

A Study of Ingredients Affecting the Private Sectors Inclination Towards Housing Supply

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ABSTRACT: Just like any other economic field, housing market has two basic foundations which are demand and supply. Its obvious that disequilibrium between these foundations, will drastically affect the housing affordability and can also lead to wide slump in many markets. That's why, policy makers usually intend to stimulate the supply by means of providing low interest loans, low priced land, etc. In this paper the correlation of private sector's inclination to invest and supply housing with various criteria has been analyzed. Dependent variables deputed for investment inclination are investment volume and estimated floor area of started residential buildings, completed residential units and total floor area and number of residential units in permits issued. On the other hand, the independent variables used are liquidity, house and land price and accumulated deficit of residential units. Besides, the Hodrick-Prescott filter (HP) has been applied to time series data, in order to separate the trend components and the cyclic components. The result of analysis indicates that the liquidity has the most correlation and the accumulated deficit of residential units has the least correlation with the private supply inclination.

Keywords: Housing, Investment in housing, Housing supply, House and land price, Housing accumulated deficit.

INTRODUCTION

Housing market, just like any other economic field, has two basic foundations, which are demand and supply. It's obvious that disequilibrium of these foundations will reduce the housing affordability, increase the investment risk and impair the market's security, form housing bubble and the like. By classifying the housing demand into consumer and capital, the main part for housing policy makers, would be the consumer demand; while this part usually has a moderate and contiguous trend based on demographic parameters. There is an important and considerable point in Iran that most of policy makers, refer the fluctuations of housing market to accumulated deficit of residential units.

Other side of housing policy is focused on supply and supporting it by different means. In some countries such as UK and Netherlands, the government has entered the housing market directly and played an important role in housing supply by constructing huge numbers of social housings¹ (Bramley, 2007; Stewart, 2005; Whitehead, 2007). In some other countries such as US, the government does not intervene in housing market, but instead provides the opportunity for consumers by enhancing employment opportunity and wealth (Goetz, 2010). In Iran, the supply

side aids includes means like providing low interest loans, free lands, which are conceded to individual applicants and developers (Heydari, 2011; Keivani, et.al., 2008).

MATERIALS AND METHODS

Equilibrium of Demand and Supply

Regarding to classical economic theories, disequilibrium of demand and supply in a pure competitive market is a short term situation and market will reach the equilibrium point by itself. As a matter of fact, in a competitive market, demand for a quantity of a specific property has a positive relation with its price; and the supply amount of a specific property has a negative relation with the property's price. The equilibrium point is reached when the supply and demand are just equal. However, if demand for a property exceeds the supplied amount, the price's growth will incite the supply. On the other hand, the raise of supply more than demand, will reduce the price and this will raise the demanded amount; that's the way general equilibrium will be reached (Dadkhah, 2009; Gan and Hill, 2009; Mohtasham Dolatshahi, 2006). In Iran's housing market -which may be assumed as a competitive market with ignorance- this question can be raised that "whether the increase and decrease of housing supply for achieving the equilibrium

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point, is mostly related to the housing demand as a consumer or capital good?" So this paper tends to answer this question that: "Is private sector's housing supply inclination mostly related to the demand for capital or consumer good?" While the primary hypothesis is that "It seems that the correlation between housing supply inclination with housing demand as a capital good is more than it's correlation with consumer demand. So the null hypothesis is that² "the correlation between private sector's housing supply inclination with consumer demand is more than or equal to it's correlation with housing demand as a capital good." In the next part this hypothesis has been tested via the assessment of housing supply and demand in Iran.

Housing Supply in Iran

In Iran, Government's share in housing supply has been about two percents within two recent decades and therefore can be ignored. So the private sector's activities in constructing residential buildings can be assumed as the whole housing supply. In this paper the housing supply data

has been extracted from Iran's central bank's time series database (CBI, 2011) for a 35 years period from 1973 to 2008. Fig.1 represents the private sector's real investment³ in urban housing, categorized in started, uncompleted and completed buildings. The graph shows that in the recent decade, private investment in housing has grown considerably. Actually, the housing supply in Iran has had a moderate and contiguous evolution until 2000 and standard deviation for 1973-2000 is 54. But in recent decade the supply has grown faster (standard deviation for 2001-2008 period is 205). However, since the usual construction period in Iran is more than one year, the major part of this investment has been led to incomplete buildings (52%); while started buildings and completed buildings have received 28% and 20% of total investment.

A Comparison Between Started and Completed Buildings

Fig.2 represents the total floor area for started and completed private housing in Iran for a period of 35 years. Comparison of the started and completed buildings indicates

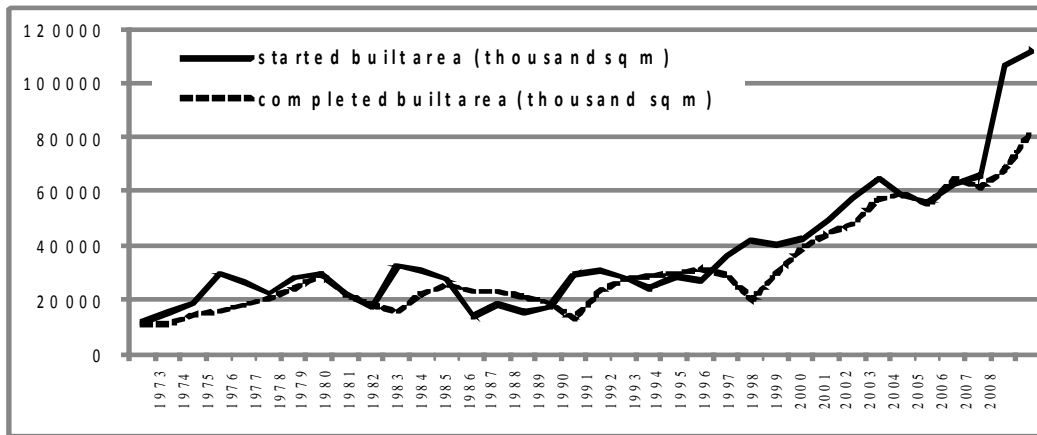


Fig.1: Investment in housing in Iran in 35years period (real prices of 1974)-(authors based on CBI, 2011)

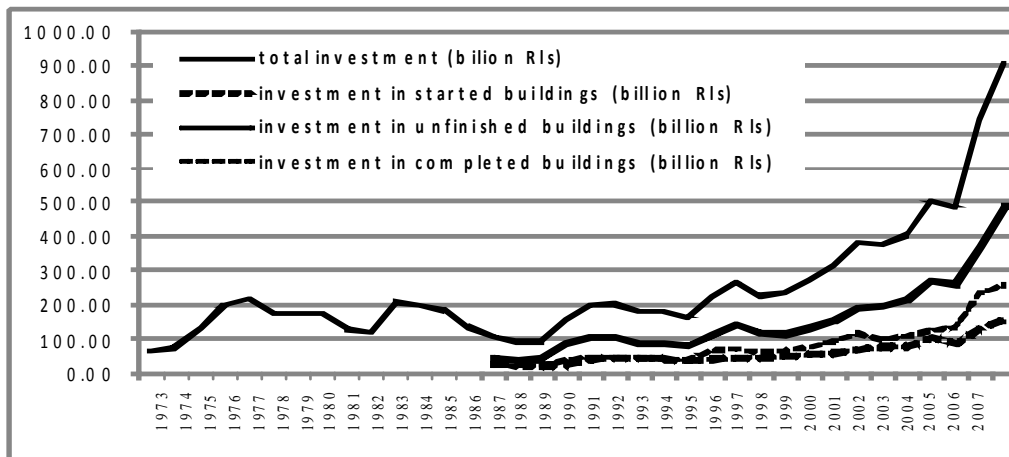


Fig.2: Started and completed private housing (floor area –thousand m²) (authors based on CBI, 2011)

that boom and slump in started buildings, has affected the floor area of completed buildings with a delay of about 1 to 2 years (which is the usual period of construction in Iran). But in recent years the slump in started private housing has led to slump in completed units directly during the same year. The reason can be traced in wide fluctuations of housing market in recent years. This means that in the slump period, while investment in started houses has reduced, some developers have suspended the unfinished projects. Obviously, it reduces housing supply more than ever and will exacerbate the slump.

Accumulated Housing Demand in Iran

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Accumulated Housing Demand in Iran

According to population and housing census, urban population growth rate has been 4.5 percent in 1976-86 (1355-65) period; and has dropped in next decades to 3.5 (1986-91), 2.9 (1991-96) and 2.7 (1996-2006). While the growth rate of households in the same periods has been 5.4 (1976-86), 3.4 (1986-91), 4 (1991-96) and 4.6 (1996-2006)(SCI, 2010). Thus in recent decades, although the population growth rate has decreased, the growth rate of households has increased (Fig.3). Naturally, this increased growth rate of households has produced an increased demand for residential units; and obviously if the production sector's capacity does not grow accordingly to provide the needed housing to suit this growth, the demand remains unanswered and will form an accumulated deficit of residential units and accumulated demand. With regard to demand function, this accumulated demand can cause supply-demand disequilibrium and though noticeable increase in prices is expectable. That's why in recent years, government and some policy makers have referred the

housing problems -such as sharp rise in housing prices, etc- to this accumulated deficit and unanswered demand (Adams and Roland, 2010; Heydari, 2011). However, statistical analysis shows that private housing supply has responded to the housing demand and consequently the accumulated deficit and household per house ratio has considerably decreased. As shown in table 1, the accumulated deficit of residential units has increased in 1996-2001 period. But in the next five years, despite the increasing number of households, accumulated deficit has decreased due to growth of private housing supply.

Fluctuations in Housing Prices in Iran

Fluctuation in housing prices in some countries, including Iran, particularly over the past two decades has been one of the major challenges affecting housing market and economy. These include increased volatility of housing prices in a period and decreasing or relatively high and pervasive recessionary stability in housing prices in other periods. Obviously these fluctuations have been important causes of irregularity in the housing market and ultimately the entire economy (Gholizadeh, 2009, 40).

Generally, in the past three decades (before 2007), according to the formation of oil-based economy and the gradual change from rural to urban residence patterns, this volatility sounds to follow a specific model which is:

- A 3 or 4 years period of relative stability in which the supply surpasses the demand slightly.
- Rise of massive and abnormal demand in Tehran initially and then other major cities.
- Failure of supply to meet this massive demand in short term.
- Sharp price increases and loss of excess demand in the new price.
- Increase in production and investment, following the price increases.
- Demand decline and supply increase, which causes the return to 3 or 4 year recession (Jahani, 2007, 5).

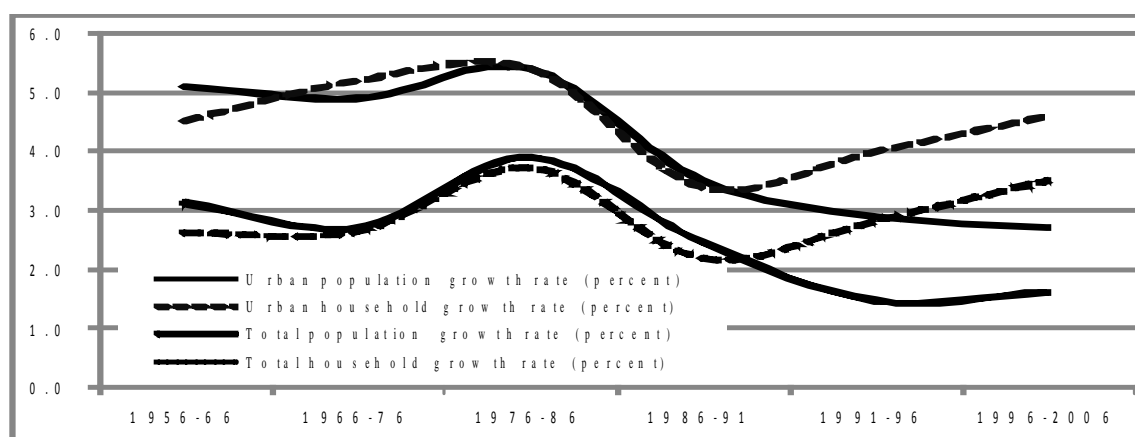


Fig.3: Population and households' growth rate (1956-2006 –percent)-(authors based on SCI, 2010)

Table 1: Urban households, residential units and housing accumulated deficit in Iran
(Source: SCI, 2010, the 2001 data in estimated by the author)

Year	Urban households	Urban residential units	Urban housing accumulated deficit
1986	5,528,542	4,669,722	858,820
1991	6,523,824	5,570,384	953,440
1996	7,948,925	6,913,730	1,035,195
2001	9,983,821	8,560,816	1,423,005
2006	12,405,584	11,431,880	973,704

However, some essential reasons for this pattern have been outlined here:

- Entering and exiting the real estate market is very simple in Iran. That's why in some years the market faces sudden capital influx and after a while, capital withdraw can be seen (Ibid, 6).
- In the absence of great developers in constructional firms, Iran's construction system is mainly formed with individual builders. At the same time, in the absence of an appropriate financing system, these individual builders have to finance about 80 percent of required capital investment from personal and pre-sales resources. That's why these builders are looking forward to market and rising prices (Ibid, 2).
- Regarding to usual long period of construction in Iran (about 1.5 to 3 years), residential units, started in boom period, will finish in recession time. When it is not in demand. It's worth mentioning that small builders, regarding to their little fixed capital and use of rental equipments and temporary labor, can exit the market rapidly in slump periods and enter again in boom periods. But big firms and developers would not exit the market because of huge amount of capital, invested in machinery, equipment and manpower and the necessity to utilize them. Moreover, these developers, having appropriate financial support, can invest in recession courses and sell in boom periods and therefore achieve greater benefits. At the same time these investments can reduce the cyclic fluctuations.

RESULTS AND DISCUSSION

Variables and Criteria

The independent variables of hypothesis test- impressibility of private sector's housing supply inclination to consumer and capital demand- are liquidity (which enforces housing demand as a capital good), actual prices of one square meter of residential unit and urban land in residential zone, and finally the accumulated housing deficit (as an enforcer of consumer demand⁵). The liquidity data has been taken from CBI time series database (CBI, 2011) and actual prices of housing and urban land has been taken from statistical yearbook of 2009 (SCI, 2010). Accumulated housing deficit has been calculated using households data (Ibid) and housing stock (CBI, 2011). These two variables have been taken directly from existing census data and in intervals, urban households' data has been estimated using marriages with proper coefficients and urban residential units' data has been

calculated through private completed units with proper coefficients.

On the other hand, according to paper's hypothesis, dependent variables should represent private sector's housing supply inclination. Therefore the dependent variables used in analysis are private investment in started buildings, started buildings floor area, completed private residential units, floor area in permits issued⁶ and residential units in issued permits. These data have been taken and calculated from CBI time series database (CBI, 2011) and 2009 statistical yearbook (SCI, 2010).

In addition the inflation coefficient has been considered as an intervening variable and it's effect on dependent and independent variables has been eliminated. In fact, to eliminate general inflation, all monetary variables used in analysis, have been converted to real prices of year 1974.

Editing Data With Hoderick- Prescott Filter (HP)

In any time series dataset, there are two types of fluctuations; which are cyclical component and trend component. Cyclical component is a usual fluctuation based on endogenous changes; while trend component depends on exogenous parameters. That's why it's important to separate these two components before comparison and the analysis is applied to the trend component. In this paper Hoderick- Prescott filter (HP) is used for the desired separation. In this filter, Y_t is assumed as logarithms of a time series dataset of a variable for $t= 1, 2, \dots, T$. And Y is the summation of trend component (τ) and a cyclical component (c).

So: Equation 1:
$$Y_t = \tau_t + c_t$$

Using an appropriate positive λ ⁷, there is a trend component that can minimize the following value. (see Hodrick and Prescott, 1997). So HP filter estimates smoothed series (trend component) from original series by minimizing the variance of original series around the smoothed series (Afshar et al., 2009). Equation 2:

$$HP = \min \sum_{t=1}^T (y_t - \tau_t)^2 + \lambda \sum_{t=2}^{T-1} [(\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1})]^2$$

It's worth mentioning that in this paper, the filter is not calculated by the author directly and is applied using Eviews 6.0 software.

Testing the Correlation of Liquidity and Housing Supply Inclination Criteria

At the first step, spearman correlation of liquidity and selected variables, representing the inclination of private sector for investment and housing supply is tested. In this test both raw data and HP applied data are used in test. Table 2 and Fig.4 represent the results and the graphs of the correlation. As it can be seen, in both data types (raw real data and HP edited data), increase of liquidity has a strong significant and positive relation with all variables of private

sector's inclination for investing in housing supply.

Testing the Correlation of House and Land Price and Housing Supply Inclination Criteria

Second step in analysis procedure is running the spearman correlation test between actual price of one square meter of residential unit and one square meter of urban housing land with housing supply inclination variables. In this test both raw data and HP applied data are used in the test. Table 3 and Fig.5 and Fig.6 represent the results and the graphs of these correlations. As the former test's results, this test shows a significant correlation between house and land prices and all variables indicating private sector's inclination towards investing in housing supply. Nevertheless, the correlation coefficient (r) is less than the coefficient in previous test

(liquidity).

Testing the Correlation of Accumulated Deficit and Housing Supply Inclination Criteria

On the other side, the spearman correlation of accumulated housing deficit with variables representing housing supply inclination has been tested. Table 4 and Fig.7 represent the results. Based on the results, in raw data (before HP filter applied) accumulated deficit is correlated only with started floor area and floor area in issued permits. But after HP filter is applied, the accumulated deficit shows significant relation with all variables except private investment in started buildings. Nevertheless, correlation coefficient (r) and determination coefficient (r²) for both data types (raw and HP applied data) are relatively low.

Table 2: Correlation test results between liquidity and housing supply inclination (raw and edited data)
(Source: author's calculations using SPSS16.0 and Eview6.0)

data	Dependent Variable	Significance coefficient (2-tailed)	Pearson Correlation coefficient (r)	Determination coefficient (r ²)
Raw data	Investment in started buildings	.000	0.925	0.856
	Started buildings floor area	.000	0.916	0.839
	Completed private units	.000	0.884	0.781
	Area in issued permits	.000	0.926	0.857
	Residential units in issued permits	.000	0.905	0.819
HP edited data	Investment in started buildings	.000	0.993	0.986
	Started buildings floor area	.000	0.984	0.968
	Completed private units	.000	0.961	0.924
	Area in issued permits	.000	0.987	0.974
	Residential units in issued permits	.000	0.975	0.951

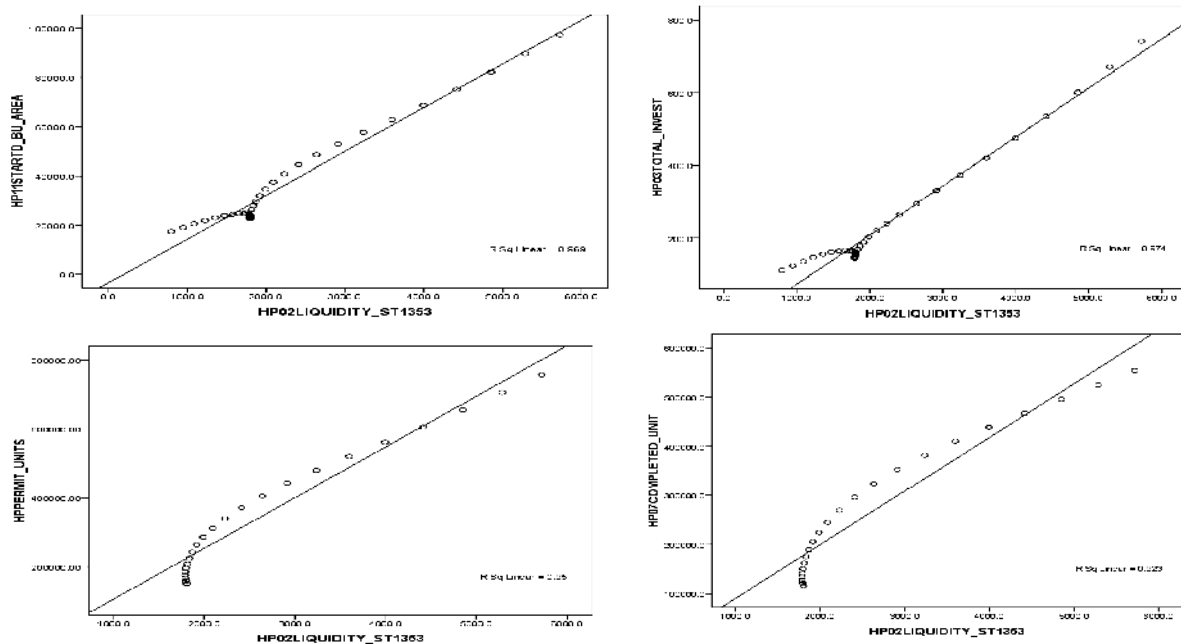


Fig.4: Correlation of liquidity and housing supply inclination criteria (HP edited data) (authors based on research database using EViews6.0 and SPSS16.0)

Table 3: Correlation test results between house and land prices and housing supply inclination.

data	Dependent Variable	Significance coefficient (2-tailed)	Pearson Correlation coefficient (r)	Determination coefficient (r ²)
House- Raw data	Investment in started buildings	.000	0.881	0.776
	Started buildings floor area	.000	0.846	0.716
	Completed private units	.000	0.750	0.563
	Area in issued permits	.000	0.820	0.672
	Residential units in issued permits	.000	0.796	0.634
House- HP edited data	Investment in started buildings	.000	0.956	0.914
	Started buildings floor area	.000	0.934	0.872
	Completed private units	.000	0.889	0.790
	Area in issued permits	.000	0.933	0.870
	Residential units in issued permits	.000	0.914	0.835
Land- Raw data	Investment in started buildings	.000	0.787	0.619
	Started buildings floor area	.000	0.761	0.579
	Completed private units	.002	0.678	0.460
	Area in issued permits	.000	0.762	0.581
	Residential units in issued permits	.000	0.739	0.546
Land- HP edited data	Investment in started buildings	.000	0.939	0.882
	Started buildings floor area	.000	0.915	0.837
	Completed private units	.000	0.869	0.755
	Area in issued permits	.000	0.915	0.837
	Residential units in issued permits	.000	0.894	0.799

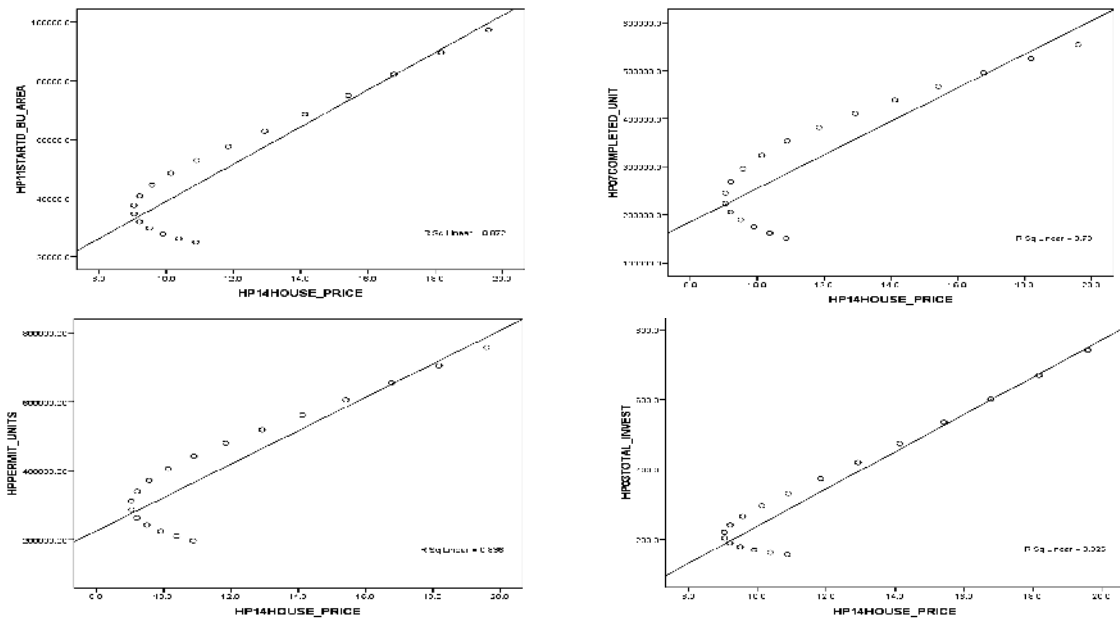


Fig.5: Correlation of house price and housing supply inclination criteria (HP edited data)
 (authors based on research database using EViews6.0 and SPSS16.0)

CONCLUSION

Comparing the correlation coefficients of liquidity, house price, land price and accumulated deficit with housing supply inclination criteria, indicates that the highest correlation coefficient is respectively associated with liquidity, housing price, land price and finally accumulated housing deficit. So the null hypothesis is rejected. As a conclusion it could be said that “the capital demand rising

from increased liquidity, has had the greatest impact on housing supply inclination in housing market. In fact, although the accumulated housing deficit has been simultaneous with the increase of housing supply, the housing supply inclination’s dependency to housing demand as a capital good has been greater than its dependency to consumer demand.”

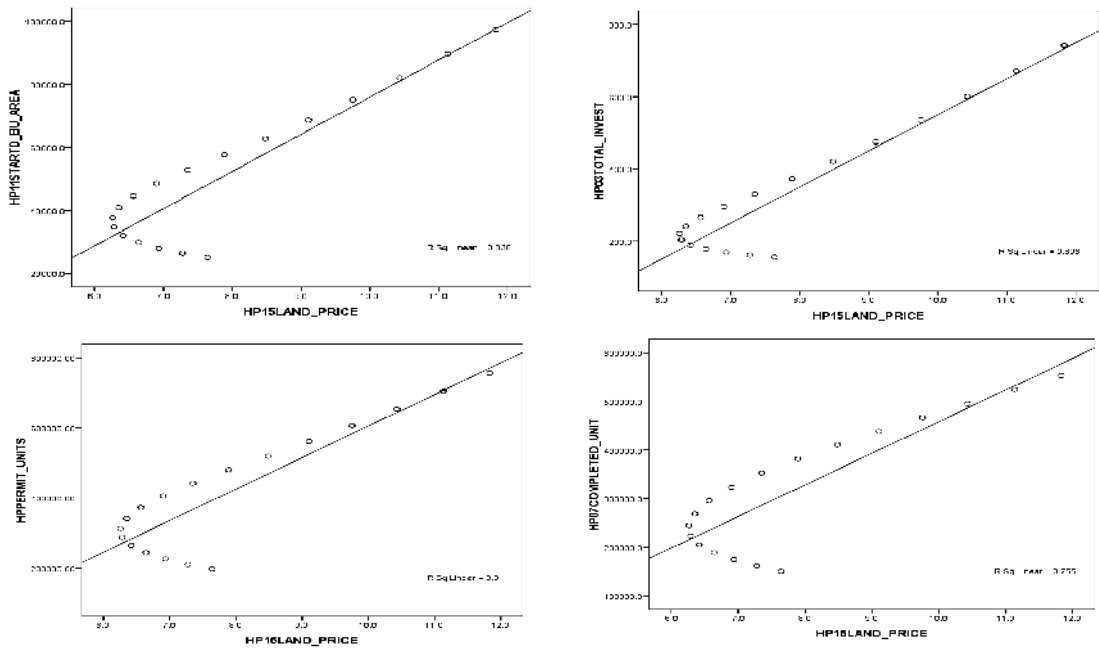


Fig.6: Correlation of land price and housing supply inclination criteria (HP edited data) (authors based on research database using EViews6.0 and SPSS16.0)

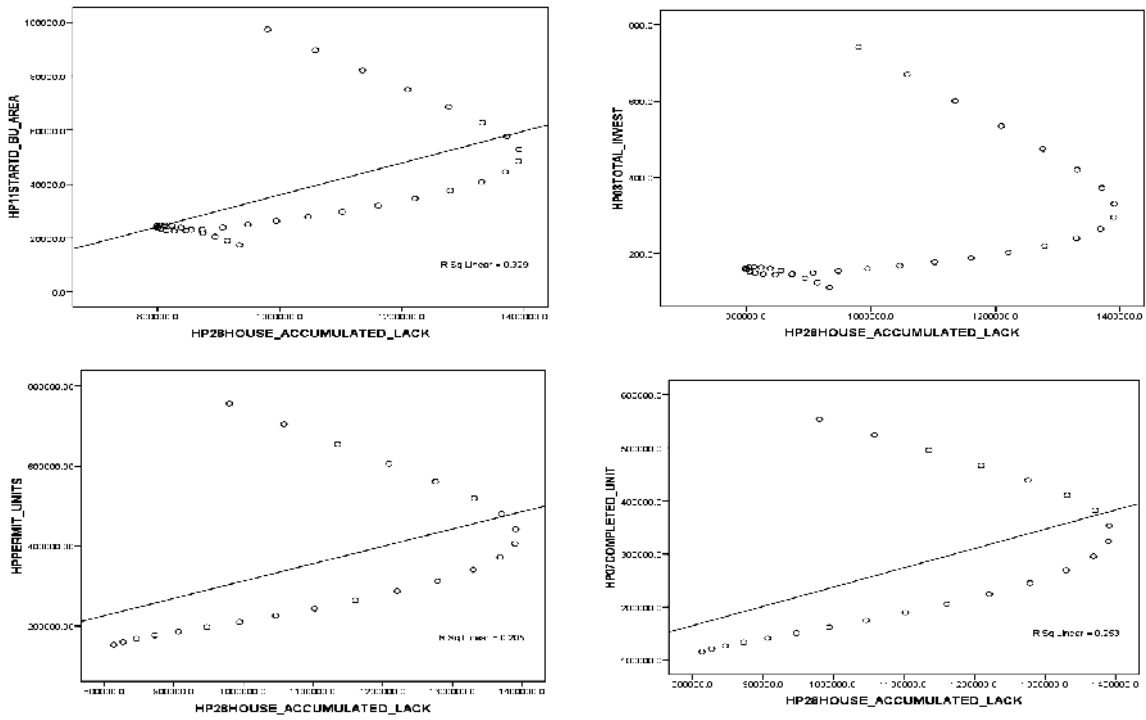


Fig.7:Correlation of accumulated deficit and housing supply inclination criteria (HP edited data)

Table 4: Correlation test results between accumulated deficit and housing supply inclination
(Source: author's calculations using SPSS16.0 and Eview6.0)

data	Dependent Variable	Significance coefficient (2-tailed)	Pearson Correlation coefficient (r)	Determination coefficient (r ²)
Raw data	Investment in started buildings	.744	0.074	0.005
	Started buildings floor area	.018	0.393	0.154
	Completed private units	.063	0.394	0.155
	Area in issued permits	.015	0.413	0.171
	Residential units in issued permits	.180	0.290	0.084
HP edited data	Investment in started buildings	.187	0.292	0.085
	Started buildings floor area	.000	0.573	0.328
	Completed private units	.014	0.503	0.253
	Area in issued permits	.000	0.597	0.356
	Residential units in issued permits	.030	0.453	0.205

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ENDNOTS

1. It's notable that this role has been reduced in recent decades. (see Stewart, 2005).
2. According to statistical theories, the null hypothesis shuld include an equity condition. So if the claimed hypthesis includes an equity condition, it will be the null hypothesis. Otherwise null hypothesis will consist of negative conditions.
3. All monetary data in this paper has been converted to actual prices by extracting inflation rate. The base year for all real monetary data is 1974.
4. Information of all years (except 2001) has been taken from population and housing census results, published in the statistical yearbook 2009 (SCI, 2010). The 2001 data has been estimated from census data, using private housing activities (completed units) and marriage and divorce data.
5. It's notable that in this paper analysis of consumer demand is focused on potential demand. As a matter of fact, although some households are not included in affective demand, but obviously they need houses as well. That's why the potential demand is considered as accumulated demand.
6. It's notable that issued permits do not represent the housing activity at all, and using it as housing supply information (which is usual in some formal reports) is obviously wrong. But this data, as pre-showing criteria, is the first step taken by private sector in housing supply and may represent this sector's inclination for housing investment.
7. \bar{e} should be selected due to the time series intervals. Sometimes this coefficient is proposed 100 for annual time series data, 1600 for quarterly data and 14400 for monthly time series data. For more information see Hoderick and Prescott, 1997.

REFERENCES

Adams, Zeno; Füss, Rolan, (2010), "Macroeconomic determinants of international housing markets", Journal of Housing Economics, 19, 38-50

- Ashari, Zahra; Yazdanpanah, Ahmad; Bayat, Marzieh, (2009), "NAIRU and economic policy making in Iran", economic research magazine, Tehran university, 78, 1-26
- Bramley, Glen, (2007) "The sudden rediscovery of housing supply as a key policy challenge", Housing Studies, 22 (2), 221- 241.
- CBI, (2011), "Economic Time Series Database", Website: <http://tsd.cbi.ir/Display/Content.aspx> (visited April, 2011).
- Dadkhah, Kamran, (2009), "The evolution of macroeconomic theory and policy", Springer, 1st edition, Berlin.
- Gan, Quan; Hill, Robert J., (2009), "Measuring housing affordability: Looking beyond the median", Journal of Housing Economics, 18, 115-125
- Gholizadeh, Aliakbar, (2009), "Housing price bubble and its causes in Iran", Housing economy quarterly, ministry of Housing and Urban Development, 46, 39-72.
- Goetz, Edward G., (2010), "Desegregation in 3D: Displacement, Dispersal and Development in American public housing", Housing Studies, 25(2), 137-158.
- Heydari, Mohammad Mehdi, (2011), "Assessment of urban housing policies in Iran and determination of reform strategies", Unpublished Ph.D. dissertation, Science and Research Branch, Islamic Azad University, Tehran, Iran.
- Hodrick, Robert J and Prescott Edward C., (1997), "Postwar U.S. business cycles: An empirical investigation", Journal of Money, Credit, and Banking, 29, 1-16
- Jahani, Mahmood, (2007), "Housing market evaluations: fields and solutions", Housing economy quarterly, ministry of Housing and Urban Development, 39, 5-11
- Jahani, Mahmood, (2008), "Editorial", Housing economy quarterly, ministry of Housing and Urban Development, 42, 1-2.
- Jahani, Mahmood, (2009), "Housing bloom and recession", Housing economy quarterly, ministry of Housing and Urban Development, 45, 5-7.
- Keivani, Ramin; Mattingly, Michael; Majedi, Hamid, (2008), "Public management of urban land, enabling markets and low-income housing, provision: The overlooked experience of Iran", Urban Studies, 45, 1825-1853.
- Mohtasham Dolatshahi, Tahmasb, (2006), "Fundamentals of economics", Khojaste publication, 25th edition, Tehran.
- SCI, (2010), "Statistical yearbook 2009", SCI website (visited April 2011): <http://salnameh.sci.org.ir/AllUser/DirectoryTreeComplete.aspx>
- Stewart, J., (2005), "A review of UK housing policy: ideology and public health", Public Health journal, 119, 525-534.
- Whitehead, Christine M. E. (2007) "Planning policies and affordable housing: England as a successful case study?", Housing Studies, 229(1), 25-44