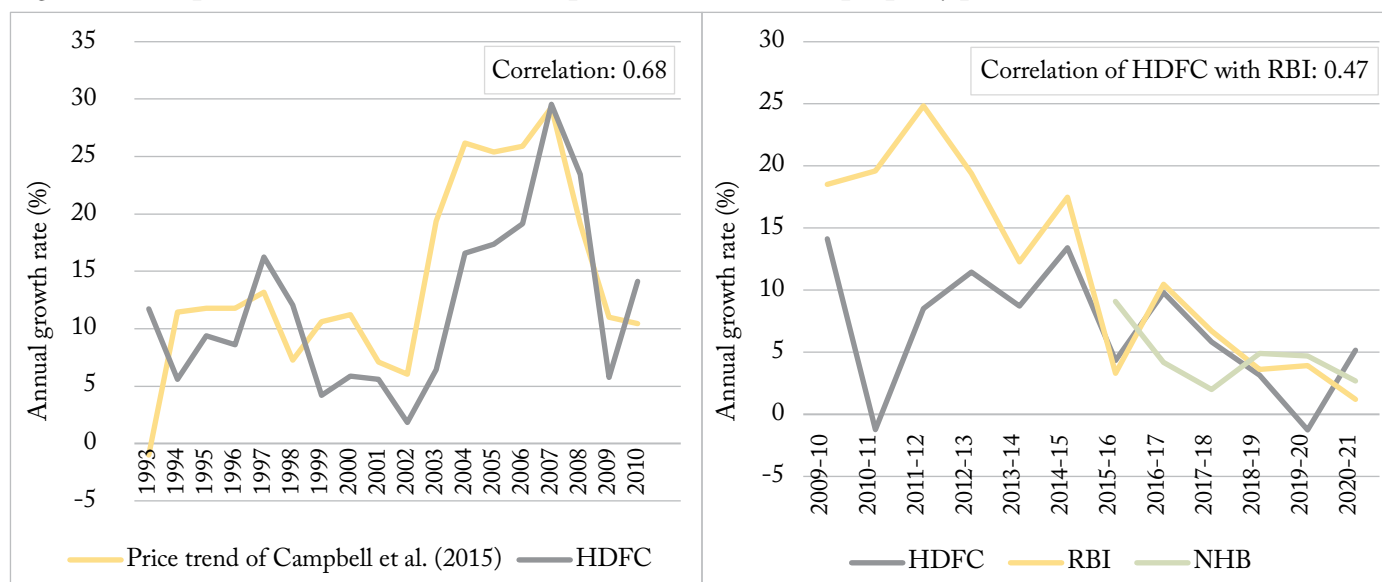
To obtain long-term property price data, we use anonymised transaction-level mortgage data from the Housing Development Finance Corporation Limited (HDFC), one of India's largest housing finance companies (HFCs). The institution had a market share of 40% among HFCs in terms of outstanding home loans in 1999–2000. In the early 2000s, banks entered the mortgage industry and expanded housing credit rapidly. However, HDFC retained 20–22% of the market share between 2000 and

2019, and it remains a popular source for home loans in India among homebuyers. Thus, we believe that house price series constructed from data from HDFC should be representative of the overall price trend.⁵

The dataset contains anonymised information for nearly 3.3 million transactions across the last 30 years, spread over more than 400 districts. The pooled cross-section data gives information on key characteristics of the borrower, the loan, property area and price, city, and other details of the property at the time when the loan was approved.

We cleaned the data by keeping only transactions that pertain to properties that are listed as flats or apartments because the notion of price per sq. ft, our primary metric to understand house prices, is cleanly defined in the case of an apartment. Since the standard level of price per sq. ft. differs widely across districts in the country depending on factors that drive local property prices, outliers were dropped by fitting a lognormal distribution at the district level. We use the cleaned database to determine the weighted mean price per sq. ft. at an all-India level (see Appendix A).

⁵ An important inference and assumption we make here is that the data captures the urban population more so than their rural counterparts, given the general trends of banking penetration in India. Since this data is the plinth of our study, our narrative remains focused on urban housing.

Figure 2: Computed series from HDFC compares well with other property price series

Sources: HDFC; Campbell, Ramadorai, & Ranish (2015); RBI's House Price Index (HPI); NHB.

We compare the computed HDFC property price series with other sources of property price data as defined above and find that the former presents a similar trend to alternative price series. When we compare the HDFC price series with the price series constructed by Campbell, Ramadorai, and Ranish (2015), who also use loan-level data from a mortgage lender, we find that the two move together with a correlation of 0.68. This confirms the reliability of the HDFC dataset to a reasonable degree.

3. Houses are expensive in India but do not represent a bubble

Conversation around the housing market in India is usually dominated by how “inordinately expensive” housing is. If true, there could be two reasons for the same. First, house prices may have grown disproportionately fast over the last few decades, making housing unaffordable over time. Second, house prices could have been high to begin with, largely due to structural bottlenecks. In this section, we first examine how expensive house prices in India actually are, and then explore which of the two abovementioned reasons is causing this lack of affordability, if at all.

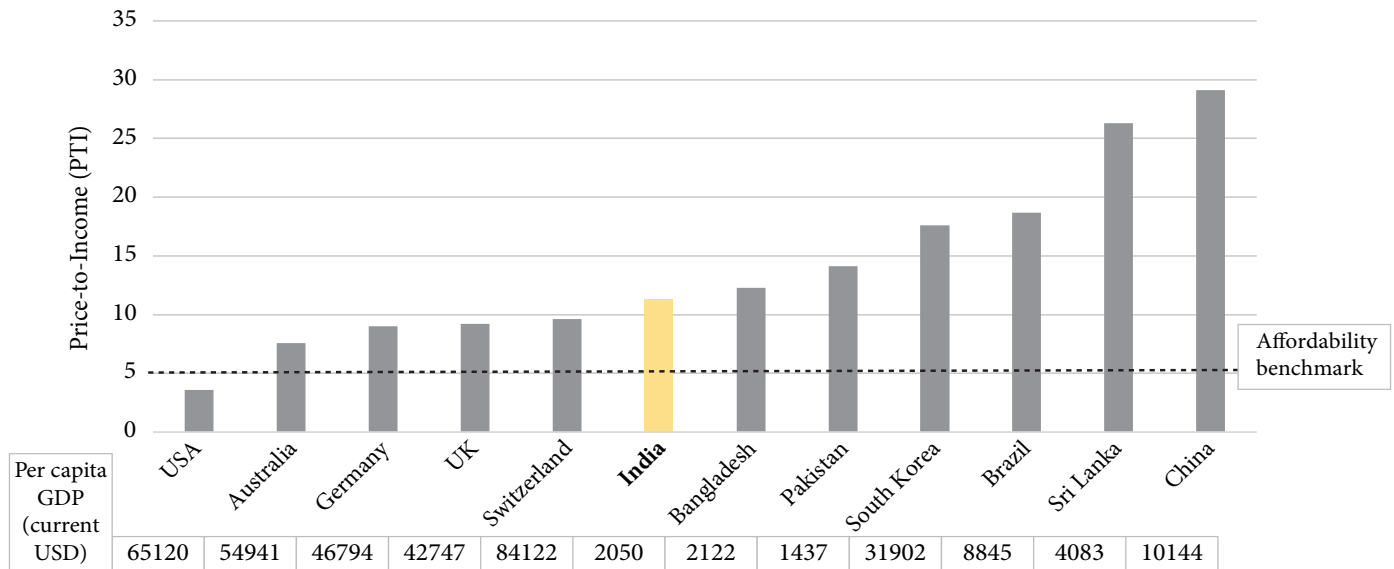
3.1. Housing is expensive in India, but we are not alone

Housing in India is generally considered affordable if it costs 4–5 times the annual income of a household (Parekh et al., 2008).⁶ Given this benchmark, at a price-to-income ratio (PTI) of 11.3, housing truly is expensive in India, and it has hovered between 10 and 11 over the last decade or so (Numbeo, 2019).⁷ Thus, housing in India has been consistently expensive for some time now. There are many countries (especially in the developed world) like the US (3.6), Australia (7.6), and Germany (9) with lower PTIs than India. However, there are also countries (especially developing countries), like Bangladesh (12.3), Sri Lanka (26.3), and China (29.1) where house prices are significantly higher.

A PTI of more than twice the benchmark value is a serious problem that has a great bearing on people's quality of life; knowing that our peers are also in the same boat may be helpful, but it does not take away the need to take action and attempt to make housing more affordable. As is widely acknowledged, “with urbanisation and growing economic activities, the challenges associated with affordable housing in urban areas have

⁶ Cost not exceeding 4 times the gross household annual income for EWS/LIG categories and 5 times the gross household income for MIG category.

⁷ PTI is calculated as the ratio of median apartment prices to median familial disposable income. Median apartment size is taken to be 90 square meters. Since Numbeo data is crowdsourced, it generally covers large cities in the country. For example, the country PTI for India comprises 23 cities.

Figure 3: Price-to-income ratio for a sample of developed and developing countries

Source: Numbeo (2019); World Bank (2019).

Note: 'Price' refers to median apartment prices in the city, the size of a median apartment is taken to be 90 square meters. 'Income' refers to median familial disposable income.

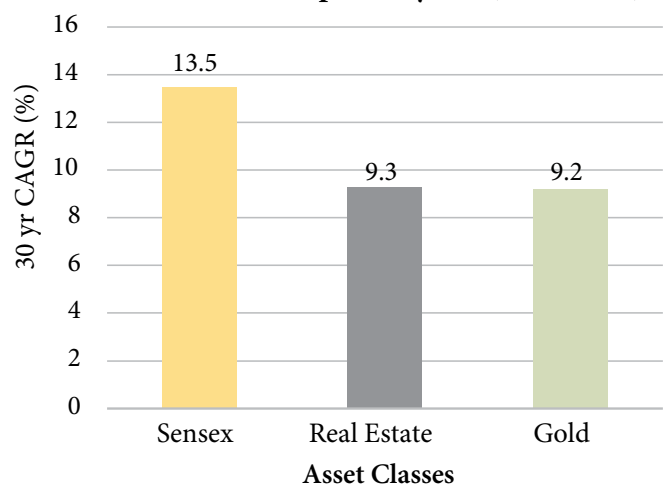
been a critical challenge to India's growth story since independence" (Ministry of Housing & Urban Affairs, 2022); most schemes aimed at making housing affordable in India have acknowledged and followed in this general ethos.

Further, house prices in major Indian cities like Mumbai and Delhi are generally even higher. For instance, in 2019, Mumbai's PTI at 39 ranked ahead of cities like Singapore (22) and was nearly three times that of New York's PTI (12) (Numbeo, 2019). We find a similar pattern in the rental market for housing. At an urban India level, on average, expenditure on rent makes up around 6% of monthly household expenditure (NSS, 2012). However, the average house rent in six major districts—Mumbai, Delhi, Kolkata, Chennai, Hyderabad, and Bangalore—is nearly 19.2% of the average household expenditure.⁸ It is because of this higher cost of housing in big cities that a significant share of their population lives in slums.

3.2. High house prices are not due to supernormal increase in house prices over time

Contrary to common perception, housing real estate in India has not given supernormal returns over the past 30 years, and hence, this is not the primary reason for

its lack of affordability. Housing real estate returns (in terms of capital gains) have been comparable with those from gold, and significantly lower than those from equity markets. In terms of 30-year annualised returns,⁹ the Sensex has given the maximum returns at 13.5%, real estate comes second with 9.3%, followed closely by gold at 9.2%. Over this period, annualised growth in nominal GDP (a proxy for income) was 12.5%.

Figure 4: Real estate has not given supernormal returns in India over the past 30 years (1991-2021)

Sources: HDFC, RBI, BSE.

⁸ Author's calculations from Household Consumer Expenditure, NSS 68th Round.

⁹ Returns in this paper refer to capital gains only, unless otherwise stated

Figure 5 depicts the returns from real estate and equity for a few countries, and the pattern for other countries is consistent with that for India. Total returns¹⁰ from equity are usually higher than those from real estate and largely by the same amount; in countries with higher returns from equity than from real estate, the average return differential between the two is 2%, which is the same as India’s return differential, also at 2%. Equity giving higher returns (but also exhibiting higher volatility) than real estate in India is consistent with the return pattern for most other countries, especially in the post-World War 2 period (Jordà et al., 2019). Thus, housing in India is not expensive due to some runaway price growth over the past few decades as is sometimes asserted.¹¹

3.3. A multitude of structural reasons are responsible for high house prices

So far, we have established that although housing is expensive in India, it does not represent a bubble¹² which may burst in the future since prices have not increased at a runaway pace. So, why is housing expensive to begin with? We argue that this is due to lack of credible and rigorous land use planning and implementation, leading to constrained and unpredictable supply of land. This gives rise to a less-than-competitive industry structure, incentivising and enabling developers/suppliers to keep prices high. These, along with the presence of a moderately-sized shadow economy, make real estate a preferred store of value, inflating (investment) demand, pushing prices up.

Figure 5: India’s pattern of total returns between real estate and equity is similar to other countries (1990–2015)



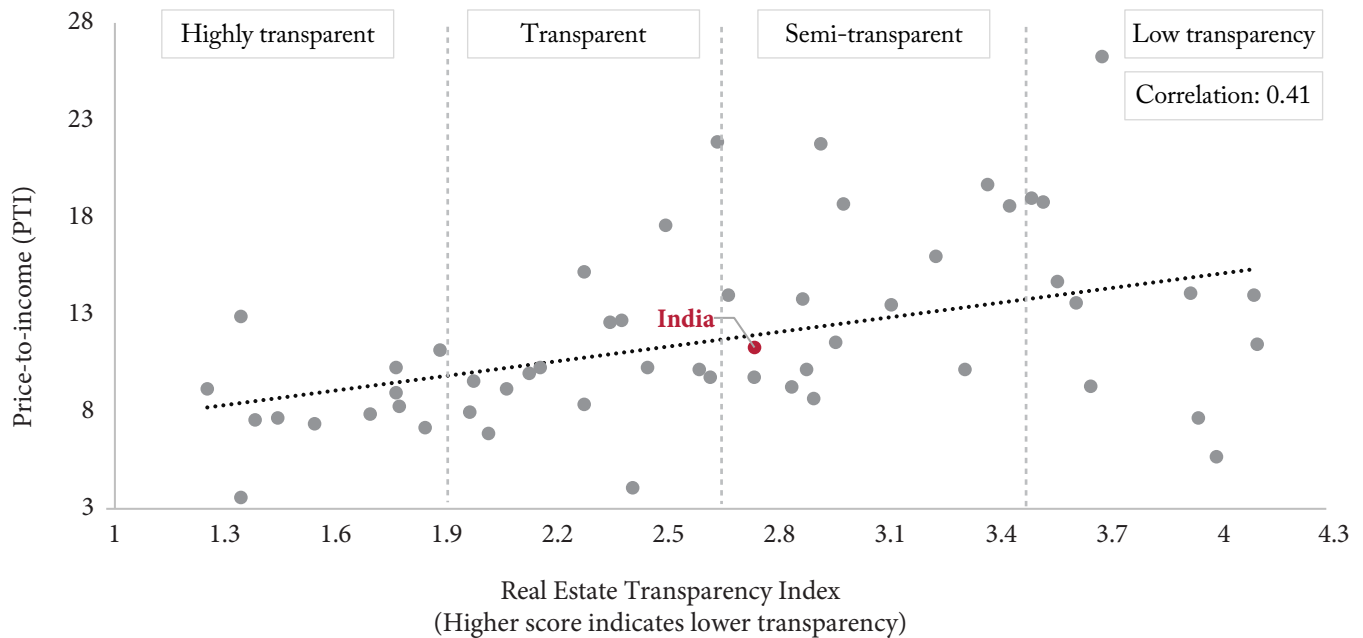
Source: Jordà et al. (2019); HDFC; BSE Sensex; World Development Indicators, IMF.

Note: Total return is the sum of compounded annual capital gain and mean rental yield/dividend yield. Period coverage for advanced countries is 1990–2015 in calendar year. Period coverage for India is FY 1991–2016. Average rental yield for India taken as 3% (IDFC, 2018).

¹⁰ Total returns, i.e., the sum of capital gains and income from investment (rental income/dividends). Rental yield is included as it makes up a proportionate share in total returns in certain advanced countries, unlike in India.

¹¹ This inference is purely based on returns from real estate vis-à-vis other assets and GDP growth. It may be the case that median income may have behaved very differently over time, resulting in lack of housing affordability. The paper makes no attempt at calculating the median family income.

¹² “..in its widespread use the term refers to a situation in which excessive public expectations of future price increases cause prices to be temporarily elevated. During a housing price bubble, homebuyers think that a home that they would normally consider too expensive for them is now an acceptable purchase because they will be compensated by significant further price increases” (Case, Shiller, Mayer, & Quigley, 2003).

Figure 6: Housing affordability and transparency of the real estate sector move hand-in-hand

Sources: JLL Transparency Index (2022); Numebo (2019).

One summary measure of the state of affairs in the sector is the Real Estate Transparency Index computed by Jones Lang Lasalle (JLL) (2022).¹³ As is evident from Figure 6, transparency in the real estate sector and housing affordability move together. For countries comprising the ‘highly transparent’ cohort, the average PTI is 8, compared to an average PTI of close to 14 for ‘low transparency’ countries. While India is part of the ‘semi-transparent’ group, which has an average PTI of 13.6, it did emerge as “the biggest improver in APAC second year running” as a result of the government’s ongoing reform initiatives such as the digitisation of land records and the Real Estate (Regulation and Development) Act (JLL, 2022). Thus, one way to improve affordability and lower PTI would be for India to keep improving the transparency of its real estate sector. It is then worth asking, how can India achieve this? Of the six pillars in the Index, India ranks most poorly (50th) in ‘Regulatory and Compliance’. Some illustrative sub-topics covered under this pillar are ‘the existence of land use rules and zoning’, ‘predictability of changes in land use and zoning’, ‘simplicity of key regulations in contract law’, ‘efficiency of the legal process’, and ‘accuracy of land registry records’. These

regulatory and institutional shortcomings may explain why land disputes account for a substantive proportion of cases in Indian courts—66% of all civil cases in India are related to land or property disputes (Wahi, 2019). They should, hence, be the first point of addressal in attempting to reform the sector.

3.3.1. Lack of credible and rigorous land use planning and implementation

India’s relatively poor performance under the ‘Regulatory and Compliance’ pillar can be attributed in great deal to the lack of credible and rigorous land use planning and implementation, leading to constrained and unpredictable supply of land. Most Indian cities have urbanised without a master plan. Recognising the palpable lack of urban planning in India, the government has affirmed that “most of the cities don’t have urban planners; smaller cities have no one” (Joshi, 2023). The foremost of all shortcomings, thus, is that of all Census and Statutory towns in India, only 28% have approved master plans as of 2021 (NITI Aayog, 2021). Since city development is inherently linked to the creation of social and physical infrastructure

¹³ The index is the weighted average of six broad sub-indices that include investment performance, market fundamentals, governance of listed vehicles, regulatory and legal, transaction process, and sustainability.

like schools, colleges, hospitals, roads, provisions for utilities etc. that enable the movement of people to find livelihoods (Brueckner, 2001), missing this first step at such a scale breeds chaotic urban expansion and promotes rent seeking (Ghosh, 2019).

Even where master plans do exist, there is a lack of granularity owing to their top-down and umbrella nature (Khan & Swapan, 2013). For example, there often is a single planning norm for the entire city, instead of a more nuanced, phased, and location-specific approach, most evident in cities' Floor Space Index policies that control building heights (Bertaud, 2004). This becomes prohibitive for cities like Mumbai, given its limited scope for outward urban expansion due to its peninsular, sea-locked shape (Bertaud, 2004). Excessive restrictions on building heights constrict housing supply, leading to increased unmet housing demand and causing house prices to rise. Cities like Singapore, New York City, and Hong Kong have a maximum free Floor Space Index (FSI) of 25, 15 and 12, respectively, in their residential districts (IDFC, 2018). However, in Mumbai it has been as low as 1.33 in the Island City, implying that "households in Mumbai consume an average of 2.9 square meter of floor space per person. This is one of the lowest residential floor area per person in the world" (Bertaud, 2004). Similarly, Chennai has a maximum free FSI of 1.5 and Bengaluru of 3.25 (Refer to Appendix B for details on FSI).

Finally, not much attention is usually given to the sequencing of different infrastructure projects so that plan implementation can be step-by-step and controlled, or to the financing of key proposals and projects. This absence of granularity and concomitant financing makes it unclear and uncertain if the city will actually develop according to the plan (Sivam, 2002) and by what timeline. In contrast, Singapore's 40–50 year concept plan is broken down into 20-year, plot-by-plot development plans with identified sequencing of projects and broad financing strategies (Singapore Urban Redevelopment Authority, 2019), lending their plan much-needed credibility.

Government schemes have usually aimed at making housing affordable by focussing on increasing the housing stock through subsidies, rather than addressing the root cause by unlocking land supply in a predictable manner. Achieving the latter could organically lead to the creation of housing at lower prices. Among the four verticals of the PMAY housing scheme, the most successful has been the Beneficiary Led Construction (BLC) sub-scheme, which focuses on disbursing subsidies to beneficiaries that have existing land titles. It makes up 75% of the total housing stock sanctioned under PMAY across the 35¹⁴ states and union territories (Dasgupta, Mukherjee & Dhar, 2022). This is possible due to the pre-existing availability of land rights. Hence, making land available for planned use and helping strengthen people's property rights may well be an effective first step in resolving this issue.

3.3.2. A less-than-competitive industry

One of the biggest hindrances in making housing affordable seems to be the lack of availability of developable land parcels because of the deficiencies highlighted previously. This kind of constrained and unpredictable land supply is not conducive to creating a competitive real estate industry since it makes the entry of new players difficult. The lack of a competitive industry structure results in inflated property prices and sub-optimal supply. Figure 7a shows the profitability of the real estate industry compared to that of other industries between 1995 and 2020. First, on average, the real estate industry does not make supernormal profits. Contrary to what may be a common perception, the average profit margin in real estate has not been abnormally high (barring the second cycle). In fact, of late, it seems to have fallen below the 'normal profit' range¹⁵ (see Appendix C), partly to correct for the excessive profit made during the second cycle.

Second, the housing real estate industry is marked by several players whose median profitability over the years has been above 20% and has reached as high as 49%, as shown in Figure 7b. Since profitability in real estate is driven in great part by prices,¹⁶

¹⁴ Of the 36 states and UTs, only 35 form a part of this list in terms of the MoA signed under the scheme, financial contribution lent towards BLC, and central assistance released; Lakshadweep is excluded here (PMAY, 2023).

¹⁵ Profitability of all non-financial companies.

¹⁶ Correlation between property price and profitability between 1995 and 2020 being 0.76 (see Appendix C).

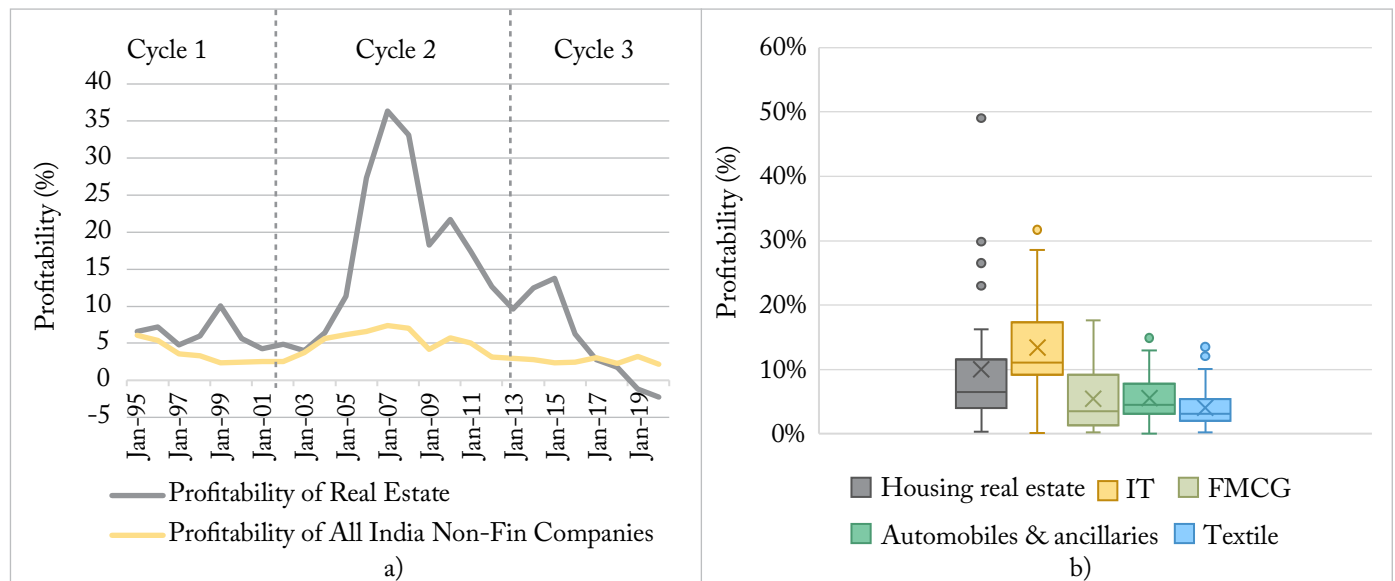
the ability of some developers to make significantly higher profits must be due to their ability to command a 'premium' on their properties, which could, in turn, be due to a host of reasons like their credibility, reputation and brand value, and access to good parcels of land with infrastructure connectivity. Advantages from access to good parcels of land become even more critical when land supply is constrained and unpredictable as described above. Real estate developers, like suppliers in any other industry, try and maximise profits and our current regulatory structure incentivises them to maximise profits by keeping prices high and supply low. If the government can amend this structure and enable more developers to enter the industry, thus increasing competition, it may improve affordability by putting pressure on prices.

Reforms like the digitisation of land records and RERA have already helped make the Indian real estate industry more transparent. The RERA Act of 2016, for instance, set up a streamlined dispute resolution mechanism, and made previously inaccessible information on housing projects available to buyers. This has helped buyers make more informed purchasing decisions and has readjusted prices for bad-quality housing so that they are lower on average (Tandel, Gandhi, Nanda & Agnihotri, 2023). While this is laudable, much more needs to be done to increase industry competition. This includes speeding up end-to-end digitisation of land records, ensuring RERA is implemented in letter and spirit in all states, and initiating the next set of reforms aimed at ensuring credible and rigorous land use planning and implementation.

Figure 7: Developers' profitability

a) Barring the second cycle, the housing sector has not given supernormal profits

b) Real estate has significant outliers in terms of profitability vis-à-vis other industries



Source: ProwessIQ.

Methodology: Profitability (profit after tax divided by sales) of the top 50 companies, in terms of market share, from each industry is computed for 2005–2020. Further, the median profitability of each company from each industry is computed and plotted. Companies that make negative median profitability are dropped from the sample as they are not representative of a stable company within the industry.

Note: Total market share of all selected companies: IT (70%), Housing Real Estate (75%), Textiles (42%), FMCG (51%), Automobiles & Ancillaries (66%). In the housing real estate industry, PAT may include profit from both commercial as well as residential real estate.

3.3.3. The shadow economy

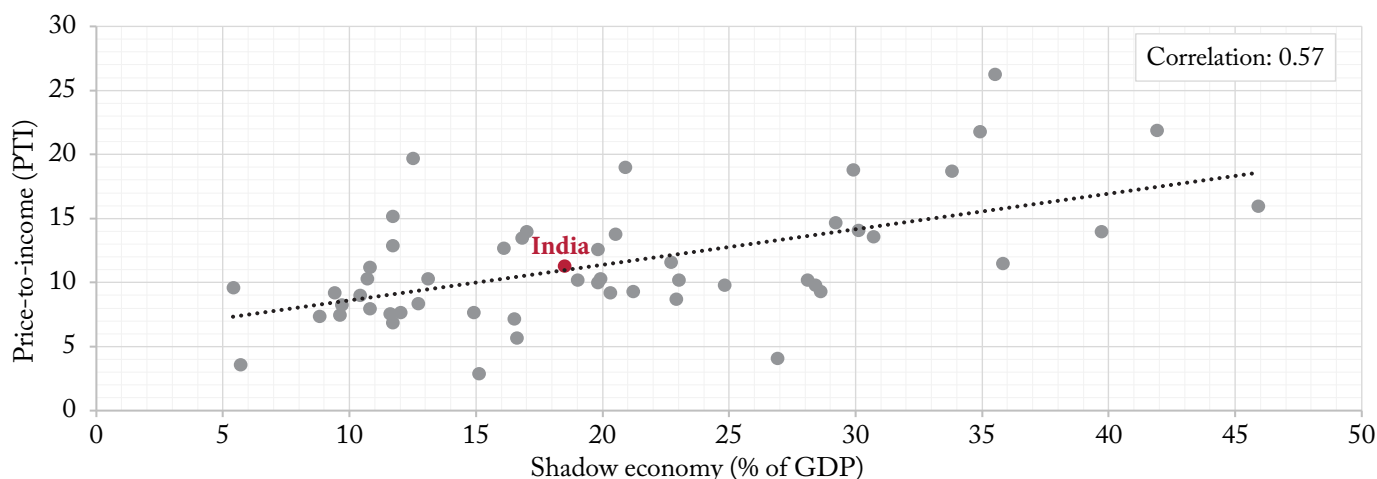
We now turn to another commonly cited reason for high house prices in India—the presence of a shadow economy, or unaccounted income. Since, by definition, unaccounted income is unreported, there cannot be an official estimate of the same. Different authors have attempted to quantify it across countries using various methodologies (Alm & Embaye, 2013; Medina & Schneider, 2019); for our analysis, we use the Medina and Schneider framework.

It is commonly asserted that real estate offers a safe haven to store unaccounted income—it cannot be stolen, it can accommodate large sums of money, and finally and probably most importantly, it is relatively easy to park unaccounted income given the generally less transparent nature of land and property markets in the developing world (as established previously). Figure 8 validates this relationship between the share of the shadow economy and the price-to-income ratio (PTI) of housing. There is a reasonably strong positive relationship between the two with a correlation of 0.57, suggesting that a high PTI exists alongside a large shadow economy.¹⁷ And India's share of the shadow economy and PTI are entirely consistent with the global trend, further substantiating this relationship.

It is no coincidence that real estate is a preferred source of storing wealth, especially in developing countries, with 77% of household wealth in India, 62% in China, and 48% in Thailand in real estate compared to 44% for the US and 37% for Germany (Household Finance Committee, 2017). Further, in India, richer households keep a greater proportion of their wealth in real estate—more than 80% of the top quintile's¹⁸ household wealth in India is in real estate, compared to around 50% for the bottom quintile (Household Finance Committee, 2017).

One could argue that such a high share of wealth in real estate is driven by historical decisions and past patterns that may not be as indicative of investment decisions people are making now. To gain more perspective into this phenomenon, we use the All-India Debt and Investment Surveys (AIDIS) to obtain our own estimates of investment demand for the years 2012 and 2018.¹⁹ Investment demand for housing real estate is defined as households that purchase an additional unit of residential property while owning at least one unit already.²⁰ We find that investment demand for property is indeed quite high; it made up 60% of the total estimated demand for residential real estate in 2012 and 67% of the total in 2018 (Refer to Appendix D for our estimation of investment demand).

Figure 8: Size of the shadow economy and PTI are positively correlated



Sources: Medina and Schneider (2019); Numbeo (2019).

Note: Shadow economy estimate reported for the latest available year, i.e., 2017, from Medina and Schneider (2019).

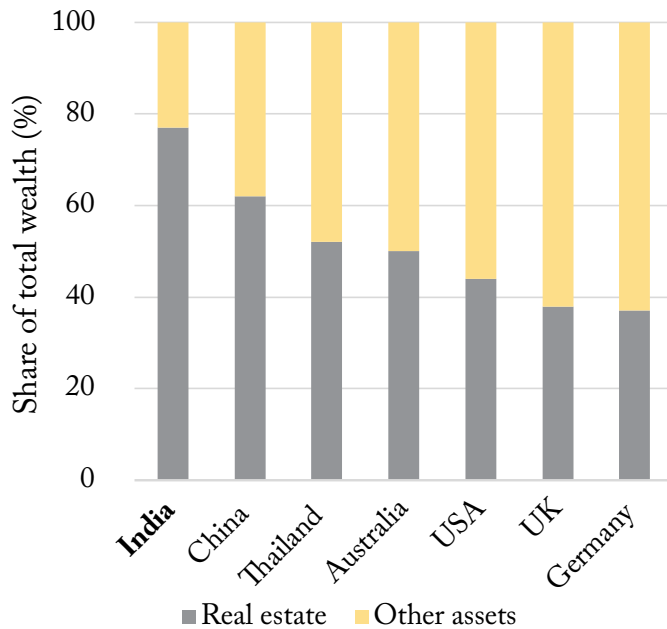
¹⁷ One could reasonably argue that given the under-recording of house price data in India, the PTI numbers may not be a reliable measure for affordability. However, this global PTI data correlates positively with the presence of a shadow economy and the lack of transparency, both of which are intuitively correct relationships, and India falls right on the trendline for both. This instills confidence in this PTI data being a reliable measure of affordability.

¹⁸ Quintiles of total household wealth.

¹⁹ Estimates of investment demand for 2012 and 2018 obtained from AIDIS 2013 and 2019, respectively

²⁰ Within the six-month period as defined in the survey

Figure 9: India's share of real estate in household wealth portfolio is high vis-à-vis other countries



Source: Household Finance Committee (2017).

Note: 'Real estate' includes residential buildings, buildings used for farm and non-farm activities, constructions such as recreational facilities, and rural and urban land. 'Other assets' include durable goods, gold, financial asset & retirement accounts.

Not only does the presence of the shadow economy keep real estate expensive in general, but when combined with the 'semi-transparent' nature of the industry, it also leads to differential returns for different classes of investors depending on the extent of (private) information they may have access to. Sporadic changes in regulations related to land use and building height restrictions without a clear spatial policy framework result in speculation of land values and insider trading practices (Ahluwalia & Mohanty, 2014). This leads to differential returns across categories of investors based on the selective flow of information, since buyers that have an informational advantage tend to buy real estate that experiences higher ex-post capital gains (Kurlat & Stroebel, 2013). It is this prospect of making supernormal profits arising out of information asymmetry that creates further incentives to keep investing in real estate.

In sum, housing is expensive in India fundamentally due to lack of credible and rigorous land use planning and

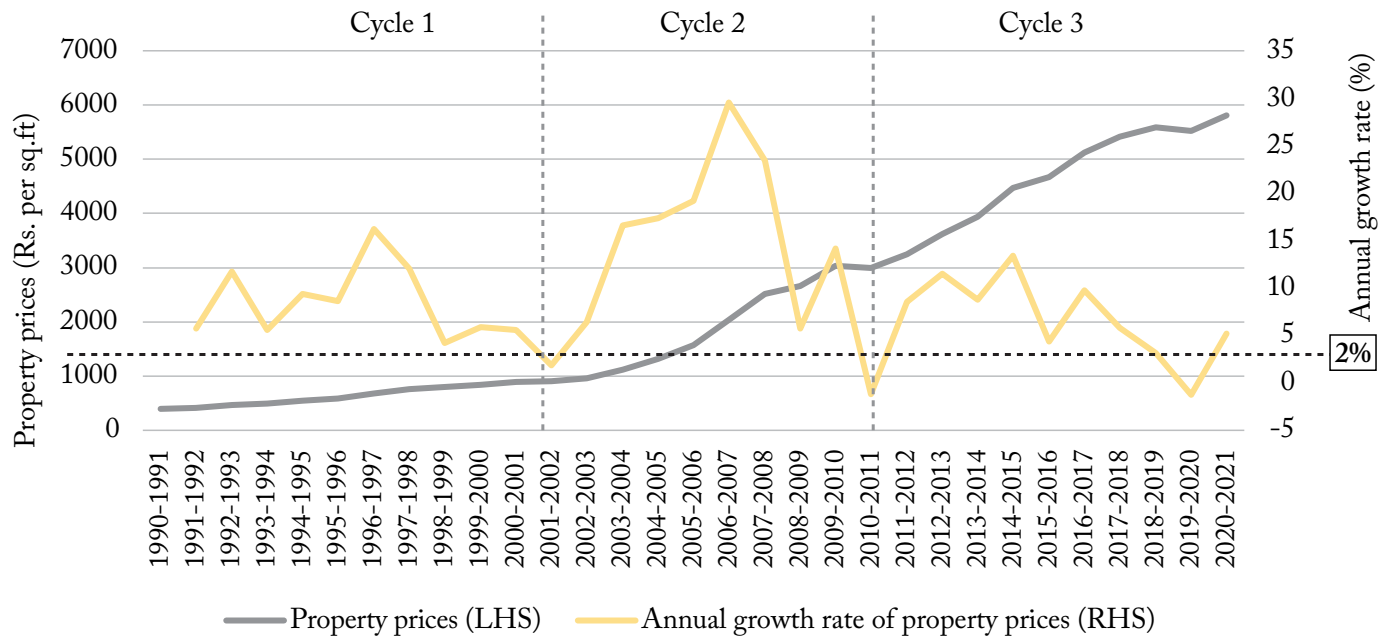
implementation, which gives rise to a less-than-competitive industry structure. Such an industry structure keeps prices high and housing supply lower than it would have been in a competitive industry. This construct provides a safe haven for economic agents, especially those with unaccounted income and/or insider information, to invest money in real estate, keeping prices high.

4. The recent stagnation in price growth is part of a property price cycle downturn

Section 3 has made the case that Indian housing real estate is not in a bubble since prices have not risen at an abnormal pace, and that house prices are high due to a host of structural reasons. This brings us to the second fundamental question of this study: what explains the tepid increase in house price growth over the last 7–8 years? This moderate, almost stagnating property price growth over the past few years is part of the property price cycle. The inference becomes clear when we expand our lens and look at annual property price growth since 1991 alongside the broader macro-economic fundamentals.

Figure 10 shows that property price growth goes through cycles of high growth followed by phases of sluggish growth. Since 1991 (at least), property price growth has demonstrated cyclical movements with a peak in growth rates followed by a trough roughly every 10 years. Consequently, property prices have been through three full cycles over the past 30 years. We define each cycle as ending when the annual property price growth falls below a threshold of 2%. This has occurred three times in the past 30 years, and twice has marked the end of the previous cycle and the beginning of the next one. Two important observations come out from Figure 10. First, absolute property prices have mostly risen over the past 30-year period; only for a few years when property price growth was negative, did property prices naturally decline. Second, while the pace of the rise and the fall in the first and the third cycles is similar, the second cycle witnessed abnormally high growth during the upward trajectory of property price growth.

Figure 10: Property price growth has gone through three cycles in the past 30 years



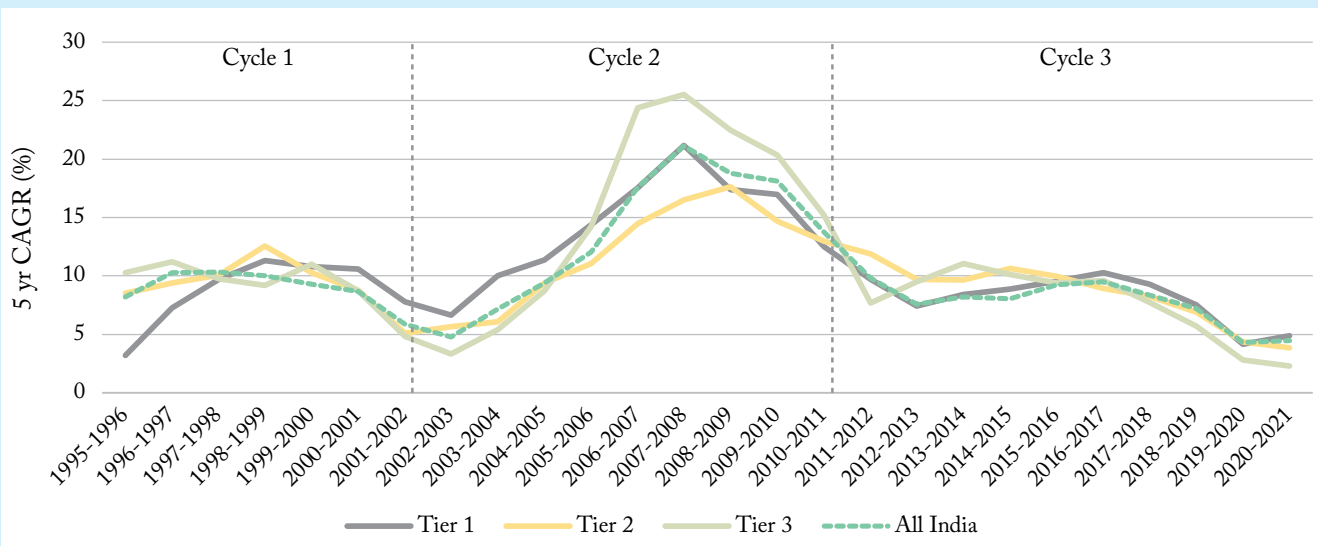
Source: HDFC.

Note: A 'cycle' is defined here by one peak, followed by a downward movement that falls below the 2% growth threshold.

Box 1: Property cycles are also present at the individual district level

The three cycles of property price growth are evident in the all-India perspective. To ascertain if they also exist at the individual district level, we pick a sample of 34 districts from our data and plot their price growth movement. We take the three tiers of cities as identified by McKinsey Global Institute (2010), and use the respective district counterparts for these cities (subject to data availability) for this analysis. We take Tier 1 districts as is given in the report. For Tier 2, we take a subset of districts from the report based on the availability of data in our dataset. For Tier 3, we combine a subset of districts from the report with other districts that have similar levels of urban population (as given in Census of India, 2011), due to data availability problems in our dataset. The districts in Tiers 2 and 3 were also chosen keeping in mind that the total transactions should be similar in both tiers so that our estimates are reliable. Plotting their five-year moving averages, we see that movement across the three groups is similar and almost imitates the all-India trend. Thus, while a few large cities/districts show inordinately high price levels, the movement in property price growth is broadly uniform for most classes of cities/districts—big or small.

Figure 11: Property price growth trend is similar across district tiers



Source: HDFC.

Note: Tier 1 includes Hyderabad, Kolkata, Chennai, Pune, Delhi (state), Mumbai (city and suburban), Ahmedabad, Bengaluru. Tier 2 includes Surat, Nagpur, Lucknow, Jaipur, Coimbatore, Vadodara, Indore, Ludhiana, Bhopal, Patna, Nashik. Tier 3 includes Raigarh (Maharashtra), Faridabad, Ghaziabad, Aurangabad, Allahabad, Mysuru, Ranchi, Jodhpur, Raipur, Gwalior, North Goa, Kota, Gurgaon, Tiruchirappalli, Ahmed Nagar.

4.1. Real estate cycles are caused by underlying macro dynamics

Property price growth cycles are driven by fundamental macroeconomic factors that affect the demand and supply of houses, as well as by expectations of how prices will behave in the future.

4.1.1. On the demand side, one of the key determinants of end-use demand for houses is the rising income levels in a country. As people's incomes

rise, the demand for housing also increases since demand for housing can often be aspirational and has a significant impact on people's standard of living (Doling, Vandenberg, & Tolentino, 2013). Owning a house becomes more of a necessity in India since there is no formal rental housing market in the country (Knight Frank, 2019), making the possibility of living in rented housing in perpetuity unsustainable. Policy interventions on the availability of hous-

ing credit also influence demand. For example, in the late 1990s, the value of tax deduction on interest payments on housing loans was raised significantly from Rs. 30,000 to Rs. 100,000 (Rao, 2008), which incentivised demand for housing. Moreover, as new players entered the mortgage industry in the early 2000s, making the industry more competitive, lending rates were pushed down closer to general lending rates, bringing down the cost of availing housing loans (Verma, 2012). As a result, home loans as a share of personal loans expanded rapidly from 25–30% in the late 1990s to about 50% by 2006–2007 (Refer to Appendix E for details on policy changes in the mortgage market).

4.1.2. On the supply side, developers' decisions to supply depend on their profit margins, and costs of construction (such as that of building materials) have a bearing on these margins. While costs alone do not determine prices or, in turn, profitability, especially given the vast dispersion in profit margins within the sector, they do form an important factor in how developers make their supply and pricing decisions. Whenever costs escalate, they are often passed down to consumers, or supply is curtailed to maintain profit margins.

4.1.3. Since housing is one of the biggest investments a typical household makes in its lifetime, expectations about house prices in the future play an important role in its decision to buy a house. Price expectations impact supply decisions as well by influencing the profits a developer may expect to make in the future. Given that expectations of price growth influence both demand and supply, they have a strong role in creating 'self-fulfill-

ing prophecies'.²¹ It has been documented that there is a strong correlation between perception of price trends by home buyers and actual price movements (Case, Shiller, & Thompson, 2012). Other studies have also noted that there is significant persistence of price growth in the short term, and have highlighted the importance of capturing extrapolative beliefs of homebuyers in models explaining prices (Case & Shiller, 1989; Glaeser & Nathanson, 2017).

We use the abovementioned framework to estimate property price growth as a function of real GDP growth, growth in construction costs—metal and non-metal prices—and changes in expectations of property price growth.²² We use data for properties under construction to get a more accurate proxy for the 'active market' we wish to study because such units are bound to be in the market.²³ The period under consideration is 1997 Q2–2020 Q1 (calendar year quarters). Our analysis stops at 2020 Q1 and does not include any further years since we want to exclude the impact of the COVID-19 pandemic on property prices.

The following equation²⁴ is estimated:

$$P_t = a_0 + a_1RGDP_{t-1} + a_2Metal_{t-1} + a_3Non-metal_{t-1} + a_4Exp_t + u_t$$

where P denotes nominal property price growth of under-construction flats/apartments. *Metal* refers to the cost of metallic minerals such as iron and steel products and *Non-metal* refers to the cost of materials such as bricks, cement, glass, and plaster, and is included to capture the effect of construction cost on property price growth.²⁵ *RGDP* refers to real GDP growth. *Exp* captures the expectation of growth in real estate prices. We define the expectation variable as the difference

²¹ The expectation of price growth leads people to demand more housing for investment, leading to further increase in prices. This increase reaffirms and validates people's previous expectations of growth, and they continue to form expectations of future increase, which in turn may translate into actual price rise, and so on.

²² We were unable to measure the impact of policy changes on property price growth due to lack of availability of mortgage lending rates on a quarterly basis.

²³ Prices in the primary and secondary markets behave similarly and share common characteristics. However, the former is more sensitive to changes in the housing market in some countries, such as Poland (Tomal, 2019). In Singapore as well, newly completed units make up a third of the supply of housing real estate and the pricing of new units affect the price level for the entire market (Ng, 1998). Prices of completed properties and under-construction properties from HDFC move together and are positively correlated at 0.65.

²⁴ We were unable to measure the impact of policy changes on property price growth due to lack of availability of mortgage lending rates on a quarterly basis.

²⁵ Construction costs are subcomponents of Wholesale Price Index (WPI) and is also introduced to control for nominal changes in prices.

between the first lag and the second lag of growth rates on a quarterly basis, i.e.,

$$Exp_t = P_{t-1} - P_{t-2}$$

where t refers to each quarterly time period and refers to the expectation of change in property price growth in quarter t .

All variables are expressed in quarterly y-o-y growth rates. We expect property price growth to exhibit a lagged response to GDP growth and construction cost growth since the effects of changes in these variables may not be contemporaneously reflected in price growth. Thus, the first lag of real GDP growth, metal price growth, and non-metal price growth are taken as explanatory variables in the model, denoted by the suffix 'L' in Table 2.

In the regression model, all variables are significant with an intuitively correct relationship with property price growth. The model explains 40% of the variation in price growth. At a macro level, the model captures the broad trend of all three property price cycles includ-

ing the recent downturn. The regression results suggest that GDP growth and costs of construction have a positive effect on growth in property prices. If real GDP growth increases by 1%, property price growth will increase by 1.092%. This suggests that housing is an income elastic good which is consistent with literature (Geng, 2018).²⁶ Further, if property price growth is expected to accelerate by 1%, actual price growth is likely to increase by 0.59%, indicating that expectations are pro-cyclical. Thus, economic fundamentals and expectations about price growth in the future are able to explain the cyclicity in property price growth.

In Figure 12, we note that the stagnation of prices from 2016 onwards can be explained as being set off due to moderating real GDP growth and a decline in the growth of the costs of construction material. Price expectations also fall sharply during this downturn in the market. This suggests that the downturn is part of a larger cyclical movement that property price growth displays rather than a structural improvement in housing affordability.

Table 2: Drivers of property price growth

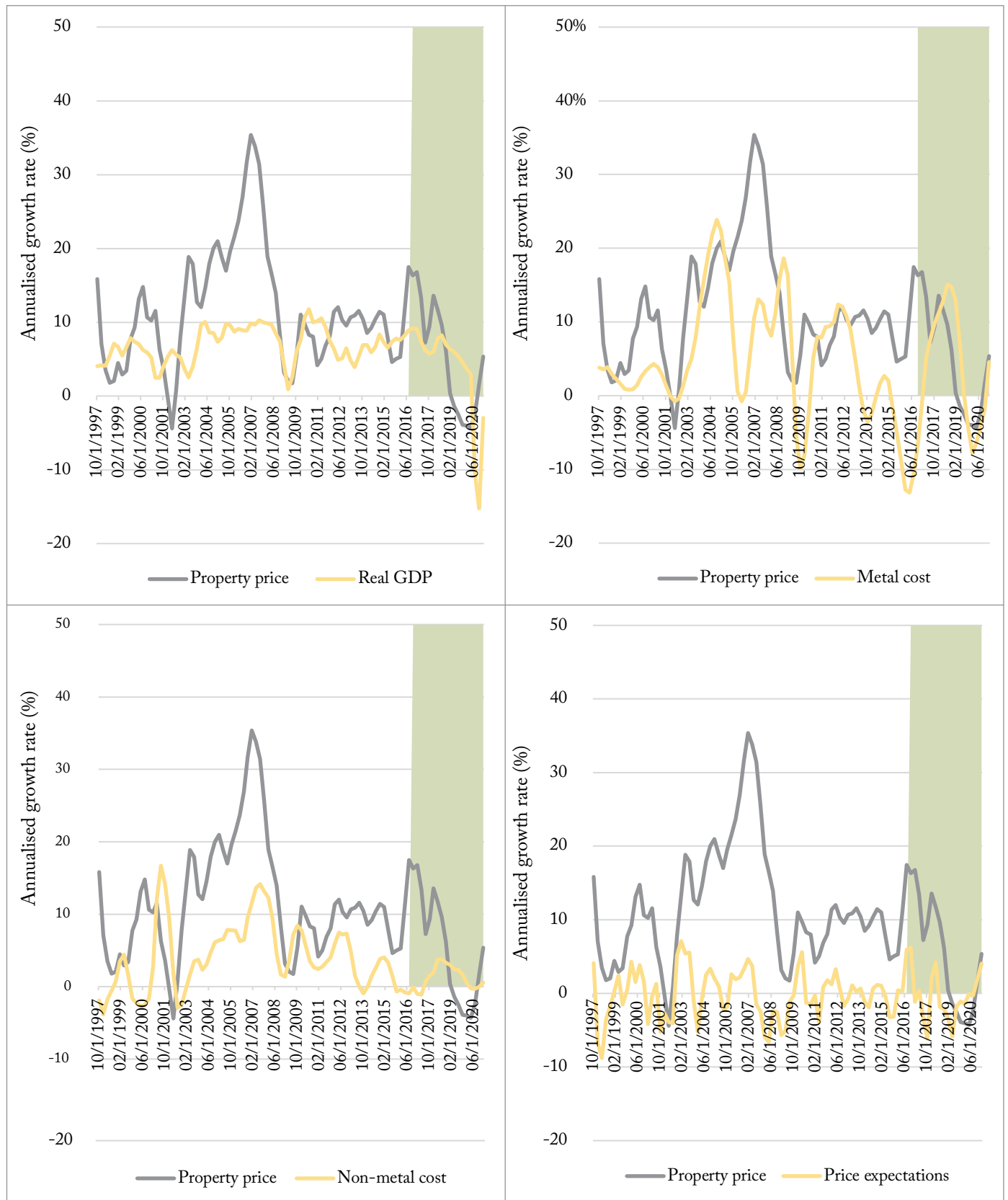
Dependent variable: Property price growth	Coefficients
L. Real GDP growth	1.092** (0.508)
L. Non-metal cost	0.503* (0.281)
L. Metal Cost	0.218** (0.0951)
Price expectation	0.596*** (0.140)
Constant	0.00594 (0.0350)
Observations	91
R-squared	0.401

Source: Fitted values from the regression model, HDFC.

Notes: The OLS model exhibited signs of autocorrelation and heteroskedasticity. Hence, Newey-West standard errors are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. The dependent variable is nominal property price growth of properties under construction. Model includes real GDP growth, metal and non-metal cost growth, and price expectations. 'L' denotes the first lag of the independent variable.

²⁶ Our specification is slightly different from that in the literature; we regress nominal property price growth on real GDP after controlling for nominal price changes using independent variables.

Figure 12: The recent stagnation in property price growth can be explained by cyclical factors



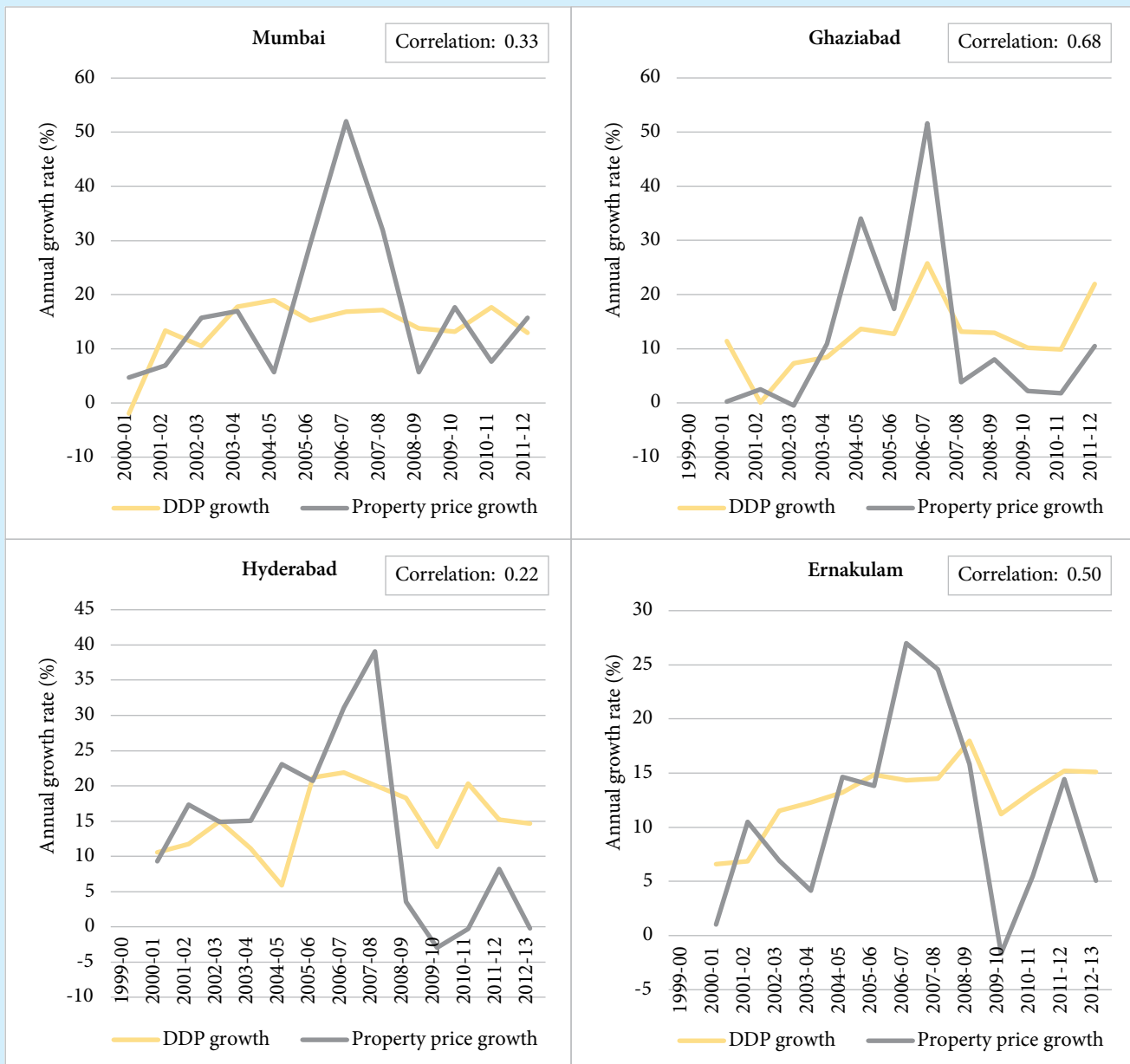
Sources: HDFC; National Accounts, Ministry of Statistics & Program Implementation.

Note: Growth rates are in 2-year moving averages.

Box 2: The macro dynamics play a key role in driving property prices at the subnational level as well

Given the heterogeneity within land and property markets and their locational specificity, property price growth at the district level may be driven by many factors that differ across cities/ districts. However, even at the district level, house price growth and GDP move together. Figure 13 shows a moderately strong correlation between district GDP growth and property price growth, indicating the importance of GDP growth in driving property prices for individual districts as well.

Figure 13: Property price growth and nominal district domestic product growth move together



Sources: HDFC; NITI Aayog.

4.2. Recovery in the real estate sector will be driven by the performance of India's macroeconomy

After a prolonged period of tepid growth, the real estate industry is now showing signs of revitalisation on the back of strengthening fundamentals. In 2022, prices in major cities appreciated by 4–11%, sales recorded a 68% y-o-y increase, and new launches increased by 81% y-o-y (JLL, 2023). This momentum seems to be sustaining well into 2023 with residential prices appreciating by 6–9% across major cities in Q2 of 2023 (JLL, 2023). There is a lot of excitement among a section of observers of the Indian economy who consider this recovery in the real estate industry as a good omen that will push an upswing in the economy as a whole. These views are based on the fact that the industry has gone through a tough time in the past 7–8 years, and hence an upward movement implies the strengthening of the cycle in terms of prices, and thus profits.

Our framework, which explains property price growth as a function of demand and supply, suggests that the core causation flows from India's macroeconomy to the real estate sector. For instance, whenever property price growth peaked in the last 3 decades—16% growth in 1997, 29% in 2008 and 13% in 2015, GDP also recorded a growth of 7.5% on average. Thus, the strength of recovery in the real estate sector is strongly linked in the long run to how India's economy evolves from hereon. If we manage to strategically focus on our priorities and improve productivity, India's GDP growth prospect may improve to around 7.5%, implying a much higher property price growth. However, if we are not able to improve our competitiveness, growth may slide further to around 5.5% per annum over the medium term (Gupta & Sachdeva, 2022), resulting in moderate growth in property prices.

5. Conclusion

The paper sheds light on the state and dynamics of house prices in India by leveraging a unique dataset that gives house prices over the past 30 years. In doing so, it confirms the commonly held belief that housing is expensive in India relative to its benchmark of affordability. Prices are high due to a confluence of structural factors such as lack of credible and rigorous land use planning and implementation, a less-than-competitive market structure, and the presence of a shadow economy. At

the same time, it dispels the notion that house prices are increasing at a runaway rate, and that the recent downturn in property price growth represents some kind of a regime change towards more affordable housing in the future. Housing has given 'normal' returns in India over the past 30 years, which is consistent with the pattern observed in other countries.

For policymakers, the task is now threefold. Foremost, to attempt to make housing affordable not only through subsidies, but also by improving the fundamental structure of the sector. Strengthening the implementation of existing reforms like RERA and the digitisation of land records, among others, should be a priority since they have demonstrably helped make the sector more transparent. Second, this ought to be supplemented with more structural reforms—such as improving clarity and credibility in land use planning and implementation—which will make the real estate industry more competitive, in turn making housing more affordable. Not only will this provide a large segment of Indians with access to decent housing by lowering house prices, but in the process also boost GDP growth and create much-needed non-farm employment.

And lastly, in order to assess and ensure that these reforms actually have the desired impact, the government needs to institutionalise rigorous and standardised measurement of key metrics like PTI across cities, the degree of industry competitiveness, and transparency in the sector, all of which are critical factors affecting housing affordability. Being able to track the sector's performance under these metrics over time will help us gauge the effectiveness of policies, and the outlook that needs to be adopted in the future.

While we set the context and attempt to answer two fundamental questions in this paper, there remains much room for further research on the topic. In particular, it is vital to understand the macroeconomic dynamics of how we would move towards more affordable house prices. By definition, this will imply a reduction in property price growth. Since investors arbitrage across assets and countries, it is important to study how this process will impact returns on other assets like gold and equity as investors shift portfolio allocations in response to lower returns from real estate. This cross-asset process is inextricably linked to a move towards housing affordability, and thus warrants further analysis.

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Appendix A

A.1. Constructing the house price series

The HDFC dataset gives the price, area, city, and other details of the property at the time of approval of the loan. It also indicates whether properties were under construction or completed and whether the loan transaction was for a plot of land, a flat/apartment, or an independent house. We matched this data with the All-India Postal Directory to get accurate state, district, and pin-code information for each transaction.

Table A.1.1: Observations in the raw data after matching with the postal code directory

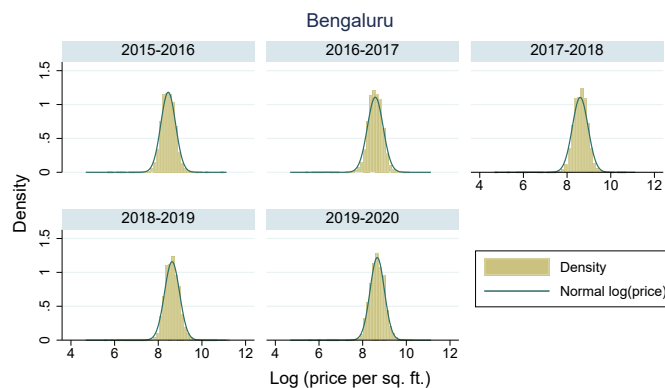
Property Type	No. of Completed properties (in millions)	No. of Properties Under Construction (in millions)	No. of Districts Covered
Flats/ Apartments	1.59	0.60	439
Independent House	0.82	0.38	596
Plot	0.02	0.02	340
Other	0.01	0.002	175

Source: HDFC, 1991–2021.

Subsequently, data cleaning is carried out by keeping only transactions that pertain to properties listed as flats or apartments. We use data for only flats/apartments since the notion of price per sq. ft, our primary metric, is clearly defined in the case of an apartment. Independent housing can have multiple levels or floors

(depending on building height restrictions), and hence, unless one knows details of the Floor Space Index (FSI) in individual cities, calculating the price per sq. ft. can be significantly erroneous. Thus, data from 1991 to 2021 pertaining to only flats/apartments is used to build our framework. Lastly, we find logarithmic values of unit-level property prices (per sq. ft.), which fit a lognormal distribution, and drop outliers beyond a certain z-score range. This exercise is carried out at the district level since the standard level of price per sq. ft. differs widely across districts depending on several individual factors that drive local property prices. We use the given price and area to determine the weighted mean price per sq. ft. at an all-India level.

Figure A.1.1: Property prices at the district level exhibit a lognormal distribution



Source: HDFC.

Note: The density plot represents the distribution of values of a continuous variable, here—log of property price per sq. ft. This is a representative plot for a single district, this exercise is similarly carried out for other districts in our sample. We plot logs of property price per sq. ft. for all districts per financial year (in yellow in the above graph), a normal distribution curve is fitted on the plot (in blue). The log property price values from the dataset fit well with the projected (log) normal distribution. All outliers outside the $[-3, +3]$ z-score range are then dropped.

A.2. Summary Statistics of the HDFC Price Series

a) All-India annual price series disaggregated by property completion (1991–2021)

Table A.2.1: Completed and Under Construction Properties

Variable	Completed				Under Construction			
	Mean	SD	Min	Max	Mean	SD	Min	Max
Property price per sq. ft.	1950	1523	393	4747	1825	1512	304	4374

Source: HDFC

b) All-India annual price series disaggregated by property type and property completion (1991-2021)

Table A.2.2: Flats/Apartments

Property Type	Completed				Under Construction			
Variable	Mean	SD	Min	Max	Mean	SD	Min	Max
Property price per sq. ft.	2365	1828	400	5652	2356	2008	347	6143

Source: HDFC

Table A.2.3: Independent Houses

Property Type	Completed				Under Construction			
Variable	Mean	SD	Min	Max	Mean	SD	Min	Max
Property price per sq. ft.	1337	1093	226	3488	1175	901	218	2857

Source: HDFC

Table A.2.4: Other

Property Type	Completed				Under Construction			
Variable	Mean	SD	Min	Max	Mean	SD	Min	Max
Property price per sq. ft.	1087	699	331	2804	724	431	204	1509

Source: HDFC.

Note: Period coverage for completed properties in 'Other' is from 1991–2019, while for properties under construction it is 1991–2010. Summary statistics for plots are not reported due to unavailability of consistent price series segregated by property completion.

Appendix B

FSI of cities in India vis-à-vis global cities

City	Maximum permissible free FSI
Singapore	25.00
Tokyo	20.00
Denver	17.00
New York	15.00
Los Angeles	13.00
Chicago	12.00
Hong Kong SAR	12.00
San Francisco	9.00
Shanghai	8.00
Vancouver	8.00
Sao Paulo	4.00
Bengaluru	4.00
Surat	4.00
Delhi	3.50
Patna	3.50
Kolkata	3.00
Bhubaneswar	2.75
Chennai	2.50
Kanpur	2.50
Lucknow	2.50
Ahmedabad	2.00
Indore	2.00
Bhopal	2.00
Ludhiana	2.00
Jabalpur	2.00
Kochi	2.00
Jaipur	2.00
Guwahati	1.75
Vadodara	1.60
Coimbatore	1.50
Nagpur	1.50
Mumbai	1.33
Pune	1.25
Udaipur	1.20

Source: IDFC (2018).

Appendix C

Developer profitability

By impacting the revenues earned by private developers, property prices become an important determining factor for profit margins. We collect relevant data for 330 companies that make up the organised housing real estate sector in our source dataset. Of these, we choose the ‘top’ 21 companies that comprise 70% of the market share (in terms of total sales), as a proxy for the sector (Analysis 1). Due to data availability constraints, we use a sub-group of seven companies (Analysis 2) to plot our data. Since this smaller set exhibits the same trend in profitability as the other 21 companies with a correlation of 0.95, we continue to use them interchangeably.

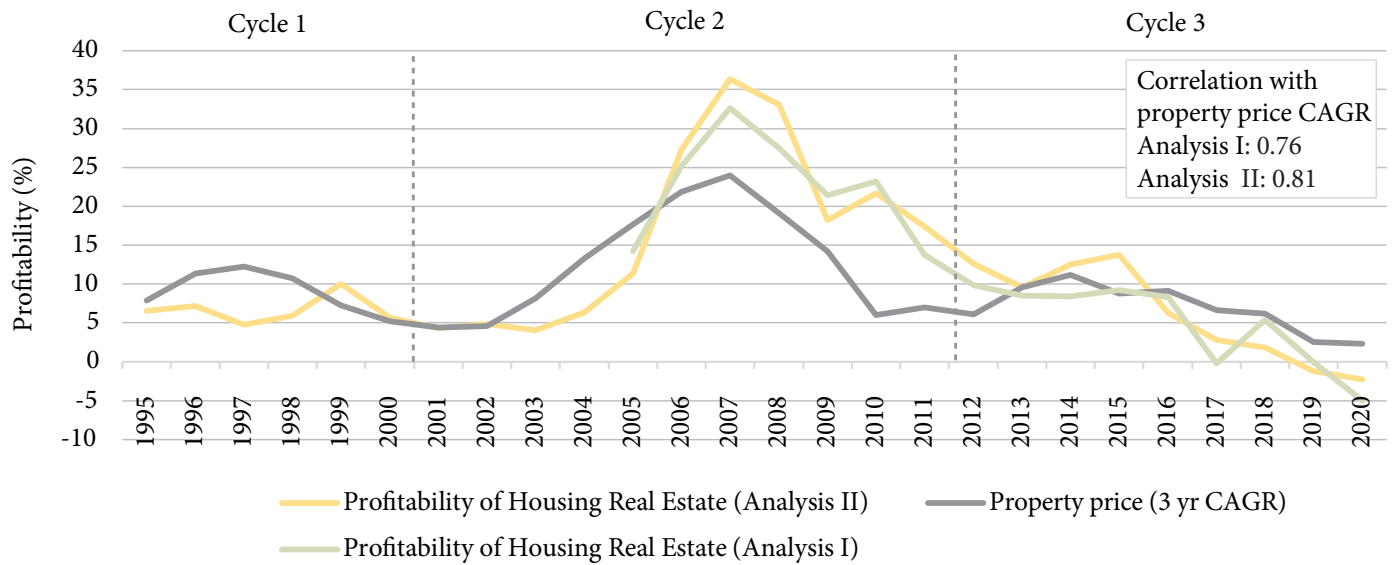
Table C.1: Data used to study developers' profitability

	No. of Companies	Market share	Time period
Data set	330 companies	100%	
Data refinement: Analysis I	21 companies	70%	2005–2020
Data refinement: Analysis II	7 companies	30%	1995–2020

Source: ProwessIQ.

The profit margins of these seven developers move similarly to property price growth, that is, profitability in the real estate industry is driven largely by price changes and not via cost reduction through efficiency improvements, as is the case in many other industries. Thus, developers are incentivised to simply increase construction and have substantial inventory instead of phasing out the development process (Ott, Hughen, & Read, 2012).

Figure C.1: Profitability of real estate sector is driven by property price growth

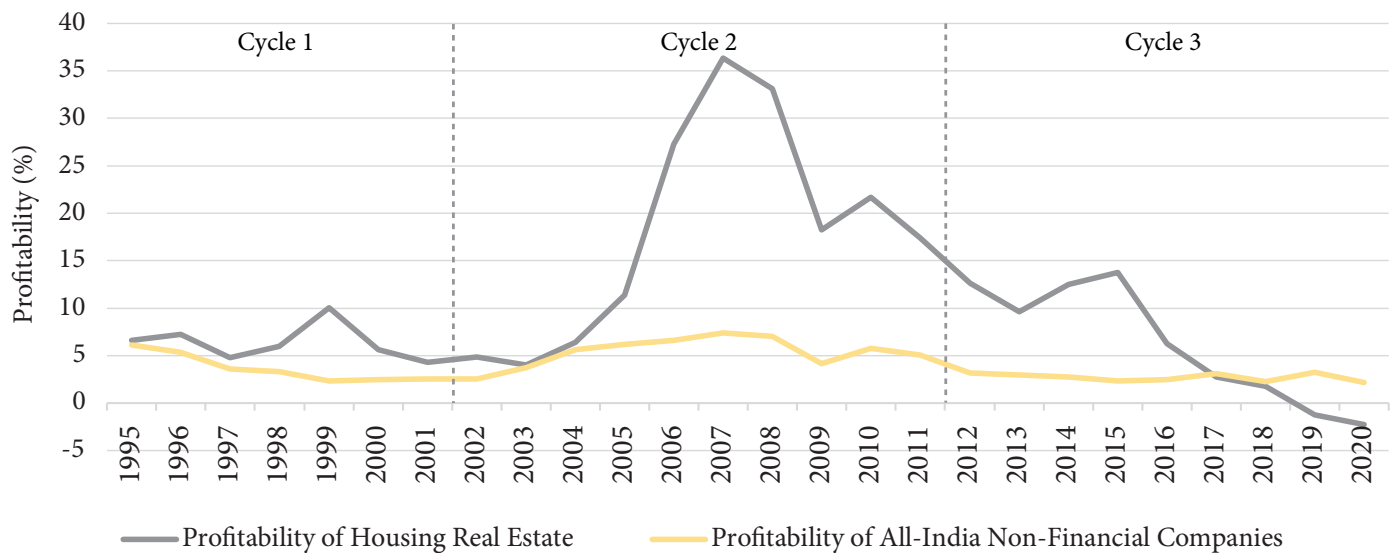


Source: HDFC, ProwessIQ.

Note: 'Profit margin' here refers to profit after tax as a percentage of sales.

It is interesting to note that profitability in the real estate industry, on average, has not been abnormally high (barring the second cycle). In fact, recently, it seems to have been falling below the 'normal profit', that is, average profitability of all non-financial companies.

Figure C.2: Profitability of housing real estate vis-à-vis all non-financial companies



Source: ProwessIQ.

Appendix D

Methodology used to estimate investment demand

To better understand households' investment demand for real estate, we use the All-India Debt and Investment Surveys (AIDIS) of 2013 and 2019 to obtain our own estimates of investment demand for 2012 and 2018.

AIDIS is a survey of assets and liabilities at the household level conducted by the National Sample Survey Organisation. It gives balance sheet-like information for households including details on financial assets and liabilities, machinery and equipment owned, stock of land and buildings, livestock and poultry, and details of loans payable, among others. We use both the stock and the transactions parts of the Survey and consider any purchase of residential property as part of investment demand if the household already owned at least one building prior to this transaction.

We consider only urban households since demand for urban housing is of importance to us. We first estimate all urban households that own at least one unit of residential property, and then see how many of these households have bought another unit of residential property in the six-month time period that is recorded in the transactions section of the Survey. If the household purchases additional property after owning at least one unit, we categorise it as investment demand. These estimates are gross measures at two specific points in time; it is possible that a household sold their first property soon after purchasing a second one. However, given the nature of AIDIS, it is impossible to ascertain the flow of investments or transactions beyond the six-month period following the survey.

Appendix E

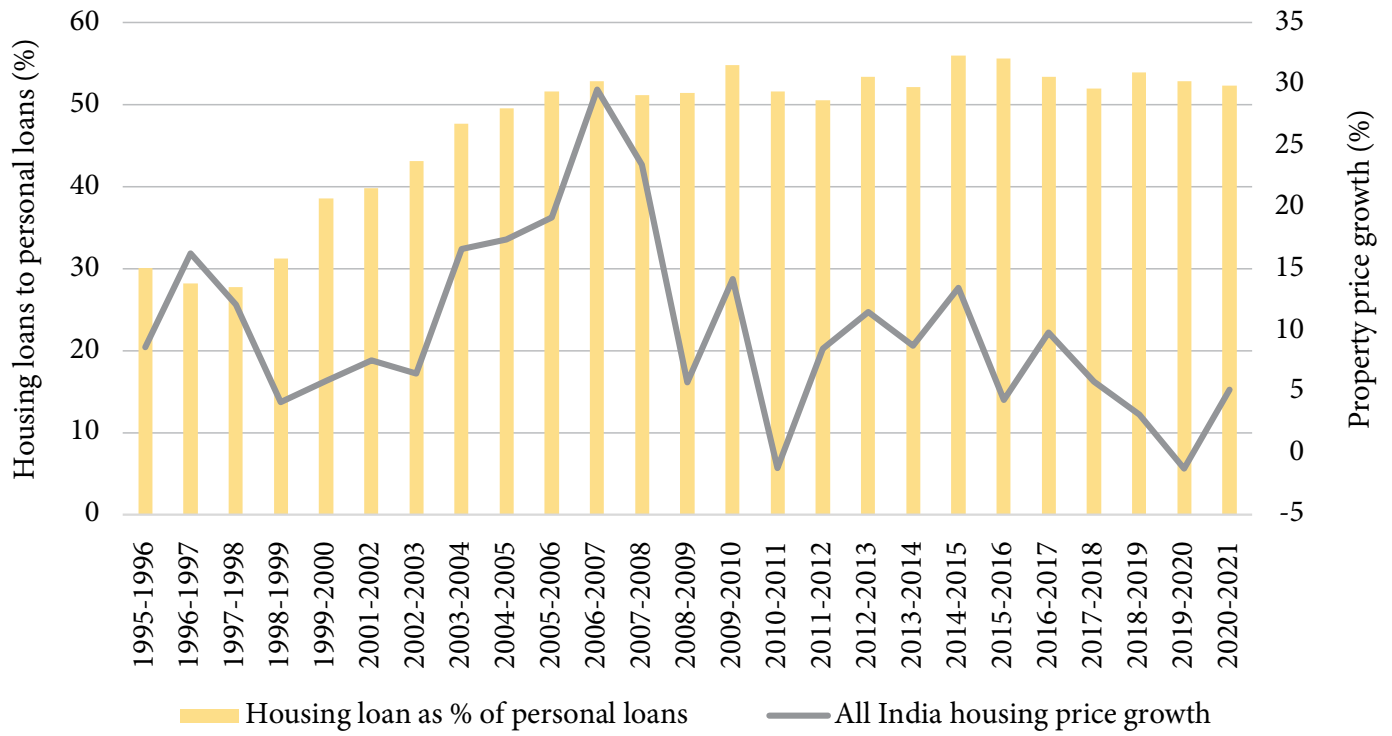
Policy shifts in the housing credit market

The policy environment plays an important role in shaping demand for housing by restricting or incentivising the disbursement of credit for purchasing property. Regulations may include those that place restrictions on financial institutions' exposure to the housing sector, and incentives include stipulations on lending to certain target groups (Campbell, Ramadorai, & Ranish, 2015).

In India, during the 1990s, the mortgage market was underdeveloped and individuals had to rely primarily on their savings to finance the purchase or construction of houses. Thereafter, the mortgage market evolved rapidly in the 2000s and was consistently shaped by the regulatory environment. Scheduled Commercial Banks and Housing Finance Companies (HFCs) rapidly expanded their credit to the housing sector. These institutions were regulated by the RBI and the NHB, respectively.

As new players entered the industry, thus increasing competition, the interest rates on housing loans converged with general lending rates over time. The general lending rate, as measured by the policy repo rate, hovered between 6% and 8% during 2002–2008 and was subsequently lowered to 5% in the wake of the North Atlantic financial crisis. During the same period, the industry cut home loan rates from 15–16% in 2002–2003 to 7–8% by 2008–2009 (Verma, 2012). In 1999–2000, the government also increased tax deductions on interest payable by more than three times, from Rs. 30,000 to Rs. 100,000 (Rao, 2008). Thus, the cost of accessing home loans has gone down over the years for borrowers. This has enabled individuals to push forward their timeline to own a house, since they do not have to rely exclusively on their savings to finance the same. As a result of opening the market, home loans as a share of personal loans expanded rapidly from around 25–30% in the late 1990s to about 50% by 2006–2007, and they have remained static at 50–55% since.

Figure E.1: Mortgage penetration and property price growth in India



Sources: HDFC; RBI.

About the authors



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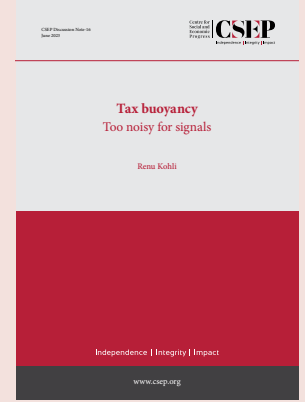
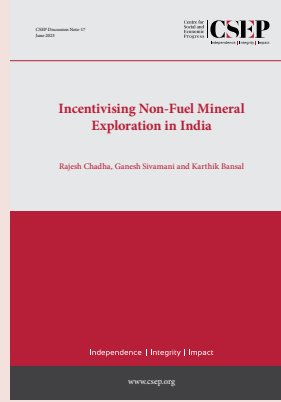
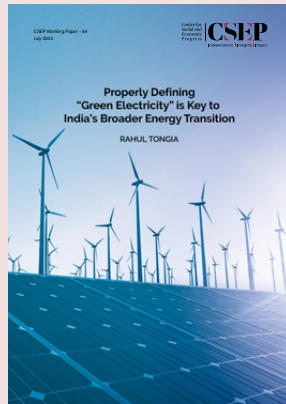
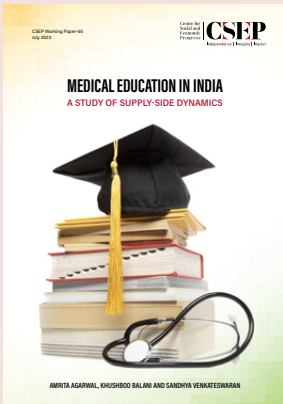
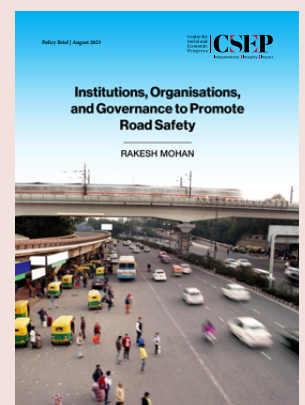
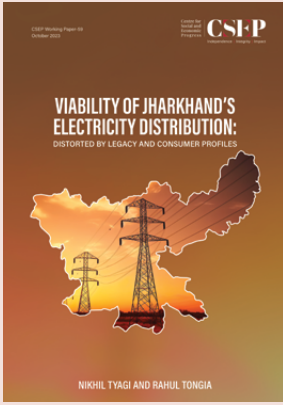
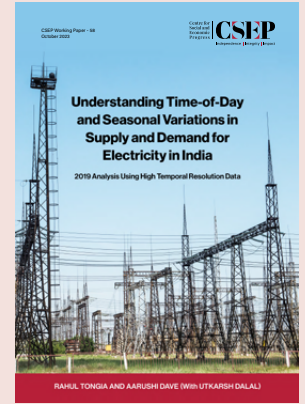
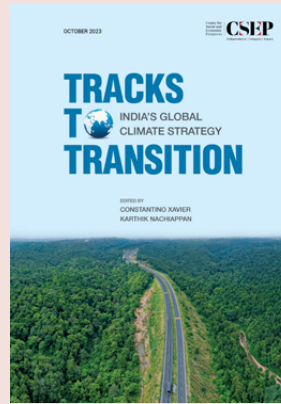


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