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Monetary Policy and Housing Prices Dynamics in India

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Abstract

This study attempts to examine the relationship between monetary policy and housing prices in India. We use monthly data from January 2009 to December 2018 of four variables- Housing Price Index (HPI), Real Effective Exchange Rate (REER), Gross Domestic Price (GDP), and interest rate for our estimations using the Autoregressive Distributive Lag (ARDL) Model. The results from the study show that the impact of monetary policy on housing prices is significant only on lag three; however, the coefficient is very small. The results from the ARDL model are also supported by the variance decomposition of housing price. The variance decomposition of housing prices highlights that monetary policy explains around 13 percent of the variation in housing prices over a period of ten months. Further, the accumulated impulse response function reveals that with one-unit shock to interest rate results in a -0.000875 unit change in housing price. The study stipulates that, since conventional monetary policy has a modest impact on housing prices, therefore, it is insignificant for addressing the problems of real estate in India.

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1. Introduction

The debate about the relationship between monetary policy and the housing market was revitalised by the global financial crisis (GFC). There are two strands of this debate. One constituent argued that loose monetary policy contributed to the housing boom and its subsequent collapse (Singh & Nadkarni, 2017; Taylor, 2007), while Leamer (2007) suggests that speculative investment in real estate resulted in a crisis. Both views contain a specific amount of truth as the real estate market is found to serve as one of the channels through which monetary policy shocks transmit to the whole Economy (Dupor, 2005; Subramanian & Felman, 2019).

Monetary policy is one of the important policies which the central banks or monetary authorities around the world employ to influence the Economy. Although the primary goal of monetary policy, in the long run, is price stability, however, in the short run, it is also used for influencing employment and output (Loayza & Schmidt-Hebbel, 2002). Even though there is clarity about the objectives of monetary policy, yet ambiguity surrounds its use to influence asset price. Bordo and Wheelock (2004), Singh and Pattanaik (2012), and Taylor (2007) stress that monetary policy should not be used to control asset prices. Similarly, Christiano et al. (2008) and Leamer (2007) argue that asset bubbles arise from misread shocks, so they should not be targeted by monetary policy. Kohn (2009) adds the speculative aspect of the asset bubble as the reason for not responding to it through monetary policy. On the contrary, Platen and Semmler (2009) argue that monetary policy is optimal only when there is the protection of wealth invested in risky assets.

Though the immediate cause of GFC in the US was the result of soaring housing prices caused by sub-prime lending (Taylor, 2007), the housing bubble in India is a result of supply outpacing the demand and a sort of aftermarket financing leading to unsuitable lending (Subramanian & Felman, 2019). Considering the pivotal role of the real estate sector in traditional economic development and the current Indian slowdown, the flow of finance in this sector and its transmission through monetary policy needs a careful look. Should the Reserve Bank of India respond by reducing the interest rate (like it did in the first five monetary policies of 2019) (Financial Express Online, 2019), or should more dedicated funds (like the announcement of about 25,000 crores of rupees for reviving real estate) (Anshul, 2019) for stalled housing projects be taken up? It is in this context; we intend to investigate the role of monetary policy vis-a-vis real estate.

The motivation of this study is drawn from various forth mentioned reasons. First, the current slowdown in the Indian Economy is attributed to the liquidity crunch in the real estate sector (Subramanian & Felman, 2019). Second, the real estate sector holds an important place in the Indian Economy owed to its linkages with more than 300 subsidiary sectors (Saxena & Yadav, 2013). Third, there are empirical shreds of evidence that show an inverse relationship between property prices and interest rate (e.g., Ahearne et al., 2005; Harris, 1989; McQuinn & O'Reilly, 2008). Also, in the

Indian context, interest rates, and bank credit contribute more than two-third to real estate prices (Joshi, 2006). Lastly, there has been a limited number of studies in India on real estate. To the best of our knowledge, there has been no study focussing exclusively on the relationship between monetary policy and real estate. We intend to fill this literature gap.

The main findings of the study can be summarised as; monetary policy has a modest impact on housing prices in India; the variance decomposition of HPI reveals that around 13 percent variation in housing prices is explained by monetary policy. Therefore, it can be concluded that the conventional monetary policy is not the right option to address the concerns of real estate.

The rest of the paper is structured as follows. Section two discusses the real estate market of India and the economic slowdown. Section three is about the survey of existing literature. Section four consists of two sub-sections comprising data and methodology, followed by time-series properties of the variables. The penultimate section deals with empirical results, and section six concludes the study.

2. Indian Real Estate Sector and Economic Slowdown

India, after independence, adopted state-led industrial development. However, the balance of payment crisis during the 1990s resulted in a change of strategy from state to market-led development. As a result of which broad reforms were taken. One of the indispensable components of these reforms was the liberalisation of the Economy. The real estate sector was initially protected from foreign competition, but in 2005, foreign direct investment (FDI) was allowed in it. In the initial years of real estate liberalization, equity capital was used by developers to acquire land for greenfield residential projects. Both developers, as well as investors, made substantial capital gains, which they further invested in acquiring more and more land. At the same time, the demand was intensified by the easy availability of home loans and project sales.

By the end of 2009-10, the developers had little leverage. Further, the sectoral credit limit of banks for land acquisition was nearly saturated (Vashisht & Chaudhry, 2019). This provided an opportunity for alternative financing institutions like domestic non-bank finance companies (NBFC), credit-based alternative investment funds to replace banks as capital facilitators for real estate companies. Thus, further accumulation of land was sought by the developers, and new projects were launched to raise sales. During this period, the construction segment was lagging while much of the focus was on the accumulation of land banks.[1] The expected higher returns prompted the new players who had little or no expertise in the business to get a

[1] Exercise in which people accumulate land parcels for future use.

share of it, and projects were launched regardless of demand and price parameters. During this period, the sales were mostly driven by cash and retail loans.

Many economic commentators have argued that the radical policy shifts like Demonetisation, Goods and Services Tax (GST), and Real Estate Regulation & Development Act (RERA) had a significant negative impact on real estate. These shocks had an impact on both the demand and supply side by increasing the cost of doing business and sucking out liquidity from the market (Chakrabarty, 2019). The real estate sector, which once was a booming business, was now struggling to sustain itself. The Infrastructure Leasing and Financial Services (ILFS) crises in September-2018 gave the final blow to the market. In the aftermath of the ILFS crises, not only were the new loans stopped, but earlier loans too were recalled by NBFCs. The other lenders-private equity and commercial bank, too, stopped lending to the real estate sector. Thus, the problem of real estate has made matters more complicated not only for itself but also for NBFC generating a twin balance sheet problem of real estate and NBFC. This twin balance sheet problem of real estate and NBFC, along with the prevalent twin balance sheet problem of commercial banks and corporates, resulted in what is now known as Great Indian Slowdown (Subramanian & Felman, 2019).

3. Review of Literature

In this section, a brief survey of related literature is presented. This section is divided into two sub-sections. Second sub-section deals with literature specific to the Indian context, and the first section with the rest of the countries.

3.1. Selected Studies from across the world

The real estate sector assumed the centre stage of world debate during the Global Financial crises 2007 and sent shock waves to the world economies all over the globe. Various studies were taken up addressing the various aspects of real estate and housing markets in different geographies. Methodologically, the literature is dominated by Vector-Autoregression (VAR) models.

Monetary policy and real estate are linked together through what is popularly known as the transmission channels which are well established in economic literature. Demary (2009) discusses various such channels through which monetary policy can transmit its impact in real estate and vice versa through inflation and output based on simple economic corollaries. A theoretical and empirical review of the transmission channels between the monetary policy and housing is provided by Mishkin (2007). He divides these channels into two types. In one, there is a direct influence of interest rate on housing supply, expectations of future house-price movements, and user cost of housing capital; and in another interest rate influences economic activity indirectly via housing price wealth effect, credit channel, and wealth effects on both housing demand and consumer spending. However, Kuttner (2013) while discussing the transmission channels primarily focusses on the

conventional user cost model besides analysing the credit and risk-taking channels. Similarly, Yan (2019) deliberates the interest rate and money supply as the transmission channels between monetary policy and real estate.

Now that the transmission channels between the monetary policy and housing sector are well established in the literature, it is worthwhile to deliberate on the outcome of such transmission channels on the housing markets by studying the nature of the relationship between the two. The relationship between the interest rate and housing prices across the administrative boundaries too has been well chronicled in the literature Claessens et al. (2011). Ahearne et al. (2005) examines this relationship in a sample of 18 industrialized countries for the period of 1970-2005 using official records, speeches, and minutes to understand the thinking behind the monetary policymaking and found that low interest rates tend to precede housing price peaks, with a lead of approximately one to three years. Nocera & Roma (2017) use Bayesian stochastic search variable selection structural VAR for several euro countries to show that monetary policy has a strong and lasting impact on house prices. However, the impact is variable across the countries with a maximum in Spain (3%) and a minimum in Germany (0.4%). Kishor and Marfatia (2017) study the relationship between the monetary policy and hosing price in conjugation with income in 15 OECD countries and find the negative relationship between the monetary policy and housing price with substantial time variation across the countries for adjustments in housing price cycles with the maximum during the boom period of 1998-2005. However, the impact is most significant in the long run only.

Besides these umbrella studies focussing on the economic and administrative country groups/organisations across the globe, there have been country-specific studies too. Taylor (2007) investigates the relationship between monetary policy and the housing market. The author first presents a review of the relation between the federal monetary policy and housing prices since the 1950s. The paper finds the marked decrease in housing price fluctuations after the mid-1980s and attributes it to improvement in monetary policy. The paper further notes that the low-interest rate from 2003 to 2006 leads to a rapid increase in housing prices and a fall in delinquency and foreclosure rates on sub-prime mortgages. McQuinn and O'Reilly (2008) develops a theoretical model of housing prices and test it on the Irish Economy in which the demand for housing is expressed as the function of individuals' capacity to borrow. The capacity to borrow, in turn, depends upon the level of disposable income and interest rate. The model is then tested on the property market of the Irish Economy. The results reveal that the level of disposable income and interest rates are the primary determinant of house price movements.

Atabaev and Ganiyev (2013) used AR on monthly data from 2003-2011 to study the impact of monetary policy shocks on the prices in Kyrgyz Economy through the interest rate. The study revealed that monetary policy shock remains on the interest rate for about 3 months which negatively impacts the prices for about 2 months. Yan (2019) provides empirical evidence for the effect of monetary policy on the real

estate market in China using the VAR model. The data with monthly frequency for the period February 2009 to October 2017 is used. Using the impulse response function, the study finds an increase in the money supply leads to an increase in housing prices. In contrast, an increase in interest rate has a negative influence on housing prices. The impulse results reveal that real estate prices are directly proportional to the money supply and indirectly proportional to the interest rate.

3.2. Studies Related to India

In the Indian context, the relationship between monetary policy and the housing sector has been studied rather reluctantly, and mostly the studies have used the VAR models for their analysis. These studies have considered the impact of monetary policy along with some other variables, and exclusivity of monetary policy impact on housing prices is missing. (Joshi, 2006) investigates the impact of monetary policy and real income on the housing prices in India using a structural VAR model and establishes the fact that monetary policy and credit growth have a positive relationship with the housing prices in India. The variance decomposition of housing price reveals that they together explain around 72 percent of the forecast variance in housing prices with an interest rate more significant than bank credit. Mahalik and Mallick (2011), while investigating the determinants of housing prices in India with the help of cointegration and vector error correction model, finds that in the long run, housing price has a positive relationship with real income and inverse relation with real non-food bank credit. However, in the short run, real income and interest rates have a negative and significant impact on housing prices. Further, the variance decomposition reveals that real income, interest rate, real exchange rate, and stock market turnover explain about one-third variation in the housing price. Similarly, Mallick (2011) reiterates that the monetary policy helps in curbing the housing price despite the absence of sectoral targets like housing prices. Singh and Pattanaik (2012) find that housing credit growth is sensitive to the interest rate as impulse response reveals that tightening monetary policy results in moderation of credit demand over the medium-term. These developments, in turn, lead to lower real output. Singh and Nadkarni (2017) compare the dominance of credit and monetary policy shocks in explaining the asset prices. The study estimates a benchmark penal VAR using quarterly macroeconomic data of 22 countries for the period 1995 to 2014, including India. The study reveals that real output, bank credit, and monetary policy shocks are the principal drivers influencing asset prices. The present study adds to this developing literature of monetary policy impact on asset prices. Our study focuses on the exclusive impact of monetary policy on housing prices in India, which differentiates our study from the above-mentioned studies in the Indian context.

4. Data and Methodology

In order to understand the relationship between housing prices and monetary policy in the Indian context, we use monthly data on HPI, Interest rate, REER, and GDP. The

Housing Price Index is to capture the inflation in the housing market; the weighted average call money rate is a proxy for the monetary policy rate, GDP for income, and REER takes into account the influence of the exchange rate on HPI. The rationale of using REER is to capture the external influence which can be substantial in an open economy like India (Sharma et al., 2019). The variable GDP and HPI are adjusted seasonally.[2] The data are sourced from the database on the Indian Economy maintained by the Reserve Bank of India (RBI). All the variables are used in first difference and log form. Detailed methodology is represented in the flow diagram (Figure 1).

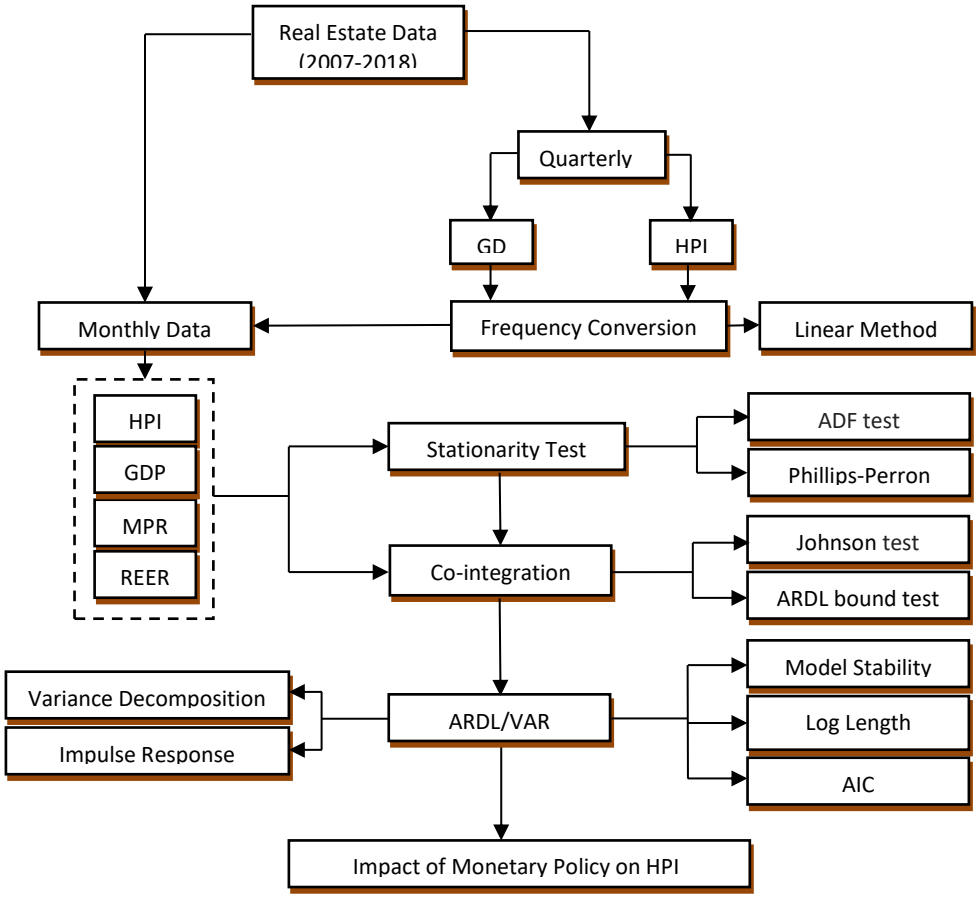

Figure 1. Detailed Methodology

[2] The data on GDP and housing prices was available quarterly. The data was converted into a monthly basis using benchmarking.

4.1. Time Series Properties of the Variables

The basic property of any time-series data to be used for analysis is to check it for stationarity and cointegration (Brooks, 2019). A time-series data is stationary when the properties of it are independent of time. Hence its mean, variance, and covariance remain the same over a period (Gujarati, 1988). In the empirical analysis, the stationarity of a data series is checked with the help of a unit root test. Many tests have been developed to check the stationarity of time series data; prominent among them is Augmented Dickey Fuller (ADF) and Phillip Perron (PP) tests. The basic difference between the two is that PP test is nonparametric and considers the issue of autocorrelation and heteroskedasticity and accordingly adjusts the statistics. Thus, as a prelude to estimate the relationship between monetary policy and housing price, we checked the stationarity of the data by using ADF test and PP test. Although ADF is the most popular test for stationarity but its inability to account for heteroscedasticity (Valkanov, 2004) compelled us to use PP test also for verification. The results of the unit root test are mentioned in Table 1. The data was found non-stationary at the level form but stationary[3] at first difference.

Table 1. Unit Root Test Results

Variable	ADF(Constant)	ADF (Constant & Trend)	PP (Constant)	PP (Constant & Trend)
HPI (L)	-1.42984	-0.25462	-1.42724	0.472947
HPI (D)	-4.58476	-4.78696	-5.60555	-5.77561
GDP(L)	2.521497	0.294423	2.606831	0.637844
GDP(D)	-5.39206	-6.00473	-8.30787	-8.87291
MPR(L)	-2.87308	-2.74502	-2.56347	-2.55604
MPR(D)	-8.97238	-9.01835	-12.0086	-12.0192
REER(L)	-2.36676	-2.63962	-2.23471	-2.413
REER(D)	-8.30754	-8.297	-9.31266	-9.29847

Secondly, in order to determine the appropriate model for the study, we tested the cointegration among variables. If two or more variables are linked to form an equilibrium relationship spanning the long run, these variables are said to be cointegrated (Enders, 1995). In order to check the cointegration among the economic variables, Johansen cointegration test is employed. The test is based on the rank of the matrix and its characteristics. The essential condition to check the cointegration requires the variables to be integrated of order 1 (Wooldridge, 2003).

The Johnson cointegration and Autoregressive Distributed Lag (ARDL) bound test in the study showed cointegration among the variables. Under these conditions, the ARDL model is more appropriate for estimation. However, we also use the impulse response and variance decomposition of the vector autoregression (VAR) model to

[3] Stationarity is a requirement for conducting time series studies and carrying out forecasts.

understand the impact of monetary policy shock. The rationale for the use of VAR is that it allows us to understand the extent and importance of monetary policy shocks.

5. Empirical Results

This section presents the econometric analysis of the relationship between monetary policy and housing prices in India. It is divided into the following sub-sections:

5.1. Estimating impact of Monetary Policy on HPI using ARDL Model

The ARDL model is the Ordinary Least Square (OLS) based model, mostly used when variables are of mixed order of integration or when data is non-stationary (Shrestha & Bhatta, 2018). It is used to estimate both short and long-run relationships among the variables. The ARDL model is simple to run, interpret, and involves just a single equation set-up. Further, the dependent variables can enter the model with different lags as we have the choice to select the lag of all variables the way we want, or economic theory requires.

The estimated Equation is

$$\Delta HPI_t = \alpha + \beta_{1i} \sum_i^n \Delta HPI_{t-i} + \beta_{1i} \sum_i^n \Delta output_{t-i} + \beta_{2i} \sum_i^n \Delta mpr_{t-i} + \beta_{3i} \sum_i^n \Delta reer_{t-i} + \omega_t \quad (1)$$

We have estimated the model both in the short and long run. In the short run, the maximum lag length is 4, while for the long run it is 12. The results both in the long run (Table 2) and short run (Table 3) from the ARDL model show that the monetary policy impact on HPI is found significant only at lag three. This supports the thesis that monetary policy impacts the different macroeconomic variables with lag. However, the results show that the magnitude of coefficients is not very high, implying that using monetary policy to influence real estate prices is not a good strategy in the Indian context.

The results also show that monetary policy has not been used to stimulate the housing price in a particular direction, or if used, the impact has not been significant due to incomplete transmission of monetary policy. The results of our study are consistent with Kuttner (2013), who explained that the effect of monetary policy on housing prices is modest and insufficient to explain the magnitude of real estate booms in most countries. The coefficient of REER and GDP were found insignificant, and variations in HPI were mostly found to be explained by its own lagged values. We initially used the stock market index, consumer price index, and oil price as a proxy for aggregate supply shock, but they did not add any significant explanatory power to the model. Therefore, they were subsequently dropped from the final model.

Table 2. Results of the ARDL Model (Long run)

Dependent Variable: HPI Method: ARDL
Maximum dependent lags: 12 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (12 lags, automatic): REER MPR GDP.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HPI (-1)	0.590368	0.067908	8.693613	0.0000
HPI (-2)	0.313275	0.071556	4.378028	0.0000
HPI (-3)	-0.575993	0.113261	-5.085547	0.0000
HPI (-4)	0.32435	0.093306	3.476208	0.0008
HPI (-5)	0.244021	0.069343	3.51907	0.0007
HPI (-6)	-0.409341	0.137022	-2.987418	0.0036
HPI (-7)	0.205473	0.107616	1.909327	0.0593
HPI (-8)	0.227149	0.061542	3.690954	0.0004
REER	-0.006781	0.018127	-0.374064	0.7092
MPR	0.000168	0.003958	0.042538	0.9662
MPR (-1)	0.000384	0.002091	0.183414	0.8549
MPR (-2)	0.002894	0.003131	0.924196	0.3578
MPR (-3)	0.014148	0.003421	4.13517	0.0001
MPR (-4)	0.006207	0.002715	2.286137	0.0245
MPR (-5)	0.005272	0.003146	1.675514	0.0972
MPR (-6)	-0.007378	0.00388	-1.901289	0.0603
GDP	-0.04909	0.108326	-0.453168	0.6515
R-squared	0.755402			
Adjusted R-squared	0.711166			

Note: Newey-West Regression was used to control for autocorrelation and heteroskedasticity in the residuals.

Table 3. Results of the ARDL Model (Short run)

Dependent Variable: HPI Method: ARDL
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): REER MPR GDP.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
HPI (-1)	0.675696	0.0843	8.015369	0
HPI (-2)	0.155593	0.093701	1.660523	0.0999
HPI (-3)	-0.42889	0.093701	-4.5772	0.0000
HPI (-4)	0.304701	0.082653	3.686497	0.0004
REER	-0.0169	0.026842	-0.62972	0.5303
MPR	0.007453	0.004165	1.789605	0.0765
MPR (-1)	-0.00246	0.003698	-0.66563	0.5072
MPR (-2)	-0.00063	0.003861	-0.1621	0.8716
MPR (-3)	0.019194	0.004597	4.175618	0.0001
GDP	-0.0005	0.10168	-0.00494	0.9961
GDP (-1)	-0.03497	0.101451	-0.34472	0.7310
GDP (-2)	-0.12197	0.091471	-1.33345	0.1854
GDP (-3)	0.287787	0.084721	3.39686	0.0010
R-squared	0.683128			
Adjusted R-squared	0.635597			

Note: Newey-West Regression was used to control for autocorrelation and heteroskedasticity in the residuals.

5.2. Effect of Monetary Policy Shock on Housing Price

The accumulated Impulse Response Function (IRF) is used to examine the change in HPI and is presented in Table 4 and Figure 2. The study computes 24 months ahead IRF of housing price index to monetary policy changes. The negative sign on MPR indicates an inverse relationship between interest rate and HPI. The accumulated IRF up to the third month is found to be rising. The one-unit shock to interest rate results in a -0.000875 unit change in housing price. Similarly, the forecasted values for other months are reported in Table 4. One important observation which the IRF reveals is that the impact of monetary policy on housing prices is not symmetric and is varying over a period of time. This presents a case of the non-reactionary response of monetary policy to housing price changes.

Table 4. Accumulated impulse Response of HPI

Period	GDP	REER	MPR	HPI
1	0.000156	-0.000337	-0.000319	0.003958
3	-0.000264	-0.001001	-0.000875	0.009432
6	0.001079	-0.002603	0.001652	0.011626
9	0.003712	-0.003449	-0.001197	0.013597
12	0.003916	-0.005397	0.000194	0.016608
15	0.00566	-0.005924	0.000798	0.018031
18	0.008159	-0.00598	-0.000769	0.018711
21	0.008329	-0.00618	-0.000388	0.020614
24	0.010402	-0.005651	-0.000889	0.021773

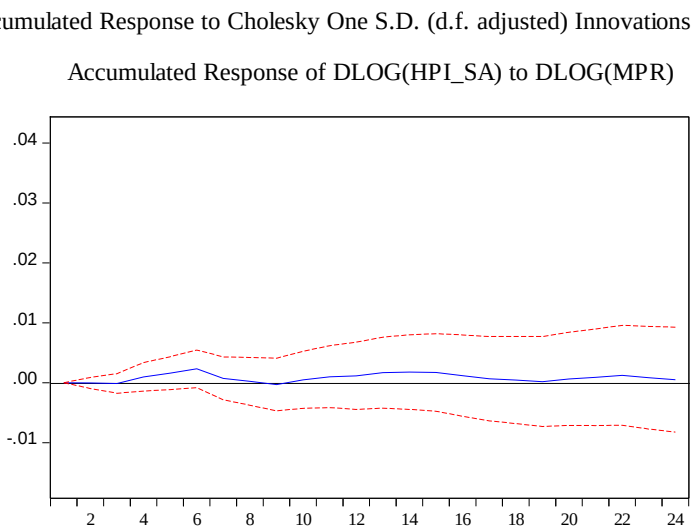

Figure 2. Accumulated impulse Response of HPI

5.3. Drivers of change in HPI

Although the impulse response function specifies the extent of the impact of monetary policy on housing prices, however, it does not indicate how important these shocks are for fluctuations in housing prices. To understand the important determinants of housing price, we employ Variance Decomposition (VD) of it. The VDs show us the percentage of forecast variance in HPI that can be attributed to various shocks, including monetary policy shock. The results of VDs of HPI over a period of 24 months are reported in Table 5.

Table 5. Variance Decomposition of HPI

Period	S.E.	GDP	REER	MPR	HPI
1	0.003262	0.153569	0.715262	0.638246	98.49292
4	0.003861	0.456292	1.263222	4.495717	93.78477
7	0.004234	5.114101	5.037672	12.23959	77.60863
10	0.004484	7.792013	7.624921	13.22369	71.35937
13	0.004789	7.789496	7.834657	13.18761	71.18824
16	0.005029	11.23705	8.228379	13.03258	67.50199
19	0.005145	12.67701	8.588675	13.40434	65.32997
22	0.005245	13.97729	8.682982	13.18962	64.15011
24	0.005292	14.78534	8.569297	13.32746	63.3179

It is found that monetary policy shock accounts for 0.638 percent of the variation in HPI in the first month. The pressure of monetary policy increases steadily to 4.49 percent in the fourth month. However, after the seventh month, its value reaches 12.23 percent. The value changes very little after the tenth month, and the value hovers around 13 percent for the rest of the period. Results from variance decomposition are in synchronisation with that of the ARDL model. Thus, both empirical evidences point to the fact that using monetary policy to arrest real estate slowdown is not an appropriate strategy. Further, the real estate sector needs a calibrated approach by focusing on both supply and demand sides.

6. Conclusion

The present study found a modest impact of monetary policy on housing prices. The empirical results from ARDL show that the monetary policy has an insignificant effect on housing prices. Further, the impulse response showed that estimates are ranging from -0.000319 in the first month to -0.000889 in the 24th month. These estimates are consistent with Kuttner (2013), who found the limited impact of monetary policy on housing prices. Further, through the VDs, it is also found that monetary policy accounts for 0.63 percent variation in the first month to 13 percent variation in housing prices in the 10th month. The variations in HPI remain almost constant after ten months.

The main policy lesson emerging from the study is that conventional monetary policy cannot be an excellent tool to address the problems in real estate. This is due to two

reasons one, monetary policy has a very modest impact on it, and second, the RBI has been given the mandate to maintain price stability. The reduction of interest rate to ease the liquidity for real estate may send a wrong signal to the market and thereby raising questions on the credibility of Reserve Bank of India policies. The other option for solving the real estate problems can be through an unconventional monetary policy but is it feasible in the Indian context will be an exciting area to further research in this direction.

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