

## ***Identifying Asset Price Bubbles in the Housing Market in India - Preliminary Evidence***

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Devoted to the analysis of housing market in India, the paper employs a special decomposition scheme for the structural VAR proposed by Blanchard and Quah (1989) to study the impact of permanent shocks to housing prices attributed to monetary variables and income growth - and, in the process, attempts to identify speculative price bubbles in the housing market. Based on the monthly data, the empirical evidence obtained in the paper suggests that the housing market in India at present remains fairly well equilibrated if seen in terms of the proximity of the actual housing prices and the estimated long run equilibrium housing prices. This implies that the risk of speculation in the market is not yet materially significant. However, as a mark of caution, since the empirical results indicate that housing prices are significantly much more sensitive to permanent interest rate shocks than shocks to credit growth, the stance of monetary policy particularly that reflected by the setting of the policy rate appears to be the single most important arbiter of the future growth of the housing market. Needless to mention, it is therefore necessary to take this factor into due account while developing policy approaches in relation to the housing sector. Besides, as income growth explains quite little about variations in housing prices, the possibility of some adverse selection in overall bank financing of the housing sector cannot be completely ruled out.

**JEL Classification :** E58, R31

**Keywords :** Structural VAR, decomposition, forecast error variance, asset prices, permanent shocks.

### **Introduction**

The rapid growth of the housing market in India in the recent years has raised concerns about its sustainability and implications for financial and macroeconomic stability. In the history of economic development, housing price bubbles have been recorded and studied with great interest.

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With the hindsight of documented experience, the bursting of asset bubbles in the housing market has often been associated with severe economic crises, especially, recessions caused by sharp reduction in spending as a result of loss in the consumers' power to leverage against capital gains. International Monetary Fund (IMF) research reported in the World Economic Outlook (April, 2003) indicated that output losses after house-price crashes in developed countries have, on average, been twice as large as those after stock market crashes, usually resulting in lasting recessions. The pace of housing sector growth can be gauged by the fact that the total value of residential property in developed economies increased by an estimated US \$ 20 trillion to over US\$ 60 trillion in the last three years which is even higher than the increase in global share values (Vedpuriswar, 2005). The surge in value of the stock of housing supported by an equally strong upturn in prices has led analysts to wonder if this boom is really sustainable or is merely a large financial bubble ready to burst. The recent surge in housing prices globally has gone hand-in-hand with a much larger jump in household debt than in previous booms. It is understood that not only that new buyers engaged bigger mortgages, but even existing owners increased their mortgages to turn capital gains into cash thereby causing a rally in housing prices.

Although the surge in the housing market in India is relatively a recent phenomenon, the rapid growth in bank financing in this sector requires attention in the light of the experience in other countries. The paper is divided into five sections. Sections I and II provide a review of international experience and the development of the Indian housing market, respectively. Section III discusses data and methodology. Sections IV and V include empirical evidence and concluding observations, respectively.

## **Section I**

### **Housing Markets: An International Perspective**

In a recently released review of the housing market, OECD Economic Outlook No.78 (2005) offers a detailed analysis of recent house price developments in the OECD countries in the backdrop of the experience of the past 35 years and in the context of the role of fundamentals. The OECD Outlook mentions that of the 37 large upturn phases between 1970

and the mid-1990s, 24 ended in downturns in which anywhere from one-third to well over 100 per cent of the previous real term gains were wiped out. This, in turn, had negative implications for activity, particularly consumption. It also observed that the current upswing in OECD countries is more generalised than in the past with a combination of factors, such as, low interest rates coupled with development of new and innovative financial products playing an important role. In regard to fundamental determinants of housing prices, while price-to-income ratio is considered a ready measure of affordability, it is by itself not a reliable measure since the cost of carrying mortgages varies over time. An assessment of a more useful measure namely, the debt servicing ratio for the OECD countries indicates that the general increase in indebtedness has been mostly offset by the decline in borrowing rates, and with the exception of Australia, the Netherlands and New Zealand, households do not seem to devote greater share of their income to debt service than in the recent past. According to the OECD Economic Outlook another approach to evaluating housing prices is based on asset pricing which uses measures, such as, price-to-rent ratio and user cost of housing. Taking these two measures, the review reports that housing prices in the UK, Ireland, the Netherlands, Spain, Australia and Norway were considered overvalued while those in France, Canada, Denmark, Sweden, Finland, Italy and New Zealand were not significantly overvalued. Housing prices are also impacted by other factors such as supply conditions, demographic changes and speculative pressures. Furthermore, housing cycles can influence economic activity through wealth effects on consumption and private residential investment due to changes in the profitability and the impact on employment and demand in property related sectors. Shocks to housing prices also have implications for financial stability as financial institutions with large exposures in the housing sector could find themselves with inadequate cushions to absorb the losses leading to deterioration in overall credit delivery. In regard to policy implications, views differ on how the monetary authorities should respond to housing price developments. The choice between using regulatory/tax actions or monetary policy actions is contextual but useful so long as the measures are appropriately designed with reference to the size of the actual shock.

In the United States economy, which is at present experiencing a strong cycle in the housing market, prices in certain regions have risen sharply if measured against the yardstick of affordability calculated as the

ratio of housing prices to annual income reflecting a build up of the asset bubble. In fact, at present, the median price of new house in the US is almost five times the median household income. More importantly, even as housing prices have risen, the rental values have remained subdued suggesting presence of speculative forces. Thus, with the rise in house prices relative to rental rates, the house price/rental ratio in the US moved above its long run average, suggesting that house prices were indeed high relative to rents (Krainer, 2003). The strong upsurge in the housing market in the US is a source of concern, especially, for the global financial stability should the market suffer a sharp downturn.

In the context of the present conditions in the global housing markets where the mortgage financing rates have fallen significantly since the last few decades, the IMF has cautioned that, just as the upswing in house prices has been an international phenomenon, so any downturn is likely to be synchronised, causing widespread effects.

## **Section II**

### **Development of Housing Market in India : A Review**

In a country with a vast population, the problem of providing shelter to all has been an issue of great concern to the civil society and the governments of various times. It has, therefore, generally been subsumed that state intervention is necessary to meet the housing requirements of the vulnerable sections and to create an enabling environment to achieve the providing of shelter for all on a self-sustainable basis. Concrete governmental initiatives began in the early 1950s as a part of the First Five Year Plan (1951-56) with a focus on institution-building and housing for weaker sections of society. In the subsequent five year plans, government action ranged from strengthening the provision of housing for the poor and the introduction of several schemes for housing in the rural and urban regions of the country. During the early years of housing development in India, initiatives were taken mostly by the government, and it is only in the recent years that private construction activity has made significant contributions mainly in urban or semi-urban regions in the area of housing/real estate development. It may be mentioned that the current surge in housing demand is generally limited to large urban

metropolitan regions, although smaller towns near these centers have also seen some good growth alongside. In the history of housing development, the Second Five Year Plan (1956-61) saw the enactment of legislations for orderly town and country planning including the setting up of relevant organisations and for the preparation of master plans for important towns. In 1959 the central government announced a scheme to offer assistance in the form of loans to state governments for a period of 10 years for acquisition and development of land in order to make available building sites in sufficient numbers. During this period master plans for major cities were also prepared. The Third Plan (1961-66) led to the coordination of various programmes to help housing for low-income groups. The Fourth Plan (1969-74) took a pragmatic view on the need to prevent the growth of population in large cities and decongestion and dispersal of population through the creation of smaller townships. The Housing & Urban Development Corporation (HUDCO) was established to fund housing and urban development programmes. A scheme for improvement of infrastructure was also undertaken to provide basic amenities in cities across the country. In order to reduce the pressure of urbanisation the Fifth Plan (1974-79) yet again reiterated the policy of promoting smaller towns in new urban centres, while emphasising on the improvement of civic amenities in urban and metropolitan regions. The Urban Land (Ceiling & Regulation) Act was enacted to prevent concentration of land holdings in urban areas and to make urban land available for construction of houses for the middle- and low-income groups. The Sixth Plan (1980-85) refocused attention on the provision of services along with shelter, particularly for the poor. The programme of Integrated Development of Small and Medium Towns was launched in small towns for development of roads, pavements, minor civic works, bus-stands, markets, shopping complexes, *etc.* Positive incentives were offered for setting up new industries and commercial and professional hubs in small, medium and intermediate towns.

The Seventh Plan (1985-90) made a marked departure in the focus given to the government-led housing development stressing on the need to place major responsibility of housing construction to the private sector. To augment the flow of institutional finance to the housing sector and promoting and regulating housing finance institutions, the National Housing Bank (NHB) was set under the aegis of the Reserve Bank of India in

1988. The Seventh Plan clearly also recognised the problems of the urban poor and for the first time an Urban Poverty Alleviation Scheme known as Urban Basic Services for the Poor (UBSP) was introduced. This was also the period when private builders were offered incentives to participate and contribute in building mass housing projects.

The Eighth Plan (1992-97), for the first time, recognised the role and importance of the urban sector for the national economy. The Plan identified the key issues in the emerging urban areas, *viz.*, the widening gap between demand and supply of infrastructural services, the increased growth of urban population and deterioration of city environments. The new Housing and Habitat Policy unveiled in 1998 aimed at ensuring “shelter for all” and better quality of life to all citizens by using the unused potential in public, private and household sectors. The key objective of the policy was on creating strong public–private partnership for tackling the housing. Under the new policy, government proposed to offer fiscal concessions, carry out legal and regulatory reforms and create an enabling environment for the development of the housing sector. The policy emphasised the role of the private sector, as the other partner, to be encouraged to take up the land assembly, housing construction and invest in infrastructure facilities.

Ever since the added emphasis was given to private initiative in housing development, there has been a rapid growth in private investment in housing with the emergence of real estate developers mainly in metropolitan centres and other fast growing townships. The growth has been fuelled by rising business opportunities in new and emerging enterprises, increasing income levels, low interest rates, employment generation and demographic changes. However, even as significant changes in laws, regulations have encouraged housing development, policy analysts believe that further reforms such as tax/stamp duty rationalisation that provide a level playing field to the housing sector may need to be carried forward to tap the unmet demand for housing stock. In the recent years for example, the scrapping of the Urban Land (Ceiling & Regulation) Act by the central government, amendment of the NHB Act to provide for easy foreclosure and permission for foreign direct investment to make investments in real estate have provided an encouraging investment climate. An Advisory Board with professionals has also been constituted to advice the government on matters relating to the development of the housing sector.

In any case, introduction of measures mentioned above, the easing of monetary policy stance and the priority given to the housing sector in RBI's credit policies and the recent Union Budgets have all provided incentives to both financial institutions and buyers of residential property.

Housing market in India, as evidenced by the growth in bank exposures to the sector took off mainly since the year 2001. For example, the retail loan portfolios of banks including housing and real estate advances expanded at rates ranging between 22-41 per cent since 2001-02 and accounted for 26.7 per cent of the incremental non-food credit in 2005-06. As per the RBI's Annual Policy Statement for the year 2006-07, the incremental growth in the loans to commercial real estate and housing clocked rates of 84.4 per cent and 29.1 per cent, respectively, in 2005-06. The rapid growth in housing loan market has been supported, *inter alia*, by the growth in the middle class population, favourable demographic structure, rising job opportunities in the metropolitan centres, emergence of a number of second tier cities as upcoming business centres, IT and ITES related boom and rise in disposable incomes. Furthermore, attractive tax advantages for housing loans make them ideal vehicles for tax planning for salary earners. The real estate market has also grown rapidly recording an annual price appreciation in excess of 10 per cent or more depending on regional importance. The real estate market has been boosted by the proposal to permit 100 per cent FDI in the sector. For banks and other housing finance institutions, the regulatory framework enabled expansion in house loan portfolios given the helpful prescriptions on risk weights for housing exposures and the benefit of compliance with the targets mandated for priority sector lending. Besides, housing loans growth by financial institutions has been assisted by the comfort of relative safety of such assets given the tangible nature of the primary security and the comfort obtained from the SARFAESI Act, 2002.

As alluded to earlier, one of the most significant factor that drove the growth of housing market in India in the recent years was the easy availability of bank finance at affordable interest rates owing to surplus liquidity with the banking sector coupled with the softening of interest rate environment on the back of lower inflationary expectations. It may be mentioned that the reductions in interest rates in the housing market have been far more noteworthy as has been the case of in respect of

other retail and corporate advances because of low risk perception and favorable fiscal and regulatory dispensations.

Concerns regarding the sustainability of increasing growth in housing and other retail financing by financial institutions now appear to be arising given the increasing load of household debt as reflected by the wide gap between borrowings and repayments as reported by the latest round of decade-wise NSSO survey. The situation calls for caution on the dangers of building up of systemic credit risk and the instability of the financial system as a whole.

The sharp growth in the housing and the real estate markets has nevertheless been of concern to policy makers especially in the context of its implications for macroeconomic and financial stability in the event of a sudden downturn. Being a recent phenomenon, the recorded history of financial markets in India has so far not experienced the pangs caused by bursting of bubbles in the housing sector, although the need to take pre-emptive policy actions can hardly be overemphasised in the light of the experience in other countries. It may be mentioned that as a part of calibrated policy response, the Reserve Bank has been gradually nudging financial institutions to exercise due diligence in the assessment of credit risks for exposures in the housing sector, while increasing the regulatory risk weights/provisioning for housing and real estate loans. As a preemptive measure the Reserve Bank in its Annual Policy Statement for the year 2006-07 increased general provisioning for residential housing beyond Rs 20 lakh and commercial real estate from 0.40 per cent to 1.0 per cent. The risk weight on bank exposure to commercial real estate has also been increased from 125 per cent to 150 per cent.

While all round development of the housing sector is a welcome objective, it is also important to take note of the pace of the cyclical growth in recognition of the risks of build up of asset price bubbles. Of the several factors that contribute to the occurrence of bubbles, high credit growth backed by low interest rates is considered equally more important. It may, therefore, be useful to have some empirical analysis devoted to the assessment of the current conditions in the housing market from the point of view of developing policy choices in regard to the housing market.



The empirical research on housing market in India is scarce due to the paucity of information. With the objective of filling the void, this paper attempts a technical analysis of housing price bubbles in India - particularly aiming at separating the real from speculative price elements by focusing on the relevant monetary aggregates that have a bearing on the growth of the housing market. There are a number of factors which appear to be important for the growth of housing market consisting of income growth, mix of monetary policy, tax and regulatory incentives and procedural ease of loan disbursals, *etc.* The speculative factors, on the other hand, may depend on the hype built around advertising, asymmetric information and speculative or herd behavior causing prices to rise to unsustainable levels and beyond that determined by relevant factors mentioned above. Although it is difficult to identify a house price bubble which occurs due to a deviation of market price from the fundamental value of the house, a number of eclectic approaches for identification have been used.

### **Section III**

#### **Data and Empirical Methodology**

Although the housing sector of the economy has received considerable attention in the recent years given its core importance in the developmental goals of the Indian economy, its significance in sustaining financial stability has been recognised rather recently following the significant credit growth at low rates of interest in the recent past. The data in respect of aggregate credit disbursed to the housing sector and national price index for housing output is not easily available on monthly frequency at which data is used in this study for the period from April 2001 to June 2005. As a result, this study is based on data which may be considered good proxies although this might be considered as an extent of limitation. However, given the fact that housing credit has formed a dominant share of overall non-food growth in the recent years, the actual annual growth in housing credit can be expected to be highly correlated with that of growth in non food credit which can be considered a good measure of the former. In fact the choice of proxy for housing credit is also supported by the fact that for the time sample under consideration, the correlation coefficient between available annual outstanding housing credit and non food credit is quite high. The price of housing is represented by the index of housing prices for major metropolitan centres compiled and provided by a bank. Although the price

index for metropolitan centres does not capture the country wide pricing conditions, the index nevertheless provides a good guide to price developments since most of the price increase in housing output in the recent years has been observed in metropolitan regions. As for interest rate on housing finance, the weighted average call money rate is taken as the proxy for interest rate on housing loans as the lack of information on higher frequency weighted lending rate on housing loans limits the use of such data. It may, however, be pointed out that among all other sector specific interest rates, the movement in the interest rates on housing loans whether fixed or floating have been by and large synchronous with the short term money market rate in the recent years, as evidenced by the reduction of interest rate on housing loans for a 20-year tenure from a high of 13-14 per cent per annum in 2000 to about 7-8 per cent in 2006 following the progressive reduction in RBI's policy interest rate. Finally, it is also necessary to include the income variable in the system for assessing the impact on housing prices. The income variable is taken as the annual growth rate in real GDP.

The experimental design is based on deflating all nominal variables by the rate of inflation based on wholesale price index (1993-94=100) in order to have the system defined fully in real terms.

The interpretation of the structural VAR considered here is made in terms of four shocks, *viz.*, interest rate ( $\epsilon_{int}$ ), non food credit ( $\epsilon_{nfoodcredit}$ ), GDP growth ( $\epsilon_{gdp\text{growth}}$ ) and housing prices ( $\epsilon_{hsgprice}$ ) shocks related to system equations for changes in interest rate, housing credit, GDP growth and housing prices. The analytical results from this experimental design would, therefore, throw light on how the housing market could be affected by the monetary conditions, especially, given the prevailing high growth in credit accompanied by low interest rates as well as GDP or income growth. The specification is also meaningful as the increase in housing prices are observed to have been noticed mainly in select metropolitan centres and other urban regions where borrowers have easier access to bank credit and those who gain relatively more from a rise in economic growth. The algebraic form of the VAR model is based on the representation proposed by Blanchard and Quah (1989) which enables the characterisation and study of the impact of permanent shocks with respect to each of the variables included in the model.

Including stationary variables in the structural VAR, and ordering the vector as  $z_t = (\Delta \text{int}, \Delta \text{foodcredit}, \Delta \text{gdpgrowth}, \Delta \text{hsprice})$ , the model is as follows :

$$\Phi(L)z_t = e_t$$

pre-multiplying by its inverse

$$[\Phi(L)^{-1}] \Phi(L) z_t = [\Phi(L)^{-1}] e_t$$

Let  $\Phi(L)^{-1} = K(L)$ , then we have

$$[I_n - \Phi(L)L - \dots - \Phi(L)_p L_p] [I_n + K(L) + \dots] = I_n$$

$$z_t = K(L)e_t \quad (1)$$

where  $K(L)$  is of a finite order and where  $e_t$  is the vector of reduced form independent white noise errors corresponding to the individual equations in the structural VAR with a covariance matrix  $\Omega$ . Assuming that the orthogonal structural shocks ( $\varepsilon_t$  below) can be written as linear combinations of the structural errors (1) especially,  $e_t = R^\circ \varepsilon_t$  where  $R^\circ$  is a non singular matrix. The moving average representation (MAR) of system (1) containing the original residuals then can be written down terms in the orthogonal disturbances with each of the  $\varepsilon_t$  normalised to have unit variance.

$$z_t = R(L)\varepsilon_t \quad (2)$$

where  $K(L)R^\circ = R(L)$  and for positive definite matrix  $\Omega = R^\circ R^{\circ'}$ . Equation (2) forms the basis for obtaining Blanchard and Quah decomposition. In particular if  $R^\circ$  is identified then the MA representation can be directly derived from (2). However, since  $R^\circ$  is a four by four matrix, a total of ten restrictions are required for identification. Since  $\Omega = R^\circ R^{\circ'}$  and  $\text{var}(\varepsilon_t)$  are normalised to unit variance, matrix  $R^\circ$  requires only six additional restrictions for identification which can be obtained by imposing restrictions on the long run multipliers in the matrix  $R(L)$ . Each component of the long run matrix  $R(L)$  namely  $R_{ij}(1)$  represents the corresponding dynamic long run multiplier (or the permanent component) which would need to be subjected to economically meaningful restrictions for identification.

The following restrictions needed for the identification of  $R(L)$  matrix are placed on the long run multipliers to identify the structural shocks, *viz.*, interest rate, nonfood credit, GDP and housing price shocks.

- (a) policy interest rate shock is the only shock that can itself have a long run effect on the interest rate.
- (b) in the long run credit conditions will be determined by supply conditions, namely, aggregate credit supply and interest rate.
- (c) GDP growth is affected by permanent shocks attributed to itself, interest rate and credit growth, presuming in the monetarist tradition, that easy credit availability in a low interest rate environment played a crucial role in stimulating economic activity in the recent years.
- (d) and finally, housing prices are affected in the long run by permanent shocks in interest rate, credit and GDP shocks and own innovations in housing prices.

With these identifying restrictions on the permanent effects, the long run matrix  $R(L)$  appears as follows

$$\begin{bmatrix} \Delta int \\ \Delta nfood \\ \Delta gdp growth \\ \Delta hsg price \end{bmatrix} = \begin{bmatrix} R11(L) & 0 & 0 & 0 \\ R21(L) & R22(L) & 0 & 0 \\ R31(L) & R32(L) & R33(L) & 0 \\ R41(L) & R42(L) & R43(L) & R44(L) \end{bmatrix} \begin{bmatrix} \mathcal{E}_{int} \\ \mathcal{E}_{nfood credit} \\ \mathcal{E}_{gdp growth} \\ \mathcal{E}_{hsg price} \end{bmatrix} \dots\dots(3)$$

From the above, it is straightforward to recover  $R^0$  as both  $K(1)$  and  $\Omega$  are known. As  $R(1)$  is lower triangular, it is also a unique Choleski factor of the long run representation  $R(1)\Omega R(1)$ .

The structural VAR is also used for obtaining forecast error variance decompositions alongside a measure of the real equilibrium housing price index which is exhibited in the form of a graph. Measure of misalignment is computed by comparing the actual housing price index with the estimated trajectory for the housing price index obtained from the model.

## Section IV

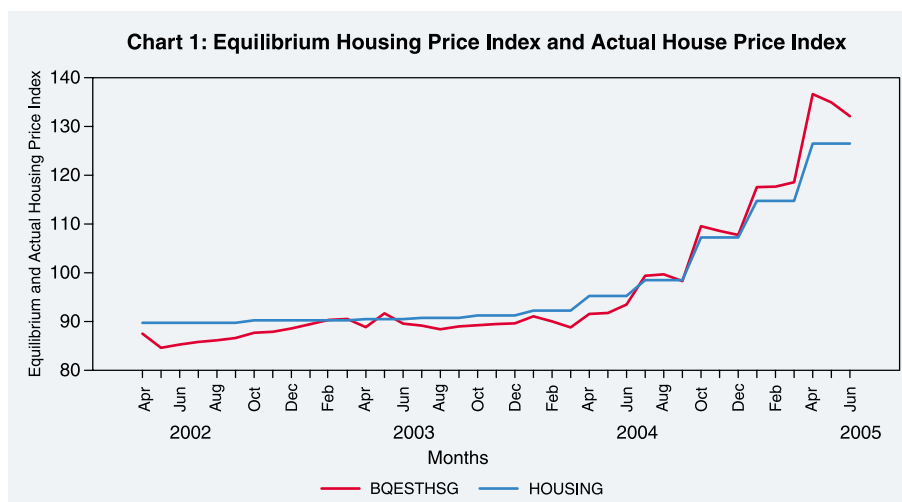
### Empirical Evidence

Table (I) presents the forecast error variance decompositions for housing prices. According to Table I, the majority of the explanation for the forecast error variance of housing prices is explained by interest rate, implying that the interest rate conditions have a significant role to play in determining housing prices. The impact of non food credit is lesser than interest rate but taken together credit growth and interest rate explain almost 72.3 percent of the forecast error variance of annual change in housing prices.

**Table I : Forecast Error Variance Decomposition of Housing Prices  
(per cent, average for 12 months)**

Accounted for by Interest Rate	Accounted for by Non Food Credit	Accounted for by Housing Prices themselves	Accounted for by GDP
45.51	26.81	17.84	7.59

However as mentioned earlier, from the point of view of the analysis, the objective of this paper is to distinguish between the real and speculative price increases in the housing market. From expression (3), it is straight forward to estimate the fundamental or long term equilibrium housing prices given the monetary fundamentals especially, interest rate and credit growth which are taken as the explanatory variables in the model and GDP growth which captures changes in income. Chart 1 depicts the relative positioning of actual (flagged 'HOUSING' in the graph) and long run equilibrium housing price (flagged 'BQUESTHSG') indices. From Chart 1 it is noted that because of the close proximity of the actual and equilibrium housing price indices, there is only a very a small extent of misalignment.



## Section V

### Concluding Observations

The empirical findings recorded in the study support the inference that amongst the various factors that have a bearing on housing prices, monetary conditions, *viz.*, interest rate and credit growth play a critical role. Together they explain a very large part of the forecast error variance of housing prices and can be considered as primary drivers of growth. It is, however, somewhat alarming to find that real income growth played only a minor role in determining housing prices, reflecting an extent of adverse selection in overall bank financing. Another notable factor is the low order of persistence of housing prices in India as borne out by the little explanation offered in the model by own innovations in housing prices. This finding is in contrast to the stylised feature of housing markets in other parts of the world where housing prices display strong persistence because of the time taken in clearing the market in the aftermath of a shock. Lower persistence implies that the risk of relatively quicker reversal in housing prices in the event of a shock cannot be completely ruled out.

The results of forecast error variance decompositions also indicate that housing prices are significantly much more sensitive to interest rate changes than credit supply. Therefore, as advised by Bernanke (2002), there is a need to carefully evaluate the consequences of monetary policy actions especially when the housing market is seized

by price bubbles, since a pre-emptive hike in interest rates (over and above what is judged necessary for overall price stability purposes), may well be counterproductive. Moreover a tighter policy to prick a housing bubble (if one could be safely identified) could also be potentially damaging for other sectors.

In the recent period, as the graphical analysis shows, the long run equilibrium housing prices are observed to closely trail the actual level of prices implying that the extent of misalignment between the actual and long run equilibrium housing prices has remained low during the period under consideration. This means that the extent of speculation in the market is subdued, and the market is primarily supported by the existing configuration of monetary variables, *viz.*, lower interest rates and easy availability of credit.

Taken together the key implication of these findings is that monetary policy is expected to exert a significant impact on the housing market as monetary conditions undergo changes either in the form of a rise in interest rates or a reduction in supply of credit. Since the variance decompositions show that changing monetary conditions especially interest rate, have particularly large impact on housing prices, it is necessary that measured policy adjustments are taken to avoid adverse effects on the balance sheet of banks, particularly of those having large exposures to the housing/real estate sector. The empirical inference in regard to the role of monetary policy is also consistent with the international evidence as reported in the IMF's World Economic Outlook (2003) suggesting that housing price bursts during the late 1970s and the early 1980s actually followed the tightening of monetary policy which was aimed at reducing inflation. It, therefore, appears that sectoral measures in the regulatory domain that help in soft landing, such as, for example, withdrawing or reducing regulatory accommodation may be more worthwhile than direct measures taken for demand compression. According to the OECD's Economic Outlook, while the monetary authorities can have many choices to respond to asset price developments including housing prices, the policy response to housing prices should be related only to the extent that they contain information about future output growth and inflation, and that, if desired, it would be more appropriate to use alternative policy instruments (taxes and regulations) to stabilise housing cycles.

On the future prospects of housing market, it may be considered that while the market has been working close to its potential as elicited from the convergence of the actual housing prices and long term equilibrium prices during the time sample under consideration, its performance nevertheless would continue to be tightly governed by monetary conditions defined predominantly in terms of configuration of interest rates and ease/tightness of credit supply.

### References

- Bernanke, B.(2002), “Asset-Price Bubbles and Monetary Policy”, Remarks before the New York Chapter of the National Association for Business Economics, October, New York.
- Blanchard, O. and D. Quah (1989), “The Dynamic Effects of Aggregate Demand and Supply Disturbances”, *American Economic Review* 79, 655-673
- International Monetary Fund (IMF) (2003), “Growth and Institutions”, *World Economic Outlook*, April.
- Krainer, J (2003), “House Price Bubbles”, *Federal Reserve Bank of San Francisco (FRBSF) Economic Letter*, Number 2003-06, March.
- Organisation for Economic Co-operation and Development (OECD) (2005), “Recent House Price Developments: The Role of Fundamentals”, *OECD Economic Outlook*, No. 78, Preliminary Edition.
- Government of India, Five Year Plan Documents, Planning Commission.
- Reserve Bank of India (2006), “Annual Policy Statement for the Year 2006-07”, April.
- Vedpuriswar, A.V(2005)., “Globally, Housing Set for a Crash !”, ICFAI, Hyderabad.